Support to ELISE
European Location Interoperability Solutions for E-Government

Project INSPIRE-MMTIS INSPIRE Conference Antwerpen, 20 September 2018
Policy background

ITS Directive Regulation for the provision of EU-wide Multimodal Travel Information Services (MMTIS) 2017/1926

Establishes the specifications necessary for publication (through NATIONAL ACCESS POINTS-NAP), exchange and update of standardised travel and traffic data to ensure distributed journey planning for the provision of MMTIS in the EU.
A range of **technical specifications** are recommended for data publication through the NAP

(a) for the road transport: **priority action B** (recommending DATEX II)
(b) for other transport modes, one of the following standards and technical specifications: **NeTEx** CEN/TS 16614, technical documents defined in Regulation (EU) No 454/2011 (**TAP-TSI**), technical documents elaborated by **IATA** or any machine-readable format fully compatible and interoperable with those standards and technical specifications;
(c) for the spatial network the requirements defined in Article 7 of Directive 2007/2/EC (**INSPIRE**)
Exchange of Public Transport data through the NAPs

For what concerns the exchange of static scheduled data (such as public transport, long distance coach and maritime including ferry), the relevant data in the national access point should use the CEN data exchange standard **NetEx CEN/TS 16614 based on the underlying conceptual data reference model Transmodel EN 12896: 2006** and subsequent upgraded versions or any machine-readable format fully compatible by the agreed timeline.

For what concerns the exchange of dynamic public transport data, if Member States choose to include dynamic data in the national access point the relevant parts of the CEN public transport data exchange standard **SIRI CEN/TS 15531** and subsequent upgraded versions or any machine-readable format fully compatible should be used.
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 – JRC collaboration
6 experts for 6 specifications
*Data models* Data Exchange specifications:
*INSPIRE, Transmodel, NeTEx, TAP-TSI, IATA, DATEX II.*

**Timeline**
Jan 2018-March 2019

**Methodology**
- Identify differences of scope the INSPIRE/MMTIS data categories
- Describe the method for handling of overlaps and linking
- Consult with ITS and INSPIRE stakeholders
- Illustrate the method by selected Use Cases
- Provide recommendations to the MS to support implementation of the ITS regulation, taking into account INSPIRE requirements
1. Data Categories: *definitions*
   Examples: Access Nodes, Routes/Lines Topology, Address Identifiers

2. Study of data models underpinning the Data Categories:
   method for *determining overlaps* of data models (general and detailed study)

3. Method for the *handling of overlaps*: what exactly to recommend? To users? To data providers?

5. **Recommendations**: full set of recommendations how to handle overlaps
Illustration of the process of overlap analysis

- Step 1: MM TIS Data Cat.
- Step 2: INSPIRE
- Step 3: Transmodel/NeTex

Detailed mapping for precise determination of overlaps.
### Overlap analysis: first draft

<table>
<thead>
<tr>
<th>Data Cat Level 1</th>
<th>TRM/NTX</th>
<th>INSPIRE</th>
<th>TAP TSI</th>
<th>IATA</th>
<th>DATEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address identifiers</td>
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<td>Topographic Place</td>
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<td>×</td>
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<td></td>
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<tr>
<td>Parking (incl facilities)</td>
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<td>×</td>
<td></td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>Geometry/map layout-structure of access nodes</td>
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<td>×</td>
<td></td>
<td></td>
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<td>....</td>
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<td>Netw. Topology &amp; Routes/Lines (topology)</td>
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<td>(x)</td>
<td>×</td>
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<tr>
<td>Stop facilities access nodes</td>
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<td>×</td>
<td>(x)</td>
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<td></td>
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</table>
Concept of a Reference/Contributing Standard/Specification

• 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
• 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:
  o NeTEx is a Reference Standard for Access Nodes (public transport Stop Places) and a Contributing Standard for Addresses
  o INSPIRE is the Reference Standard for (postal) Addresses
## Overlap analysis: further results

<table>
<thead>
<tr>
<th>Data Cat Level 1</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Address identifiers</td>
<td>1</td>
<td>C</td>
<td>R</td>
<td>C</td>
<td>C</td>
</tr>
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<tr>
<td>Points of Interest</td>
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<td>C</td>
<td>R</td>
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<td></td>
</tr>
<tr>
<td>Identified access nodes</td>
<td>4</td>
<td>R</td>
<td>C (for air)</td>
<td>C</td>
<td>C</td>
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<td>Parking (incl facilities)</td>
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<td>C</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Geometry/map layout-structure of access nodes</td>
<td>5</td>
<td>R</td>
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<tr>
<td>Netw. Topology &amp; Routes/Lines (topology)</td>
<td>7</td>
<td>R</td>
<td></td>
<td></td>
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<td>8</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Routes/Lines (topology): defined as public transport service topology

NeTEx: dedicated to the provision of service topology → R

INSPIRE is providing infrastructure topology → has a different scope
What next?

- Finalise an agreement as regards the qualification of the specifications for all 20 data categories (Reference/Contributing specification)

According to the EU regulations, data providers are allowed to provide data sets so that overlaps appear...

- Consider what type of recommendations is most useful:
  - recommend to publish data sets according to the Reference Specification and recommend to other data providers (which need this information) to link their data to the Reference?
  - let overlaps be and provide guidance to data set users? Provide mapping tables?
What recommendations for data providers/users regarding the data sets made available through the NAP? Example of questions

Is a link between standards possible?
To conclude...

- The project is challenging: the specifications are complex and a result of many years of investigations

- The main objective is help in understanding:
  - What is the scope of the different specifications?
  - What data categories are going to be published by which specification?
  - Where are the overlaps?
  - What is the preferred/recommended process to handle the overlaps...
  - How to take advantage of the INSPIRE data set publication in the context of the MMTIS Directive

Next stakeholder consultation/information meeting planned: 20 November 2018 in Brussels.
Run by the ISA Unit at DIGIT (European Commission) with 131€M budget, the ISA² programme provides public administrations, businesses and citizens with specifications and standards, software and services to reduce administrative burdens.
<table>
<thead>
<tr>
<th>Publication deadline</th>
<th>Spatial data categories</th>
</tr>
</thead>
</table>
| 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)  
<p>|                      |   — Pedestrian network and accessibility facilities |</p>
<table>
<thead>
<tr>
<th>Spatial data categories for the NAP Level of Service 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st December 2020</strong></td>
</tr>
<tr>
<td>— Location search (demand-responsive modes):</td>
</tr>
<tr>
<td>— Park &amp; Ride stops</td>
</tr>
<tr>
<td>— Bike-sharing stations</td>
</tr>
<tr>
<td>— Car-sharing stations</td>
</tr>
<tr>
<td>— Publicly accessible refuelling stations for petrol, diesel, compressed natural gas / liquid natural gas, and hydrogen powered vehicles, and charging stations for electric vehicles</td>
</tr>
<tr>
<td>— Secure bike parking (such as locked bike garages)</td>
</tr>
<tr>
<td>— Information service: where to buy tickets for scheduled modes, demand responsive modes and car parking (all scheduled modes and demand-responsive)</td>
</tr>
<tr>
<td>— Trip plans, auxiliary information, availability check: Fare network data (fare zones/stops and fare stages)</td>
</tr>
</tbody>
</table>
### Spatial data categories for the NAP

<table>
<thead>
<tr>
<th>Date</th>
<th>Information service (all modes):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st December 2021</td>
<td>- 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</td>
</tr>
<tr>
<td></td>
<td>- Trip plans:</td>
</tr>
<tr>
<td></td>
<td>- 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)</td>
</tr>
</tbody>
</table>
Structure of public transport standards

Transmodel Ecosystem

Transmodel

Model for the overall Public Transport domain

NeTEx: XML
Exchange format for scheduled information

SIRI: XML
Exchange format for real time information

OpRa: XML
Exchange format for operational raw data

OJP: XML
Open Journey Planning API (possibly distributed)
NeTEx Overview

Transmodel based data exchange format for public transport scheduled information

- Part 1: Common concepts and **Network** description
- Part 2: **Timing** information (timetable, etc.)
- Part 3: **Fare** descriptions
- **XML** Based

NeTEx Profiles are defining subsets of NeTEx for dedicated use cases: a European Profile for passenger information is under development. It is now **mandatory for the National Access points required by the Priority action A.**
In scope of NeTEx

• Network description
  - Lines
  - Journey Patterns
  - Stop Places
• Timetable descriptions
  - Passing times
  - Calendars
  - Run-times
  - Etc.
• Connections and access
• Places (POIs, etc.)
• Fare offer description
• Accessibility information
• Planned availability
• Operational data
  - Vehicle’s services
  - Timing points
  - Etc.

Not in scope

• Infrastructure
  - Road network
  - Rail network
  - Cycling network
• Ticketing
  - control and validation
• Events and real-time information
• Provision of maps
• Driver related information
Airline Industry Model (AIDM)

Vehicle Enabling Standards Development

- Integrated living model with defined structure and behavior
  - Business processes
  - Information models
  - Message models
- Consistent methodology for all new standards development projects
- Automated model driven generation of message specifications
- Used by all passengers standards development projects to develop new or align existing standards


Accessing AIDM

- Available on the IATA Developer Portal (AIR Tech Zone)
  - HTML to view
  - XMI for download
    https://airtechzone.iata.org/industry-programs/aidm/

- Modelers developing standards access directly using Sparx Enterprise Architect

- Questions on the model content can be directed to
  padis.secretariat@iata.org
• APIs are a new way of sharing data, which are cost effective and promote an open eco system. IATA has been tasked with promoting this concept to become a normal way of sharing data across the industry.
• In 2017 IATA Members gave the direction to prepare the industry for a better and faster way to deploy APIs in the industry.
• IATA started a project to develop industry standards and best practices
• All industry standard APIs will leverage the Airline Industry Data Model

Link: https://www.iata.org/whatwedo/stb/Documents/OpenAPI.pdf
APIs Provided by Airlines Today

Source: IATA Survey, Summer 2017, responses from 54 airlines
Open APIs Planned by Airlines by 2020

Source: IATA Survey, Summer 2017, responses from 54 airlines
Open API projects focus on aspects that are common to all use cases.

Data providers (airlines, airports, customs authorities, ...)
Variety of APIs exposed by individual data providers

Incl. Flight Schedule, Flight Status
... Flight Info

Travel Communications
APIs with data relevant to traveling public

Variety of end user applications mixing & matching the data
Data consumers (traveling public, business partners... )
Conclusion

- Airlines live in a competitive environment
- Legacy standards and bespoke messaging options in place
- New business drivers leveraging AIDM to generate standards based messaging specifications.
- Open API the delivery method
- IATA domain delivers part of the Inspire-MMTIS requirement
- Mapping between in scope data models and mapping overlaps all important to feed into Use Cases and Recommendations