European Commission

Support to ELISE

European

Location

Interoperability

Solutions for

E-Government

27 March 2019
Workshop 3

Project INSPIRE-MMTIS

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Christophe Duquesne (NeTEx)
Stefan Jugelt (TAP TSI)
Giacomo Martirano (INSPIRE)
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Bard De Vries (DATEX II)

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Project context

Francesco Pignatelli - JRC

Overall context

ELISE:
European Location Interoperability Solutions for E-Government is an Action of the ISA² (Interoperable Solutions for public administrations, business and citizens) Programme of DIGIT.

INSPIRE:
The INSPIRE Directive (2007/2/EC) aims to create a European Union spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment. It is based on the SDIs established and operated by the Member States

ITS Directive 2010/40/EU:
It sets a framework for the deployment if Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

Policy background

Delegated Regulation 2017/1926

o   is supplementing the Directive 2010/40/EU as regards the *provision of EU-wide Multimodal Travel Information Services* (MMTIS)

o   establishes the list of specifications necessary for accessibility, exchange and update of standardised travel and traffic data to ensure the provision of MMTIS in the EU

Link with INSPIRE
Static travel and traffic data shall be provided using the INSPIRE requirements, when related to the spatial networks

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INSPIRE support to the Multi-Modal Travel Information Services (MMTIS)

Problem statement

With INSPIRE, other ITS standards should be considered:

- What are the overlaps and the links?
- What are the options for MS when addressing the requirements of the two Directives?

Actors

- DG MOVE – DG JRC collaboration
- 6 experts for 6 standards
- ITS and INSPIRE stakeholders

Timeline: Jan 2018 - March 2019

The Project Actors' Roles

- Francesco Pignatelli (JRC) contracting partner

- Kasia Bourée: project leader/Transmodel Expert
- Christopher Dodson: IATA Expert
- Christophe Duquesne: NeTEx Expert
- Stefan Jugelt: ERA - TAP/TSI Expert
- Giacomo Martirano and Marco Minghini: INSPIRE Experts
- Bard de Vries: DATEX Expert

Presentation overview

what	who	role in the project
Summary of objectives/methodology	Kasia Bourée	Coordinator + Transmodel expert
Example of overlap situation: UC trip planning	Christophe Duquesne	NeTEx expert
Recommendations with INSPIRE as Reference publication standard (examples)	Giacomo Martirano	INSPIRE expert
Recommendations with NeTEx as Reference publication standard (examples)	Christophe Duquesne	NeTEx expert
Examples of data categories with no Reference	Bard de Vries	DATEX expert
IATA position	Christopher Dodson	IATA expert
Conclusion: next steps	Kasia Bourée	coordinator

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Summary of objectives/methodology

Kasia Bourée
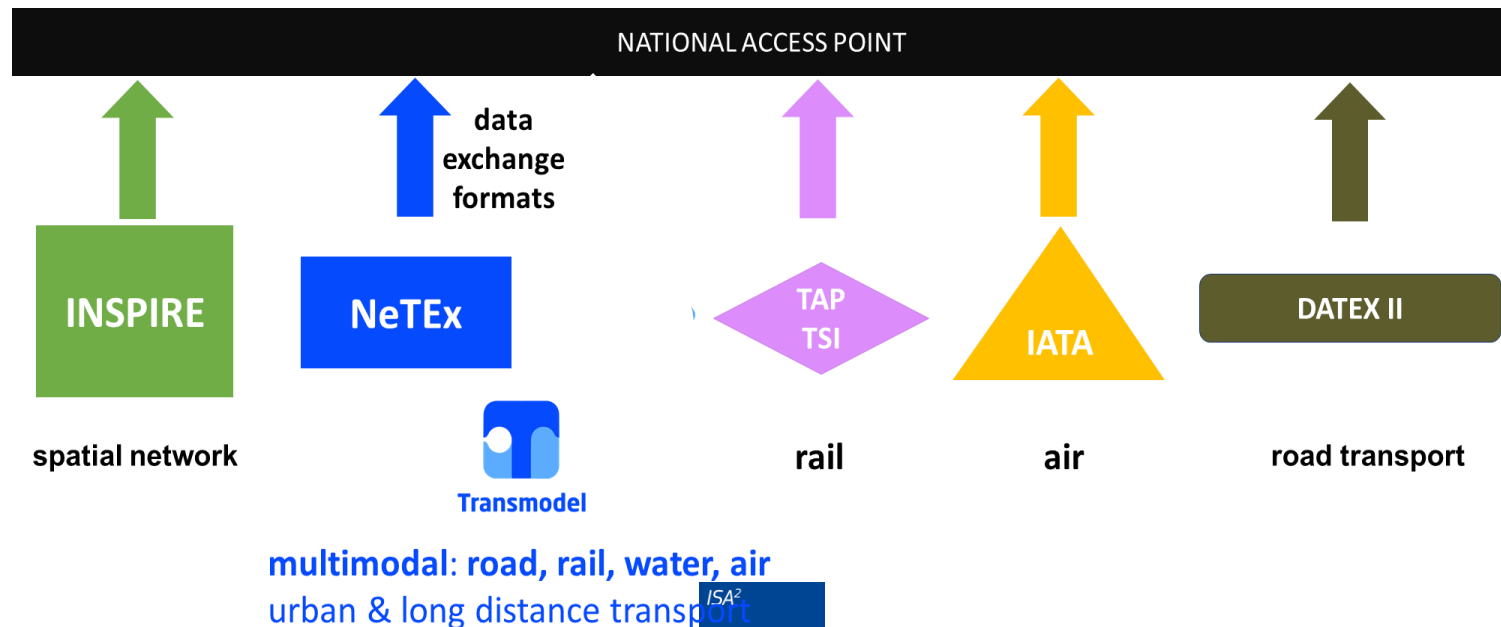## coordinator

Purpose of this workshop
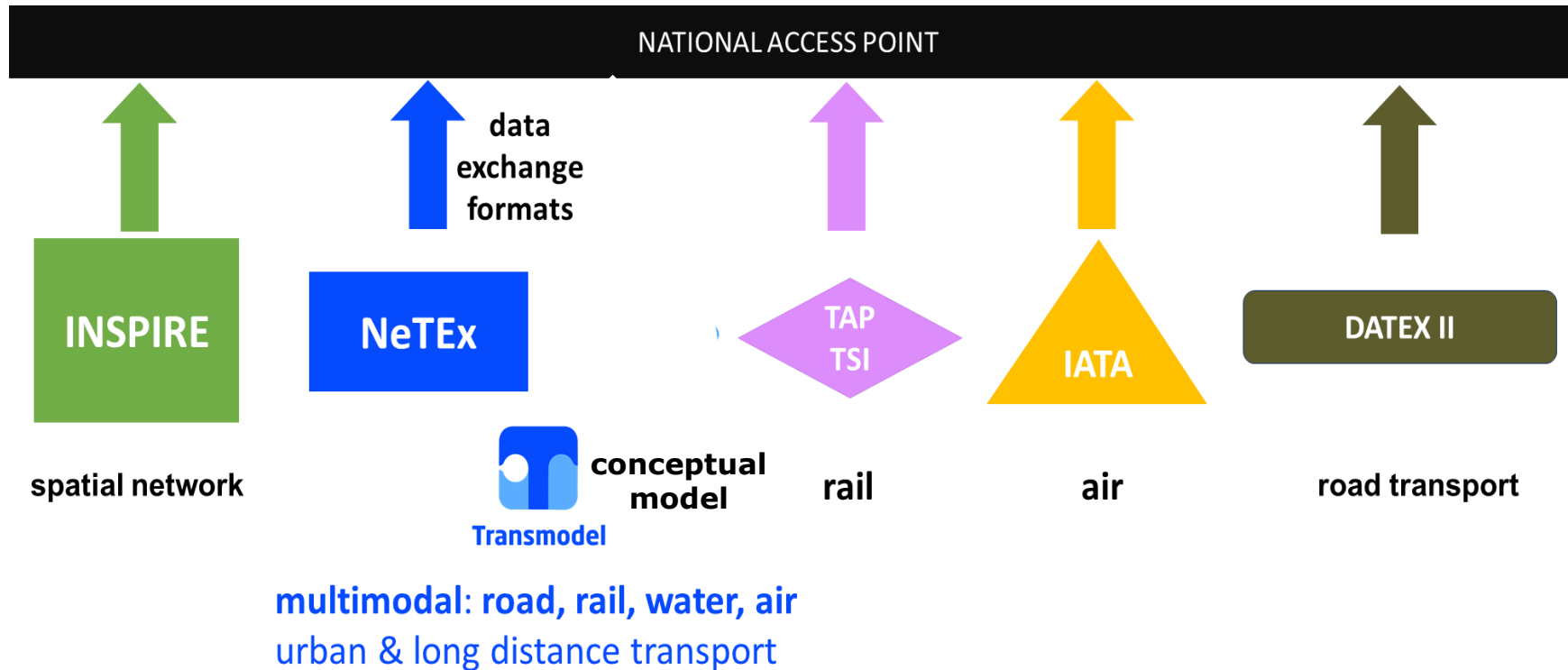
To present the main results of the project
and

collect your feedback
address questions at the end of this session

Regulation 2017/1926 Article 4 - Accessibility, exchange and reuse of static travel and traffic data

Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide **the static travel and traffic data and historic traffic data listed** in point 1 of the Annex, of the different transport modes by using the following specifications

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NATIONAL ACCESS POINT

data exchange formats

INSPIRE

NeTEx

TAP TSI

IATA

DATEX II

spatial network

Transmodel

conceptual model

rail

air

road transport

multimodal: road, rail, water, air
urban & long distance transport

1. Identify/describe overlaps
2. Provide recommendations to handle overlaps

In scope: spatial, static information

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Stepwise approach

1. Consider 20 data categories related to static, spatial information mentioned in the MMTIS Regulation

Publication deadline	Spatial data categories for Level of Service 1 listed in Annex of the Delegated Regulation 2017/1926
01/12/2019	— Location search (origin/destination): — Address identifiers (building number, street name, postcode) — Topographic places (city, town, village, suburb, administrative unit) — Points of interest (related to transport information) to which people may wish to travel — Location search (access nodes): — Identified access nodes (all scheduled modes) — Geometry/map layout structure of access nodes (all scheduled modes) — Trip plan computation — scheduled modes transport: — Connection links where interchanges may be made — Network topology and routes/lines (topology) — Stop facilities access nodes (including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations) — Trip plan computation — road transport (for personal modes): — Road network — Cycle network (segregated cycle lanes, on-road shared with vehicles, on-path shared with pedestrians) — Pedestrian network and accessibility facilities

Stepwise approach

1. Consider 20 data categories related to static, spatial information mentioned in the MMTIS Regulation
2. Provide definitions of these data categories (Workshop 1)

Data Category	Definition
Topographic Place (city, town, village, suburb, administrative unit)	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest (INS: Geographical Names) **INSPIRE-based**
Points of Interest	Types of places to or through which passengers may wish to navigate as part of their journey. (TRM/NTX: POINT OF INTEREST) **Transmodel -based**
Identified access nodes (all scheduled modes)	**Topological aspect**: Zero-dimensional nodes of the network (that may be located by coordinates in a particular Coordinate Reference System) used for the spatial description of the network, where passengers can board or alight from vehicles (TRM/NTX: SCHEDULED STOP POINT) **2 aspects** **Geographical aspect**: Places comprising one or more locations where vehicles may stop and where passengers may board or leave vehicles or prepare their trip (TRM/NTX: STOP PLACE)

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Stepwise approach

1. Consider 20 data categories related to static, spatial information mentioned in the MMTIS Regulation
2. Provide definitions of these data categories (Workshop 1)
3. Identify standards potentially related to data categories
   - Identify differences in scope/purpose of the different standards involved
   - Extract data models and compare → overlap table
   - Identify Reference Standards and Contributing Standards
   - Identify standards providing semantically equivalent information and build mapping tables

- A *Reference Standard* **(R)** is a specification of which the scope covers a particular data category in a most comprehensive way.

- Other standards are *Contributing Standards* **(C)** of a data category.

- The scope of a *Reference Standard* is such, that the standard is specifically designed to publish data for a particular data category D, whereas the scope of a *Contributing Standard* is such that this standard only refers to (uses) the data category D to better describe other concepts.

- Example: NeTEx describes Access Nodes (is a Reference Standard for Access Nodes) and is a Contributing Standard for Addresses (of which the Reference Standard is INSPIRE);

Step 3: Overlap table
(Level of Service 1)

Data Category - Level of Service 1		TRM/NTX	INSPIRE	TAP TSI	IATA	DATE X
Address identifiers	1	C	R	C		C
Topographic Place	2	C	R			C
Points of Interest	3	C	R (limited)			
Identified access nodes	4	R	C (air/rail)	C	C	
Parking (incl facilities)		C	note			C
Geometry/map layout-structure of access nodes	5	R				
Connection links	6	R	note	C		
Netw. Topology & Routes/Lines (topology)	7	R	note	C (service patterns)	C	
Stop facilities access nodes	8	R		note		
Road Network	9	note	R			note
Cycle network	10	note	C (segregated lanes)			
Pedestrian network and accessibility facilities	11	note	C (no accessibility)			

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Overlap: For each data category, the situation in which two or more data models underpinning a data category have a similar scope as regards this data category (is also called overlap of data models).

> type 1: data model overlaps - semantically equivalent information
>
> *(information modelled by one model may be replaced by the information modelled by the other model without loss of information)*
>
> type 2: data model overlaps – complementary information

*Data set overlap: not considered within this project – may be solved by adequate NAP governance:*

> *Type 3: duplicate instances of published data using the same standard format by different data providers.*
>
> *Type 4: duplicate instances of published data using two different standard formats.*

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C → **m** → **R**

The Mapping is a correspondence between a source structure C and a target structure R
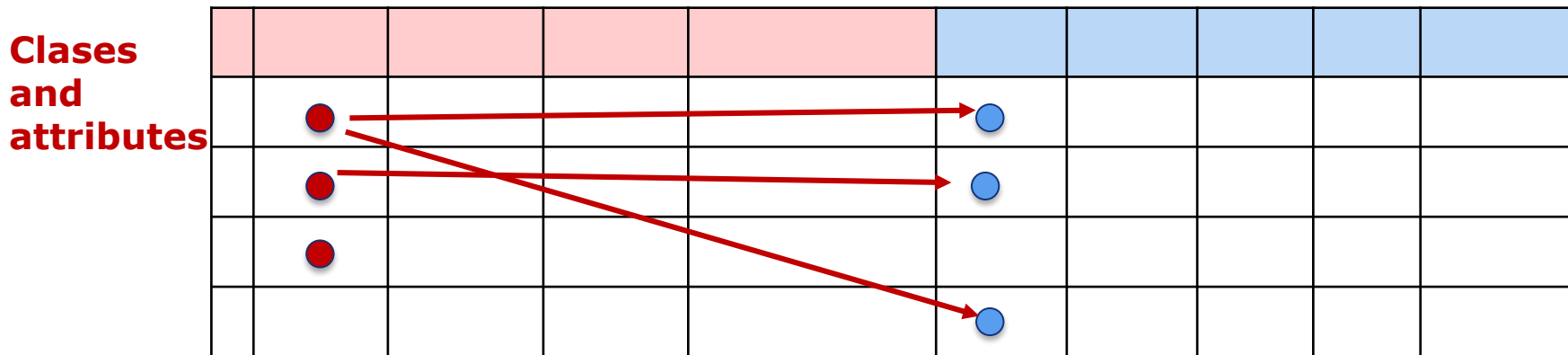
Meaningful for standards **semantically equivalent / complementary**
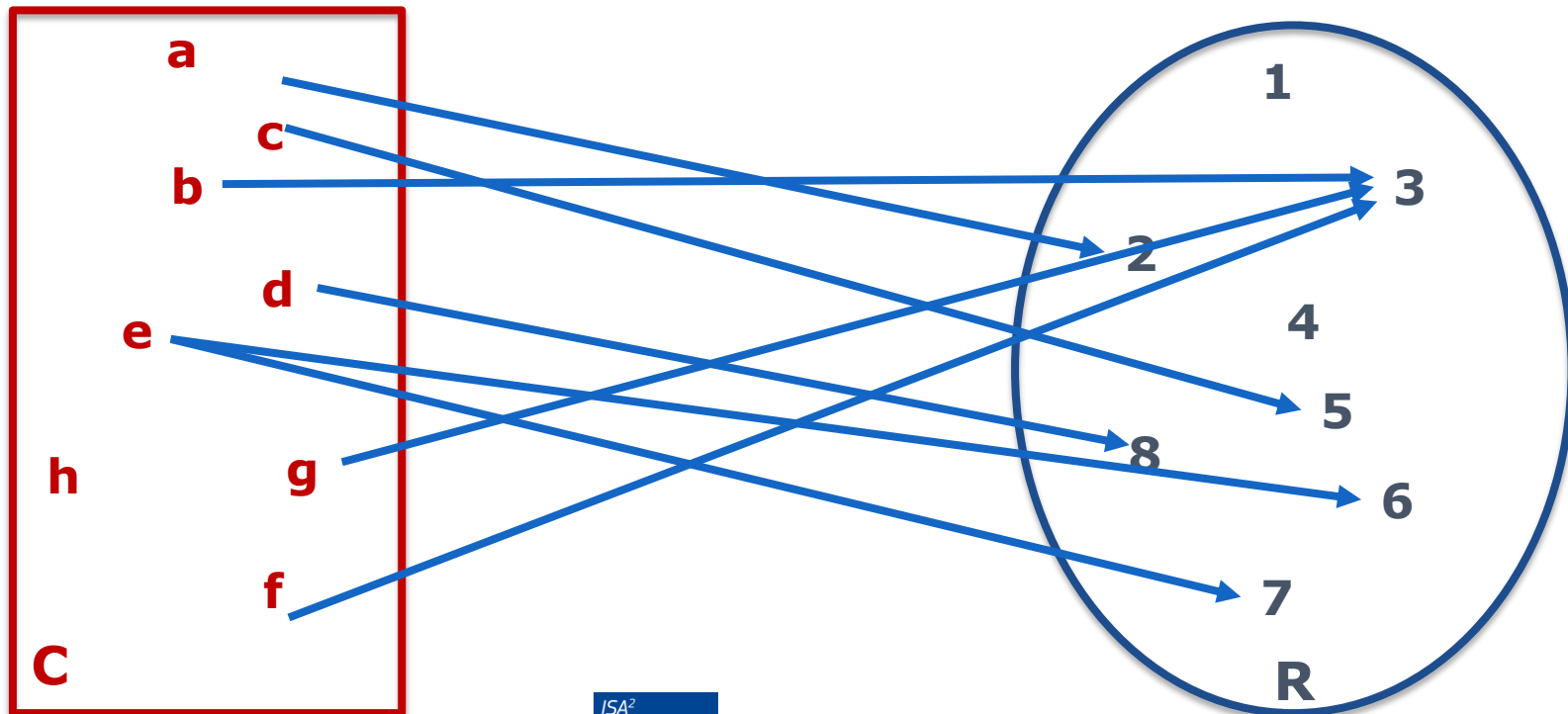
A mapping may be represented in a correspondence table:

Source elements: C standards   **Target element: R standards**

Clases and attributes

Example of mapping situation:

Contributing: Transmodel/NeTEx Postal Address

Reference: INSPIRE elements for Postal Addresses

Stepwise approach

1. Consider 20 data categories related to static, spatial information mentioned in the MMTIS Regulation
2. Provide definitions of these data categories (Workshop 1)
3. Identify standards potentially related to data categories
   - Lead a detailed analysis of the data models underpinning the data categories
   - Identify differences in scope/purpose of the different standards involved
   - Extract data models and compare → overlap table
   - Identify Reference Standards and Contributing Standards
   - Identify standards providing semantically equivalent information and build mapping tables
4. Illustrate through concrete Use Cases (Workshop 2)
5. Provide recommendations to MS to support implementation of the ITS regulation, taking into account INSPIRE requirements

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Concrete problem for data consumers: identify Stop Places and possibly thier addresses in the neighbourhood (buffer 300m) of administrative services for Region1&2

D A T A   C O N S U M E R S

Governmental Service				
Postal Addresses	**Stop Places & Addresses Region 1**	**Stop Places & Addresses Region 2**	**Rail Stations & Addresses Region 1**	**Rail Stations & Addresses Region 2**

N A P

INSPIRE   Transmodel/ NeTex   TAP TSI   IATA   DATEX II

D A T A   P R O V I D E R S

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What can be recommended

- To NAP DATA CONSUMERS to manage overlaps?

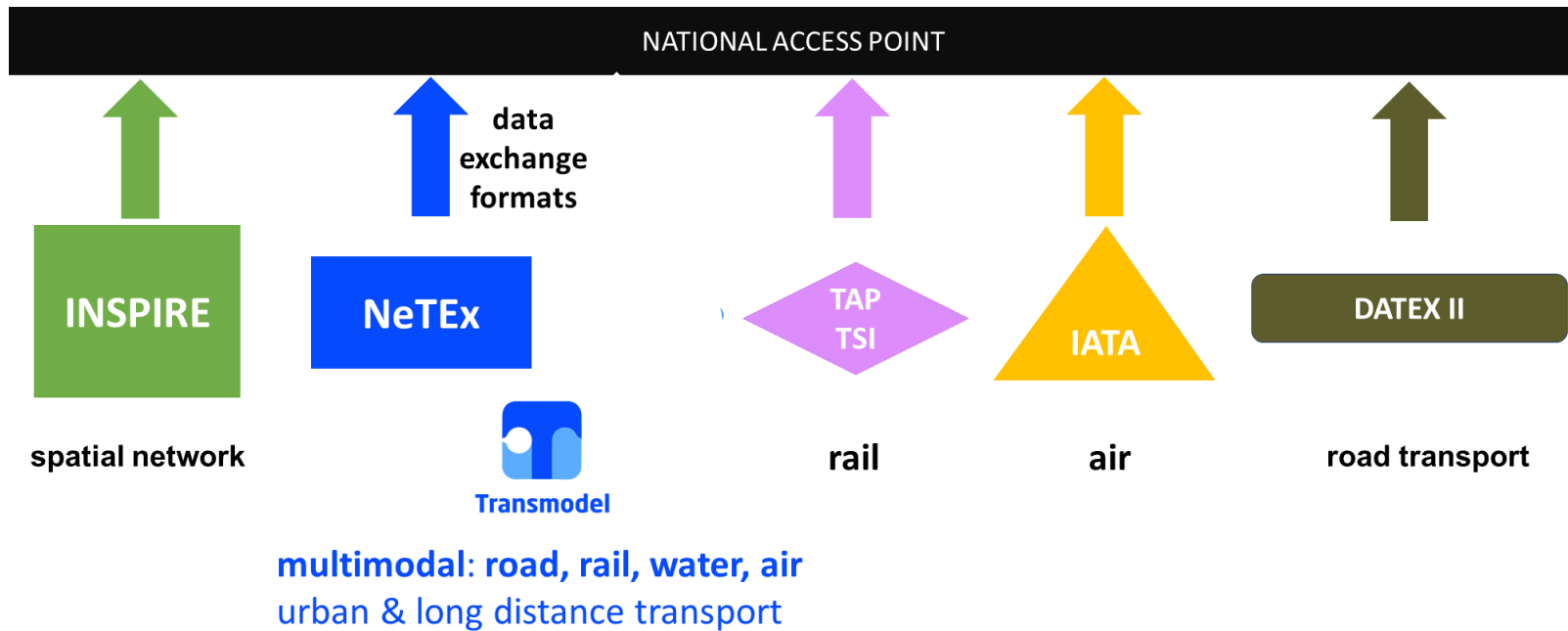- To NAP DATA PROVIDERS to avoid overlaps ?

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Stepwise approach

1. Consider 20 data categories related to static, spatial information mentioned in the MMTIS Regulation
2. Provide definitions of these data categories (Workshop 1)
3. Identify standards potentially related to data categories
   - Lead a detailed analysis of the data models underpinning the data categories
   - Identify differences in scope/purpose of the different standards involved
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   - Identify Reference Standards and Contributing Standards
   - Identify standards providing semantically equivalent information and build mapping tables
4. Illustrate through concrete Use Cases (Workshop 2)
5. Recommendations

- reference standard identified:
  - to NAP data consumers-scenario1
  - to NAP data providers –scenario2 (avoid overlap)

- gaps in standardization or missing reference standard specification
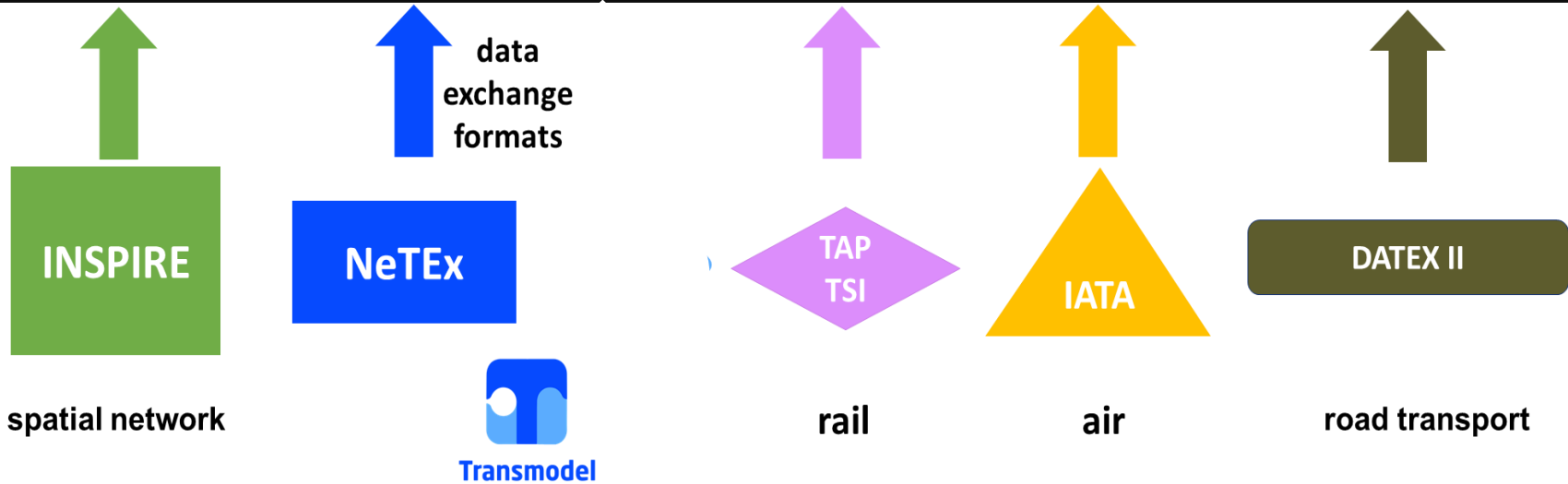
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Data providers use all specifications mentioned in MMITS directive

Recommendations for

NAP DATA CONSUMERS

NATIONAL ACCESS POINT

data exchange formats

INSPIRE

NeTEx

TAP TSI

IATA

DATEX II

Transmodel

spatial network

rail

air

road transport

multimodal: road, rail, water, air
urban & long distance transport

Consideration of each data category – data transformation into the Reference format
taking guidance from the mapping tables

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NATIONAL ACCESS POINT

INSPIRE

NeTEx

data exchange formats

TAP TSI

IATA

DATEX II

spatial network

Transmodel

rail

air

road transport

multimodal: **road, rail, water, air**
urban & long distance transport

Recommendations for

NAP DATA PROVIDERS

How to avoid
dubble effort in publication

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1. Standardisation **gaps:**
- absence of adequate data models
  - absence of publication profiles

2. Presence of **competing standards** (no reference)

- Recommendations to the MS/EC/CEN

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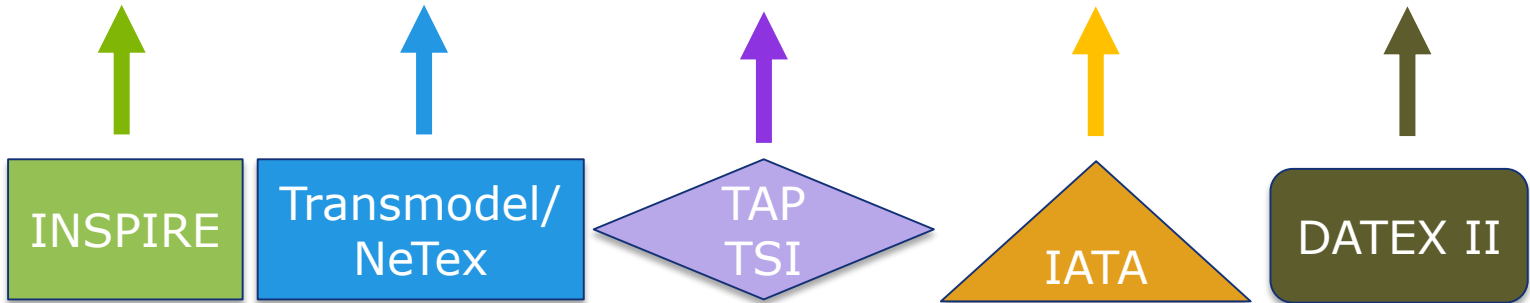# Use Case « trip planning » as illustration of overlap situation

Christophe Duquesne

Overlaps of data categories   Trip Planning

END USERS

Journey Planner

DATA CONSUMERS

N A P

INSPIRE
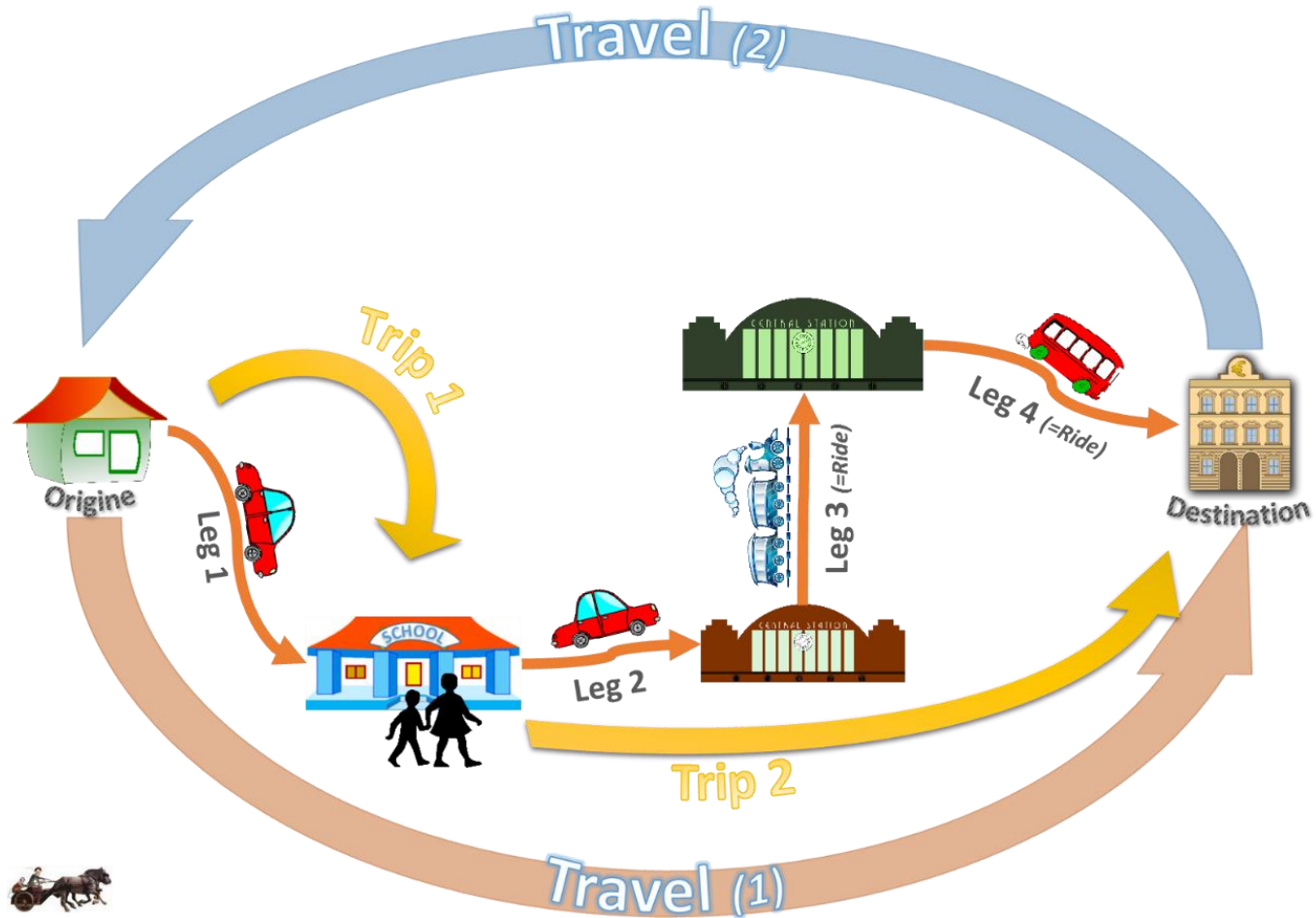
Transmodel/ NeTex
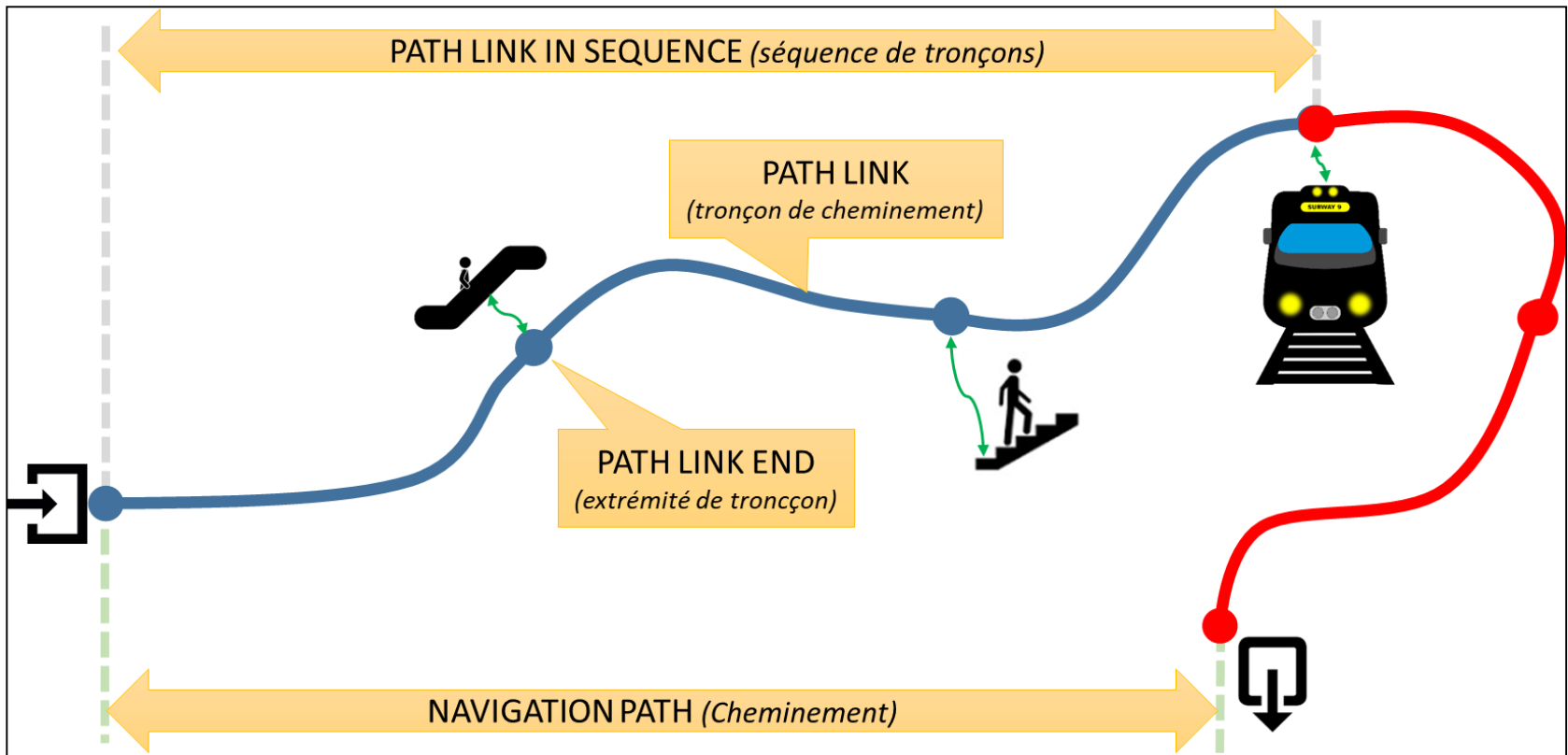
TAP TSI

IATA

DATEX II

DATA PROVIDERS

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Trip planning :

➢ **Preparing an guiding travelers trips, particularly in answering specific TRIP REQUESTs.**

➢ **Input Origin and destination places of an intended trip**

➢ **Takes into account the user's constraints or preferences, such as minimal trip duration, minimal number of interchanges, cheapest fare, etc.**

➢ **Proposes one or several trip solutions... espected to be optimised**

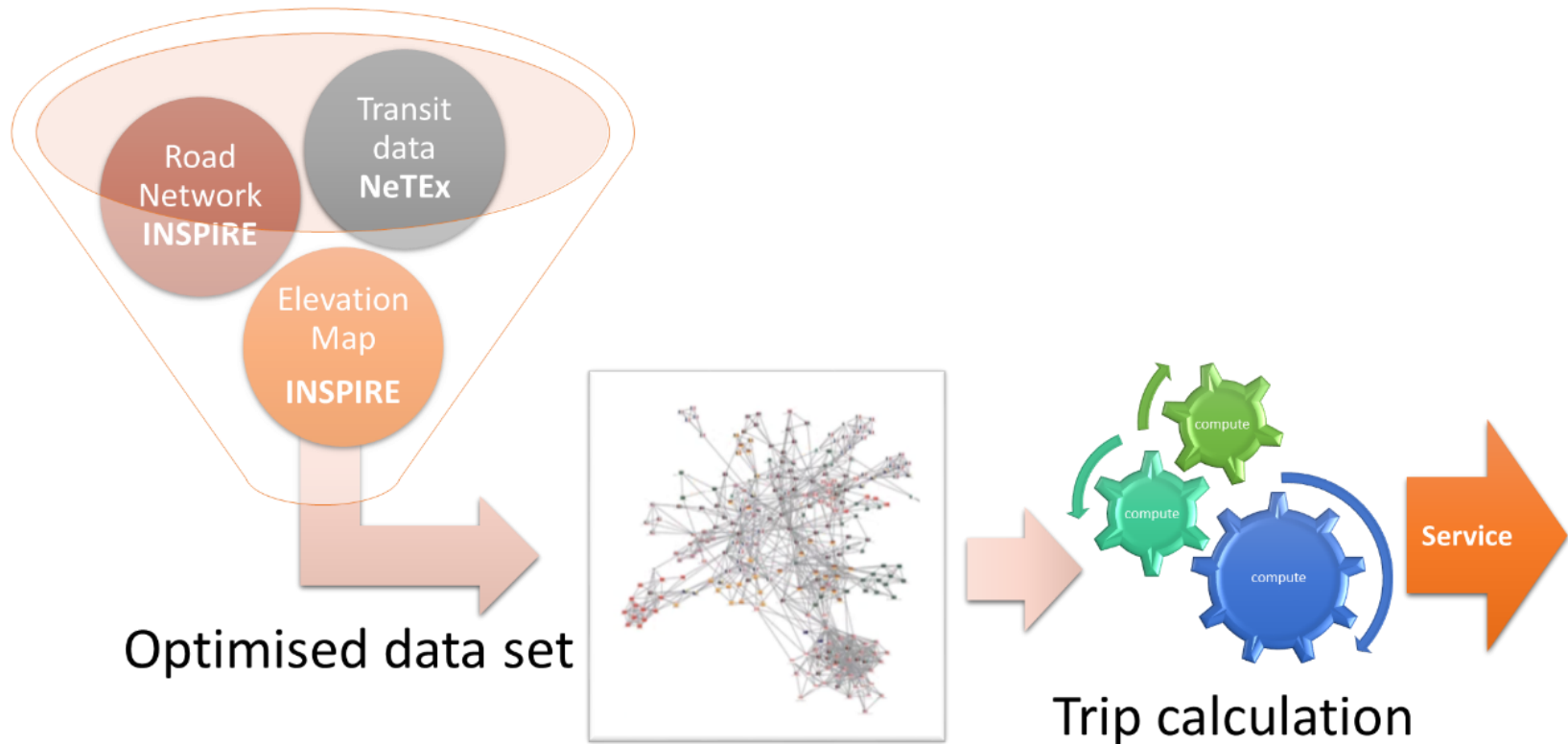# Trip, as described by Transmodel

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Details of a walking path

PATH LINK IN SEQUENCE *(séquence de tronçons)*

PATH LINK
(tronçon de cheminement)

PATH LINK END
(extrémité de tronçon)

NAVIGATION PATH *(Cheminement)*

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Principle of a Journey Planner

Description of data needed for trip computation

Data	Provider	Comment
Origin and destination, being results of Location Search	Location search API based service, OJP recommended (standard from TC278/WG3/SG8)	The information can be : • Id of Access Nodes • Id of Inspire feature Geographic locations • POI Id (OSM, etc.) • Geographic location
Connection links where interchanges may occur	NeTEx	Note that SITE CONNECTIONs may refer external objects (INSPIRE, OSM, etc.)
Interchange	*NeTEx*	*The interchanges are connections between 2 specific VEHICLE JOURNEYs (at a certain place and at a specific time).*

Description of data needed for trip computation

Access nodes	NeTEx Some access nodes (or complementary information on access nodes) can be provided by TAP TSI, IATA and INSPIRE (Aerodromes, etc.) but are expected to be converted to NeTEx	Needed for arrival/departure, within connections, to connect to other modes (walking, car, bike or any new mode) and for unplanned PT connections (not described as Connection Links)
Network Topology (Routes, Lines, etc.)	NeTEx Some information about the Network Topology (or complementary information) can be provided by TAP TSI, IATA and INSPIRE but are expected to be converted to NeTEx	
Timing information	*NeTEx* *Some information about the Timing Information can be provided by TAP TSI for rail but are expected to be converted to NeTEx*	

Description of data needed for trip computation

Network description for all other supported mode :		
Road network	INSPIRE	
Cycling network	Gap There is no standard format to describe a full cycling network (OSM may be used instead, GDF may also be used but is lacking of cycling data source for now)	
Walking Network	Gap There is no standard format to describe a full walking network (OSM may be used instead, GDF may also be used but is lacking of cycling data source for now)	Note that today's trip planners often use the road network as a walking network

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Description of data needed for trip computation

Additional data		
Elevation data (especially for bikes and walking…)	*INSPIRE*	
Weather data	*DATEX II but not generic*	*Specially useful for cycling and outdoor walking*
Statistical information (traffic data, etc.)	*DATEX II*	
Stop facilities access nodes (including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations)	NeTEx	
Availability update, real-time updates, traffic data, etc	*SIRI for Public Transport and equipments* *DATEX II for Traffic*	

Recommendations

Examples of overlaps of data categories where INSPIRE is Reference

Giacomo Martirano

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Data categories where INSPIRE is the Reference

Static Spatial Data Category		TRM/NTX	INSPIRE	TAP TSI	IATA	DATEX
Level of service 1						
Address identifiers	1	C	R	C		C
Topographic places	2	C	R			C
Points of interest	3	C	R			
Road network	9	note	R			note

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Address identifiers

Definition: Locations of properties based on address identifiers, usually by road name, house number, postal code (INS AD)

Overlaps: there are overlaps with TRM/NTX, TAP-TSI and DATEX (3 mapping tables have been provided, from each of the 3 contributing standards to the reference standard)

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Address identifiers

Notes: Transmodel provides a data model for ADDRESSES with two specialisations POSTAL ADDRESS and ROAD ADDRESS. NeTEx implements both as a description of Addressable Places. The ROAD ADDRESS is used for all location where no POSTAL ADDRESS is available (not associated to any specific number, etc.), which is the case of most bus stop, for example. ROAD ADDRESS are not entirely covered by INSPIRE.

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Address identifiers - Recommendations

For NAP data providers:

NeTEx, TAP-TSI and DATEX datasets where Postal Addresses are needed, should use the INSPIRE data format, by taking guidance from the mapping tables provided by this study.

Wherever Road Addresses are needed the original format, should be used.

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Address identifiers - Recommendations

For NAP data consumers (1/2):

INSPIRE is the only standard providing a comprehensive Postal Address dataset and therefore whenever a Postal Address is needed the INSPIRE dataset should be considered.

NeTEx, TAP-TSI and/or DATEX datasets containing a Postal Address should be transformed into the INSPIRE Addresses data format, based on the mapping tables provided by this study.

NeTEx datasets containing a Road Address should be used without transformation.

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Address identifiers - Recommendations

For NAP data consumers (2/2):

DATEX datasets containing a Road Address should be used without transformation.

When a transformation of Road Addresses NeTEx/DATEX is needed, coordinates should be used.

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Address identifiers – Comments and further recommendations

Member States should ensure that the INSPIRE Addresses datasets are discoverable through the NAPs.

There is no correspondence between the INSPIRE Addresses IDs and the IDs of Addresses used in the other standards.

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Address identifiers – Comments and further recommendations

Recommendation to the MS and the Commission:

In order to increase data interoperability across the different standards, MS are encouraged to implement a national strategy related to the reuse of persistent identifiers for spatial objects. This would allow to build lookup tables of Address IDs at national levels.

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Points of interest

Definition: Types of places to or through which passengers may wish to navigate as part of their journey (TRM/NTX: POINT OF INTEREST).

Points of interest

Notes: INSPIRE can be considered as Reference standard only for a limited set of PoIs categories (Utilities and Governmental Services (US), Buildings (BU), and Protected Sites (PS)), each of which has its own specific data model.

Although a classification of POIs is taken into account in Transmodel, NeTEx does not prescribe any typology of POIs and thus the correspondence to INSPIRE is not straightforward. The fact that there is no predefined typology in NeTEx makes it difficult to map to existing INSPIRE data models for POIs but also allows to describe POIs that could not be described by INSPIRE (e.g. leisure, entertainment, etc).

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Points of interest - Recommendations

For NAP data providers:

INSPIRE should be used to publish POIs for the types present in INSPIRE (buildings, protected sites, governmental services); however, different levels of completeness (level of detail and scope) of these three types of POIs should be considered.

NeTEx should be used to publish POIs for the types not present in INSPIRE (in particular leisure, entertainment, historic monuments, etc.).

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Points of interest - Recommendations

For NAP data consumers:

The consumers should use coordinates (if available) to identify any correspondence between the INSPIRE POIs and NeTEx POIs.

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Points of interest – Recommendation to the Commission:

The overall typology of Points of Interest should be standardised.

Parking may be considered as a POI. The functional scope of both NeTEx and DATEX II is very extensive with regard to Parking and goes beyond the scope of this project. Work is ongoing in a different form to complete the mapping in combination with an effort to align and harmonise the standards involved. In addition, a reference standard should be appointed at least as regards the Parking layout structure for personal vehicles in order to avoid double publication.

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Recommendations

Examples of overlaps of data categories where NeTEx is Reference

Christophe Duquesne

Recommendations — where NeTEx is Reference

Static Spatial Data Category		TRM/NTX	INSPIRE	TAP TSI	IATA	DATEX
Level of service 1						
Identified access nodes	4	R	C^7	C	C	
Geometry/map layout- structure of access nodes	5	R				
Connection links	6	R	note	C		
Netw. Topology & Routes/Lines (topology) [8]	7	R	note	C^9 note	C	
Stop facilities access nodes	8	R		note		
Level of service 2		**TRM/NTX**	**INSPIRE**	**TAP TSI**	**IATA**	**DATEX**
Park & Ride stops	12	R^{10}		C^{11} note		C
Bike sharing stations	13	R^{12}				
Car-sharing stations	14	R^{13}				C
Secure bike parking (such as locked bike garages)	16	R^{14}				
Where to buy tickets	17	R		C note	note	C^{15} note
Fare network data (fare zones/stops and fare stages)	18	R		C^{16} note		

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Identified Access Nodes : Definition

Topological aspect: Zero-dimensional nodes of the network (that may be located by coordinates in a particular Coordinate Reference System) used for the spatial description of the network, where passengers can board or alight from vehicles (TRM/NTX: SCHEDULED STOP POINT)

Geographical aspect: Places comprising one or more locations where vehicles may stop and where passengers may board or leave vehicles or prepare their trip (TRM/NTX: STOP PLACE)

Identified Access Nodes – Recommendation

For NAP data providers

(Road & Cable & Water): NeTEx Access Nodes data sets should be used as there is no semantic overlap with other standards.

(Air):

For NeTEx data providers: STOP PLACE code should have the value of the IATA code

For TAP-TSI data providers: « Rail Location Codes » (former UIC) should be completed with a IATA code where commercial agreements between the involved parties exists. This is usually the case where a rail station is attributed with an additional IATA code (e.g. Brussels-Midi with the IATA code ZYR) for air-rail products.

Under these conditions, NeTEx publication of STOP PLACEs (for the MODE=air) should be used.

Identified Access Nodes - Recommendation *(continued)*

For NAP data providers & for data consumers*:*

The IATA code should be used to link the Access nodes for air.

INSPIRE should be used for complementary information of the airport

(Rail)

 - "Railway Location - primary Code" (as specified in TAP TSI technical document B.9, known as UIC location code) should be used to relate the Access Nodes for rail as a link provided it is used by the other standards.

-INSPIRE should introduce the « Railway Location - primary Code » in the RailwayStationCode

-Transmodel/NeTEx should introduce the « Railway Location - primary Code » in the STOP PLACE code

-TAP-TSI: should convert Access Nodes to NeTEx (using the "TAP-TSI to NeTEx" mapping) to get a NeTEx representation. A publication in the TAP TSI data formats (TAP TSI technical document B.4) is allowed as well by the regulation. If not done by the provider, the mapping can be done at the NAP level. Note that this conversion should be done together with the timetables conversion in order to avoid any merging need with existing data.

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Identified Access Nodes - Recommendation *(continued)*

-IATA-AIDM: To consider the conversion of Access Nodes to NeTEx (following an IATA approved conversion of the initial comparison of "AIDM to NeTEx" to an agreed mapping specification) to get a NeTEx representation.

NeTEx should be used for the publication under the conditions above.

Note: a publication in the IATA data format is also allowed by the regulation, as for all other standard specifications.

For NAP data consumers

Converters (to the NeTEx format) based on the mapping tables (Appendix 2) and coordinates should be built.

Recommendation to the MS:

The ID coding rule for the Access Nodes as defined in the NeTEx PI European Profile should be adopted

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Geometry/map layout structure of access nodes

Definition

➢ A map representing schematically the layout of the topographic structure of places or the public transport network (e.g. a set of lines).

Recommendation

➢ For NAP data providers: NeTEx shall be used for the publication of   "Geometry/map layout structure of access nodes"

➢ For NAP data consumers: none, as a unique standard is used for publication.

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Connection links where interchanges may be made : Definition

➢**Topological aspect:** Couples of places located sufficiently near that it may represent for a passenger a possibility to reach one of these points when starting at the other one in a timescale which is realistic when carrying out a trip.
(TRM /NTX: TRANSFER and its specialisations CONNECTION, SITE CONNECTION, DEFAULT CONNECTION)
Geographical aspect: Designated paths between two places, which may include an ordered sequence of links within a place or between two places that represents a step in a possible route for pedestrians, cyclists or other out-of-vehicle passengers *(TRM/NTX: NAVIGATION PATH)*

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Connection links where interchanges may be made : Recommendation

➢**For NAP data providers:** use NeTEx for publication of Connection Links

➢**For NAP data providers/consumers:** the mapping TAP/TSI→ NeTEx provides guidance to build a converter.

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Network Topology & Routes/Lines

Definition

➢Service topology determined by routes, lines and service patterns
(TRM/NTX: ROUTE, LINE, SERVICE PATTERN)

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Network Topology & Routes/Lines

Recommendation

➤ **For NAP data providers**:
 NeTEx Network Topology publication should be used.
 For TAP-TSI: a converter should be built taking guidance from the Mapping table provided in Appendix 2.
 For IATA-AIDM: To consider the conversion of Network Topology & Routes/Line to NeTEx (following an IATA approved conversion of the initial comparison of "AIDM to NeTEx" to an agreed mapping specification) to get a NeTEx representation. A publication in the IATA data format is also allowed by the regulation.

➤ **For NAP data consumers**:
 NeTEx, TAP-TSI, IATA may use their standards for publication.
 The mapping TAP-TSI→ NeTEx provides guidance to build a converter.
 IATA publication is in development and the deadlines of the Regulation will be respected.

Network Topology & Routes/Lines *(continued)*

➢**Recommendation to the Commission / data providers:**

The link between Network Topology '(i.e. "service network") and the "infrastructure network" (as published by INSPIRE) should be carried out using the Transmodel/NeTEx projection mechanism (additional processing effort), described in Transmodel Part 1- Chapter 5.5.7 .

This recommendation is symmetrical to the one provided for the Road Network.
See also Road Network Data category.

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Stop facilities access nodes
including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations

Definition

➤ Types and locations of fixed equipment or facilities related to access nodes.
(TRM/NTX: FACILITY, EQUIPMENT, EQUIPMENT PLACE)

Recommendation

➤ For NAP data providers/consumers:
NeTEx Passenger Information Profile should be used.

Recommendation for the Commission: the development of the Stop Place and Accessibility profile should be confirmed taking into account the deadlines of the Regulation.

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Park & Ride stops

Definition

➢Location dedicated to travellers allowing them an dedicated modal transfer, in particular to leave/pick up their vehicles before/after a trip on public transport.
(URBAN ITS - Models and Definitions for New Modes)

Recommendation

➢Presence of 3 data models (Transmodel, DATEX and a data model developed by the Parking Industry ADPS) generates overlaps…

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Park & Ride stops *(continued)*

Recommendation to the Commission

1. The situation of the 2 (or 3) competing data models should be considered and a decision should be taken for harmonisation or mapping.

2. The harmonisation of Parking Layout Structure should be provided to allow for a common representation of the Park & Ride Stops and other topological elements related to alternative modes operation.

3. The implementation of the data model for the "New Modes" shall be developed (project Alternative Modes API submitted to the EC through CEN TC278 WG17) according to the CEN. Rolling Plan 2019 and the recommendation of the Mandate 456.

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Bike sharing stations

Definition

➤A dedicated location (part of a parking) for short term cycle rental (cycle sharing) where the cycle can be taken from and parked and which is composed of one or more places to park an individual cycle.
(based on Urban ITS- Models and Definitions for New Modes)

Recommendation

➤For data providers/consumers: Publication format shall be used based upon the Conceptual Model developed as an extension of Transmodel
This format is planned to be provided by CEN TC278 WG17 (mid 2020)

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Car-sharing stations

Definition

➢A dedicated location (part of a parking) for short term car rental (car sharing) where the car can be taken from and parked and which is composed of one or more places to park an individual car.
(based on Urban ITS- Models and Definitions for New Modes)

Recommendation

➢The situation of the 2 competing data models should be considered and a decision should be taken for harmonisation or mapping: See recommendation for the Park & Ride Stops

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Secure bike parking (such as locked bike garages)

Definition

➢ A parking location for cycles including specific facilities and/or services providing safety to cycles.

Recommendation to the Commission

➢ The Work Item "Alternative Modes API" as the implementation of the "Urban ITS – Models and definitions for New Modes" model should be considered and started (cf. Rolling Plan 2019 and Mandate 546).
At this occasion the facility code list should be extended to enable the consideration of this data category as a facility linked to parking areas.

Where to buy tickets

Definition

➢ Locations (physical or on-line) of ticketing service.
(TRM/NTX: EQUIPMENT PLACE related to TICKETING EQUIPMENT)

Recommendation

➢ NeTEx should be used
Recommendation to the Commission: the development of the EU NeTEx Fares Profile should be considered.
The Work Item "Alternative Modes API" as the implementation of the model "Urban ITS – Models and Definitions for New Modes" should be considered and started (cf. Rolling Plan 2019 and Mandate 546).

➢ Recommendation to the Commission/Member States: The mapping between the overlapping standards (NeTEX and TAP-TSI, DATEX) should possibly be considered and clarified.

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Fare network data *(fare zones/stops and fare stages)*

Definition

➢ Tariff zones used to define a zonal fare structure in a zone-counting or zone-matrix system and/or if applicable, fare zones composed of fare sections built of consecutive points used to define elements of the fare structure
(TRM/NTX: TARIFF ZONE, FARE ZONE, FARE SECTION)

Recommendation

➢ Use NeTEx for Fare Network Data publication

Recommendation to the Commission: The development of the EU NeTEx Fare Profile should be considered.

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Recommendations

Examples of data categories with no Reference

Bard de Vries

Data Category		TRM/NTX	INSPIRE	DATEX
CEN standardisation in progress				
No plan/action for standardisation known				
No reference of standardisation to be started				

Recommendations

IATA position
Christopher Dodson

IATA Data Expert – Comments and Recommendations

- **Background to participation as IATA Data Expert, but not representing IATA.**

- **Airlines operating in extremely competitive area with multiple commercial sources for both static and dynamic data available.**

- **EU Commission goals are in line with IATA, regarding the dissemination of standardized air travel information from an authoritative source.**

- **AIDM represents the scope of INSPIRE-MMTIS study for IATA data.**

- **IATA engaged in active programs to deliver 'Travel Communications' and 'New Distribution Capability' via standardized API.**

- **EU Commission should continue to engage in discussion with IATA regarding the integration of the requirements for the Delegated Regulation into the active IATA API workstreams.**

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Conclusions

Kasia Bourée

Next step : documentation

- Main document: findings and conclusions

- Appendix 1: documentation data models underpinning the different data categories

- Appendix 2: mapping tables - commented comparisons

Data Category Number	Data Category Name	Description
A	Context	Functional context taken from the MMTIS regulation (location search, trip plan computation, information provision)
B	Definition	Definition as agreed
C	Reference standard	The standard marked R in the overlap matrix INSPIRE or Transmodel (NeTEx for publication)
D	Further description	Description of the contribution of standard xxx to this data category
E	Note by standard xxx	**Comment related to the identified overlap** of xxx explaining the reasons why the mapping is relevant or not. This corresponds in most cases to the "note" in the overlap table.
F	Mapping Status	done/not relevant/started done: mapping table completed not relevant: no semantic equivalence with the Reference standard
G	**Recommendations**	**To NAP data consumars (scenario 1)** **Tp NAP data providers (scenario 2 – to avoid overlaps)**
H	Comment and further recommendation	Concerns situations where either no Reference Standard is identified or a gap in standardisation is identified. **Recommendation to MemberStates or the Commission / CEN**

Conclusions

• Current standards are sufficient to start implementation of the Delegated Regulation EU 2017/1926

• Several recommendations show that further work is necessary

• The establishment of the link between actions proposed by the experts' group and the EC workplan may be of benefit

• To be noted: similar investigations may be led for data categories not considered in this project (e.g. time-related information, dynamic information)

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Annex

Publication deadline	Spatial data categories
1st December 2019	— Location search (origin/destination): — Address identifiers (building number, street name, postcode) — Topographic places (city, town, village, suburb, administrative unit) — Points of interest (related to transport information) to which people may wish to travel
	— Location search (access nodes): — Identified access nodes (all scheduled modes) — Geometry/map layout structure of access nodes (all scheduled modes)
	— Trip plan computation — scheduled modes transport: — Connection links where interchanges may be made — Network topology and routes/lines (topology) — Stop facilities access nodes (including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations)
	— Trip plan computation — road transport (for personal modes): — Road network — Cycle network (segregated cycle lanes, on-road shared with vehicles, on-path shared with pedestrians) — Pedestrian network and accessibility facilities

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1st December 2020	— Location search (demand-responsive modes):
	— Park & Ride stops
	— Bike-sharing stations
	— Car-sharing stations
	— Publicly accessible refuelling stations for petrol, diesel, compressed natural gas / liquid natural gas, and hydrogen powered vehicles, and charging stations for electric vehicles
	— Secure bike parking (such as locked bike garages)
	— Information service: where to buy tickets for scheduled modes, demand responsive modes and car parking (all scheduled modes and demand-responsive)
	— Trip plans, auxiliary information, availability check: Fare network data (fare zones/stops and fare stages)

| 1st December 2021 | —Information service (all modes):

—Where to pay for car parking, public charging stations for electric vehicles and refuelling points for compressed natural gas / liquid natural gas, hydrogen, petrol and diesel-powered vehicles |
| | —Trip plans:

—Detailed cycle network attributes (surface quality, side-by-side cycling, shared surface, on/off road, scenic route, 'walk only', turn or access restrictions (e.g. against flow of traffic) |

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Definitions provided for LoS 1 data categories

Data Category	Definition
Address identifiers (building number, street name, postcode)	Locations of properties based on address identifiers, usually by road name, house number, postal code (INS: Addresses)
Topographic Place (city, town, village, suburb, administrative unit)	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest (INS: Geographical Names)
Points of Interest	Types of places to or through which passengers may wish to navigate as part of their journey. (TRM/NTX: POINT OF INTEREST)
Identified access nodes (all scheduled modes)	**Topological aspect**: Zero-dimensional nodes of the network (that may be located by coordinates in a particular Coordinate Reference System) used for the spatial description of the network, where passengers can board or alight from vehicles (TRM/NTX: SCHEDULED STOP POINT) **Geographical aspect**: Places comprising one or more locations where vehicles may stop and where passengers may board or leave vehicles or prepare their trip (TRM/NTX: STOP PLACE)

Definitions provided for LoS 1 data categories

Data Category	Definition
Geometry/map layout structure of access nodes (all scheduled modes)	A map representing schematically the layout of the topographic structure of places or the public transport network (e.g. a set of lines).(TRM/NTX: SCHEMATIC MAP)
Connection links where interchanges may be made	**Topological aspect:** Couples of places located sufficiently near that it may represent for a passenger a possibility to reach one of these points when starting at the other one in a timescale which is realistic when carrying out a trip. (TRM /NTX: TRANSFER and its specialisations CONNECTION, SITE CONNECTION, DEFAULT CONNECTION) **Geographical aspect**: Designated paths between two places, which may include an ordered sequence of links within a place or between two places that represents a step in a possible route for pedestrians, cyclists or other out-of-vehicle passengers (TRM/NTX: NAVIGATION PATH)
Network topology and routes/lines (topology)	Service topology determined by routes, lines and service patterns (TRM/NTX: ROUTE, LINE, SERVICE PATTERN)

Definitions provided for LoS 1 data categories

Data Category	Definition
Stop facilities access nodes (including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations)	Types and locations of fixed equipment or facilities related to access nodes. (TRM/NTX: FACILITY, EQUIPMENT, EQUIPMENT PLACE)
Road network	Link and node structure to represent a road system used for the transportation of vehicles in the form of a linear network (INS Road Transport Network)
Cycle network (segregated cycle lanes, on-road shared with vehicles, on-path shared with pedestrians)	Self explanatory Gap in standards (Placeholders present in INS & TRM/NTX)
Pedestrian network and accessibility facilities	Road reserved for pedestrian use and closed for regular vehicular use by a physically barrier (INS: walkway)

Definitions provided for LoS 2 data categories

Data Category	Definition
Park & Ride stops	Under development (draft proposal:TRM/NTX :A SITE containing at least one STOP PLACE and a PARKING connected by a SITE CONNECTION)
Bike sharing stations	Under development (TRM/NTX draft proposal: Specialisation of PARKING AREA which is a marked zone within a PARKING containing PARKING BAYs
Car-sharing stations	Under development (TRM/NTX draft proposal: Specialisation of PARKING AREA which is a marked zone within a PARKING containing PARKING BAYs (places to park an individual vehicle).
Publicly accessible refuelling stations & charging stations for electric vehicles	Locations that can contain one or multiple points at which the fuel/gas/energy is transferred to the customer (DTX)

Definitions provided for LoS 2 data categories

Data Category	Definition
Secure bike parking (such as locked bike garages)	Parking place for users allowing them to avoid unsuitable parking and contributing to safety of their bicycle. (TRM/NTX:EQUIPMENT PLACE of CYCLE STORAGE EQUIPMENT)
Where (and how) to buy tickets	Locations (physical or on-line) of ticketing service. (TRM/NTX: EQUIPMENT PLACE related to TICKETING EQUIPMENT)
Fare network data (fare zones/stops and fare stages)	Tariff zones used to define a zonal fare structure in a zone-counting or zone-matrix system and/or if applicable, fare zones composed of fare sections built of consecutive points used to define elements of the fare structure (TRM/NTX: TARIFF ZONE, FARE ZONE, FARE SECTION)

Definitions provided for LoS 3 data categories

| Data Category	Definition
Where (and how) to pay for car parking, public charging stations for electric vehicles and refuelling points	Locations (physical or on-line) of service related either to the payment of parking and/or refuelling or recharging. (TRM/NTX EQUIPMENT PLACE related to TICKETING EQUIPMENT)
Detailed cycle network attributes (surface quality, side-by-side cycling, shared surface, on/off road, scenic route, 'walk only', turn or access restrictions (e.g. against flow of traffic)	Self explanatory Gap in standards (Placeholders present in INS & TRM/NTX)

Overlaps/gaps table (v.2) – LoS 2

Data Category - Level of Service 2		TRM/NTX	INSPIRE	TAP TSI	IATA	DATEX
Park & Ride stops	12	R note		C note		C
Bike sharing stations	13	R note				
Car-sharing stations	14	R note				C
Publicly accessible refuelling stations & charging stations for electric vehicles	15	C note	C note			C note
Secure bike parking (such as locked bike garages)	16	R note				
Where (and how) to buy tickets	17	R		C note	C note	C note
Fare network data (fare zones/stops and fare stages)	18	R		C note		

Overlaps/gaps table (v.2) – LoS 3

Data Category - Level of Service 3		TRM/NTX	INSPIRE	TAP TSI	IATA	DATEX
Where (and how) to pay for car parking, public charging stations for electric vehicles and refuelling points	19	C note				C note
Detailed cycle network attributes (surface quality, side-by-side cycling, shared surface, on/off road, scenic route, 'walk only', turn or access restrictions (e.g. against flow of traffic)	20					

Alternative Modes
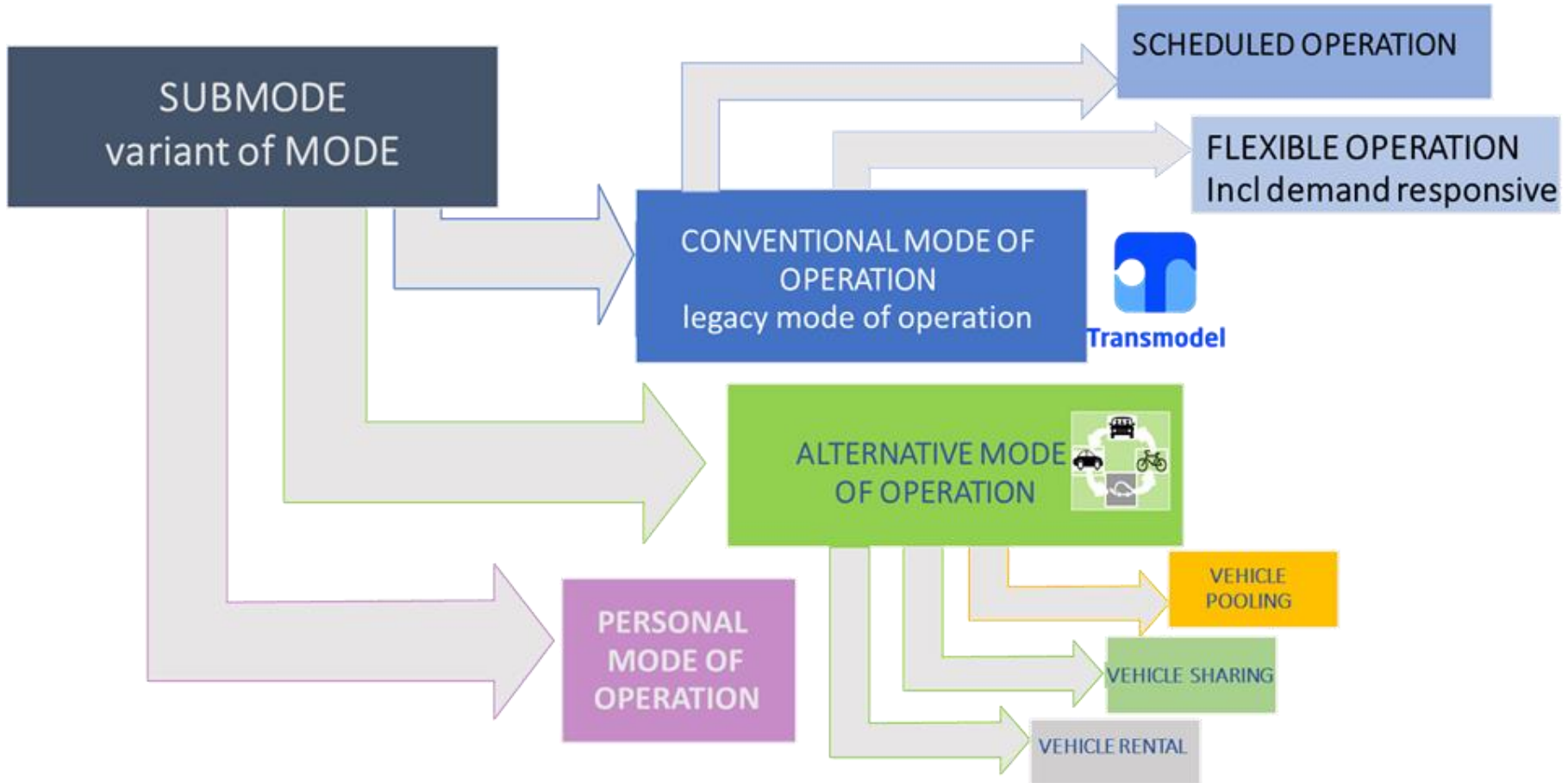
Alternative Modes

Mode of operation	Type of mode of operation	Specification covering data requirements	*Delegated Regulation (EU) 2017/1926*	The Commission Delegated Regulation (EU) 2017/1926: examples
Conventional mode of operation				
	Scheduled mode of operation	Transmodel	*Scheduled mode*	Air, rail including high speed rail, conventional rail, light rail, long-distance coach, maritime including ferry, metro, tram, bus, trolley-bus.
	Flexible mode of operation	Transmodel	*Demand-responsive mode*	Shuttle bus, shuttle ferry
Alternative mode of operation	**For comments 1 Q 2019**			
	Vehicle sharing (car sharing, cycle sharing)	Extension of Transmodel	*Demand-responsive mode*	car-sharing, bike-sharing
	Vehicle pooling (carpooling)	Extension of Transmodel	*Demand-responsive mode*	car-pooling, taxi
	Vehicle rental (Car rental, cycle rental)	Extension of Transmodel	*Demand-responsive mode*	car-hire, bike-hire.
Personal mode of operation			*Personal mode*	Car, motorcycle, cycle.