Data Quality - Workshop on the Implementation of EU RTTI 2022/670

TISA
Traveller Information Services Association

In close cooperation with

napcore Gemeente Amsterdam ndw

27-28 November 2023 | Amsterdam

Welcome to Amsterdam!

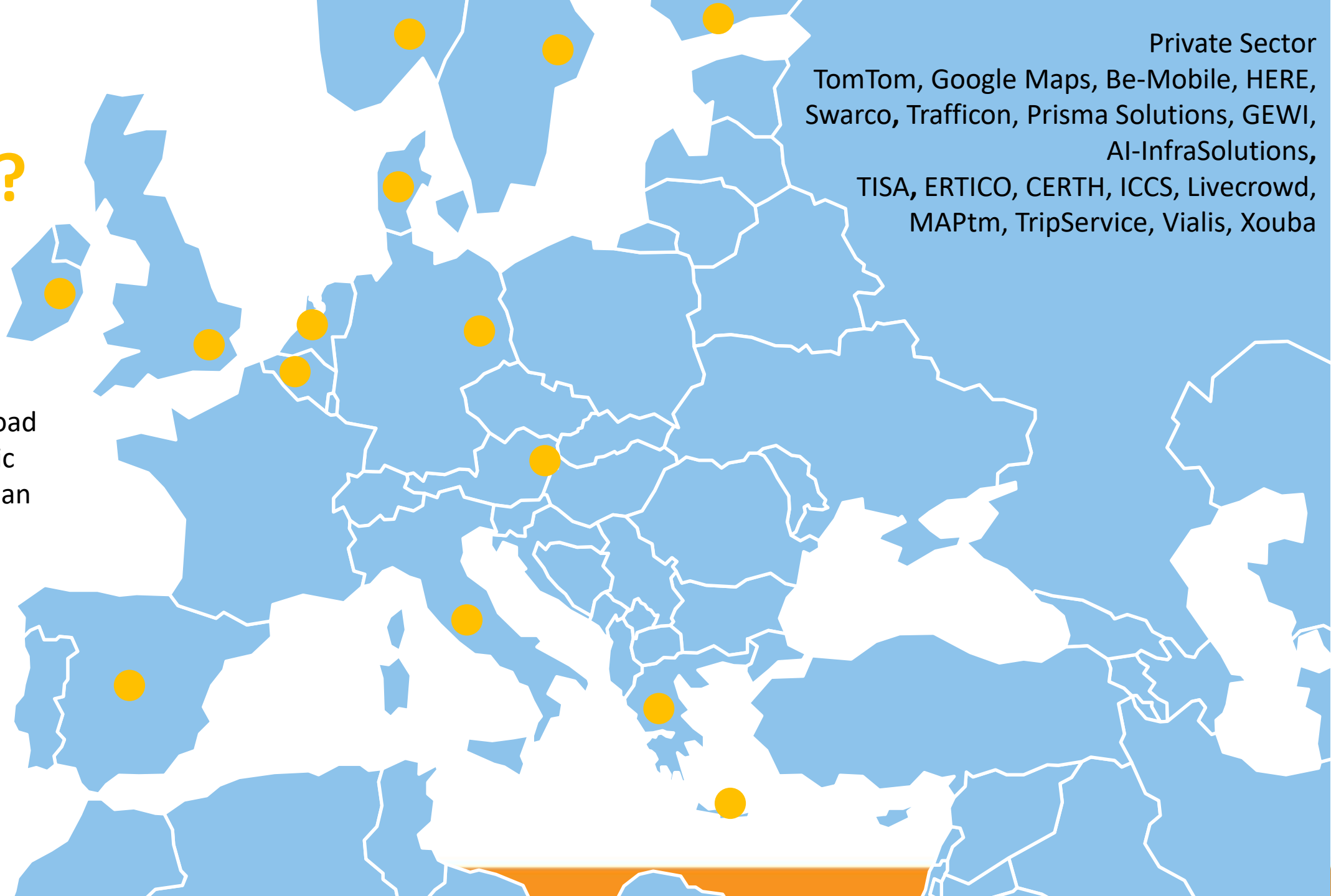
Agenda

Monday 27 November	
12h00	**Welcome Lunch**
13h00	Welcome & Workshop Objective Setting
13h15	NAPCORE Data Quality Progress Update
14h15	TISA's Learnings & Recommendations on Data Quality
15h15	**Coffee Break**
15h30	ITS Service Provider 5 Star RTTI Data Quality Proposal – Presentation and Discussion
Evening	Spontaneous drinks in Amsterdam

Tuesday 28 November	
09h00	Welcome Coffee
09h30	Explanation EU ISA Regulation
09h45	Understanding Priority Use Case Data Quality Requirements • Speed Limits (SL) • Road Works (RW) • Road Closures (RC)
11h10	Examples of Priority Use Case Best Practice • Speed Limits (SL) • Road Works (RW) • Road Closures (RC)
12h30	**Lunch**
13h30	Minimum Data Quality Requirements for Speed Limits, Road Works And Road Closures Priority Use Cases – EU RTTI 2022/670
15h30	Next Steps in RTTI Implementation Preparation
16h00	**End of the event**

Who do we have?

Private Sector
TomTom, Google Maps, Be-Mobile, HERE, Swarco, Trafficon, Prisma Solutions, GEWI, AI-InfraSolutions, TISA, ERTICO, CERTH, ICCS, Livecrowd, MAPtm, TripService, Vialis, Xouba



Local/National Road Authorities, Public Agencies, European Commission

Quick recap of how we got here

RTTI Webinar

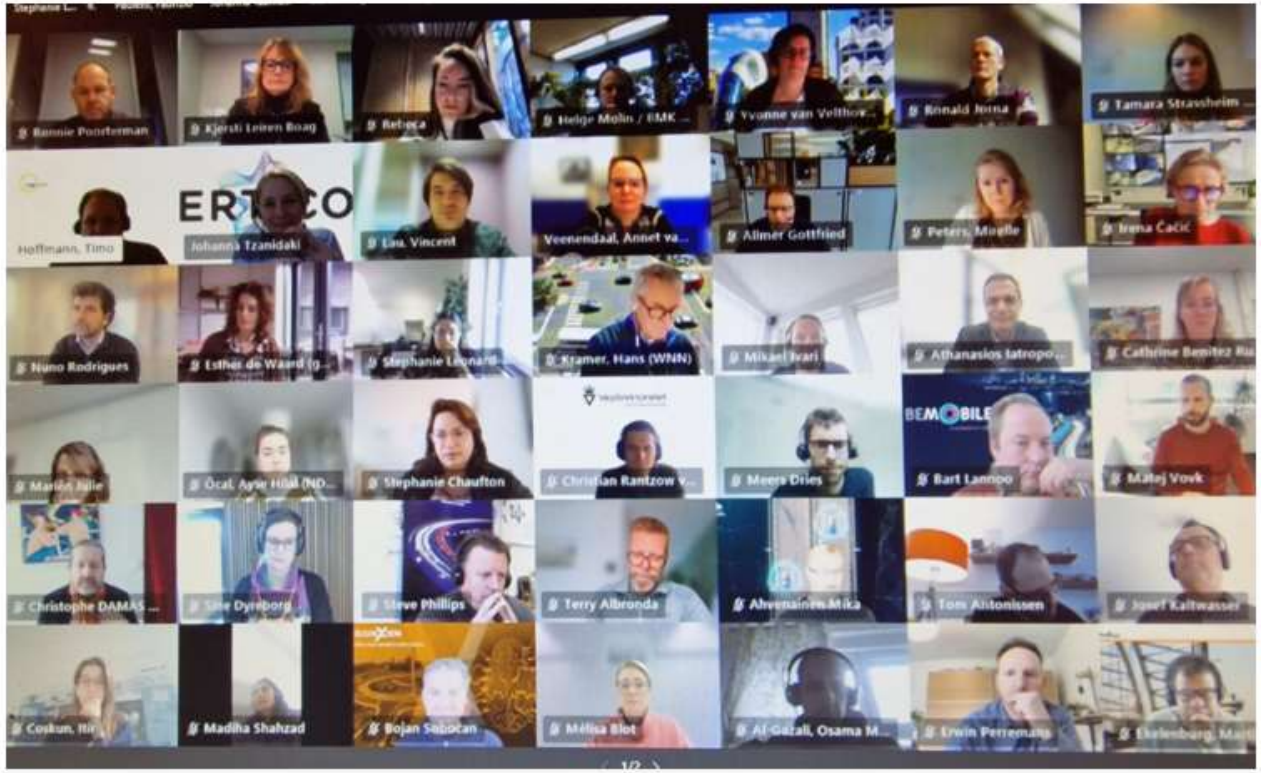
Date: 1st February 2023

Organised by: NAPCORE/TISA/TM2.0/TomTom

Scope: SP obligation to process Traffic Circulation Plans/Temporary Traffic Management Measures

Attendees: 167 public and private actors

Link: NAPCORE online workshop on the implementation of the revised RTTI DR - YouTube



FOLLOW UP of the workshop on the implementation of the revised RTTI DR

13 February 2023 · No Comments

The video and the presentation of the workshop are available

Read More

RTTI Workshop Berlin April 23’

- ITS Service Providers Be-Mobile, Google Maps, HERE Technologies and TomTom jointly organised a workshop at their corporate offices to **discuss the implementation of RTTI 2022/670** with 60 public/private stakeholders.
- **Trainings** were provided on the basics of digital maps, navigation software and traffic information and **how to increase the useability of public RTTI data.**
- Workshops were held on 4 RTTI **priority uses cases** groups to address bottlenecks and identify mitigation measures:
  - Truck Routing in Cities & Bridge Wind Warnings
  - Car Routing in Cities & Park and Ride Information
  - Inaccurate Road Works/Road Closures
  - Inaccurate Speed Limits and Railway Crossings

Implementation Focus Until 25’/27’

- Feedback Loops
- Minimum Quality Levels
- Service Level ~~Agreements~~ (SL~~A~~)for NAPs
- Digital Traffic Circulation Plans – Harmonized Functional Road Classification (FRCs)
- Road Works
- Road Closures
- Speed Limits

Workshop Objective

In accordance with Article 5/6/7 Paragraph 2b, of RTTI, agree draft minimum quality requirement proposal for priority use cases:

10 Static Speed Limits

Road Works

Road Closures

House Rules and General Logistics

- Laptops down and phones away during presentations/workshops
- Feel comfortable to ask questions
- No idea is a ‘bad’ idea
- Listen with an open mind
- Focus on the ‘problem’ not the person
- Try to articulate your point concisely
- Let’s make it fun!
- Keep your name badge for tomorrow

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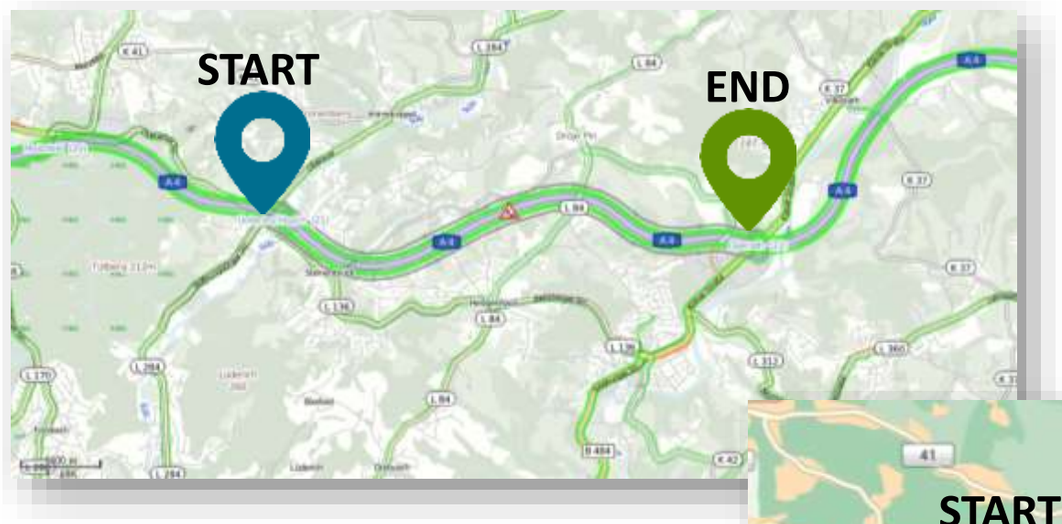
NAPCORE Data Quality Progress Update

Data Quality - Workshop on the Implementation of EU RTTI 2022/670

November 27th, 2023 | Peter Lubrich | BASt

Why a Quality Framework for ITS Data and Services?

Real-life example



Why a Quality Framework for ITS Data and Services?

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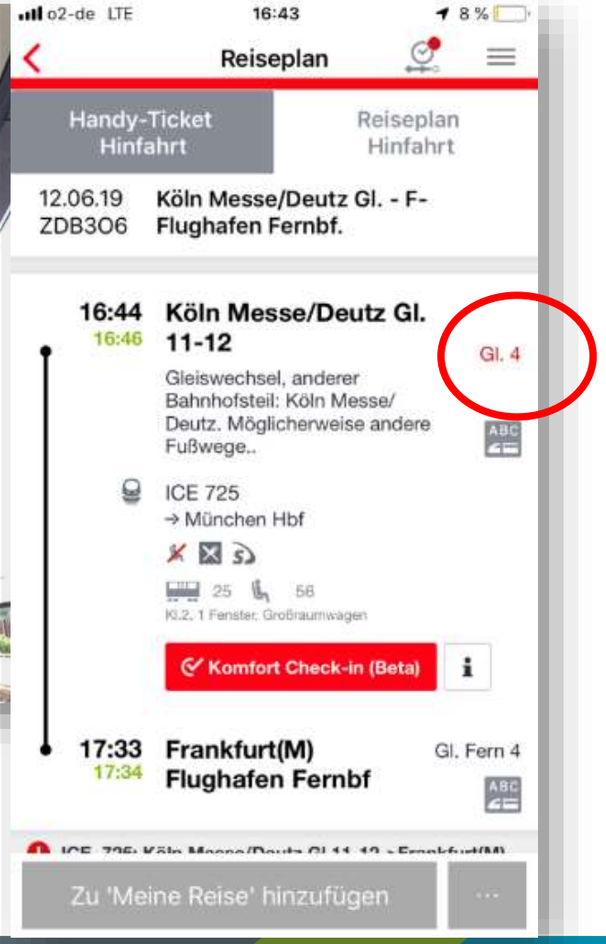


Why a Quality Framework for ITS Data and Services?

What to do with Quality of ITS Data?

- ✓ Assess
- ✓ Document
- ✓ Report
- ✓ Implement QMS
- ✓ Improve Quality

Data Quality in EU Legislature

EC Delegated Regulation 2022/492 (RTTI new)

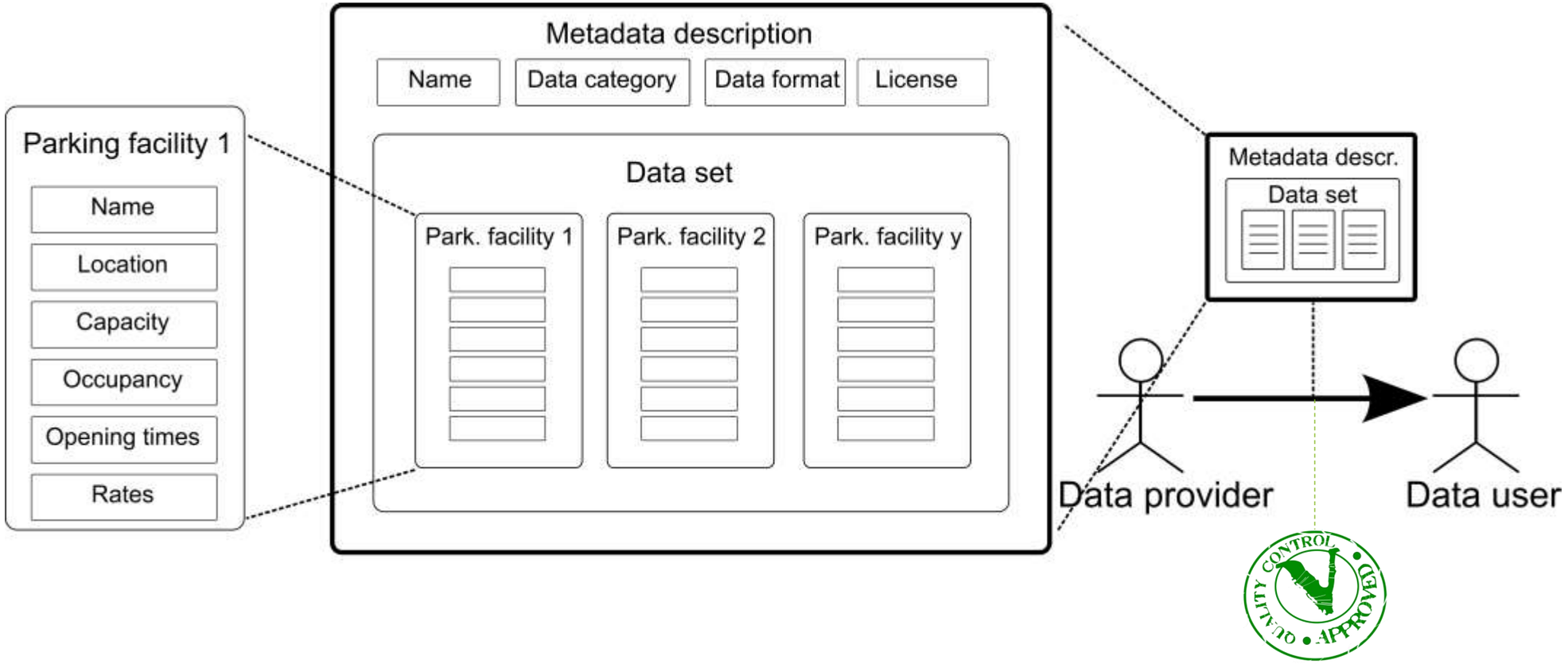
Article 4

Accessibility, exchange and re-use of data on infrastructure

2. The data referred to in paragraph 1 and the corresponding metadata including information on the quality thereof shall be accessible for exchange and re-use by any data user within the Union:

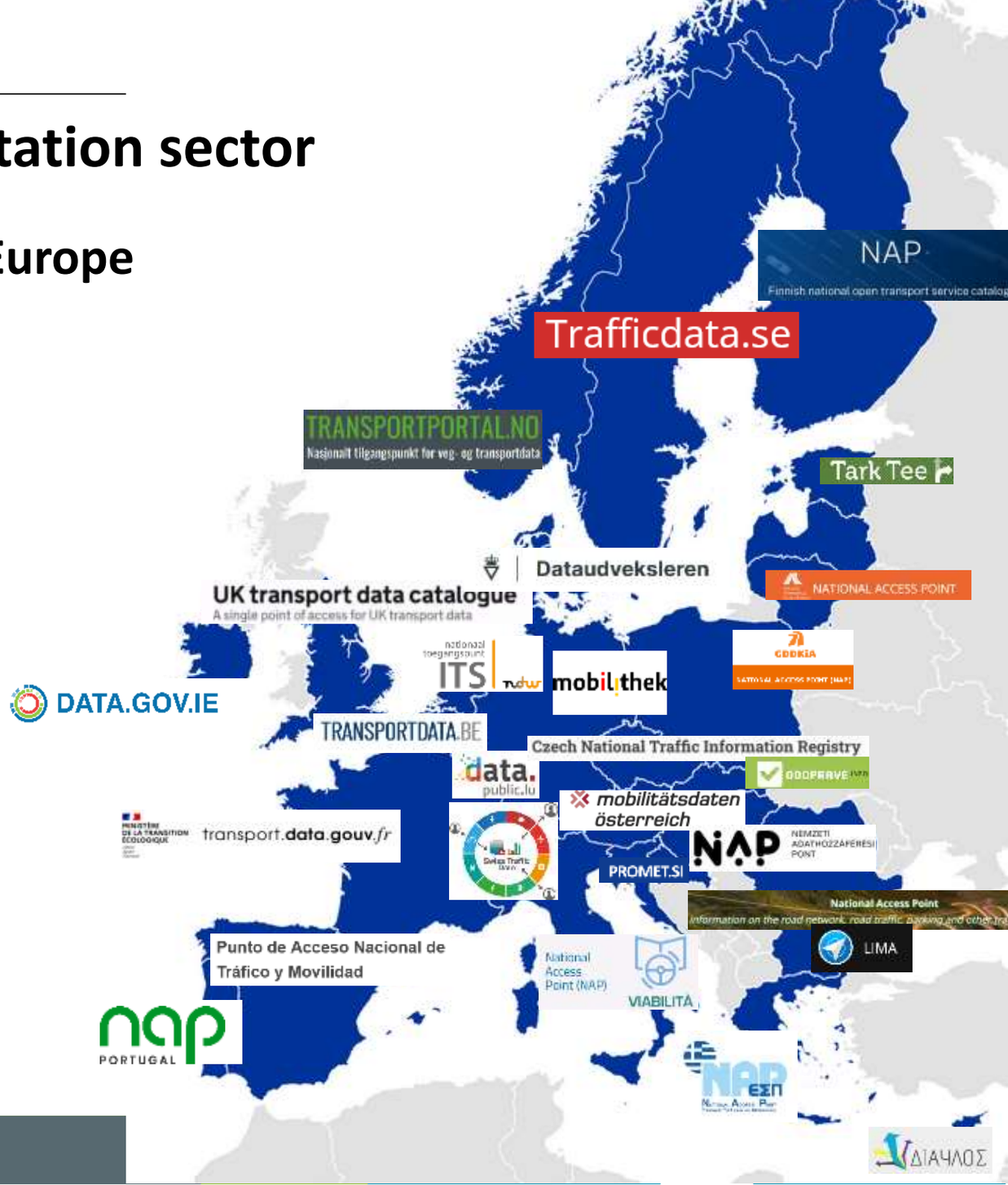
(b) following minimum quality requirements that Member States shall agree upon in cooperation with relevant stakeholders:

The Data-Exchange Scenario



Data portals for the transportation sector

National Access Points (NAPs) in Europe



Data portals for the transpo

National Access Points (NAPs) in

The Concept of Quality Frameworks

The Concept of Quality Frameworks

Specific expectations of data quality established by stakeholders and use case needs (criterion-specific).

Specific/measurable aspects that enable data quality assessment. They may be grouped under various quality dimensions (overarching categories) and associated with various quality metrics.

Techniques and procedures used to assess and measure the quality of data (i.e., quantify each criterion).

Previous definitions of Quality Criteria

Traffic Data Quality Measurement: Final Report (FHWA, 2004)	Quality of Safety-Related and Real-Time Traffic Information Services (EU EIP, 2019)	ISO 19157-1:2023 Geographic information Data quality	ISO/TR 21707:2008 Data quality in ITS systems
Accuracy Completeness Validity Timeliness Coverage Accessibility	Geographical coverage Availability Timeliness Reporting period Latency Location accuracy Classification correctness Error Rate Event coverage Report coverage	Completeness Logical consistency Positional accuracy Temporal quality Thematic quality	Service completeness Service availability Service grade Veracity Precision Timeliness Location measurement Measurement source Ownership

Quality Frameworks elaborated in EU projects

Scope/domain	Baseline	Project
Safety-Related and Real-Time Traffic Information Services (SRTI and RTTI)	Workshops, conceptualisation, validation with real-life data	EUEIP European ITS Platform Link Published in 2019-2020
Multimodal Travel Information Services (MMTIS)	Stakeholder consultation	
Intelligent Truck Parking Services (ITPS)	Workshops, conceptualisation, validation with real-life data	
Cooperative ITS (C-ITS)	Pilot projects	

Quality Frameworks elaborated in EU projects

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Cooperative ITS (C-ITS)	Pilot projects	
On-street Parking	Real-life data assessment	napcore Link To be published in 2024
Alternative Fuels (AF)	Pilot projects	
Multimodal Travel Information Services (MMTIS) - upgrade	Analysis of national approaches. Stakeholder consultation	
Floating Car Data (FCD)	Literature, Real-life data assessment	
Urban Vehicle Access Regulations (UVAR)	Pilot projects	
Network Topology	Pilot projects	
Cross-domain / formal / technical	Workshops, conceptualisation, validation with real-life data	

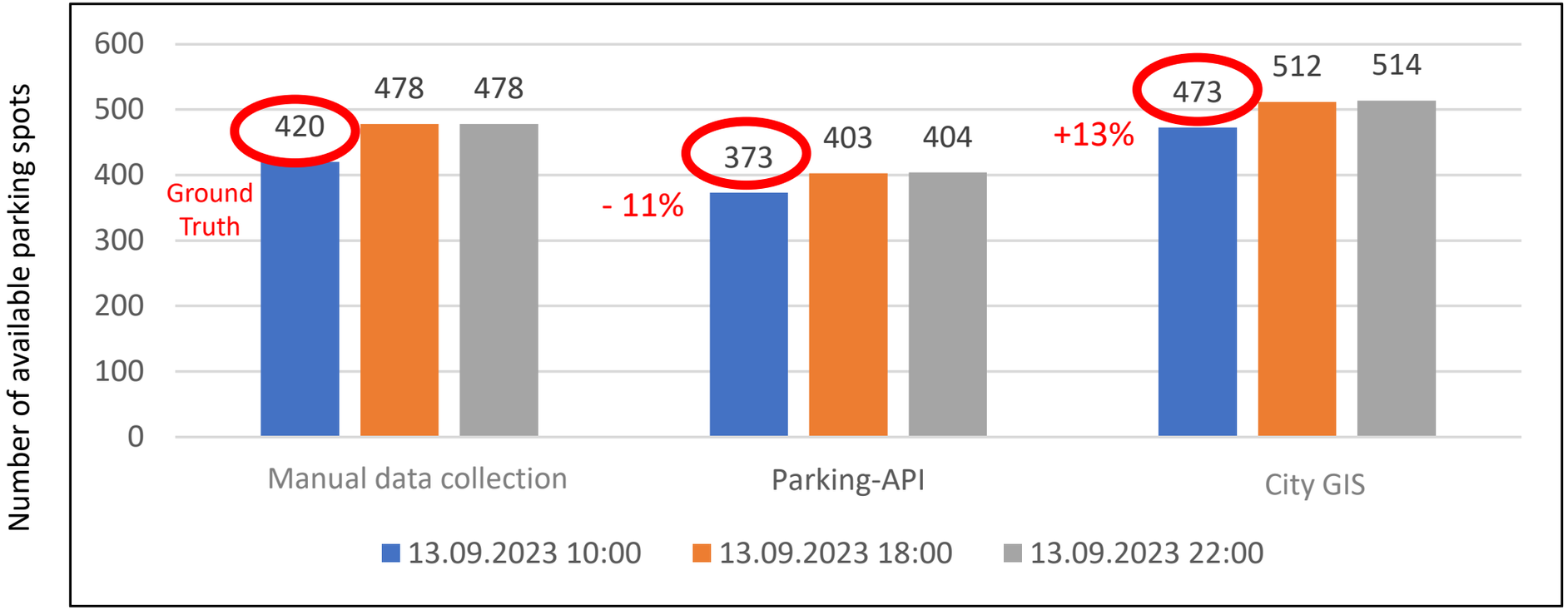
A Quality Framework for Parking Data

Data Campaign: Data Sources

Ticket Machine Transactions 	Smart Phone Payment Transactions 	Sensor Data 
INRIX: Parking API	Manual Data Collection 	City GIS 

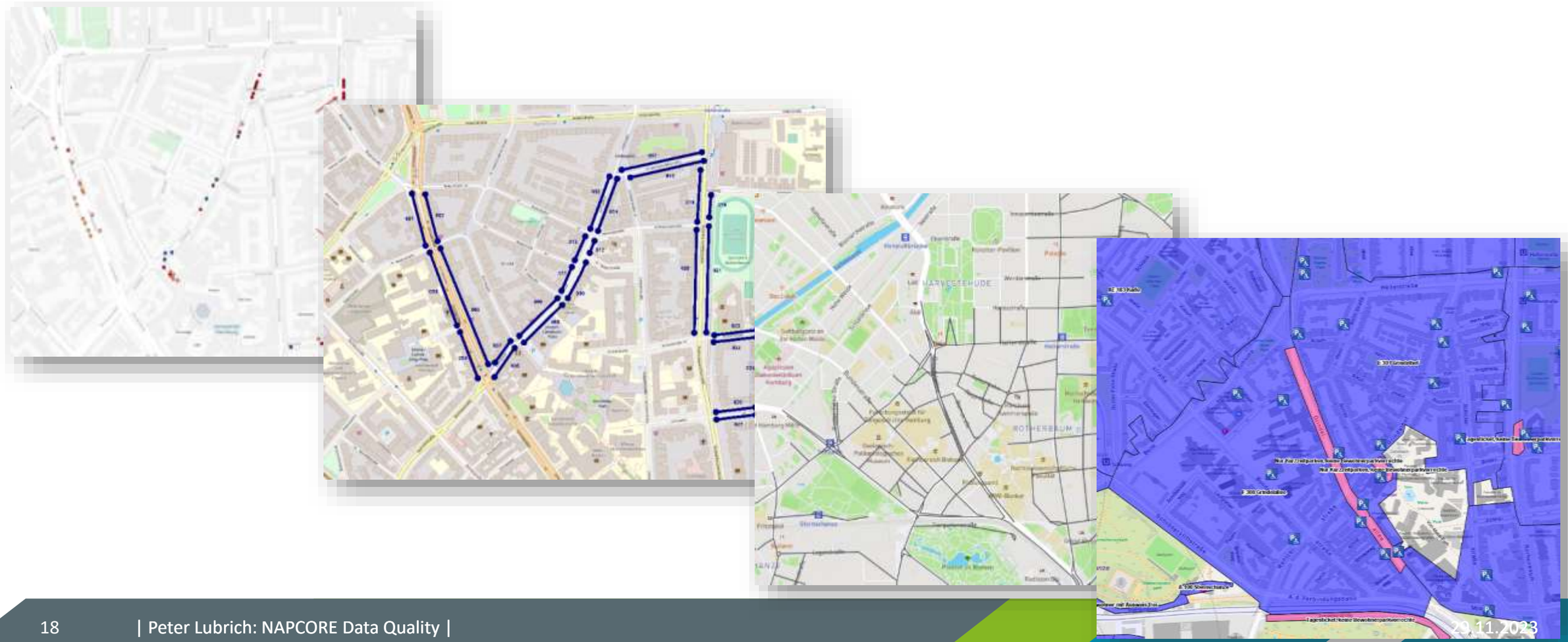
A Quality Framework for Parking Data

Identified quality issues – Quantitative deviations



A Quality Framework for Parking Data

Identified quality issues – Spatial Granularity



Potential Quality Dimensions and Criteria by NAPCORE

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Correctness	Completeness	Timeliness	Reliability	Usability
Accuracy – error rate	Spatial coverage	Freshness	Consistency	Granularity
Bias rate	Network coverage	Latency	Logical precision	Service availability
Classification correctness	Temporal coverage		Uniqueness	
Location accuracy	Situation/condition coverage			
	Missing values			

Potential Quality Metrics by NAPCORE

Dimension	Criterion	Metrics	Unit	Assessment Object
Correctness	Accuracy – error rate	$Q_{Correlation\ Coefficient\ R}(\mathrm{C})$ $Q_{MAPE}(\mathrm{C})$ $Q_{RMPSE}(\mathrm{C})$ $Q_{RMPSE-weighted\ by\ length}(\mathrm{C})$	-1 … 1 0 … ∞ 0 … ∞ 0 … ∞	Value pairs of reference data and test data
	Bias rate	$Q_{MBPE}(\mathrm{C})$	0 … ∞	Value pairs of reference data and test data
Timeliness	Freshness	$Q_{Update\ Frequency}(C)$	Time interval	One data offer
	Latency	$Q_{Latency\ of\ Availability}(C)$	Time delta	One data offer
Completeness	Network coverage	$Q_{Coverage\ ratio}(D)$	0 … 1	One data offer

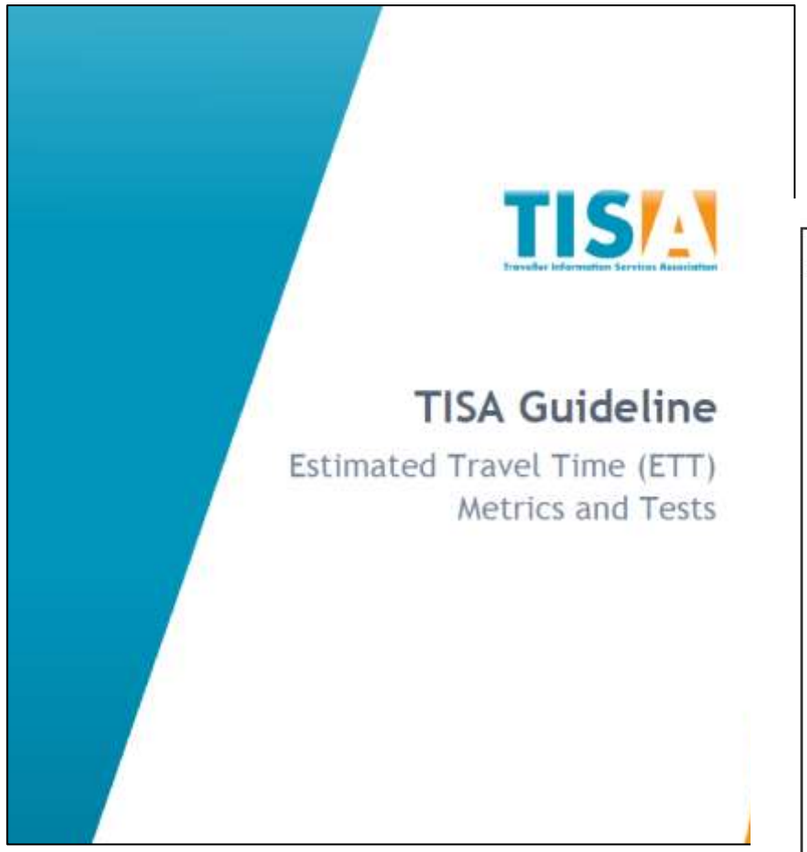
Recommendations

For each NAP data set, there should be a “Quality Statement” by the Data Provider, including:

- Multiple Quality Criteria, each with:
  - Concrete definitions
  - Calculation methods
  - Calculation results
  - Last date of calculation
  - Information objects being assessed
- Any auxiliary information
- Feedback channel

-> This “Quality Statement” should be published as part of the Metadata of a Dataset!

Best-practice by TISA members



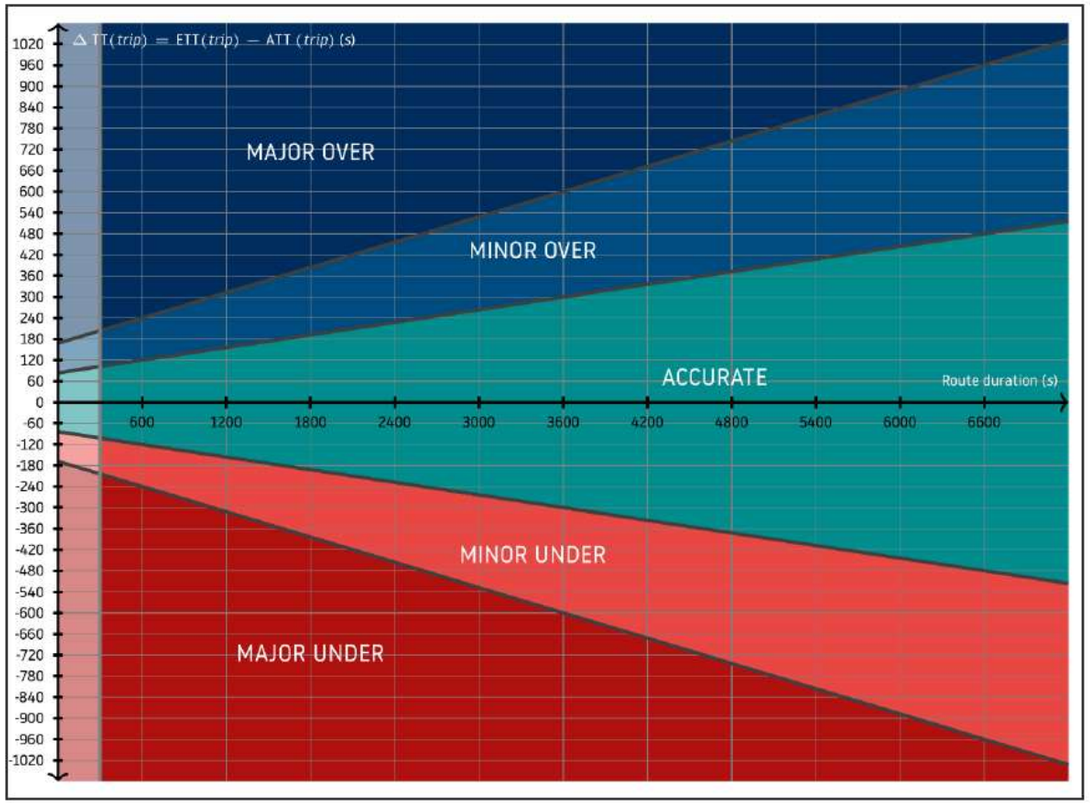
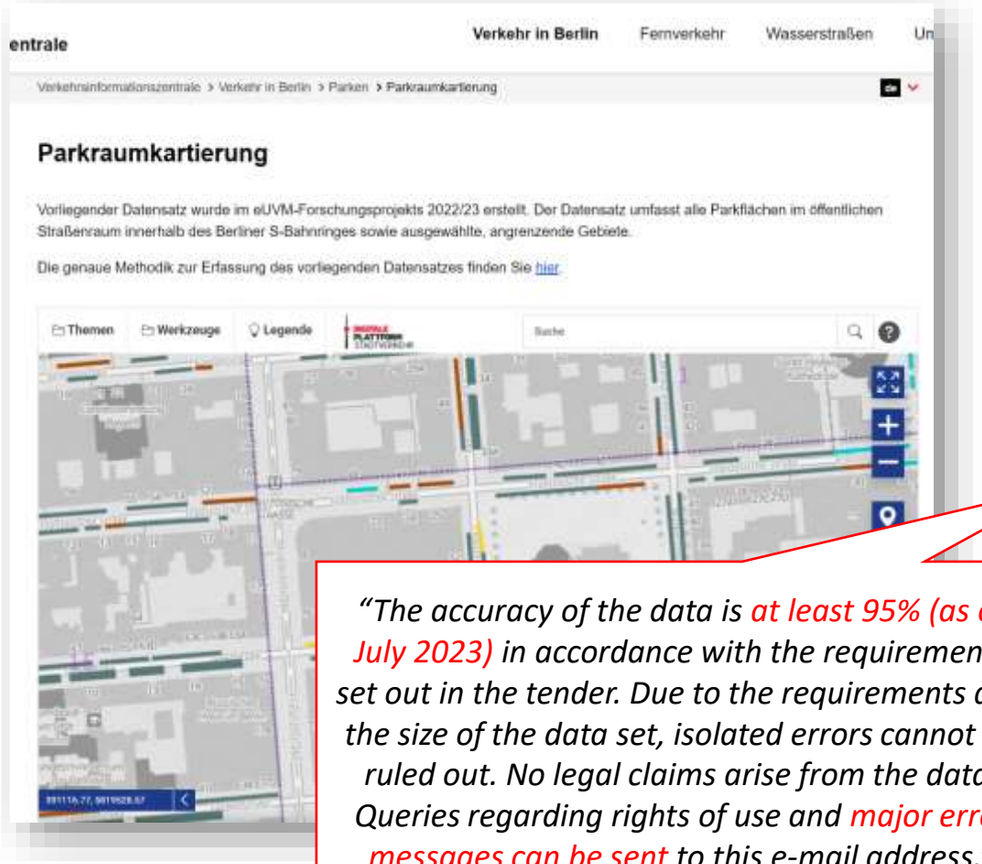


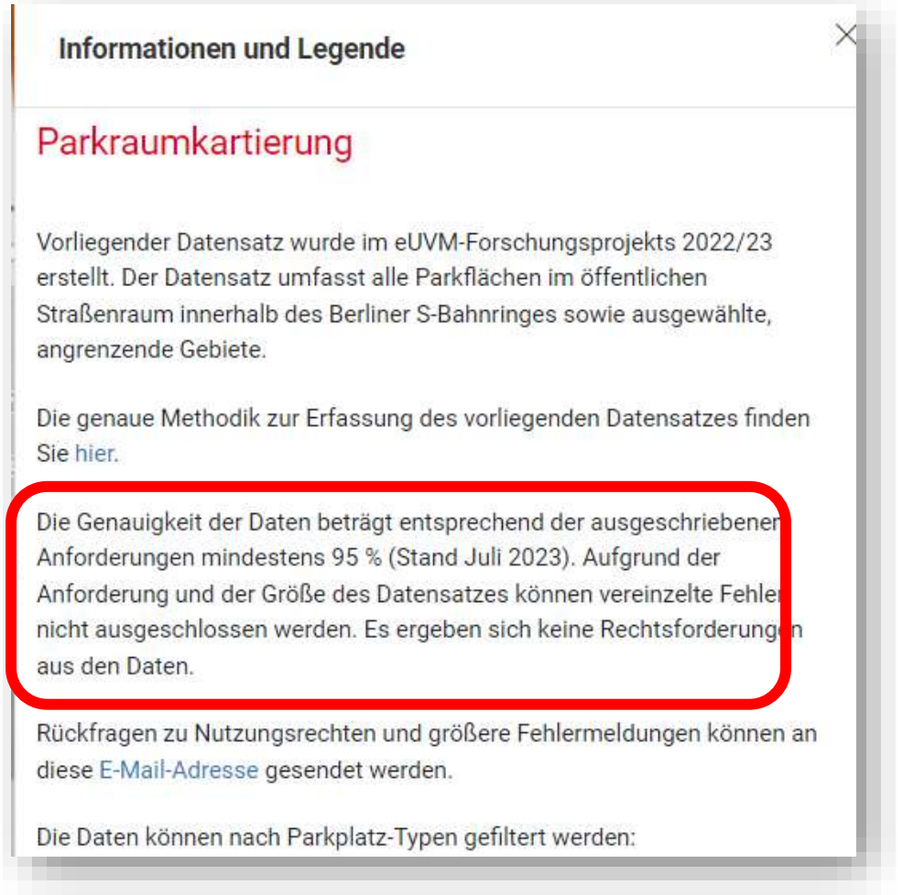
Figure 2: Trip evaluation by duration and ETT deviation

How to implement on NAPs?

First attempts: On-street Parking Dataset from Berlin



"The accuracy of the data is at least 95% (as of July 2023) in accordance with the requirements set out in the tender. Due to the requirements and the size of the data set, isolated errors cannot be ruled out. No legal claims arise from the data. Queries regarding rights of use and major error messages can be sent to this e-mail address."



Informationen und Legende

Parkraumkartierung

Vorliegender Datensatz wurde im eUVM-Forschungsprojekts 2022/23 erstellt. Der Datensatz umfasst alle Parkflächen im öffentlichen Straßenraum innerhalb des Berliner S-Bahnringes sowie ausgewählte, angrenzende Gebiete.

Die genaue Methodik zur Erfassung des vorliegenden Datensatzes finden Sie hier.

Die Genauigkeit der Daten beträgt entsprechend der ausgeschriebenen Anforderungen mindestens 95 % (Stand Juli 2023). Aufgrund der Anforderung und der Größe des Datensatzes können vereinzelte Fehler nicht ausgeschlossen werden. Es ergeben sich keine Rechtsforderungen aus den Daten.

Rückfragen zu Nutzungsrechten und größere Fehlermeldungen können an diese E-Mail-Adresse gesendet werden.

Die Daten können nach Parkplatz-Typen gefiltert werden:

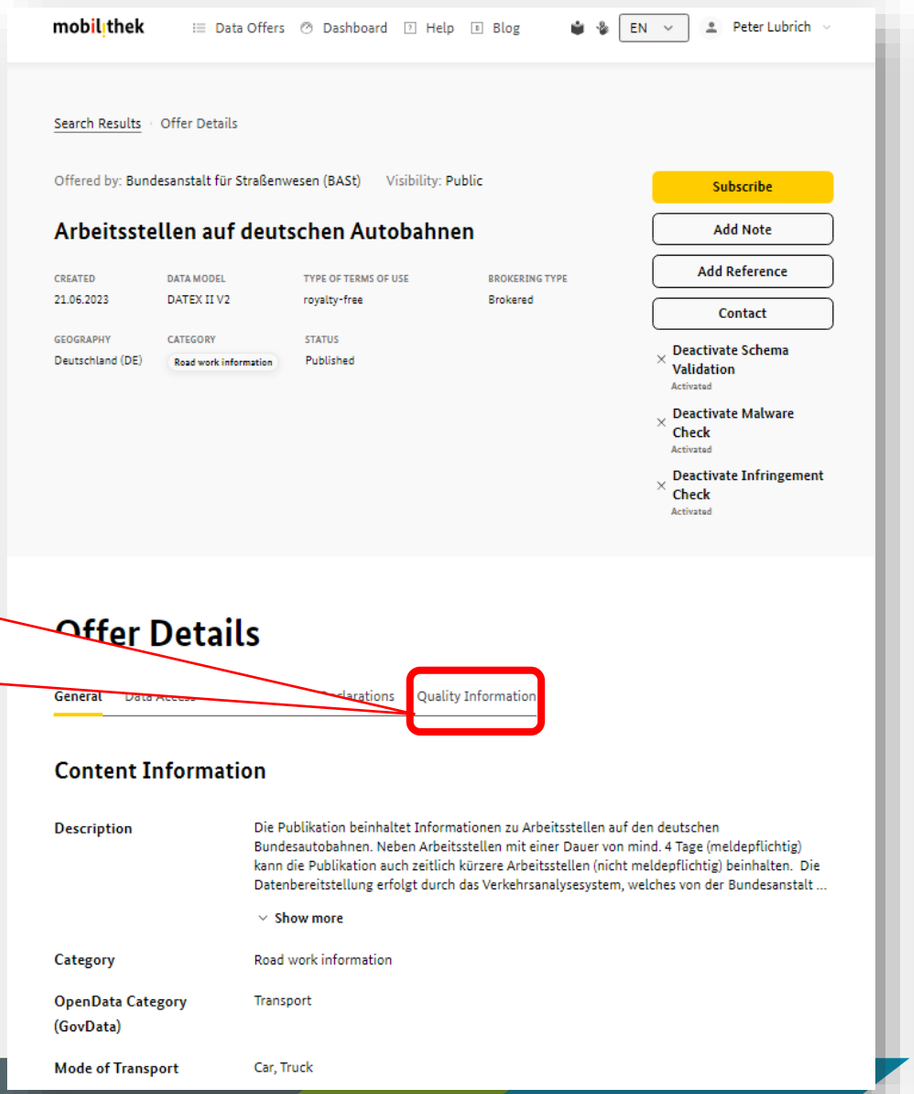
How to implement on NAPs?

What about structured Quality Information via Metadata?

Quality Criteria

	Current Value	Measured on / by
Availability		
Completeness		
Timeliness		
etc.		

?!



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Thank you!

Any questions?

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Quality of traffic information: *TISA perspectives and lessons learned*

Traveller Information Services Association

27-11-2023
RTTI quality workshop, Amsterdam

Traveller Information Services Association

TISA
Traveller Information Services Association

Our Vision

A world where traffic and travel information is 100% correct, 100% of the time in 100% of the world

Our Mission & Purpose

MISSION

To lead the development of trusted traffic and travel standards and harmonized services for our members

PURPOSE

a world where travel is safe, efficient & sustainable for everyone.

Our Value Proposition

For all stakeholders in the intelligent transport system (ITS) value chain

Who want to enable highly accurate, reliable and comprehensive traffic and traveller information services

Our membership driven trade association develops and maintains the standards, software and tooling in traffic information delivery and data quality

That can reduce development costs and provide seamless traffic services;
Ensure interoperability worldwide;
Enable access to 15 years of domain knowledge and stakeholder engagement across entire ITS eco-system

	Traffic Information Standardisation	Other Activities
PAST SUCESSES	• Development of traffic info delivery TPEG1 and TPEG2 used in millions of vehicles worldwide by OEMs/SPs • Development of location referencing tech TMC & OLR	• Industry guidelines on data quality, harmonisation of standards, estimated arrival time • Input to ITS regulatory framework • ITS Congresses/ITS Events
FUTURE PROJECTS	• Emergency Alerts and Warnings EAW • Quality assessment • *Other TBC*	• University Partnership Program • Synergies with other standards • *Other TBC*

Our Global Membership

- ITS Service Providers
- Vehicle Manufactures and Suppliers
- Public Broadcasters
- Public Authorities
- User Device Manufacturers

www.tisa.org

End-user quality is determined by the whole value chain

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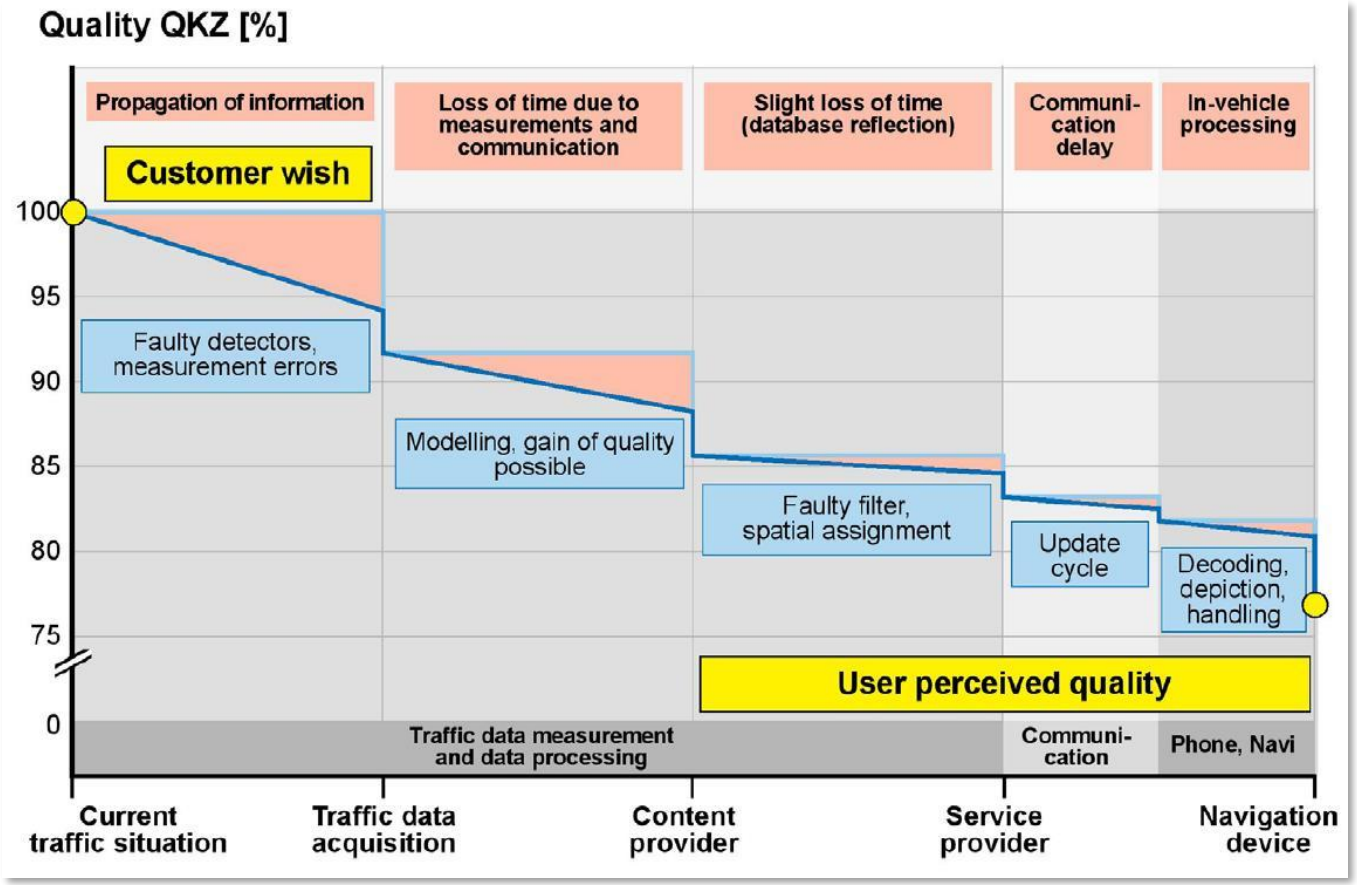

The-Quality-of-Traffic-Information Klaus Bogenberger 2003

Key TISA lessons learned:

- What determines end-user quality?
- What quality assurance is needed towards end-users?
  - And, how to assess quality?
- How to harmonise quality assurance?

Quality of traffic information services

Quality of traffic information:
the TISA view

TISA Quality WG		QWG16001 2016-10-06 Page 1 of 36
Public		
Position Paper		

The Traveller Information Services Association (TISA) is a market-driven membership association with worldwide scope, established as a non-profit company focussed on proactive implementation of traffic and travel information services and products based on existing standards, including primarily RDS-TMC and TPEG technologies.

TISA's mission is to develop and promote open standards and policies that

- facilitate a timely and cost-effective deployment of TTI services and products that save end users time and money, increase traffic safety, and minimize environmental impact
- improve the quality and minimize the cost of such services and products by maximizing interoperability worldwide

With this Position Paper, TISA wishes to provide advisory information to all concerned with Traffic and Travel Information services and products. It represents the consensus opinion of all TISA membership organisations in areas of business and technology.

TISA Position

On

Quality of Traffic Information

Available for download from: https://tisa.org/newsroom/position-papers/

Traffic information services
Key value drivers for users

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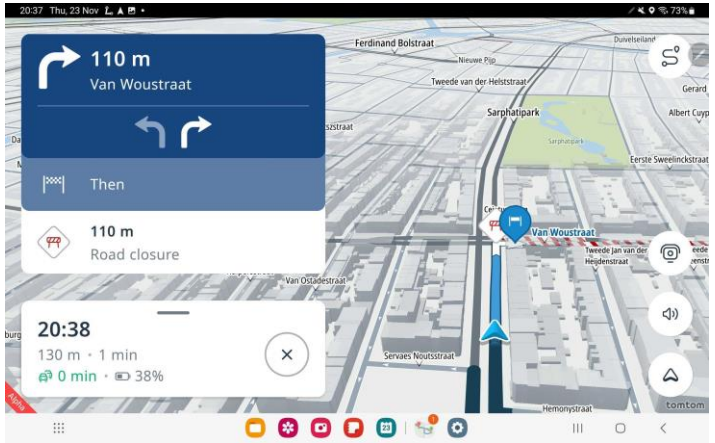
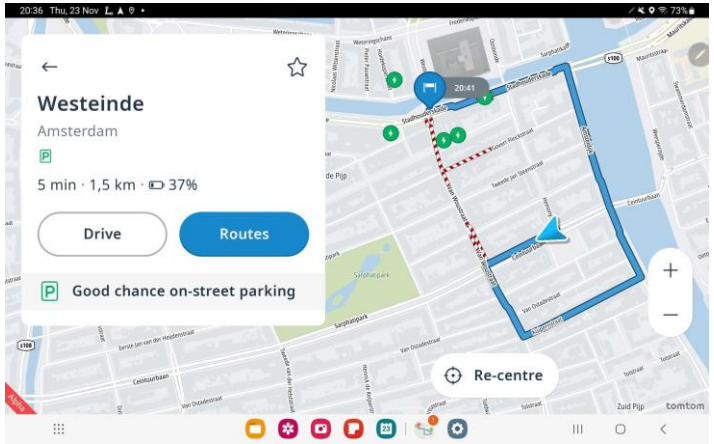
- **Safety: Warning a driver in time for traffic issues**
  - Congestion, accidents, roadworks
  - Unusual travel conditions

Effective travel support
  - Travel times and road closures
  - Speed limits



- **Decision support for alternate route selection**
  - Road network coverage
    to include (local) alternatives
  - Current conditions as well as
    (short-term) predictions



Quality of traffic information:
Core components towards end-user quality

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- **Road Coverage**
  - all road categories from inner cities to rural areas / from residential roads to major highways
- **Content Accuracy & Completeness**
  - position, time and duration, content
- **Reception Coverage**
  - Broadcast coverage / mobile internet coverage / V2X communication methods
- **User Interface**
  - Understandable and recognizable by end users

➔ User quality requires alignment across the whole value chain

Traffic information provisioning:
Dissemination technology impacts user quality

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Traffic information provisioning is characterised by

- **Heterogeneity of protocols and encoding schemes**
  - Impacts coding specificity (event) and
  - Impact position resolution(location)

- **Heterogeneity of delivery channels**
  - Impacts capacity limits,
  - Impact delivery and repetition speeds
  - Requires prioritization

DATEX II
TN-ITS Map Update Exchange
TMC TRAFFIC MESSAGE CHANNEL
TPEG TRANSPORT PROTOCOL EXPERTS GROUP

R·D·S
HD Radio
DAB+ Digital Audio Broadcasting
V2X
IOT INTERNET OF THINGS

➔ Faster, more precise, dissemination technology (or combinations thereof) enables increased content quality to reach the user

Traffic information services: *trends*

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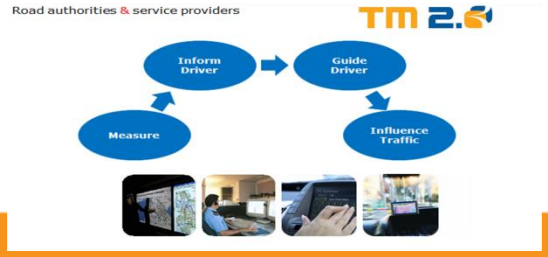
European (International) coverage

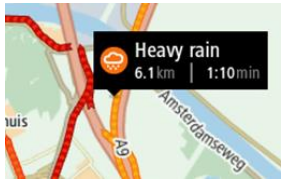
- Scale at least across Europe
- Increasing coverage of local roads
- Global standards: TMC and TPEG
- Harmonised service concepts

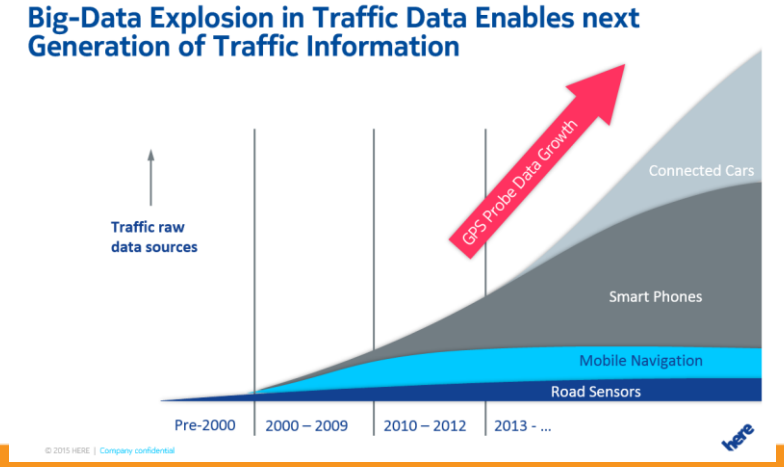
Traffic Management 2.0 concept



Increased use of car sensor data

- Detailed road situations
- Camera recognition, E-call, B-call
- Good, low-latency coverage
- Progressing towards incidents
  - E.g. Road weather, accidents





Quality of traffic information:
Traffic Flow versus incidents and events

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End-users have high expectations both of quality of flow and incident/event information

- High location precision, timeliness as for flow (congestion)
- Notwithstanding that flow is *automated*, whereas incidents are most often still *manually* collected
- When provided together, relationship of flow and incident information should be plausible
- The user experience should be consistent across Europe, when e.g. traveling afar or abroad

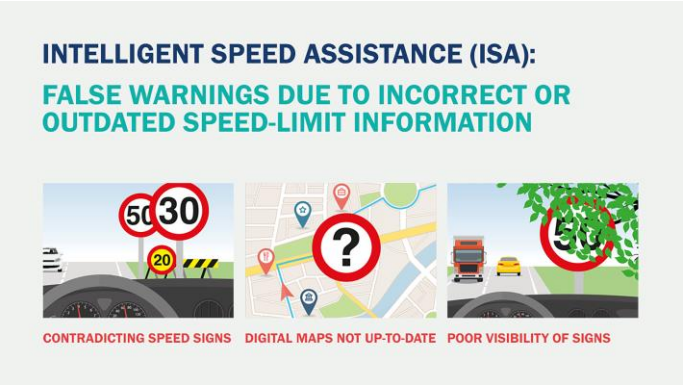
Quality of traffic information:
Quality and quality criteria

Traveller Information Services Association

End-users evaluate quality based on their own, personal, real-world experience and observations while driving

Thus, quality and quality criteria shall reflect the
End-user experience on the road

- **Today: focusing on speed limits, roadworks and closures**



Key quality criteria from an end-user perspective

- Appropriateness of traffic information notifications
- Detection, Error Rate versus Reality
- Accuracy of visual representation
- (Estimated Travel Time Error)

Quality assurance of traffic information

Quality assessment at Service providers:
integral part of the operation and OEM SLA's

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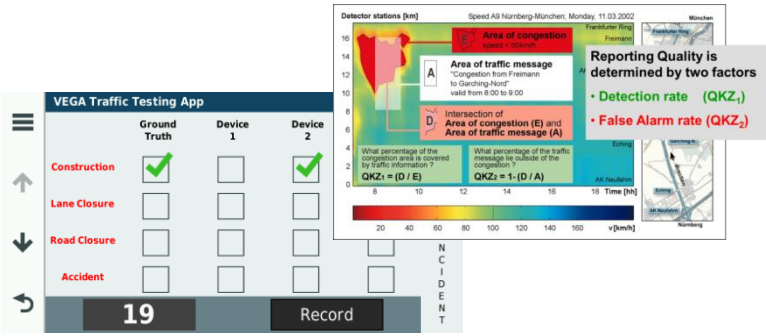
Congestion, events

- QKZ assessment
  - detection rate and error rate
- Drive testing (QFCD, events)



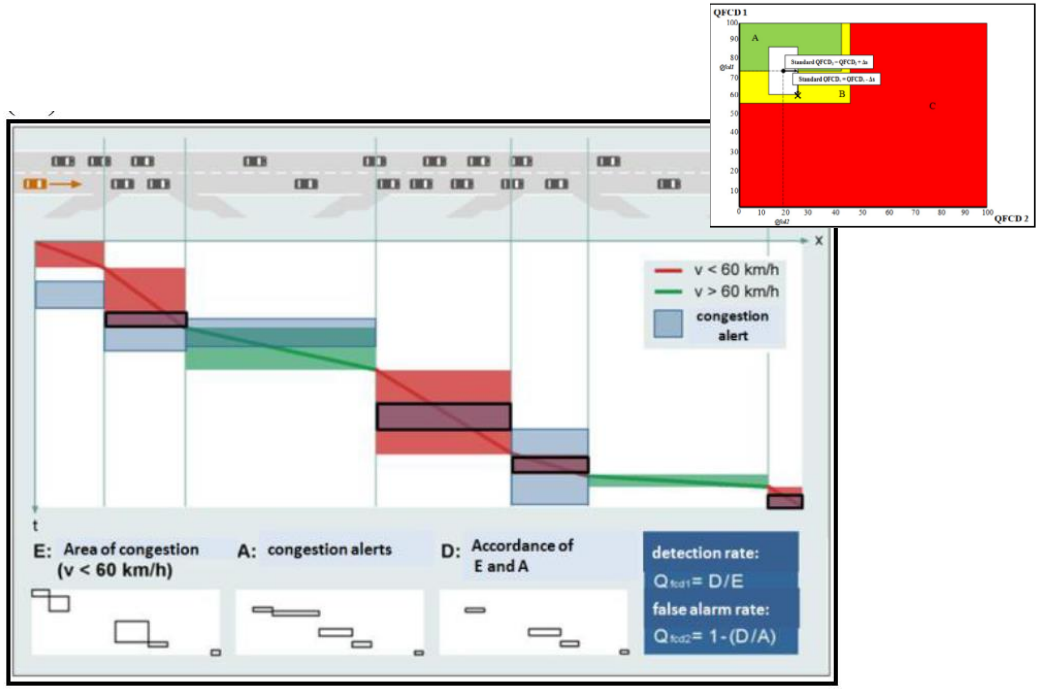
Flow, travel time data

- (TISA) Qbench assessment
- (TISA) ETT assessment
- Drive testing (flow severity)

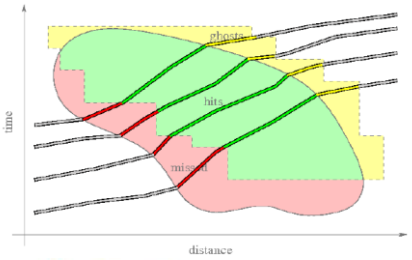
User experience validation

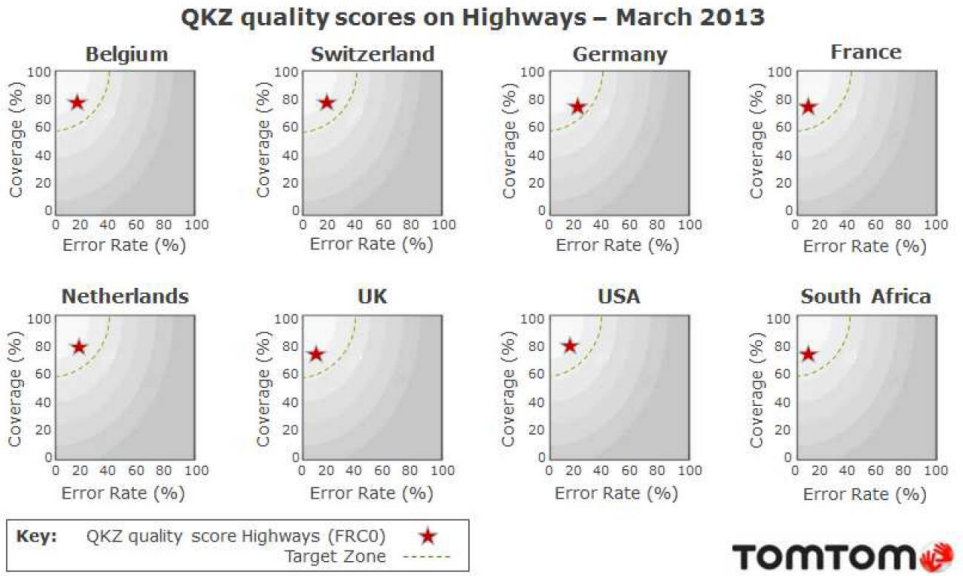
- Drive testing

Quality assessment at Service providers *in practise*



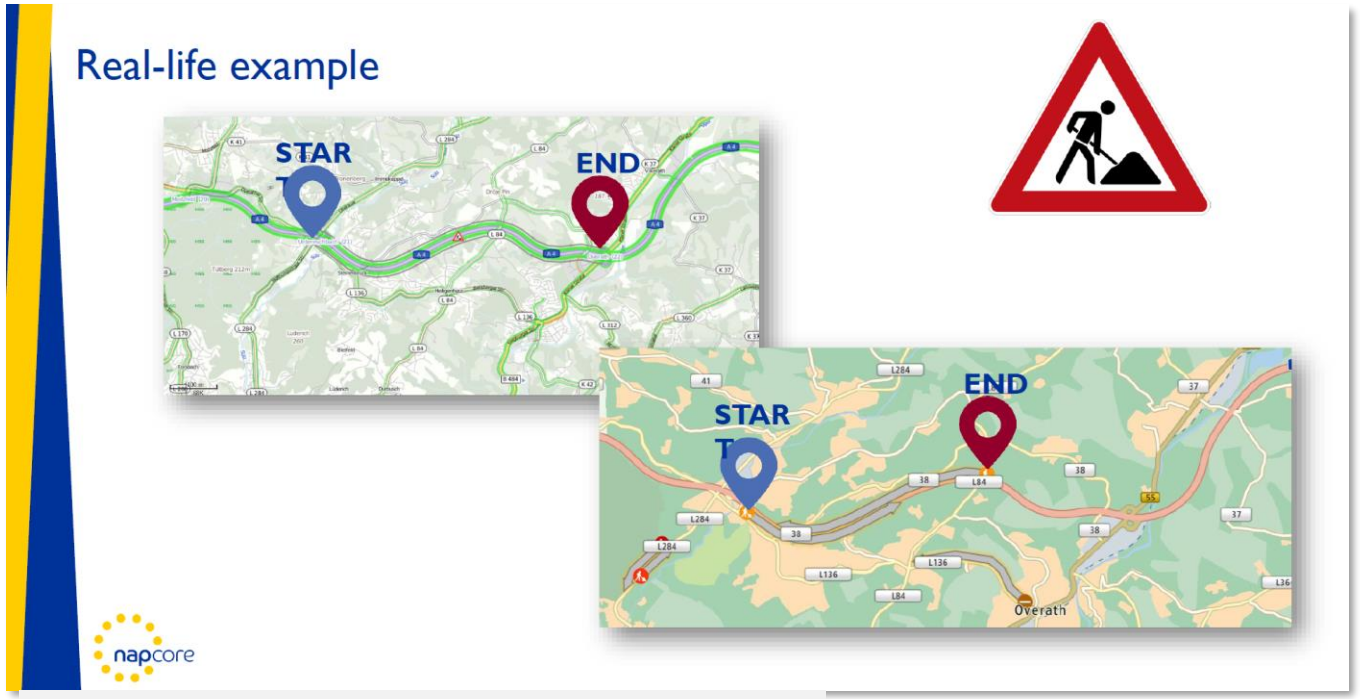
Source: Quality Management Methods for Real-Time Traffic Information, Bogenberger in Elsevier
2011 QM for RTTI, Bogenberger



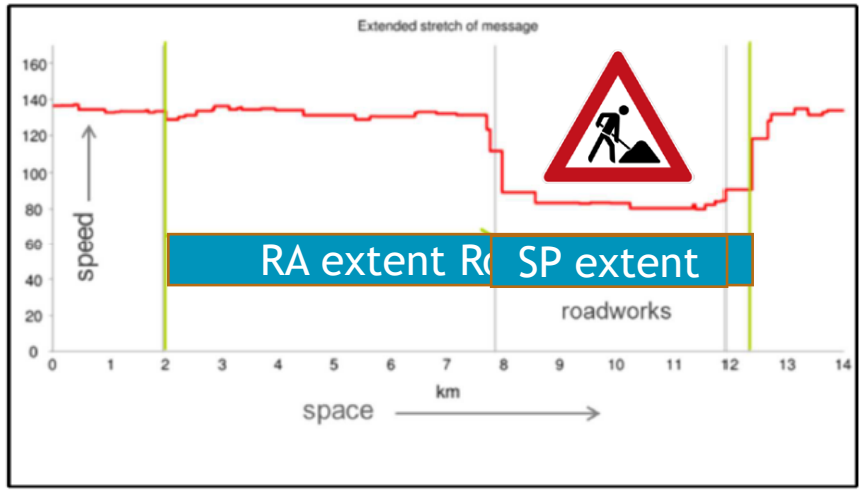


Source: TomTom, ATEC ITS France Congress, 2014
2014 TomTom Brouwer paper

SP quality assurance roadworks extent
QKZ correction based on driver speeds

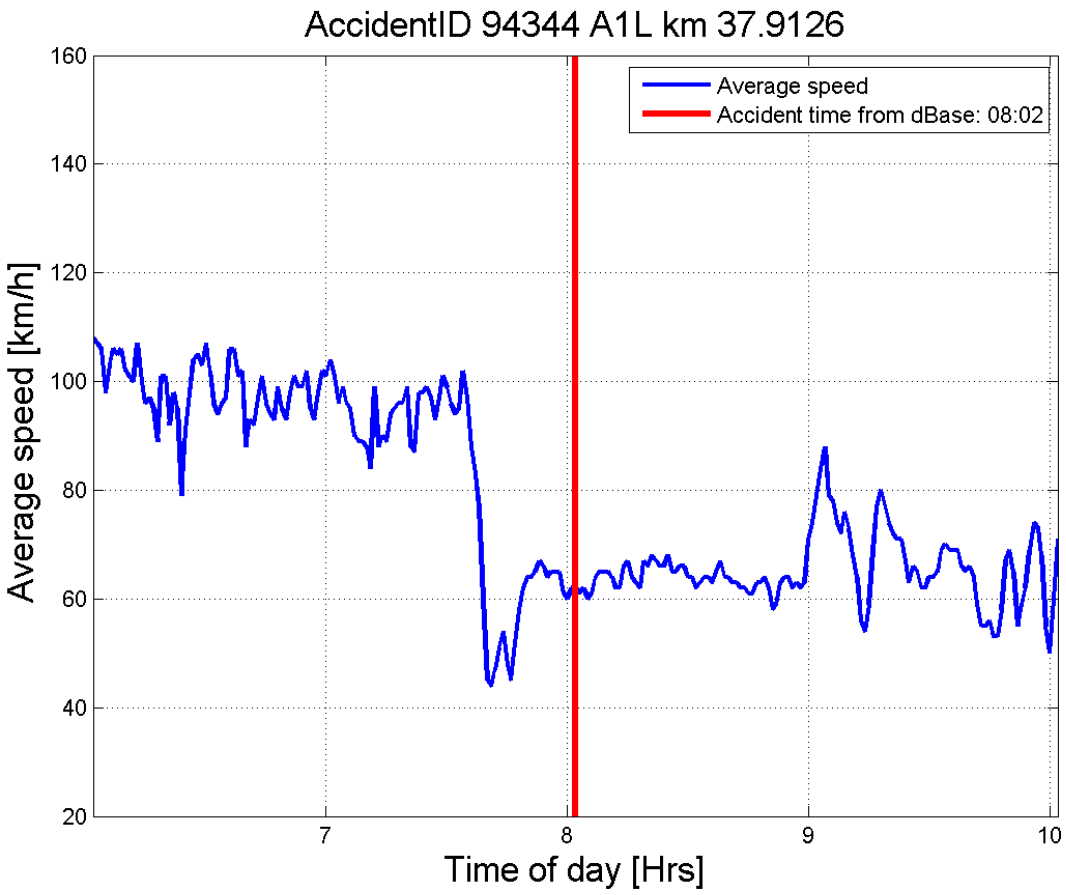


Slide of NAPCORE presentation Peter Lubrich, BASt @ TISA September 2023



Source: TomTom, ATEC ITS France Congress, 2014
[2014 TomTom Brouwer paper]

QA: Correlating flow with incident data
accident on Thursday April 18th 2014 in NL



Visible in figure:

Average speed of vehicles on the road in the time window an accident was reported

Accident reported according:

- Regional logging tool logged on: 08:02 hour (RWS)
- GMU tool logged on 7:52 hour (Police)

09:08 road inspector gives end incident report.

Source: TNO Delft, M. Snelders

Quality management and Quality assurance is needed

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Quality Assurance (QA)

- QA refers to the systematic processes and activities implemented within an organization to ensure that products or services meet specified quality standards and requirements.

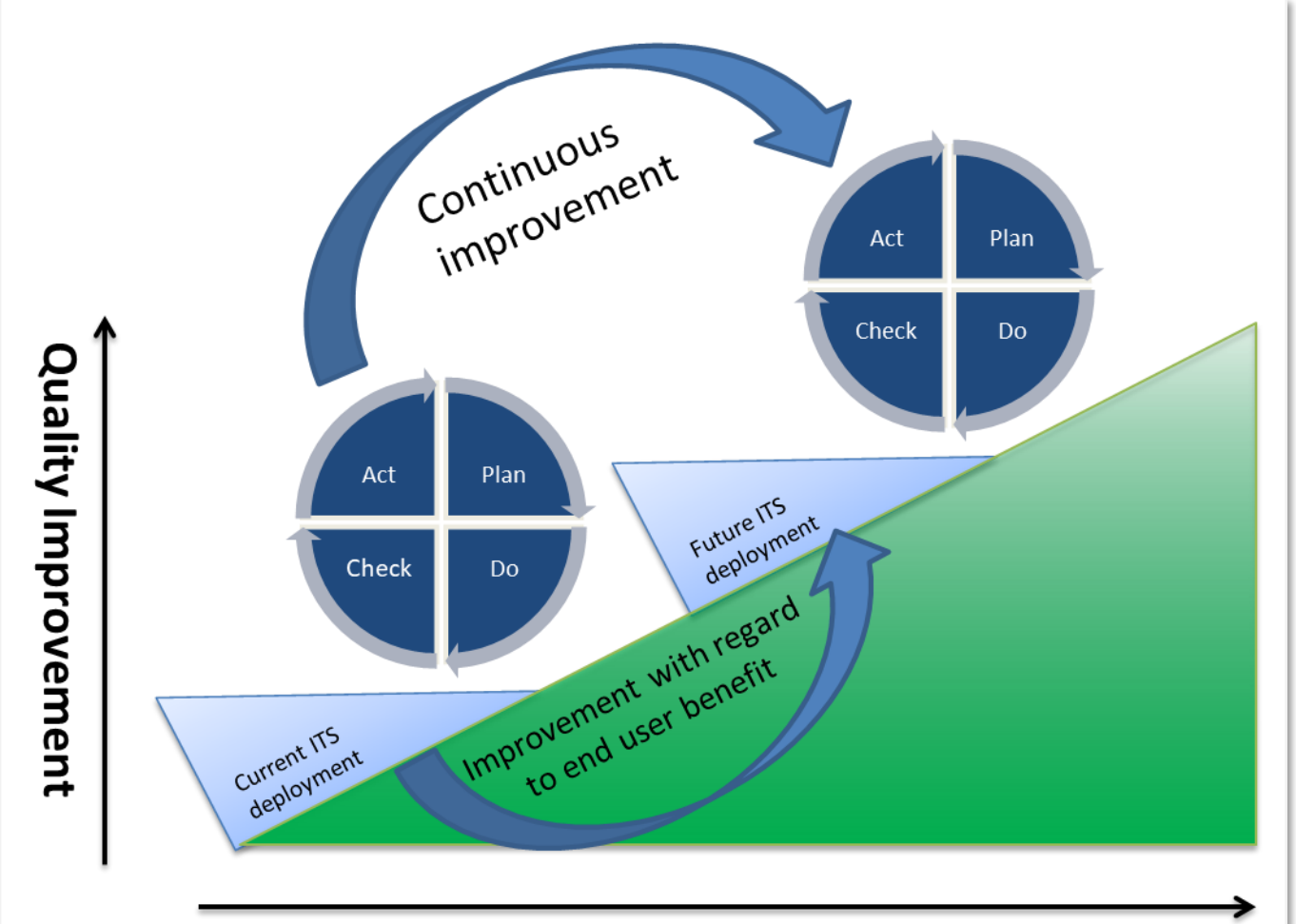
Quality Management (QM)

- QM encompasses a broader range of activities and processes that oversee the entire quality control system within an organization. It includes quality planning, quality control, quality assurance, and continuous improvement.

→ Quality Management in an organization should drive proper QA

- as part of an organization's overall strategic approach to quality within that organization

Basis for quality improvement is a *Plan-Do-Check-Act cycle*



Source: EU-EIP

Quality management

- Defining and embedding the Plan-Do-Check-Act cycle in an organisation

Quality Assurance

- Systematically executing the Do-Check phases

Organisation-internal quality assurance: *define quality targets and processes*

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Key elements for organisation-internal quality assurance plan

- Set explicit quality targets,
- Define clear organizational responsibilities to ensure regular quality assessment and reporting,
- Establish corrective measures, such as issue tracking and feedback mechanisms.

External quality assurance:
For service levels that satisfy end-user needs

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Key elements for organisation-external quality assurance

- **24/7 data availability and updates**
- **Road coverage to include all roads**
- **Timeliness of data**
  - not only for newly occurring events, also for expiration and deletion of events
- **Explicit quality commitment to customers and stakeholders**
  - E.g. service level agreements such as 5-star rating, quality feedback channel

Key TISA quality lessons learned and recommendations

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- Realise a comprehensive end-to-end quality management
- Use commonly agreed quality assessment procedures and quality metrics
- Establish, or intensify, collaboration along the value chain, in particular between public and commercial entities
- Ensure fair competition among Travel and Traffic Information Providers

Collaboration on traffic information quality assurance at TISA

Quality assurance for incident information:
A public-private partnership in EU

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Traveller Information Services Association

Much Real-Time Traffic Information is collected by (EU) Road Authorities

- Especially incidents, roadworks, speed limits, road closures

Service providers would like to disseminate this road authority content

- But it must meet quality expectations of end-users, and this consistently
  - … as end-users are accustomed to high quality levels of flow data
  - … as service providers are first in line to be blamed when it is wrong

➔ Effective quality assurance is a pre-requisite to use of RA data

- This requires both internal and external quality management
- …. On both data/content and process

Quality of traffic information:
Desired collaboration with road authorities

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Achieve a common / EU-wide understanding towards:

- Roles, responsibilities and interaction between service providers and road authorities
- Effective quality assurance, consistency of content collection
- Clarified work processes, and harmonised content interface profiles
- Needed service levels to meet end-user and provider needs

Harmonisation and consistency across Europe needed

Quality of traffic information:
TISA is a meeting place for all ITS stakeholders

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Purpose of this RTTI Quality workshop:

- Align on quality criteria and quality levels for Service Providers to incorporate RA content for
  - Roadworks
  - road closures, and
  - Static (and dynamic?) speed limits

- Harmonise experiences and definitions of various organisations:
  - DFRS, EU-EIP, NAPCORE, TN-ITS, TISA

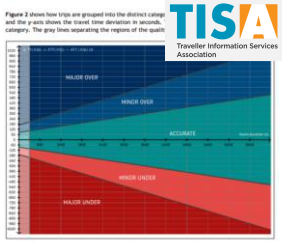

Figure 2: Trip evaluation by duration and ETT deviation

Parameter	Entry	Basic	Elite	Ultimate
Timeliness	3 Month	Month	Week	Day
Location Accuracy	>10m	<10m	<5m	<1m
Completeness	>80%	>90%	>95%	>99%
Correctness	>80%	>90%		

TN-ITS
Map Update Exchange

Data for Road Safety Consortium
data for road safety

Self-Declaration for Short-Term Road Works Warning Data

Quality Level

For each provided message the DATEX II field "probabilityOfOccurence" should be used including one of the two parameters:

Level A:	Level B:
Certain – Roadworks with a high confidence level (e.g. feedback from road operator, IoT device, camera, traffic flow). Can be used directly for informing the end user.	**Probable** – Roadworks with a lower confidence level. Can be used as supporting data

Level-of-Service and Level-of-Quality Criteria for RTTI and SRTI

	Definition of Quality Criteria for RTTI and SRTI		Applicable for: Event Information	Applicable for: Status-Oriented Information
Level of Service	Geographical coverage	Percentage of the road network covered by the (content provision) service	X	X
Level of Service	Availability	Percentage of the time the (content provision) service is available	X	X
Level of Quality	Timeliness (start)	The time between the occurrence of an event and the acceptance of the event	X	-
Level of Quality	Reporting period	The time interval for refreshing / updating the status reports	-	X
Level of Quality	Timeliness (update)	The time between the end or (safety) relevant change of condition and the acceptance of this change	X	-
Level of Quality		The average age of the sensor data used in the most recent reporting period	-	X
Level of Quality	Latency (content side)	The time between the acceptance of end or (safety) relevant change of co moment the information is provided t access point		
Level of Quality		The time between the calculation of data and the moment the informatio the content access point		
Level of Quality	Location accuracy	The relative accuracy of the referenc the published event with respect to t of the actual event		
Level of Quality	Classification correctness	100% minus the percentage of the p which are known to be not correct, concerning actual occurrence of this event type / class	X	-
Level of Quality	Error Rate	Percentage of published status report excessive deviations of a reported qu speed or travel time) versus the actua otherwise determined as erroneous		
Level of Quality	Event coverage	Percentage of the events which are ku correctly detected and published by ty and location (i.e. detection rate)		
Level of Quality	Report coverage	The percentage of reporting locations status report is received in any given		

napcore

EUEIP
European ITS Platform

End-user quality is determined by the whole value chain

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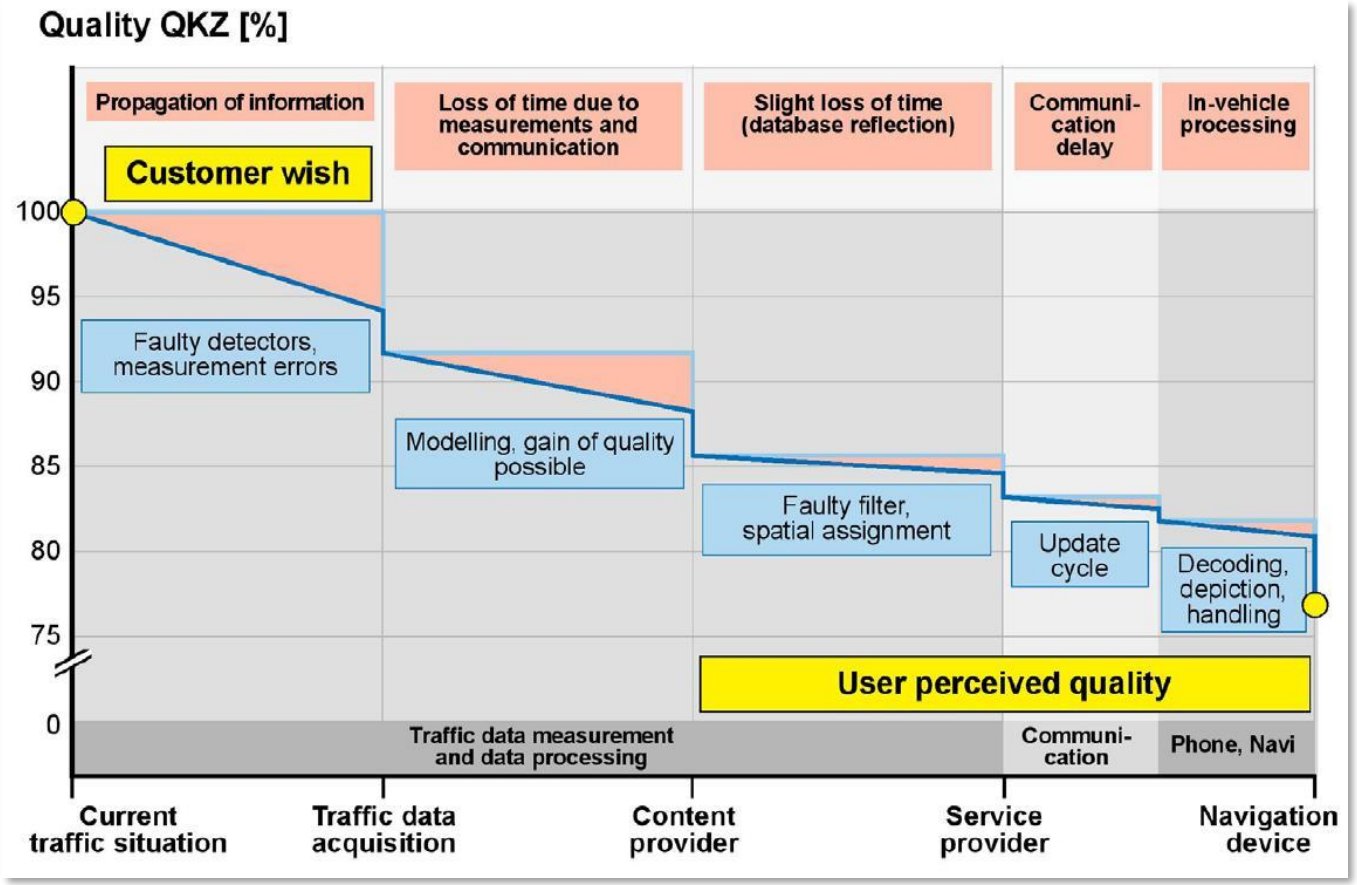

The-Quality-of-Traffic-Information Klaus Bogenberger 2003

Key TISA recommendations:

- End-to-end quality management
- Commonly agreed quality assessment procedures
- Collaboration along the value chain
- Fair competition

Quality assurance for incident information:
A public-private partnership in EU

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What is needed for overall quality assurance

- Minimum quality criteria and quality level
  - 5 star rating proposal, presentation after the break

Additionally needed for overall quality assurance

- Process, roles and responsibilities clarified
- Feedback channels service providers <--> Road authorities
- Agree on quality assessment methods
- ….

→ how to realise this public-private partnership?

→ how to make this public-private partnership effective?

Thank you for your attention !

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Implementation of (EU) 2022/670 RTTI

TISA RTTI Quality Workshop
Amsterdam, 27-28 November 2023

Stephanie Leonard, TomTom

Christian Kleine, HERE Technologies

Bart Lannoo, Be-Mobile

Rebeca Joaquin, Google Maps

Implementation Focus Until 25’/27’

- Feedback Loops
- Minimum Quality Levels
- Service Level ~~Agreements~~ (SL~~A~~)for NAPs
- Digital Traffic Circulation Plans – Harmonized Functional Road Classification (FRCs)
- Road Works
- Road Closures
- Speed Limits

How to combine and use input from Berlin workshop?

Key Aspects for Data Quality

3. Data Quality

1. Service Level Agreement (SLA)
   1. a commitment between the provider and customer on various aspects of the service (quality, availability, responsibilities)
   2. the most common component of an SLA is that the services should be provided to the customer as agreed upon in the SLA
   3. Very common tool in traffic business, could be useful in RTTI NAP context (see next slide)
2. **Location Referencing** – standardized/widely adopted method required
3. **Event and Validity Handling** – high level of detail required
4. **Content** – detail and context of data required
5. Description of accuracy, freshness, completeness, correctness – quality management
6. High requirements expected when we move from SD, ADAS Map to HD Map

Data Quality – Minimum Service Provider Requirements

General

Must have:
- **format: xml/json/DATEX II**
- **feed: can be fetched once per minute**
- **stable message id required if referring to the same event**
- if possible, event description/comments available

Location Referencing

Must have:
- **coordinate referencing system is stated: preferably WGS84**
- **lon/lat stretches/polylines or OpenLR**
- **direction defined / bidirectional attribute**
- if possible, road names given (lane level specific for high road classes, updates available as close to real time for automation use cases)

Event & Validity Handling

Must have – Event:
- **differentiation between full road closures and lane closures**
- **vehicle specific closures (i.e. older petrol cars)**
- if possible, documentation around all valid event types
- if possible, guided by Datex II standard or Alert-C event codes

Must have - Validity
- **start/stop times available**
- if possible, schedules available (e.g. "Mon-Fri 22:00-06:00")

Content

Must have
- **Coverage:**
  - **which road classes are covered?**
  - **which areas are covered (urban, rural)**
- **how many messages are active at the same time (or is the feed cluttered with old messages)?**
- **how many short-term events are available (intermittent road closures, accidents) or are the events mostly scheduled?**
- if possible, how well does map matching onto our map work

Service Level Agreement (SLA) in TN-ITS GO

Parameter	Entry	Basic	Elite	Ultimate
Timeliness	3 Month	Month	Week	Day
Location Accuracy	>10m	<10m	<5m	<1m
Completeness	>80%	>90%	>95%	>99%
Correctness	>80%	>90%	>95%	>99%

TN-ITS GO, Deliverable 4.1 Evaluation

TN-ITS Service Levels	Basic	Elite	Ultimate
Support services	(low)	(medium)	(high)
Service Availability (over a period):	90%	96%	99.9%
Incident management – support hours	Office hours	Office hours	24x7
Incident management – Initial response time	1 day	4 hours	1 hour
Incident management – Target resolution time	Reasonable effort	1 day	4 hours

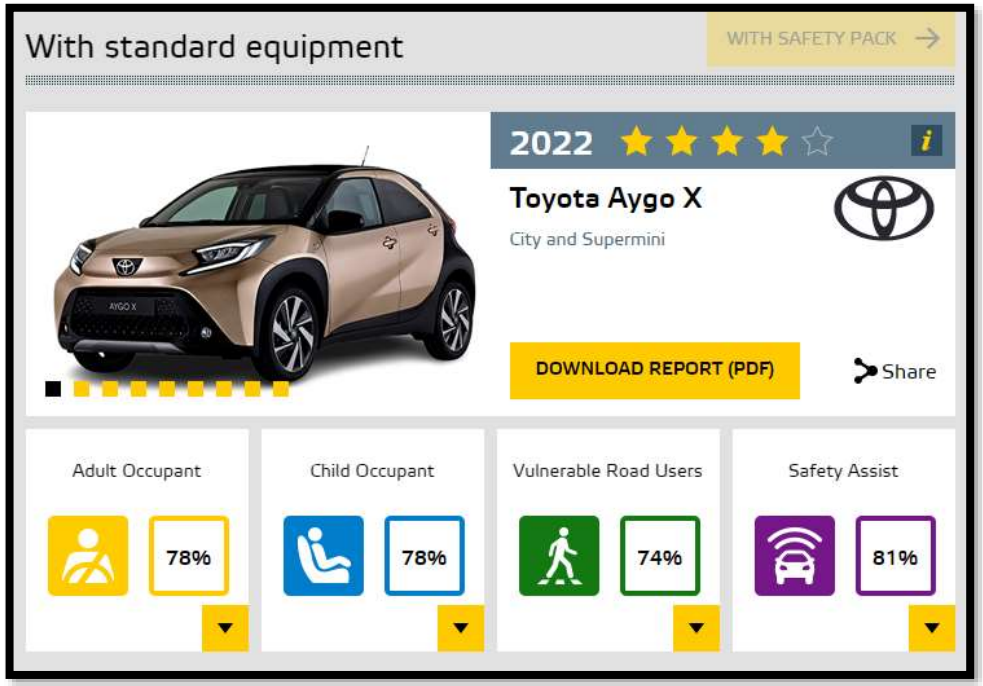
Table 2 - Service Quality Levels

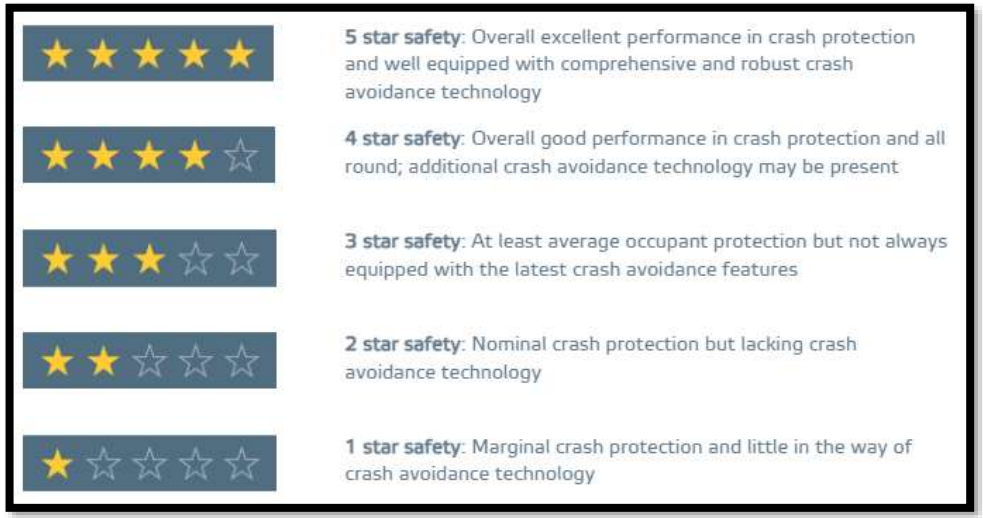
Chicken or Egg Paradox

We learnt in Berlin that many road authorities and road operators know the quality of their traffic data could be improved but they don’t want to make investments without the assurance ITS Service Providers will use the new and improved feeds.

What comes first, traffic data quality improvements or commitment to use traffic data?

Inspired by EuroNCAP's 5 Star Vehicle Safety Rating as an SLA Alternative





Introducing our RTTI 5 Star Rating Scheme

Purpose:

1. Give road authorities and road operators a helpful, practical and easy-to-use tool to self-assess the quality level of their traffic data.
2. Understand what minimum quality level ITS Service Providers require to use public traffic data
   → this in turn should increase the use of traffic data from Road Authorities and Road Operators by ITS Service Providers
      → which in turn should provide road users with more accurate and complete traffic information that can help reduce congestion, travel times and emissions on Europe's road network

Content:

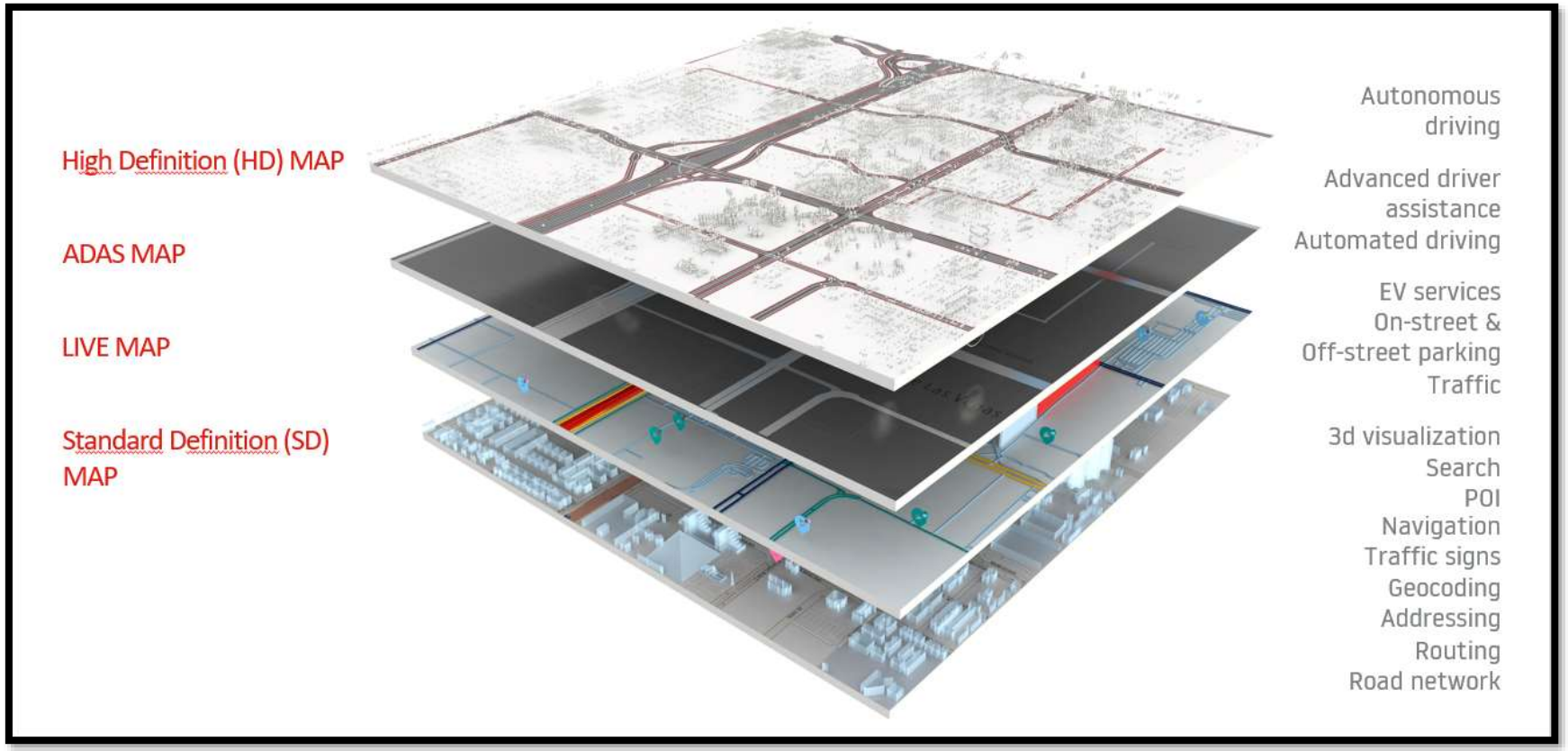
- **Part 1 - RTTI Data Useability**
  - NAP Functionality
  - Static Data (Traffic Regulation/Restriction & Infrastructure Data)
  - Dynamic Data (State of the Network & Real-Time Use of Network)
- **Part 2 - RTTI Data Processing ~~Ingest~~**

General framework and use case specific framework (i.e. speed limits, road works, road closures).

Scope of 5 Star Rating

Out of scope (for now)

Included in scope



RTTI 5 Star Rating Scheme – NAP Functionality

RTTI Data Useability					
Part 1a NAP Functionality	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Language	Local Language	Local Language	Local Language + English	Local Language + English	Local Language + English
Search	<15 Minutes Search Time	<10 Minutes Search Time	<5 Minutes Search Time	<3 Minutes Search Time	<1 Minute Search Time
Metadata and Harmonized Data Terminology	Use of Metadata Catalogue	Use of Metadata Catalogue	Use of DCAT-AP based Common Metadata Catalogue	Use of DCAT-AP based Common Metadata Catalogue	Use of DCAT-AP based Common Metadata Catalogue
Service Provider Registration Process	Performed by Service Provider	Performed by Service Provider	Performed by NAP on SP behalf based on Standardized Template (i.e. TISA)	Performed by NAP on SP behalf based on Standardized Template (i.e. TISA)	Performed by NAP on SP behalf based on Standardized Template (i.e. TISA)
Grouping/ Consolidation of Individual RTTI Data Feeds	OSM FRC 1+2 (Motorway + Trunk) Motorway = A restricted access major divided highway, normally with 2 or more running lanes plus emergency hard shoulder. Trunk = The most important roads in a country's system that aren't motorways.	OSM FRC 1-3 (Motorway+Trunk+Primary) Primary = The next most important roads in a country's system (often link larger towns.)	OSM FRC 1-4 (Motorway+Trunk+Primary+ Secondary) Secondary = The next most important roads in a country's system. (Often link towns.)	OSM FRC 1-5 (Motorway+Trunk+Primary+ Secondary+Tertiary) Tertiary = The next most important roads in a country's system. (Often link smaller towns and villages)	OSM FRC 1-6 (Motorway+Trunk+Primary+ Secondary+Tertiary+Residential) Residential = Roads which serve as an access to housing, without function of connecting settlements. Often lined with housing.

RTTI 5 Star Rating Scheme – Static Data 1/2

RTTI Data Useability Part 1b Static Data	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
RTTI Data Terminology & Definition	Self-defined	Self-defined	According to official standard*	According to official standard*	According to official standard*
Data Format Used	Bespoke local format	Bespoke local format	TN-ITS/DATEX II (latest version)	TN-ITS/ DATEX II (latest version)	TN-ITS/ DATEX II (latest version)
Use of Standard	Bespoke profile used	Bespoke profile used	Unified use of standard (i.e. common EU profile)	Unified use of standard (i.e. common EU profile)	Unified use of standard (i.e. common EU profile)
Location Referencing			***Use Case Specific***		
Linear Referencing	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined	Not referenced	Not referenced	Referenced	Referenced	Referenced

RTTI 5 Star Rating Scheme – Static Data 2/2

RTTI Data Useability					
Part 1b Static Data	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Update Cycle	***Use Case Specific – Time Based Measurement*** Definition: the time interval for refreshing + updating published events/road attributes (~ reporting period) (EIP 2019)				
Timeliness Rate	***Use Case Specific – Time Based Measurement*** Definition: the time between the occurrence of the event/relevant change and the acceptance of the event (entering system) (EIP 2019)				
Accuracy	***Use Case Specific – Distance Based Measurement*** Definition: the absolute accuracy of the referenced location of the published event/road attribute with respect to the actual location (EIP 2019)				
Correctness	***Use Case Specific – % Based Measurement*** Definition: 100% minus the % of published events/road attributes which are known to be NOT correct, concerning the actual occurrence of type/class (EIP 2019)				
Completeness	***Use Case Specific – % Based Measurement*** Definition: % of the events which are known to be correctly detected and published by type/class, time and location (EIP 2019)				

RTTI 5 Star Rating Scheme – Dynamic Data

RTTI Data Useability					
Part 1c Dynamic Data	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
All Static Data Elements	Difference with Dynamic Data – two different set of accuracy, correctness and completeness requirements for functional road classes groups: **FRC1-4 and FRC5-6 OR FRC 1-2 and FRC 3-6 (to be discussed)**				
RTTI Event Message ID	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Non-secured	Non-secured	Secured via https	Secured via https	Secured via https
Outdated Messages Deleted from Feed	***Use Case Specific – Time Based Measurement***				
Availability Short Term Events	***Use Case Specific – Content Availability Yes or No***				
Validity	***Use Case Specific – Start/stop or Schedule Available***				
Other	***Other Use Case Specific Parameters***				

RTTI 5 Star Rating Scheme – Static Speed Limit

Static Data - Speed Limit	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	Self-defined	Self-defined	According to EU ISA Regulation 'Applicable Speed Limit'	According to EU ISA Regulation 'Applicable Speed Limit'	According to EU ISA Regulation 'Applicable Speed Limit'
Data Format Used	Bespoke local format	Bespoke local format	TN-ITS	TN-ITS	TN-ITS
Use of Standard	Standard instructions only used as guide – ad hoc implementation used	Standard instructions only used as guide – ad hoc implementation used	Unified use of standard	Unified use of standard	Unified use of standard
Location Referencing	Basic GPS INSPIRE coordinates	Basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates
Linear Referencing	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Quarterly	Monthly	Weekly	Daily	Daily
Timeliness Rate	Max 3 months old	Max 1 month old	Max 1 week old	Max 1 day old	Data available before speed limit change – pre warning
FRC1-6 Accuracy	<30m	<20m	<10m	<5m	<1m
FRC1-6 Correctness	>80%	>80%	>90%	>95%	>99%
FRC1-6 Completeness	>80%	>80%	>90%	>95%	>99%

RTTI 5 Star Rating Scheme – Road Works 1/2

Dynamic Data - Road Works	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	Self-defined	Self-defined	Harmonized Definition Required (Can TISA Help?)	Harmonized Definition Required (Can TISA Help?)	Harmonized Definition Required (Can TISA Help?)
Data Format Used	Bespoke local format or DATEX II	Bespoke local format or DATEX II	Only DATEX II (latest version)	Only DATEX II (latest version)	Only DATEX II (latest version)
Use of Standard	Standard instructions only used as guide – ad hoc implementation used	Standard instructions only used as guide – ad hoc implementation used	Unified use of standard (i.e. common EU profile) when ready	Unified use of standard (i.e. common EU profile) when ready	Unified use of standard (i.e. common EU profile) when ready
Location Referencing	Basic GPS INSPIRE coordinates	Basic GPS INSPIRE coordinates	Strong preference for OpenLR over TMC	Strong preference for OpenLR over TMC	Only OpenLR
Linear Referencing	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Weekly	Every 3 days	Daily	Max 6 Hours	Hourly
Timeliness Rate	Max 1 week	Max 3 days	Max 24 hours	Max 6 Hours	Max 1 hour
FRC1-4					
Accuracy	<1km	<500m	<250m	<100m	<50m
Correctness	>70%	>75%	>80%	>85%	>90%
Completeness	>70%	>75%	>80%	>85%	>90%
FRC5-6					
Accuracy	<200m	<100m	<50m	<25m	<10m
Correctness	>60%	>65%	>70%	>75%	>80%
Completeness	>60%	>65%	>70%	>75%	>80%

B

RTTI 5 Star Rating Scheme – Road Works 2/2

Dynamic Data - Road Works	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
RTTI Event Message ID	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Non-secured	Non-secured	Secured via https	Secured via https	Secured via https
Outdated Messages Deleted from Feed	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Availability Short Term Events	Scheduled road works only	Scheduled road works only	Scheduled and unplanned road works	Scheduled and unplanned road works	Scheduled and unplanned road works
Road Type	Generic road works only	Generic road works only	Lane level specific	Lane level specific	Lane level specific
Validity	Start/stop times available	Start/stop times available	Schedules available (e.g. Mon-Fri 22:00 – 06:00)	Schedules available (e.g. Mon-Fri 22:00 – 06:00)	Schedules available (e.g. Mon-Fri 22:00 – 06:00)
Other?					

B

RTTI 5 Star Rating Scheme – Road Closure 1/2

Dynamic Data - Road Closure	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	Self-defined	Self-defined	Harmonized Definition Required (Can TISA Help?)	Harmonized Definition Required (Can TISA Help?)	Harmonized Definition Required (Can TISA Help?)
Data Format Used	Bespoke local format or DATEX II	Bespoke local format or DATEX II	Only DATEX II (latest version)	Only DATEX II (latest version)	Only DATEX II (latest version)
Use of Standard	Standard instructions only used as guide – ad hoc implementation used	Standard instructions only used as guide – ad hoc implementation used	Unified use of standard (i.e. common EU profile) when ready	Unified use of standard (i.e. common EU profile) when ready	Unified use of standard (i.e. common EU profile) when ready
Location Referencing	Basic GPS INSPIRE coordinates	Basic GPS INSPIRE coordinates	Strong preference for OpenLR over TMC	Strong preference for OpenLR over TMC	Only OpenLR
Linear Referencing	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Every 3 days	Daily	Twice Daily	Every 3 Hours	Every 5-60 Minutes
Timeliness Rate	Max 3 days	Max 24 hours	Max 12 hours	Max 3 Hours	Max 5-60 Minutes
FRC1-4					
Accuracy	<250m	<100m	<50m	<25m	<10m
Correctness	>80%	>85%	>90%	>95%	>99%
Completeness	>80%	>85%	>90%	>95%	>99%
FRC5-6					
Accuracy	<50m	<20m	<10m	<5m	<1m
Correctness	>70%	>75%	>80%	>85%	>90%
Completeness	>70%	>75%	>80%	>85%	>90%

RTTI 5 Star Rating Scheme – Road Closure 2/2

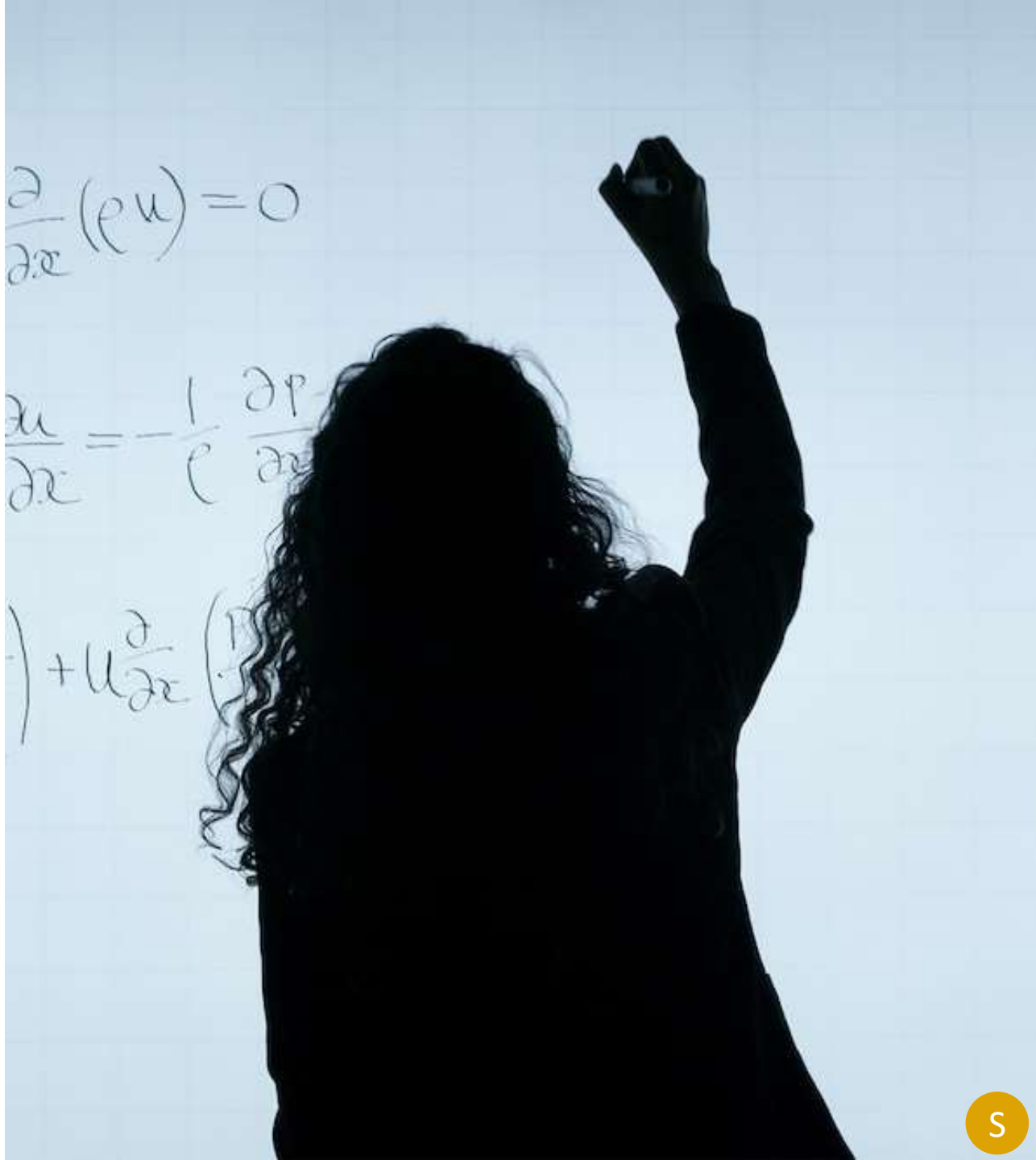
Dynamic Data - Road Closure	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
RTTI Event Message ID	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Non-secured	Non-secured	Secured via https	Secured via https	Secured via https
Outdated Messages Deleted from Feed	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Road Type	Generic road closure only	Generic road closure only	Lane level specific	Lane level specific	Lane level specific
Vehicle Type	No detail on applicable vehicle type	No detail on applicable vehicle type	Vehicle type specific (i.e. only applicable for HDV)	Vehicle type specific (i.e. only applicable for HDV)	Vehicle type specific (i.e. only applicable for HDV)
Other?					

Calculating Use Case Minimum Quality Level Score?

Minimum Quality is 3/5 at parameter level but do we need to calculate an overall score?

Will RO/RA be 3/5 for every single parameter? Unlikely

Some parameters are more important than others – how to reflect?



How often should the quality assessment be performed?

i.e. will the RO/RA rating expire?

How will rating thresholds increase overtime with technology advancements?

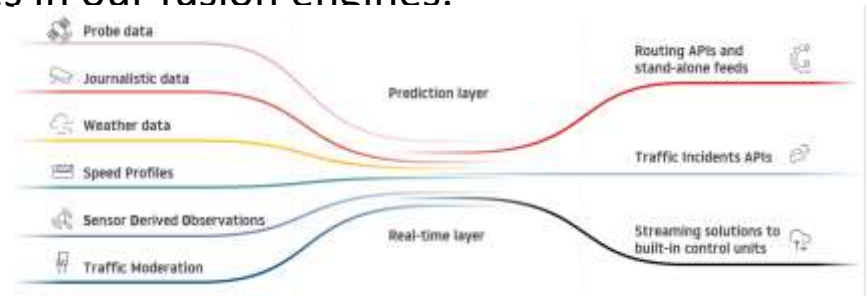
Commitment to Use SL, RW, RC Data

Minimum Level

If the data is below the agreed minimum quality standard, there is no guarantee the data will be used by Service Providers.

If the data meets the **commonly** agreed minimum quality standard or higher, ITS Service Providers will use the data:

- Subject to **company specific** product requirements
- Subject to validated quality score (w/o 3rd party assessment)
- Data is sourced via the National Access Point (NAP)
- Data is never published as is, always validated with other sources in our fusion engines.



- If data quality degrades over time and goes below minimum quality standard, we may stop using it (giving feedback to data provider).

What happens if we acquire/process SL/RW/RC data through an aggregator and not directly through the road operator or authority?

RTTI 5 Star Rating Scheme – RTTI Data Use

Part 2 **RTTI Data Use**	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Feedback ITS SPs are using RTTI Data	To be discussed with MS in RTTI Task Force				
SL Data Processed in Fusion Engine	To be discussed with MS in RTTI Task Force				

***SL Data Processed in Fusion Engine means =** the maximum period of time before the RTTI data is processed in our fusion engine alongside other data sources. This does not refer to the maximum period of time that content derived from RTTI data is shown to end users (which is out of our control in non-branded products).

EU ISA Regulation 2021/1958

TISA RTTI Quality Workshop
Amsterdam, 27-28 November 2023

Stephanie Leonard, TomTom

EU Intelligent Speed Assistance (ISA) - Brief

ISA system has three components, OEMs given choice how to implement:
SLIF Speed Limit Information Function + **SWF** Speed Warning Function
OR
SLIF Speed Limit Information Function + **SCF** Speed Control Function

ISA system is subject to whole vehicle type approval as a safety function
Mandatory in all M and N category vehicles

- All new vehicle types from 7 July 2022
- All new vehicles from 7 July 2024

Regulation does not prescribe which **technology** must be used, OEMs allowed to choose camera-only, map-only or fused camera-map ISA system to fulfil requirements

ISA system must be able to correctly identify **90%** of speed limits during type approval assessment and operational use (aka 'real-word performance') on FRC1-6
Catalogue of Road Signs (Annex) specifies which type of speed restrictions ISA system must be able to correctly detect during day and nightime:

1. **Explicit** speed limits (i.e. sign showing large numerical value)
2. **Implicit** speed limits (i.e. city entry/leaving sign, residential zone sign)
3. Dynamic speed limits (VMS)

INTELLIGENT DATA EXCHANGE ALLIANCE VALIDATING ROAD WORKS VIA FCD

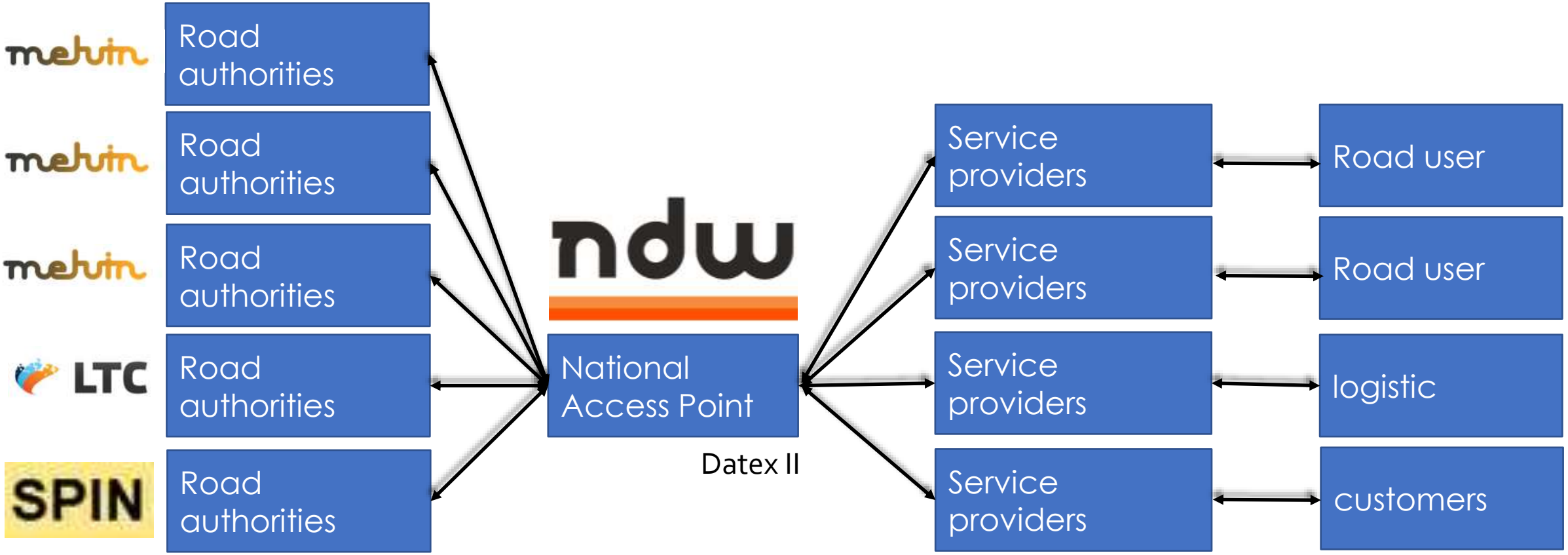
Context: roadworks data in the Netherlands

342 Municipalities

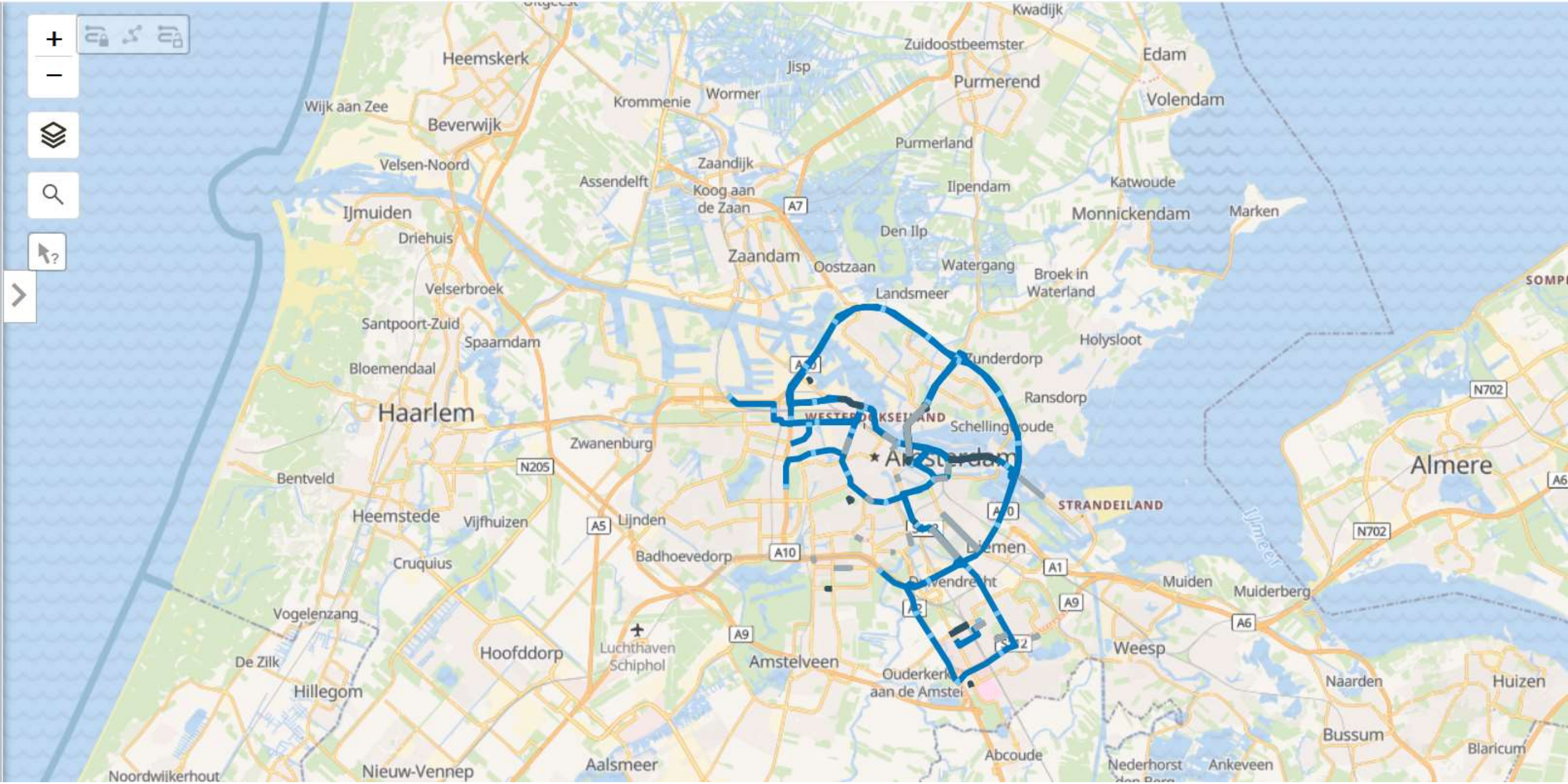
12 provinces

1 national road authority

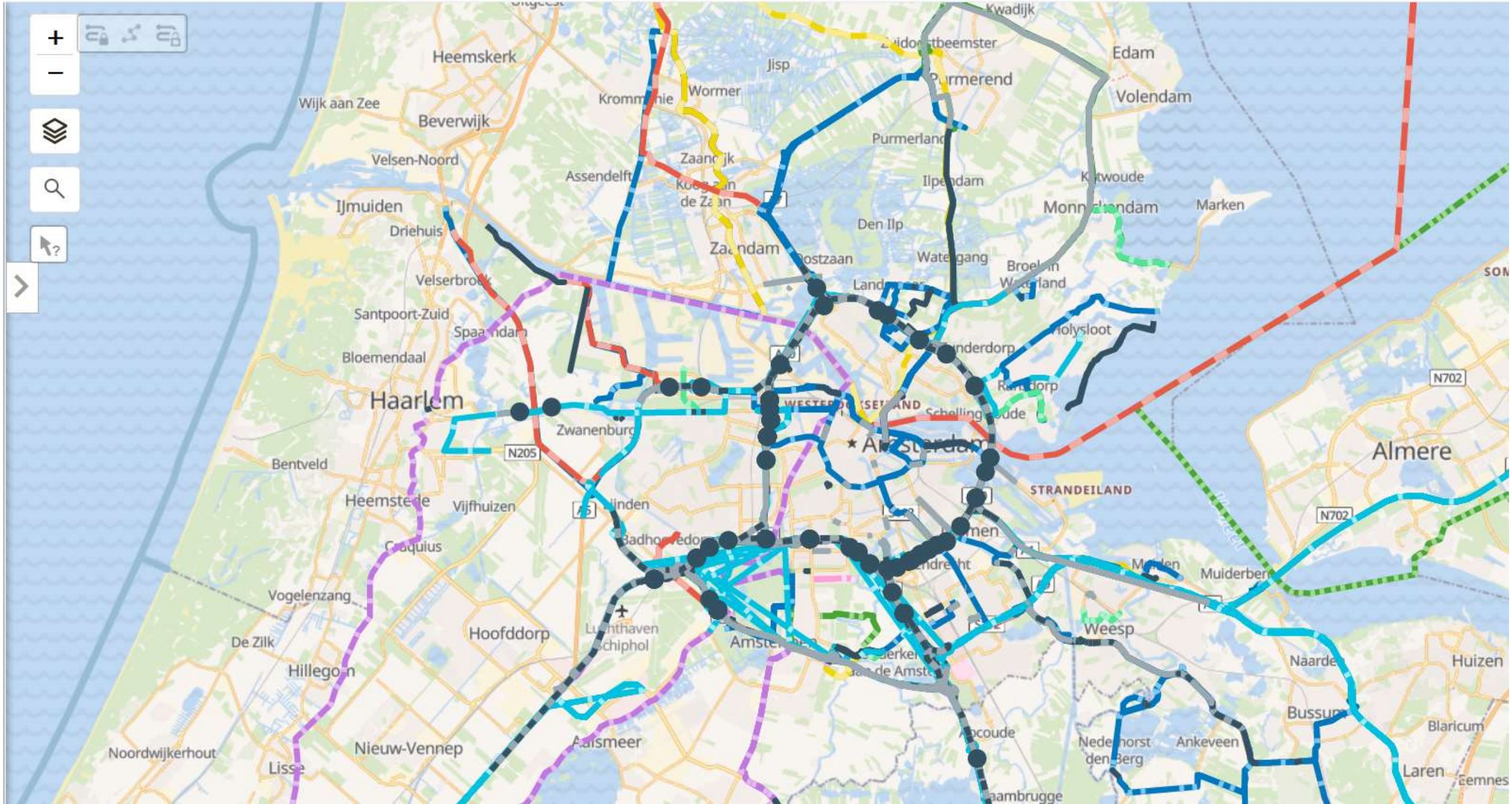
Context: The data chain



Filtersets | Gebied | 01/12/2022 - 01/09/2024 | Laatst gewijzigd | Activiteit | Status | Hinder | Invoerder | Beperking | Regio regie | Conflicten



Filtersets | Gebied | 01/12/2022 - 01/09/2024 | Laatst gewijzigd | Activiteit | Status | Hinder | Invoerder | Beperking | Regio regie | Conflicten



However…

IDEA as a solution

IDEA is an initiative of the City of Amsterdam. Realization in cooperation with and on the platform of NDW. Pilot conducted with:

- Municipality of Amsterdam
- Municipality of The Hague
- Province of North Holland
- Rijkswaterstaat (National Road Authority)

ndw

VREDE EN RECHT
Den Haag

Gemeente Amsterdam

Rijkswaterstaat
Ministerie van Verkeer en Waterstaat

MERIDIAN

Co-funded by
the European Union

Road works validation
Intelligent Data Exchange Alliance (IDEA)

Planned roadworks & closures

+

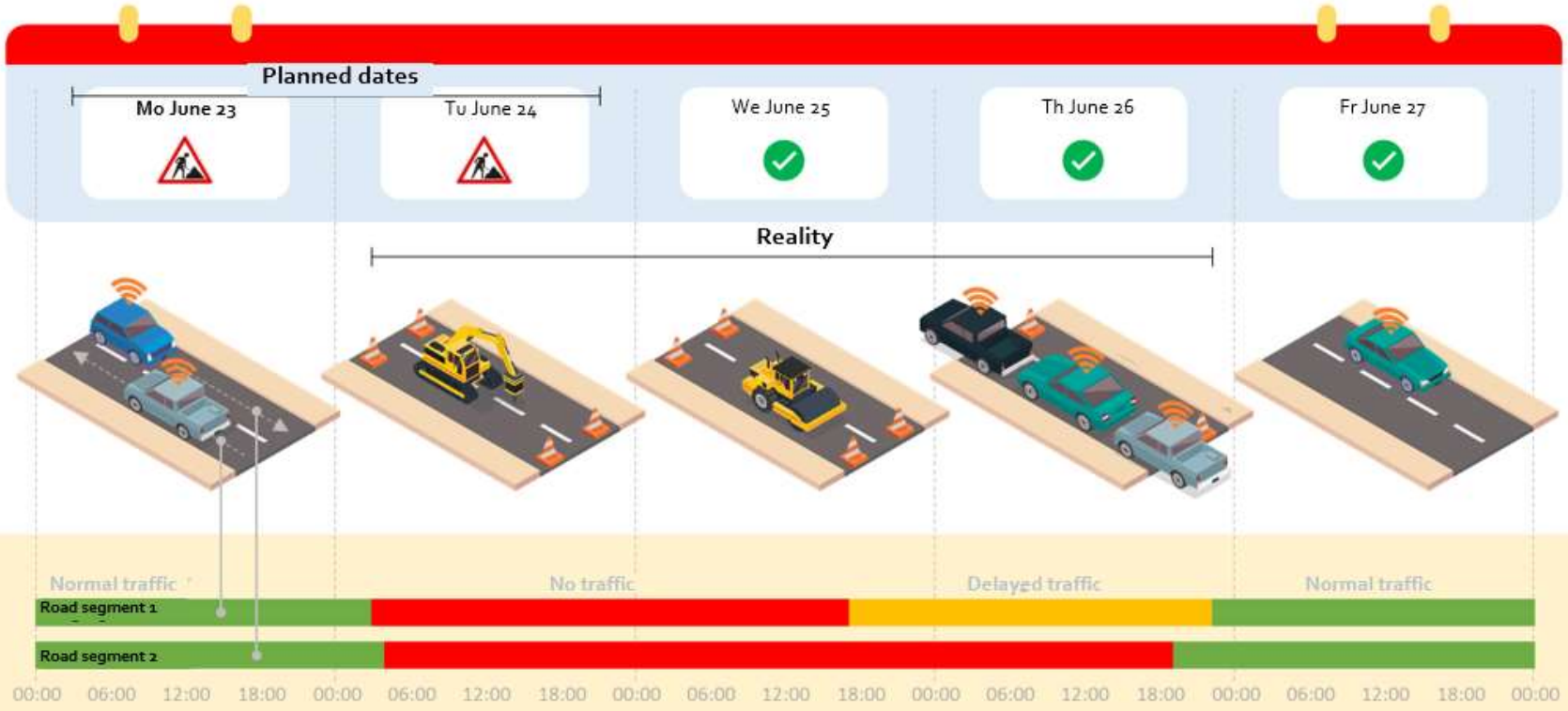
Floating car data

Incident data, canbus data, connected drivers data

=

IDEA

Realtime validated roadworks data for road authorities and service providers



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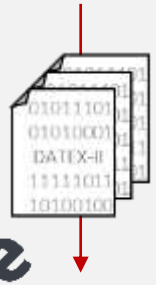
Road works validation
Intelligent Data Exchange Alliance (IDEA)

1

For **service providers** it delivers high quality, validated, real-time data.

- On most roads closures are detected within 10 minutes
- On road and/or times with less traffic this is done within 20 minutes



here TOMTOM Google Maps BEMOBILE waze

2

For **road authorities** the disrepancies between planned and actual roadworks are accessable.

- During the scheduled dates and the days before and after, it is possible to see at what times there were actual delays or closures.

3

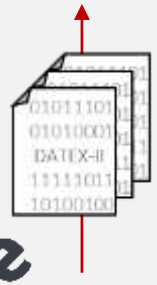
For **road authorities** a dashboard provides insight into data quality.

- Per road authority and by desired unit of time, it's possible to determine development over time

4

Finally **service providers** will deliver feedback to IDEA

- About how they use the data, so it will stimulate **road authorities** to do better (or deliver data at all)
- Corrections to the data, to improve the IDEA algorithm



here TOMTOM Google Maps BEMOBILE waze

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Highlights

High quality data

- Useful for service providers. Available in DatexII version 3.
- Closures and incident feeds are also compatible.

Understanding data quality

- Road authorities gain insight in roadworks and data quality.
- Agreements with contractors can be checked without additional actions (eyes on the street)

Financial sustainability

- Dutch road authorities already deliver data to the NAP
- FCD data was already, no increase in costs (aside from maintaining the application)

Eco-system of Digital Corridor Management

- Ready for feedback from service providers.
- All Dutch Road authorities are automatically joining from Q1 (or Q2) 2024.

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Not easy

Are all Dutch road authorities on board?

- Are they okay with

What do service providers want?

- Remove, correct/incorrect or probability score?

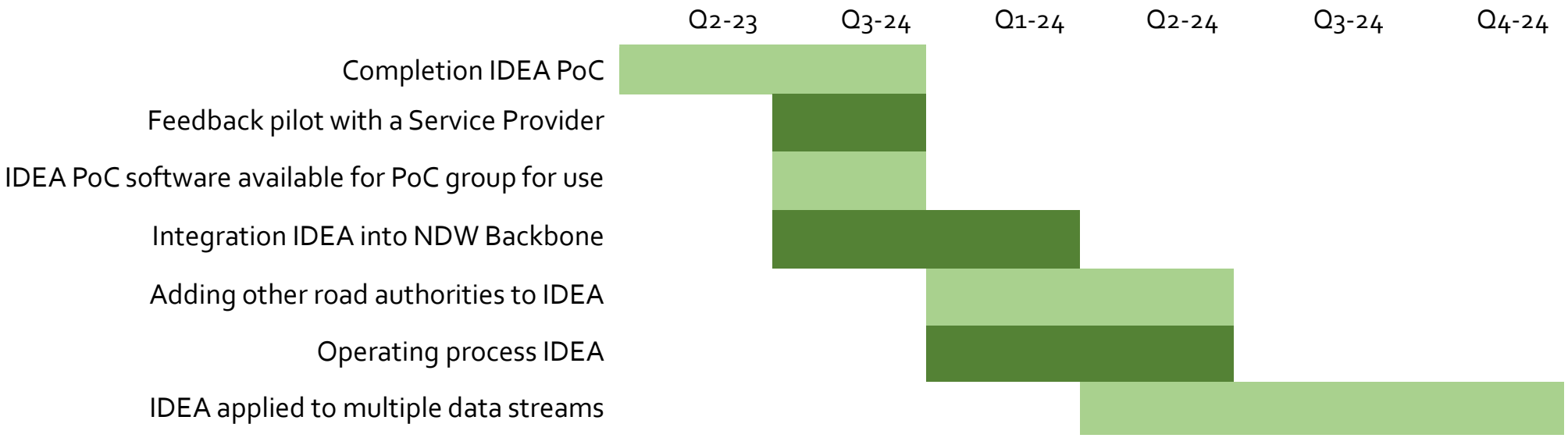
What is the best moment to include service providers?

- DatexII version 2 or 3?
- What about the rest of EU? Wait or start now?

How will feedback work?

- There is no standard yet for feedback accross EU. Make one or just improvise?
- How fast is feedback? Every minute, day, week, month?
- What are we allowed to do with feedback if we get it?

IDEA roadmap



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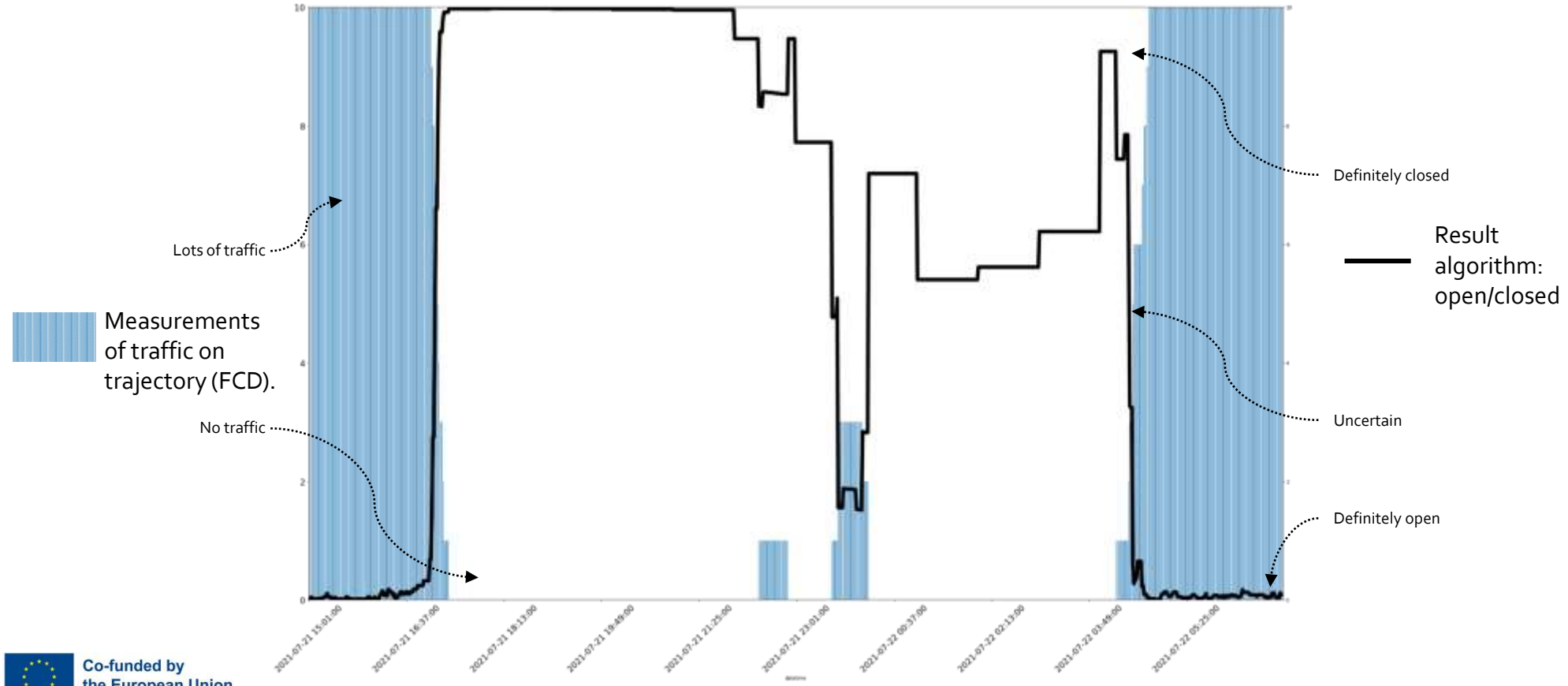
Any
Questions

How does the algorithm work?

Point estimates are made based on FCD using an ML Algorithm.

This incorporates current coverage (5 min and 30 min) and the difference from historical profiles.



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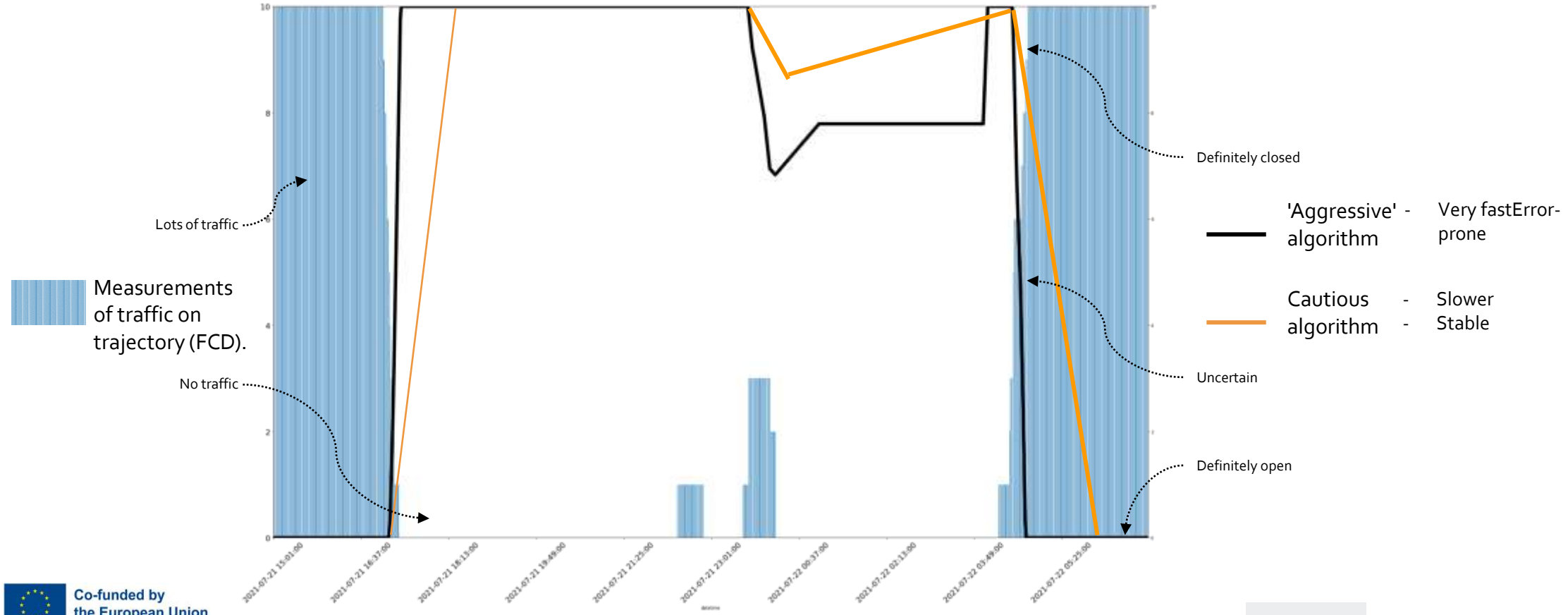
How does the algorithm work?

The point estimates are then made more stable and reliable in "post-processing" based on previous point estimates.



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DATEX II

Highlights from DATEX II Road Closure/Road Works Workshop and DATEX II Profiles

TISA RTTI Quality Workshop 27-11-2023

Martin van Ekelenburg - NDW

napcore

Co-funded by the European Union

Workshop on temporary road/ lane closures in navigation

tomtom

Processing of closure and roadworks messages using DatexII

DATEX II

napcore

Co-funded by the European Union

Conclusions

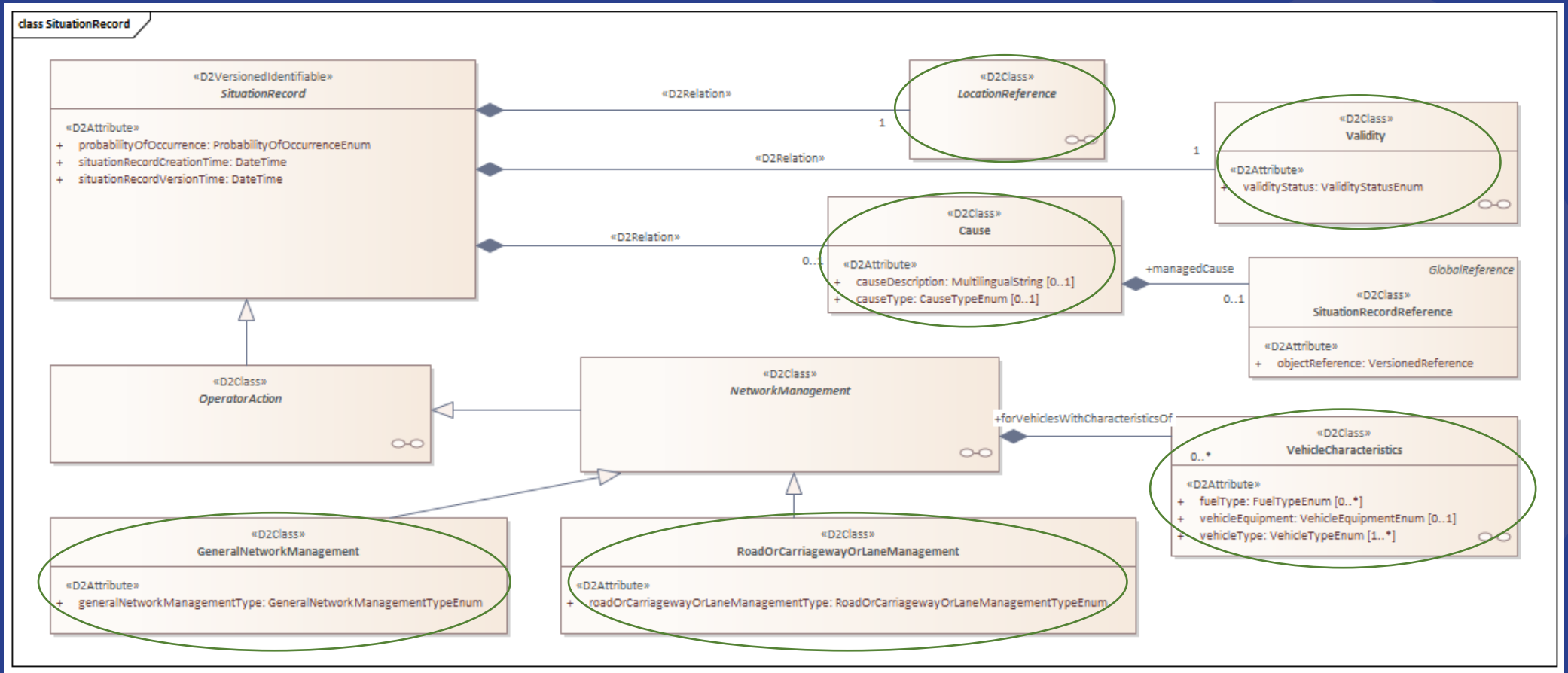
- Road closures + cause
  - Closed lane(s) is not Road closure.
- Validity is supported with recurring time-windows.
  - Additional complexity of validity is ignored
- Locationreferencing type: Linear
  - X/Y WGS84, at least Start and End + preferred midpoints
    - Linestrings (Even a point is a linear of several meters, so automatic direction)
    - Direction, Road name / description
  - OpenLrBinary
- Differentiation to vehicle categories for informational purposes
- Data and Coding Quality is important (outside pure scope of DATEX II)

DATEX II

napcore

Co-funded by the European Union

Road Closures Profile



DATEX II

napcore

Co-funded by the European Union

Next steps

- Roadworks and Speedmanagement profiles available
- Example messages for all profiles
- Improvement on DATEX II website and DATEX II documentation site with areas for these specific service profiles, both functional and technical.
- NAPCORE SCOM will be asked to endorse this profile as a NAPCORE recommendation (March 2024)
- Implementing this profile with good quality data will lead to SP's using this data in their services

DATEX II

napcore

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EVIS.AT

Realtime traffic information Austria

November 28th 2023
Amsterdam

Tobias Schleser
ASFINAG

ASFINAG
GUTE FAHRT, ÖSTERREICH!

What is Austria known for?

harmonized real-time traffic information data

Pictures:

Mozart: https://depositphotos.com/ and mozerthaus.biz | Skiing: https://www.austria.info/ | Transit: http://orf.at | Soccer: http://orf.at

A|S|F|i|N|A|G

CONTENTS

EVIS.AT is the one-stop-shop platform for real-time traffic information data for all of Austria.
(no need to „shop around“ in Austria)

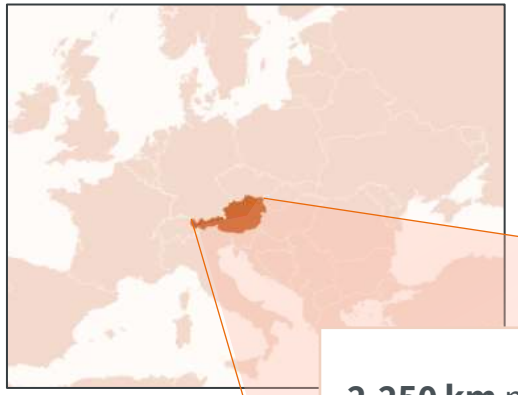
Now you can…

…access all traffic information data of Austria at one physical interface.
…implement the real-time feeds in your online services.
…make your users happy by providing reliable data of road authorities.

But first things first:

Setting the stage!

…SETTING THE STAGE!



Roads

2.250 km motorways – 1 operator (ASFINAG)

5.800 bridges, **166** tunnels

35.000 km main+secondary network

3 main alp crossings (Brenner, Tauern, Phyrn)

Country

9 Mio residents

9 federal states

Largest cities: Vienna (2 mio), Graz (300k), Linz (210k), Salzburg (160k)

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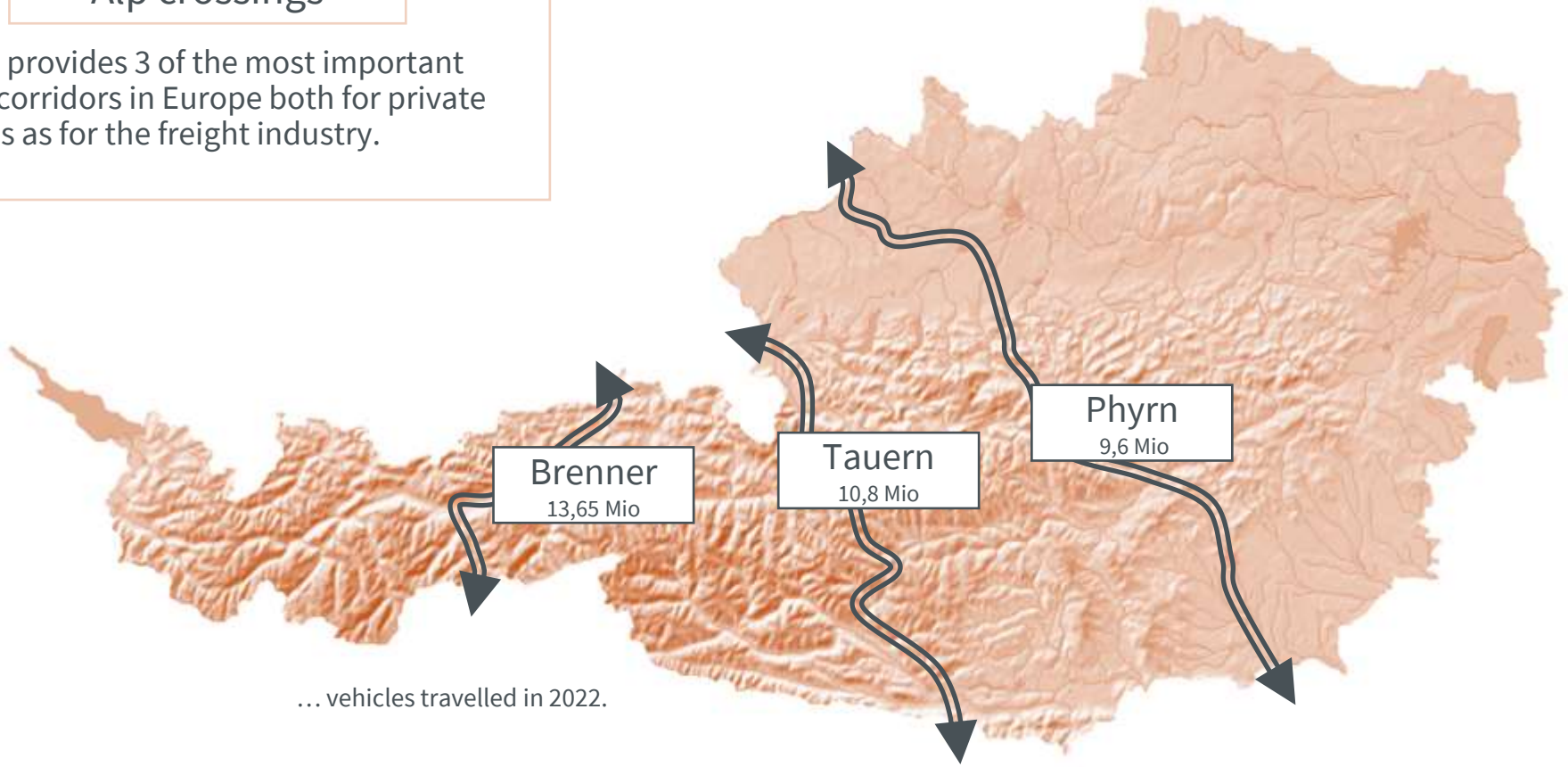
…SETTING THE STAGE!

(or: „Why Austria is relevant“)

Alp crossings

Austria provides 3 of the most important alpine corridors in Europe both for private vehicles as for the freight industry.



… vehicles travelled in 2022.

…SETTING THE STAGE!

(and: „…complicated“)

(Road)traffic authorities

- 1 motorway operator („Autobahn“, „Schnellstraße“)
- 9 federal states („Landesstraßen“)
- Cities and local authorities

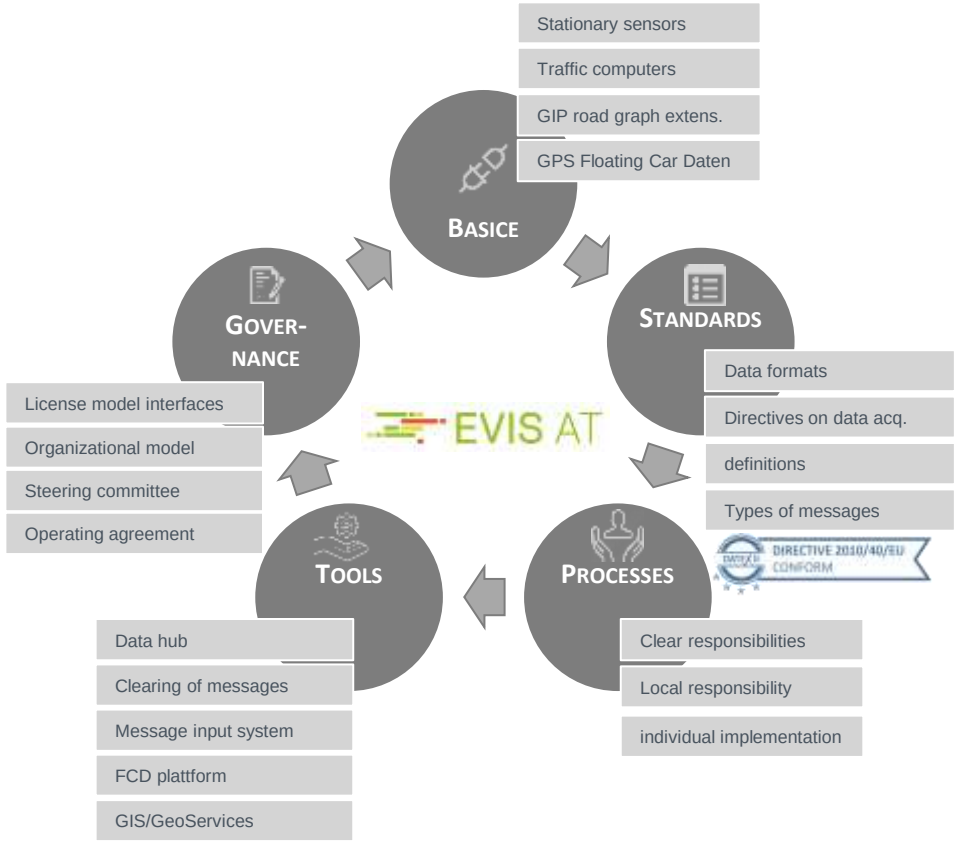
- Federal police
- 1 major automotive club (ÖAMTC)
- 4 ITS organisations (east, west, south, Upper Austria). models and live traffic data for federal states

So along comes…

EVIS AT

EVIS AT FROM PROJECT TO PLATFORM

- **Reliable, up-to-date traffic information** already plays a decisive role in traffic control today and will continue to do so in the future (e.g., routing, automated driving).
- In the past, operators and authorities did not have much **influence on traffic information of navigation providers** or where able to provide their own data to these services.
- With EVIS.AT, the foundations, processes, tools, standards and dissemination measures have been created to **provide traffic information on a uniform national basis and to enable comprehensive traffic management**.



EVIS AT A VALUABLE PARTNERSHIP

Traffic information

Traffic Analytics

Traffic Management

Austrian framework and platform for the creation, provision and exchange of real-time traffic information data of alle federal states, police, ÖAMTC and ASFINAG (motorway operator) as well as Cities (tools and agreements).

EVIS AT

Nice marketing pictures.

But what is in it?

EVIS AT DATA SETS

Messages on **Unplanned Events**	Messages on **Planned Events**	**Traffic State**	**Traffic State Prognosis**	**Traffic Regulations**
DATEX2	DATEX2	JSON	JSON	DATEX2
motorways (secondary road network will be added in 2024)	Motorways, secondary network, 5 major cities	Motorways, scondary road network	motorways, scondary road network	Motorways, federal states of Salzburg and Tirol
accidents, danger on the motorway, lost goods,…	roadworks, closures due to regulations (events,…)	LOS, travel times	LOS, travel times	closures for through traffic

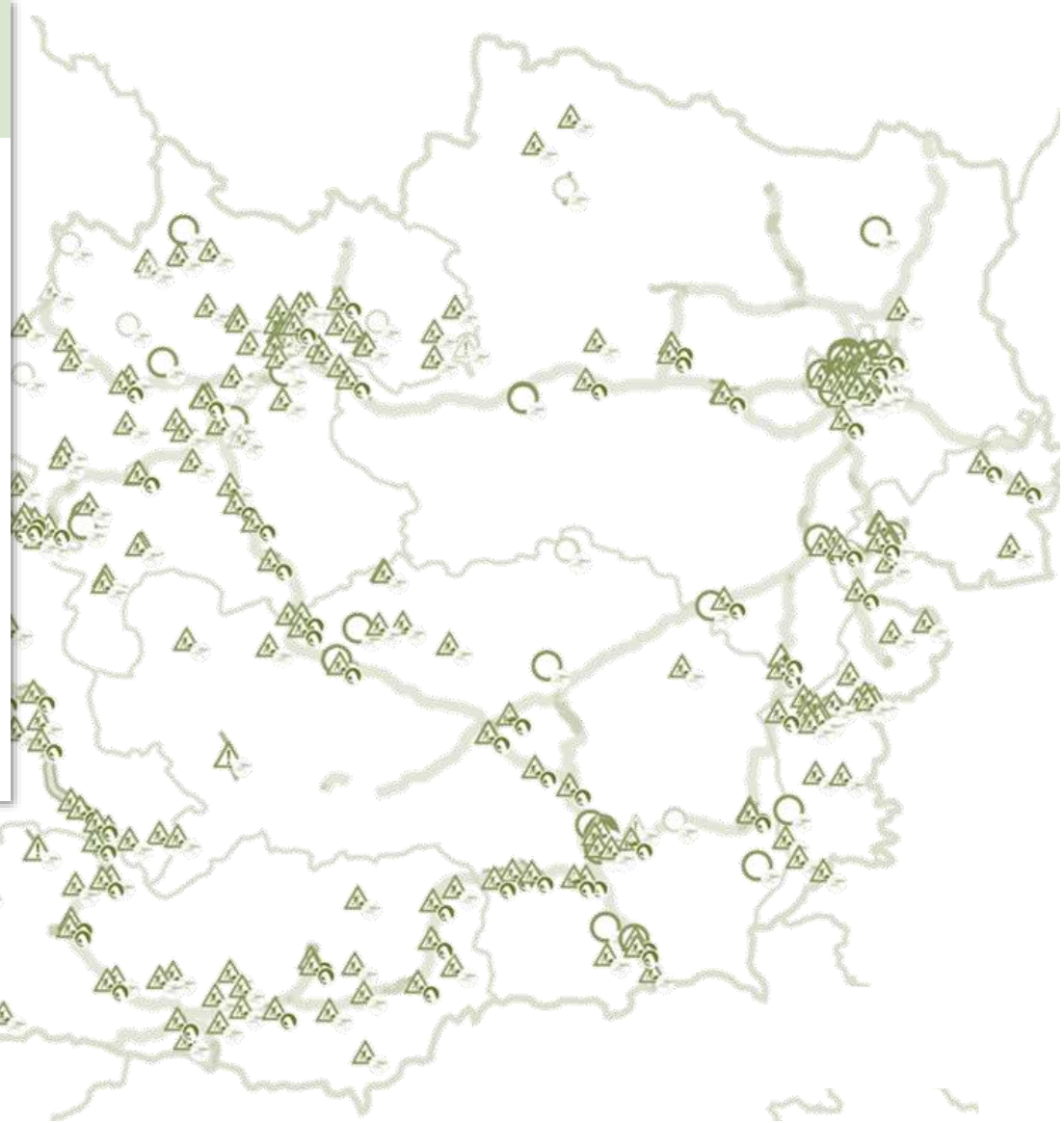
More information, description and sample data are available at Austria‘s NAP:

https://mobilitaetsdaten.gv.at/daten?search=EVIS.AT

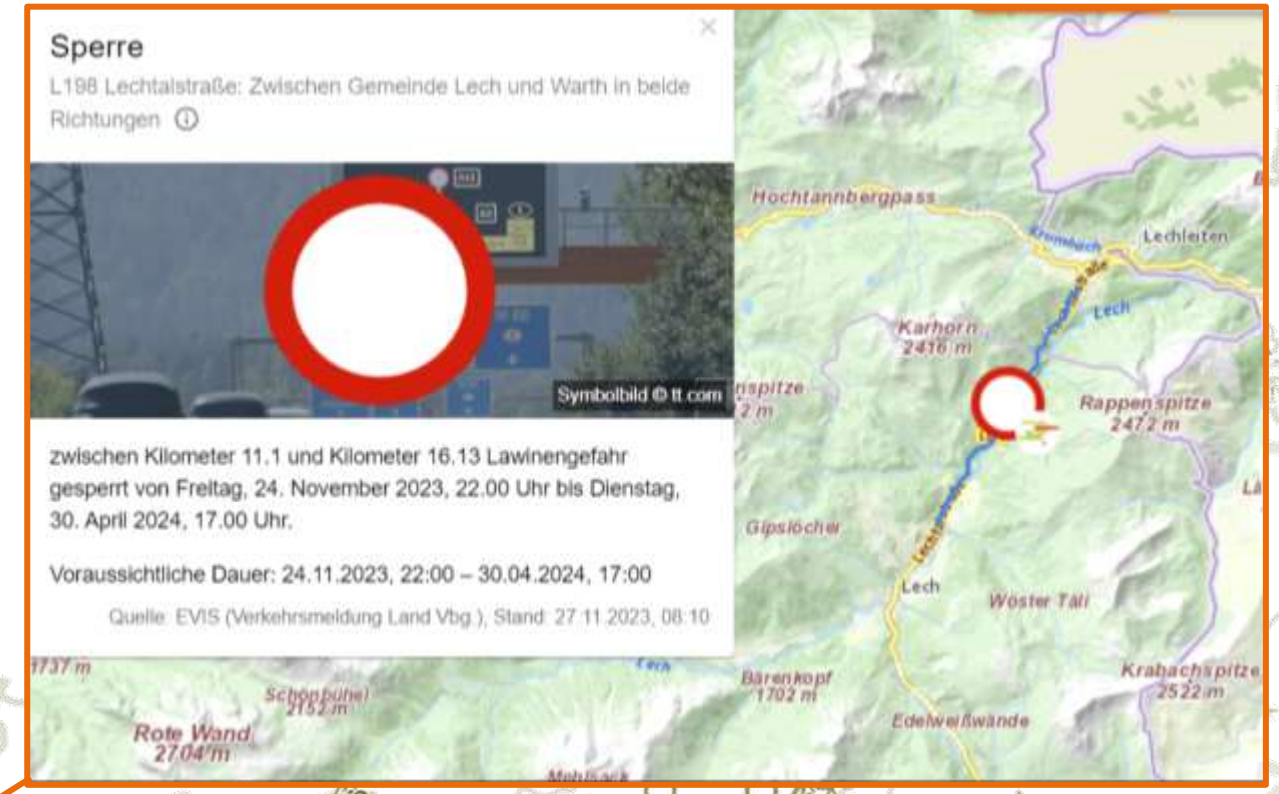
TRAFFIC MESSAGES

Sample data set traffic messages
November 13, 2023 - „a random day in fall“:

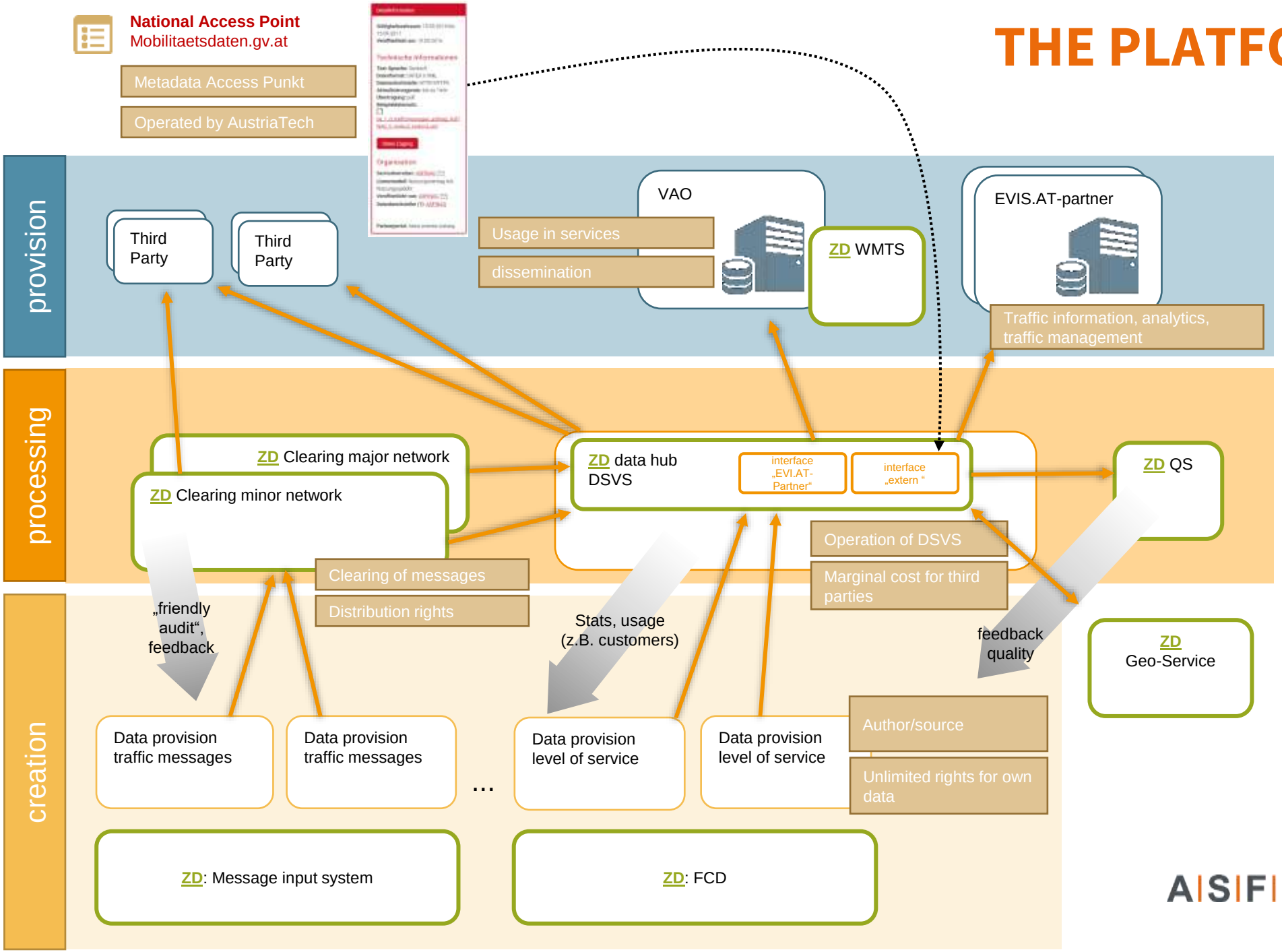
messages unplanned traffic events	**374**
of which spontaneous closures	20
messages planned traffic events	**866**
of which closures	127
messages winter closures	**5**
total	**1245**
of which closures	152



EVIS AT TRAFFIC MESSAGES



THE PLATFORM



A|S|F|i|N|A|G

REAL TIME TRAFFIC DATA FOR ALL OF AUSTRIA

/data

- Professional interfaces
- Service Level Agreement
- DATEX2, TIC ML, GeoRSS

/services

- Easy access to information
- ready-to-use white label apps (traffic data, routing websites, apps,...)
- B2B

/cooperations

- routing interfaces („VAO“)
- „Linking Services“
- Data and service provision for third parties, TMC channel, DAB etc.

- ☑ Messages directly from the authorities
- ☑ Coverage: all of Austria, motorways & secondary & larger Cities (more added) (unplanned events will be added in 2024 with interfaces to police data)
- ☑ ONE DATEX2 format and profile per data set for all data of all partners
- ☑ ONE physical real-time interface and ONE contract required

ROOM FOR IMPROVEMENT

Accuracy:

- In some states: predicted closure time ⇔ actual closure time
- Assess and report accuracy (completeness, special and temporal accuracy)

Comprehensiveness:

- Adding more cities to the platform (2024f)
- Adding police to the platform (2024)

Other:

- Take service providers priorities' into account
- Promoting and using the data sets (Translation of metadata,…)
- Accessing the data, licences

Cities in EVIS.AT

- ☑ Wien (Vienna)
- ☑ Graz
- ☑ Innsbruck
- ☑ Linz
- ☑ Villach
- ☐ St. Pölten
- ☐ Mödling
- ☐ Salzburg
- ☐ Bregenz
- ☐ Klagenfurt

Thank you for your attention!

Want to know more?

EVIS.AT platform website:
evis.gv.at

EVIS.AT data sets on Austria‘s NAP:
https://mobilitaetsdaten.gv.at/daten?search=EVIS.AT

EVIS.AT platform chair:
Tobias Schleser
ASFINAG Maut Service GmbH
tobias.schleser@asfinag.at

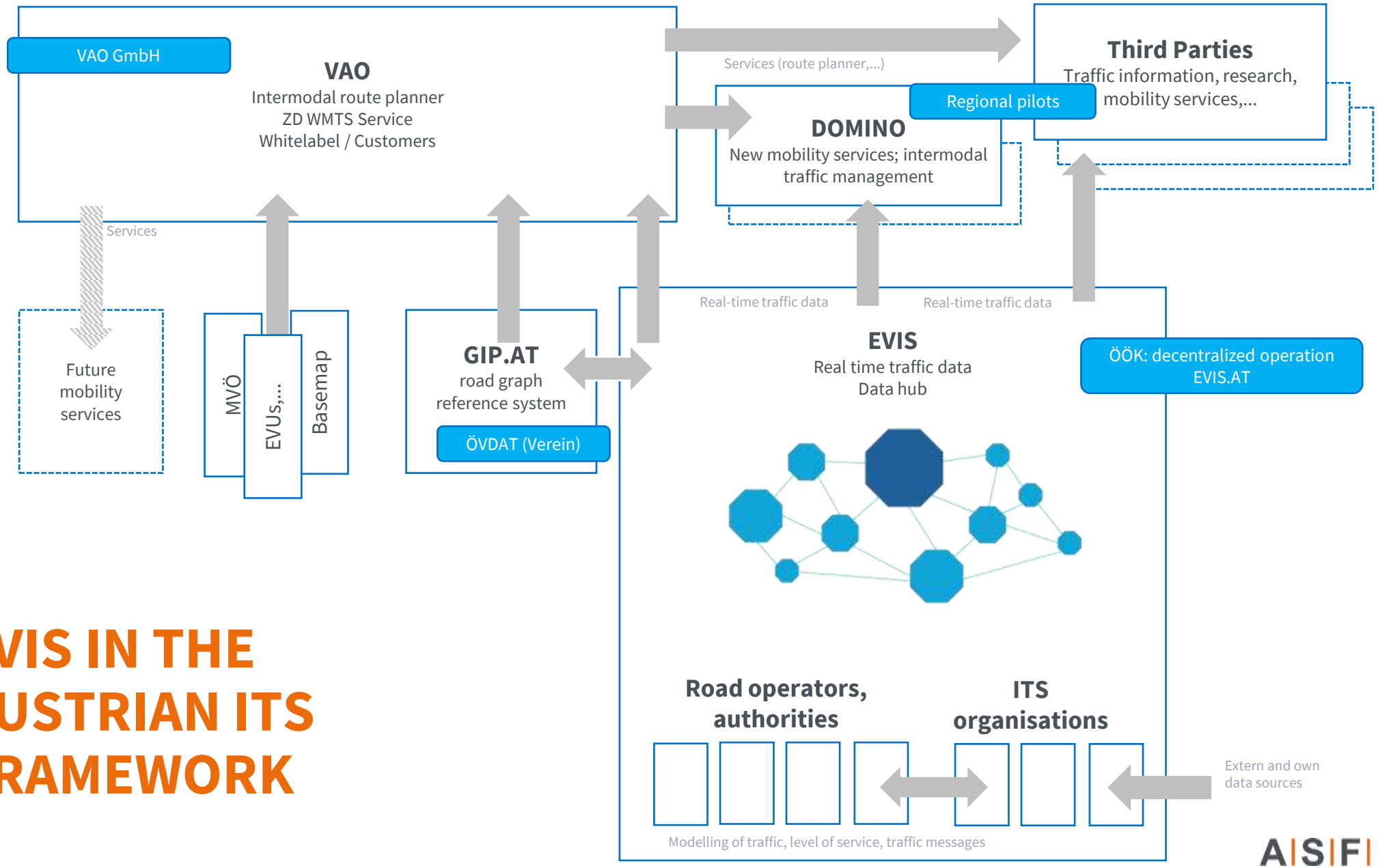
Let‘s connect!

Happy to receive feedback!

ASFINAG

Backup

EVIS IN THE AUSTRIAN ITS FRAMEWORK



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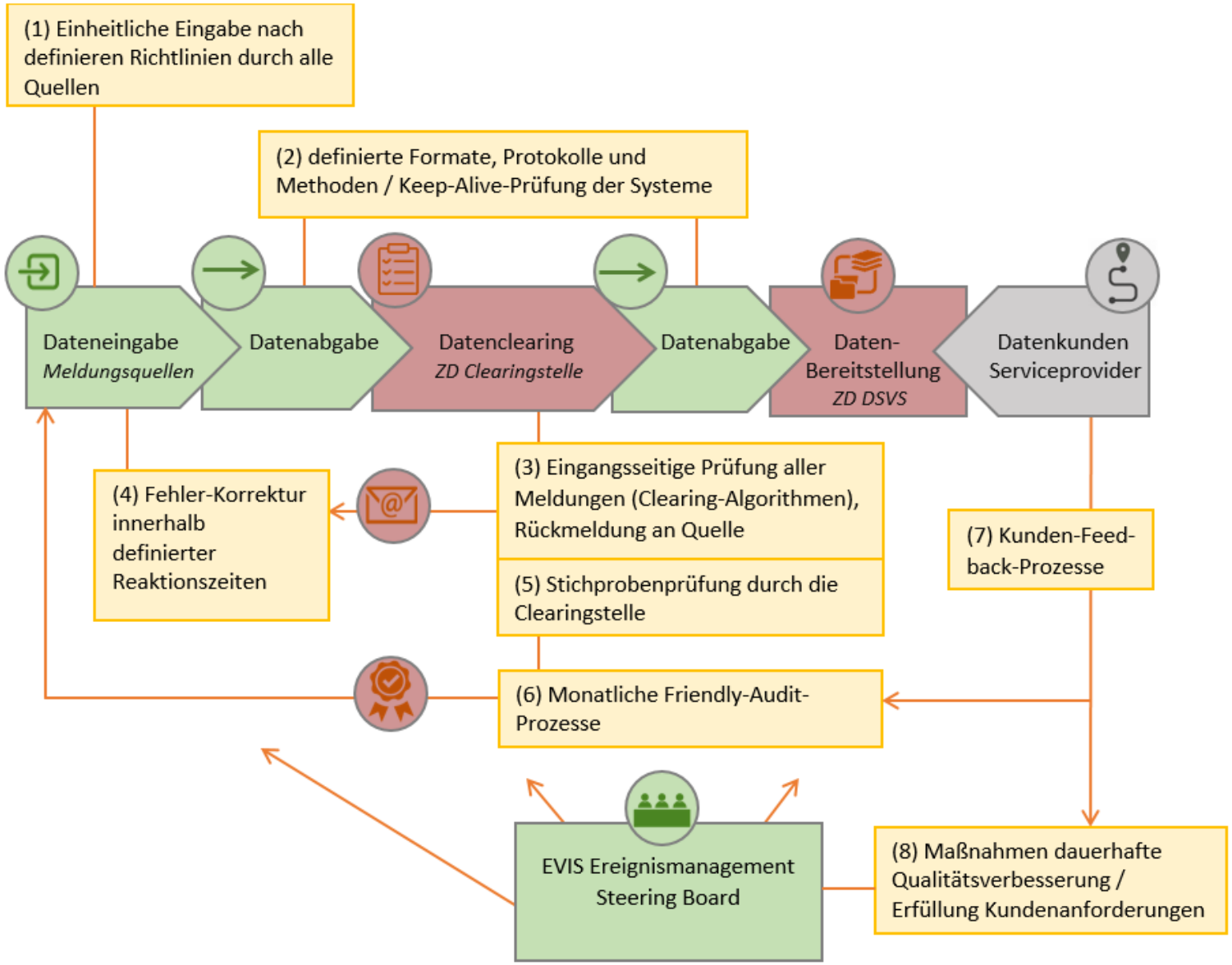
QUALITY MEASURES TRAFFIC MESSAGES



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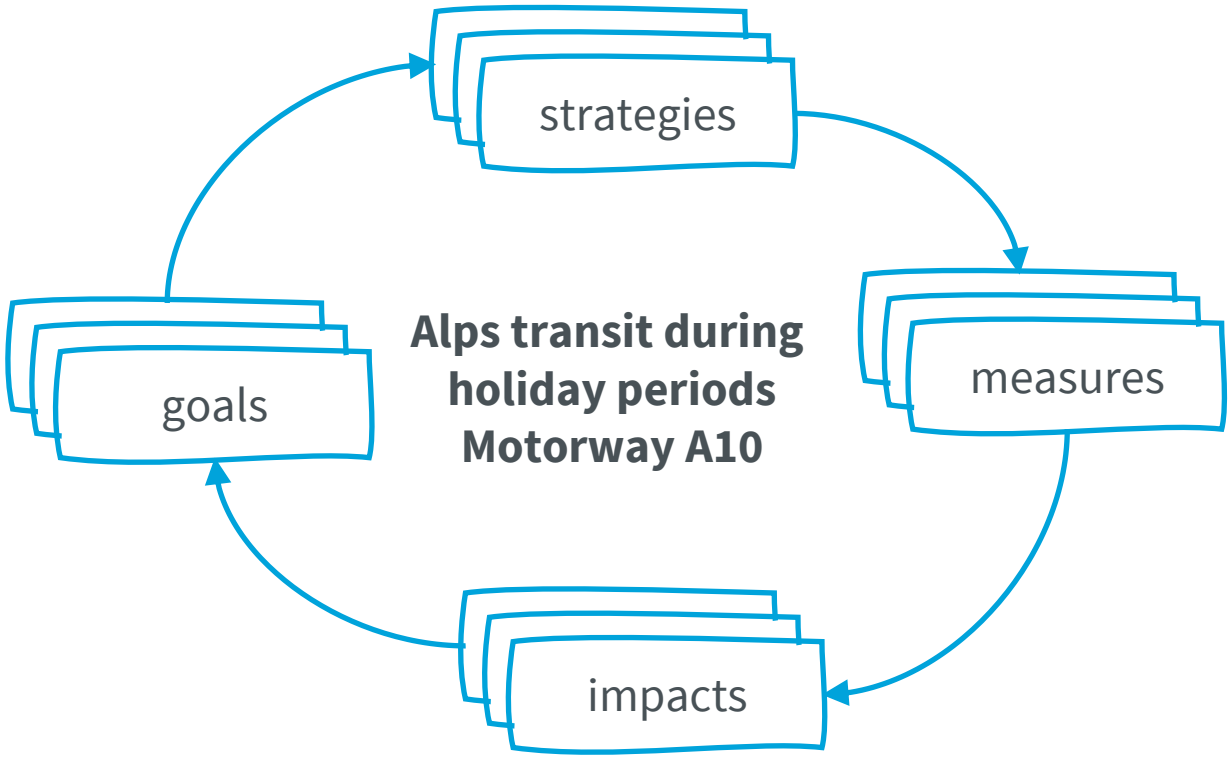
STRATEGIC TRAFFIC MANAGEMENT

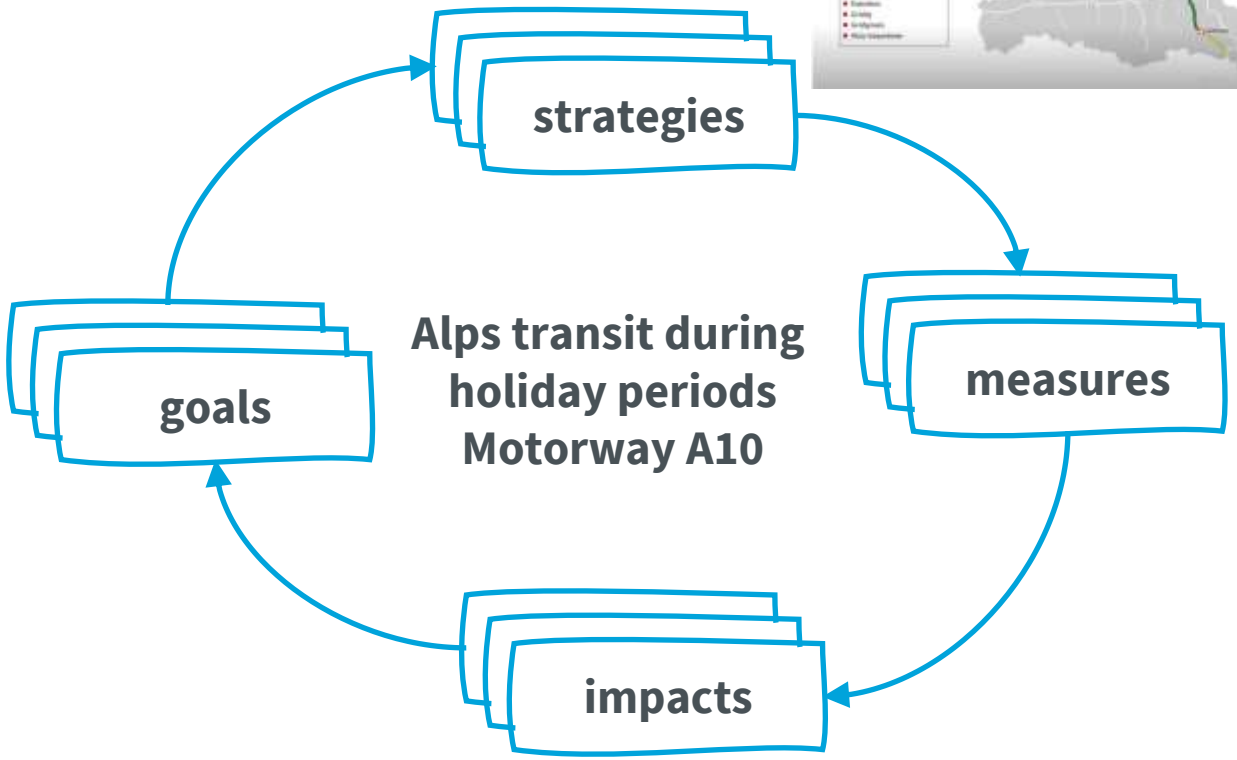


EXAMPLE USE CASE: TRAFFIC REGULATIONS

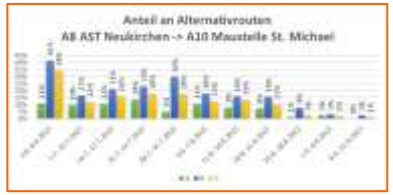
congestion on A10
avoid evasion traffic

© FMT-PICTURES – T.A.

traffic regulation



conditional closure of off-ramps



measure KPIs

A|S|F|i|N|A|G

EXAMPLE USE CASE: TRAFFIC REGULATIONS

legally binding regulations by local and federal authorities

digitization (DATEX2) by Salzburg Research and ASFINAG


```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<d2:payload xmlns:com="http://level3/schema/3/common"
xmlns:tro="http://level3/schema/3/trafficRegulation"
xmlns:ns3="http://level3/schema/3/commonExtension"
xmlns:ns4="http://level3/schema/3/locationExtension"
xmlns:loc="http://level3/schema/3/locationReferencing"
xmlns:atp="http://level3/schema/3/austriaProfile"
xmlns:d2="http://level3/schema/3/d2Payload"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
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modelBaseVersion="3" extensionName="AustriaProfile" extensionVersion="01-00-00"
profileName="Austria trafficRegulation" profileVersion="01-00-00">
  <com:publicationTime>2022-06-16T10:00:00+01:00</com:publicationTime>
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    <com:nationalIdentifier>Land-AT-5</com:nationalIdentifier>
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version="1">
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        <com:values>
          <com:value lang="de">Gemäß § 44 a iVm 94 b der Straßenverkehrsordnung
1960, BGBl. Nr. 159/1960 in der derzeit geltenden Fassung, wird für alle
Donnerstage, Freitage, Samstage, Sonntage vom 07.07.2022 bis 11.09.2022,
jeweils in der Zeit von 06:00 bis 22:00 Uhr Folgendes verordnet: Einfahrt
verboten auf der Franz-Peyerl-Straße, auf dem Bachmannweg, auf dem Mitterweg
auf dem Dr.-Friedrich-Oedlweg, jeweils bei der Kreuzung mit der B160
Berchtesgadener Straße und jeweils in Fahrtrichtung Ortsgebiet Grödig. Von
diesem Verbot ausgenommen sind Radfahrer und Ziel- oder Quellverkehr Gemeinde
Grödig.</com:value>
        </com:values>
      </tro:description>
      <tro:issuingAuthority>
        <com:values>
          <com:value lang="de">Bezirkshauptmannschaft
Salzburg-Umgebung</com:value>
```


distribution through the EVIS.AT platform

EVIS AT

implementation in services

VERKEHRSAUSKUNFT ÖSTERREICH

TomTom

ASFINAG

EXAMPLE USE CASE: TRAFFIC REGULATIONS

indicator: choice of route for different service providers

indicator: impact on traffic

indicator: origin of vehicles

Regions feeding critical safety information via TN-ITS to mapmakers

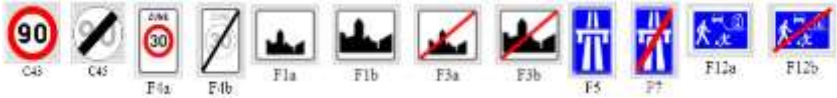
Vlaanderen
is wegen en verkeer

TN-ITS in Flanders: Background

- Active in TN-ITS for many years
  - » NAPCORE
  - » member of TN-ITS platform
- 2 important data sources for TN-ITS:
  - » Wegenregister
  - » Traffic sign database

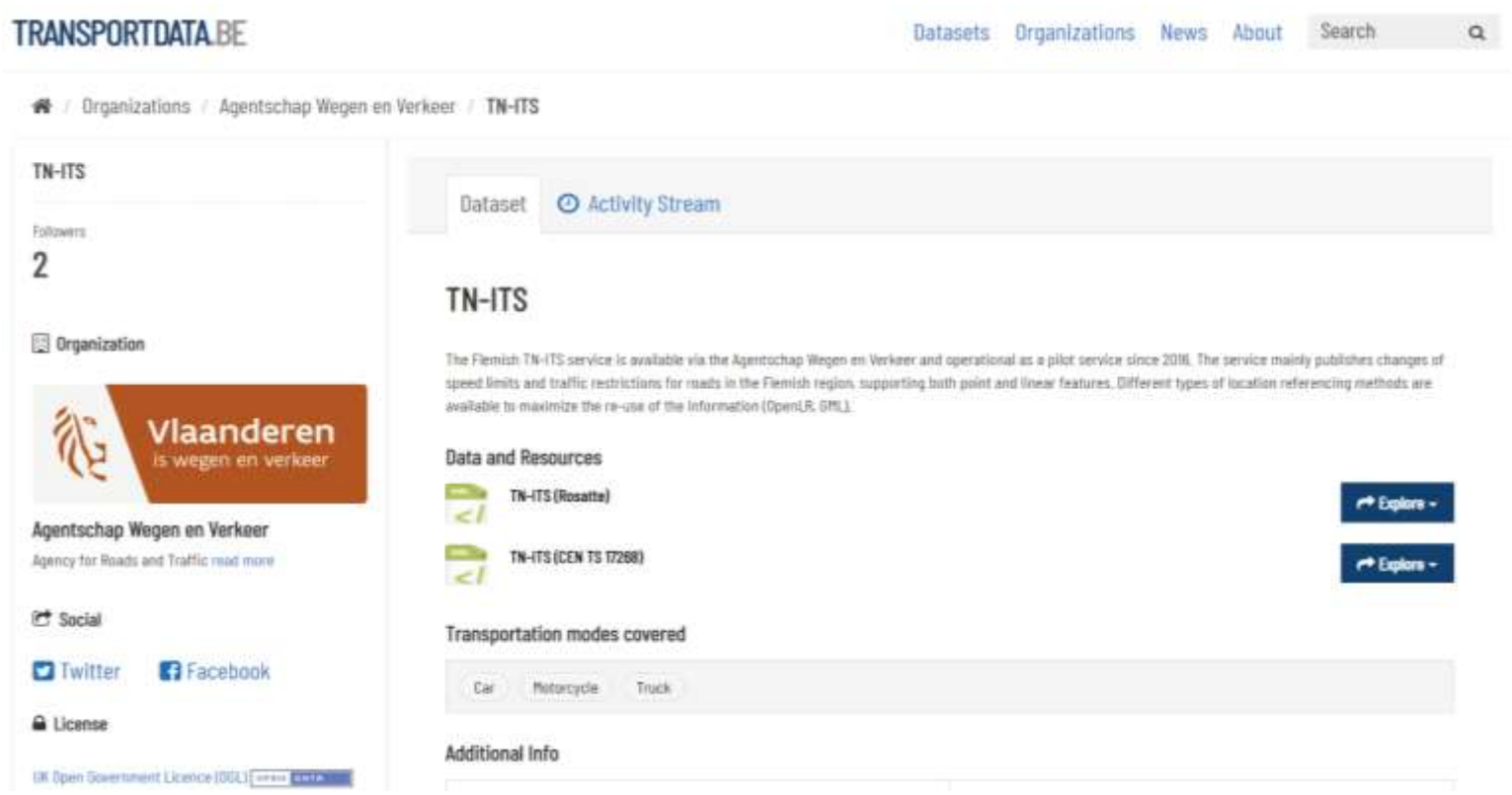
TN-ITS in Flanders: Status

- Pilot TN-ITS service operational since Q4 2016
- Implementation of the CEN TS 17268 in 2021
- Current TN-ITS service (daily updates):
  - » Static speed limits (point features and line features)
  - » Warning signs, restriction signs on vehicle type and vehicle properties, and a number of mandatory signs implying limitations, ...



Vlaanderen
is wegen en verkeer

TN-ITS on the Belgian NAP ITS



Vlaanderen
is wegen en verkeer

Examples of Priority Use Cases from Denmark

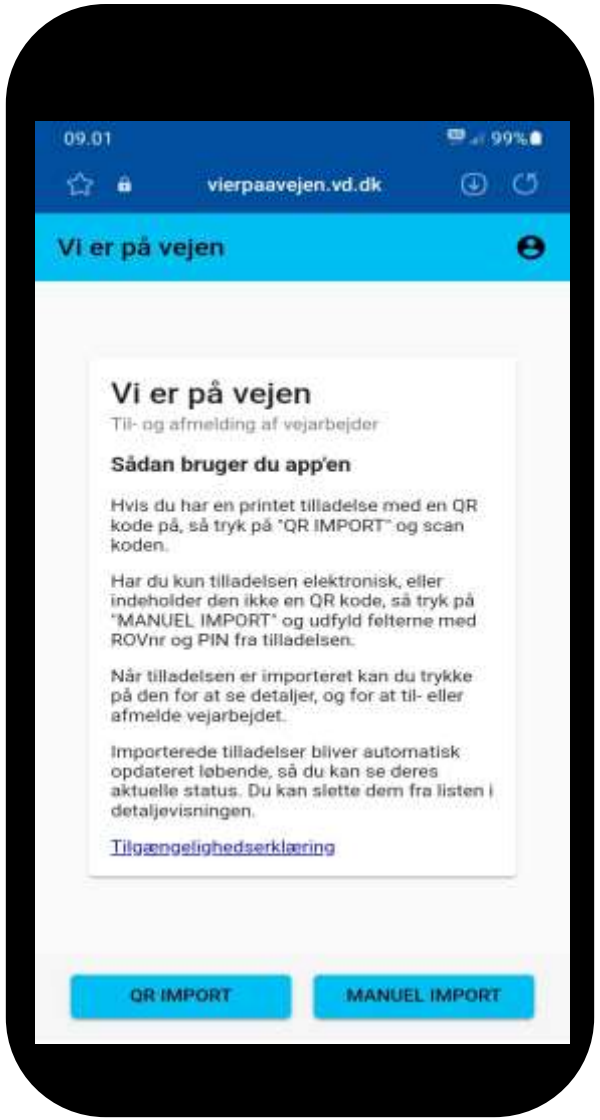
Thomas Mark de Laine, Danish Road Directorate

Vejdirektoratet
DANISH ROAD DIRECTORATE

Proud Moments

When are roadworks actually going on?

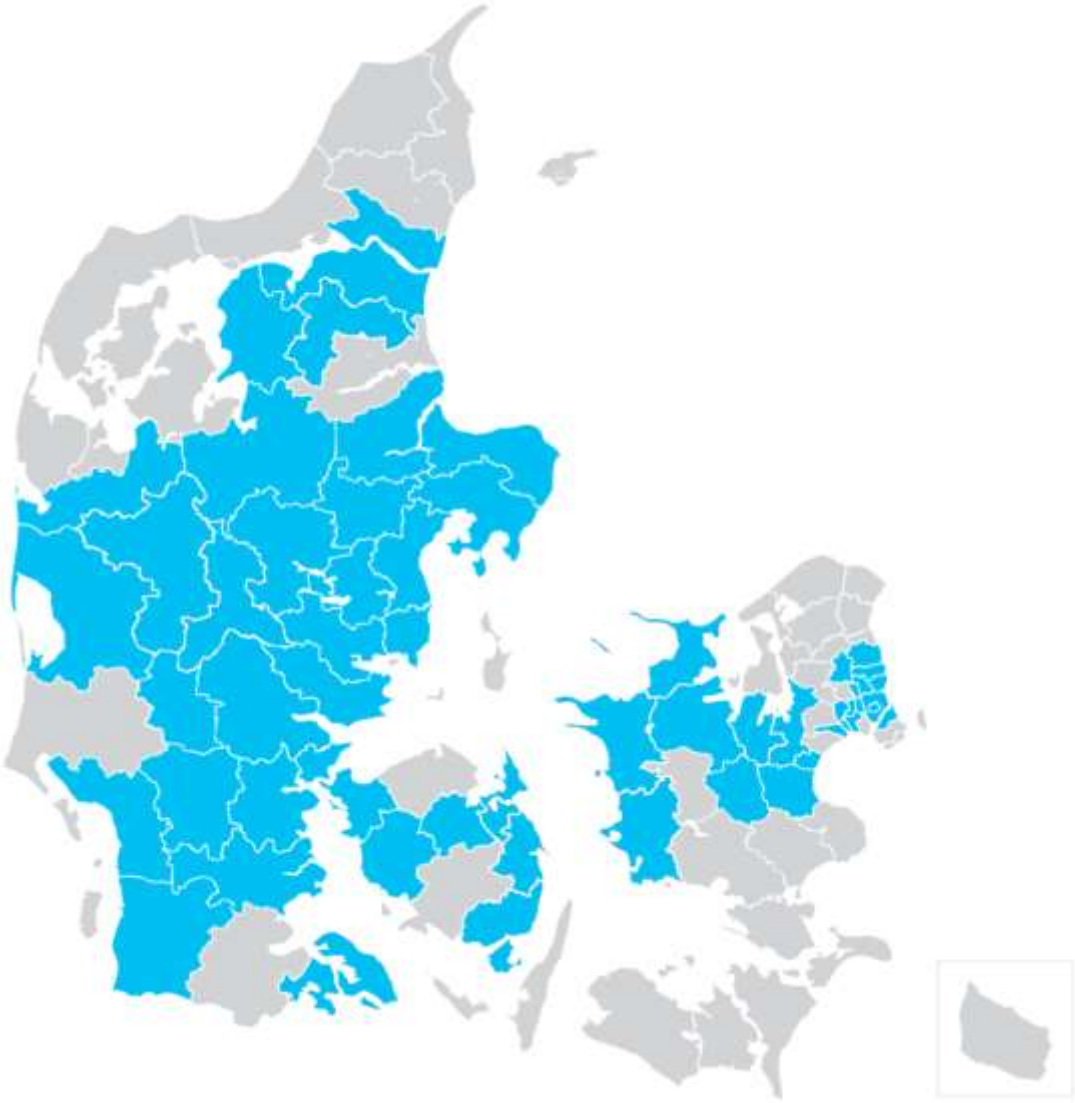
- The Danish Road Directorate will often issue permits for roadworks that allow the contractor more time on the road than needed – just like many other road authorities
- But the contractor uses an app to activate and deactivate the roadworks message in the data we supply
- Roadworks are activated just before safety measures (cones, signage etc.) are being put in place and deactivated when they have been removed
- A roadworks message is thus only active when the activity affects traffic



Proud Moments

Coordinated national solution for roadworks and events data:

- More than half of the Danish municipalities (55 out 98 – those in blue on the map) are already using a national service for roadworks and events information
- Traffic messages from the municipalities and the Danish Road Directorate are all in the same data feed on the Danish NAP and they use the DATEX II standard in the same way



Frustrations

- Location, Location, Location…!
- We are not able to provide OpenLR location references
- This is affecting both Roadworks, Road Closures and Speed Limits from the Danish Road Directorate
- …and the data from the national solution for roadworks and events information from the municipalities
- To do OpenLR we lack some necessary data in our “homemade” map and digital road network plus some reworking of several IT systems