



VIENNA 2018



A digital era for transport

solutions for society, economy and environment

Data standards for system interoperability and people mobility

Kasia Bourée, KBIC, France

Fabrizio Arneodo, 5T, Italy

Christophe Duquesne, Aurige, France

Gergely Nitsch, One Planet Engineering Ltd, Hungary

With contribution from Ulf Bjersing (Hogia, Sweden), Nicholas Knowles (Steam Intellect, UK), Stuart Reynolds (Reynolds Consultancy Ltd, UK), Andrej Tibaut (University of Maribor, Slovenia),

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MaaS and interoperability



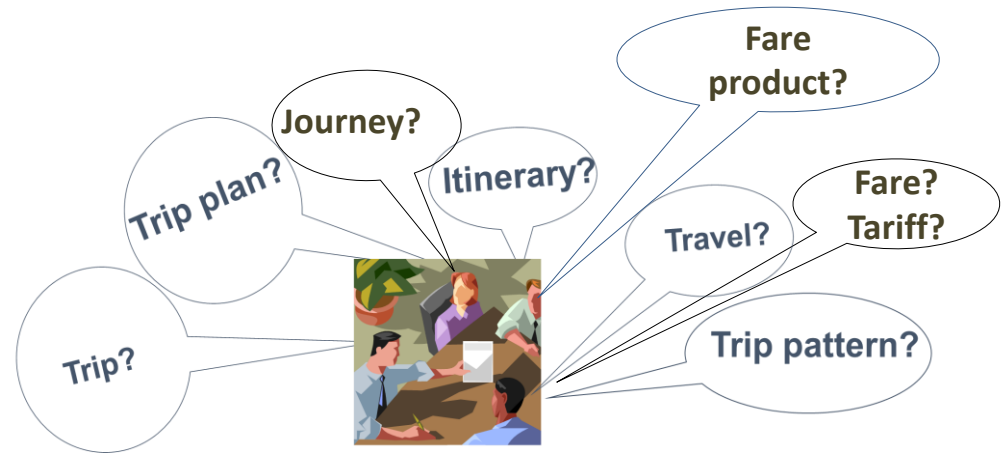
- MaaS: full mobility services for travellers require
 - provision **information associated with a particular trip**,
 - related **fare data**,
 - consideration of **operational changes**,
 - consideration of **events**, delays, accidents influencing public transport services and modifying information provided to travellers.
- Necessary condition: interoperability of application systems across domains

Interoperability requirement



- “Interoperability” means here “building coherent services for users when the individual components are technically different and managed by different organisations”
- Parameters influencing interoperability:
 - good cooperation between actors (public/private organisations);
 - provision of efficient software components;
 - **easy communication between software components;**
 - availability and collection of basic data and its reliability;
 - clear contractual aspects between actors
 - Etc
- **Semantic interoperability:**
 - systems that communicate smoothly, "understanding" the information they exchange without ambiguity
 - without the need for complex translators

Transmodel: standard data model data semantics and structure for Public Transport domains

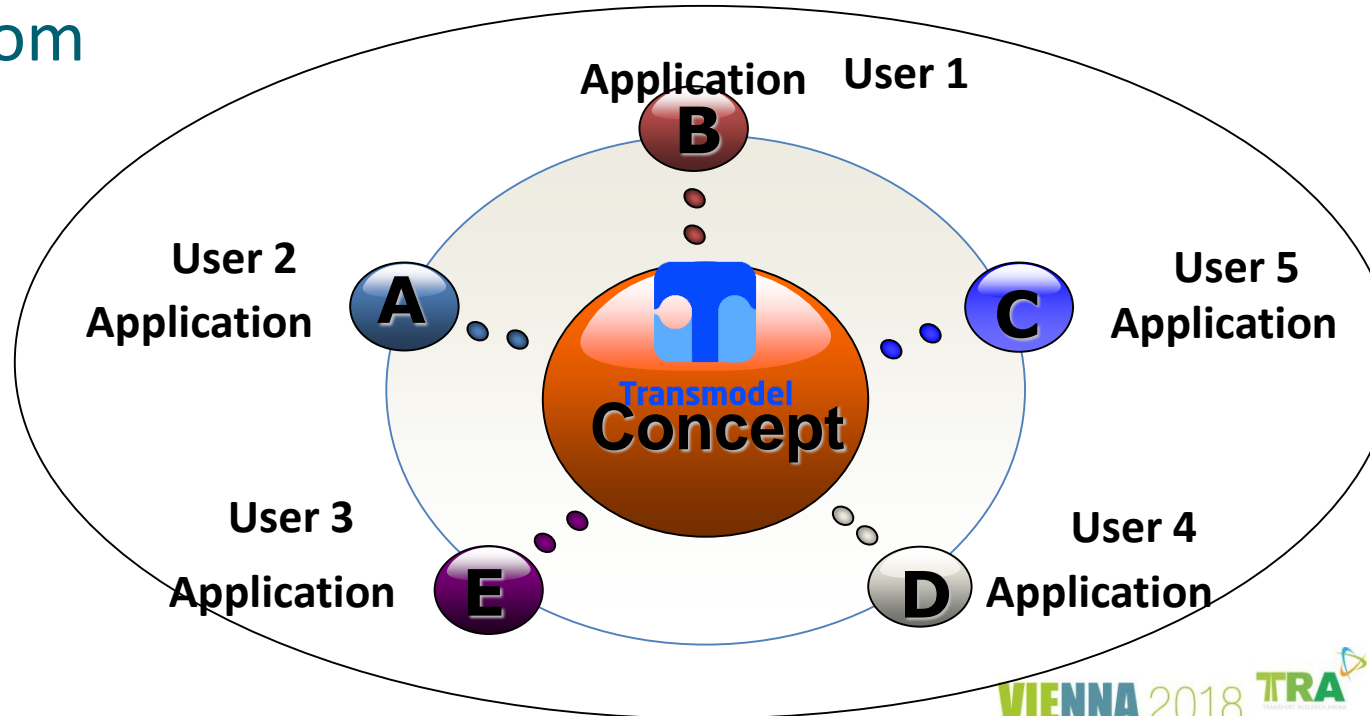


- **Network** topology: routes, lines, stops, etc;
- Vehicle schedules and public **timetables**
- **Operations Monitoring** and Control: vehicle follow-up, facility monitoring, etc;
- **Fare** Management: tariffs, fare products, sales, validation, control of access rights
- **Passenger Information** : general information and specific trip plans
- **Driver Management** : driver schedules
- **Management Information** : raw data for service performance indicators

Transmodel principle

Semantics of a concept is independent from

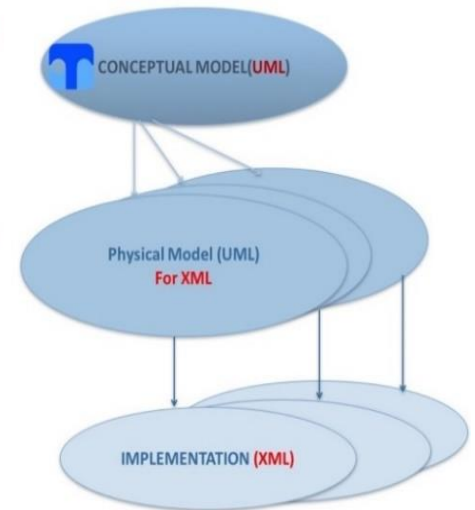
- domain
- user
- system



Transmodel for model driven design

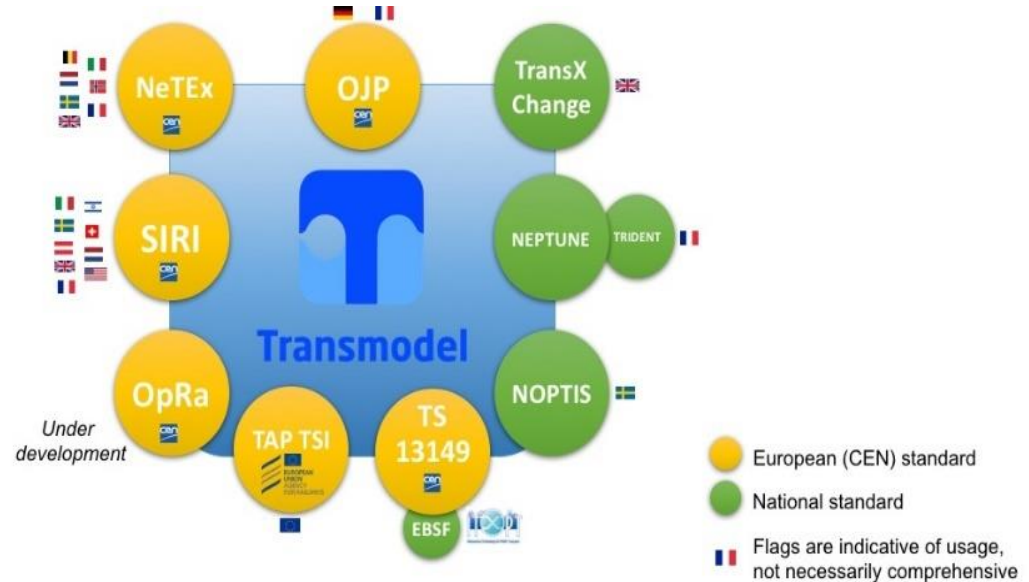
- Same semantic model for different types of implementations

- Conceptual model is implementation independent (Transmodel)
- Multiple physical models for different target implementations may be derived from one conceptual model
 - Example : NeTEx XML Physical design
- Implementation is derived from physical model
 - Example: NeTEx XML Schema



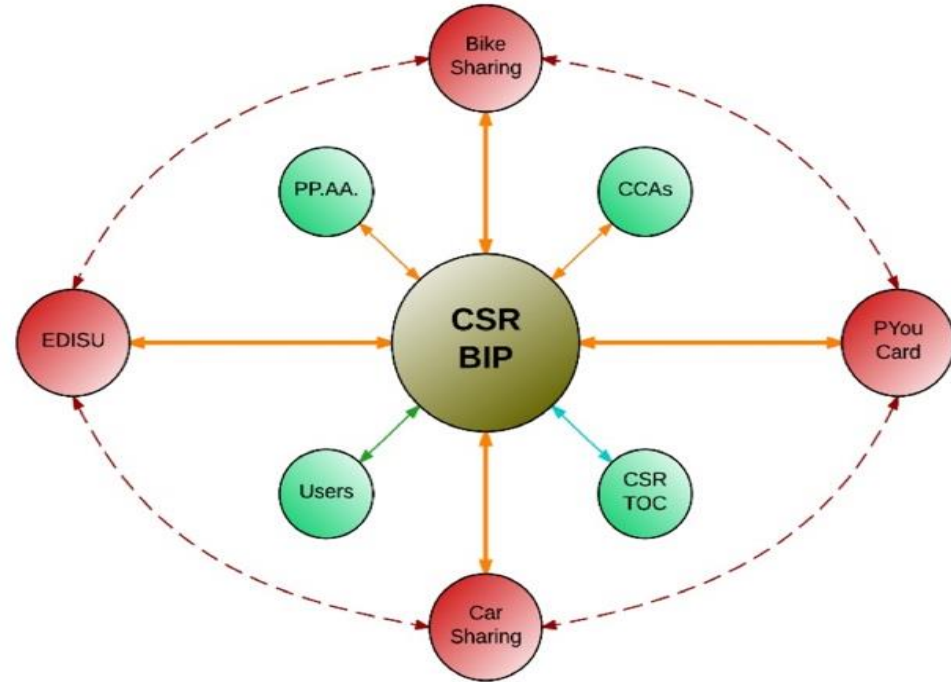
Benefits: coherent series of standards

- Co-existence of data exchange formats:
 - static data (NeTEx)
 - dynamic data (SIRI)
- « Bridges » to other standards:
 - TAP-TSI rail timetables
- Flexibility: adaptations to local needs
 - TransXChange (UK)
 - NEPTUNE (FR)
 - NOPTIS (Scandinavia)



Benefit: integrated systems

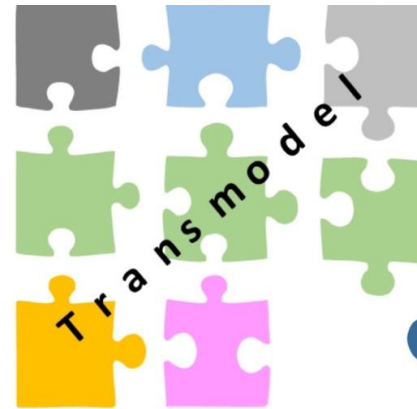
- Same semantic model for fares and payment allows for one integrated fare system in the Piemonte Region



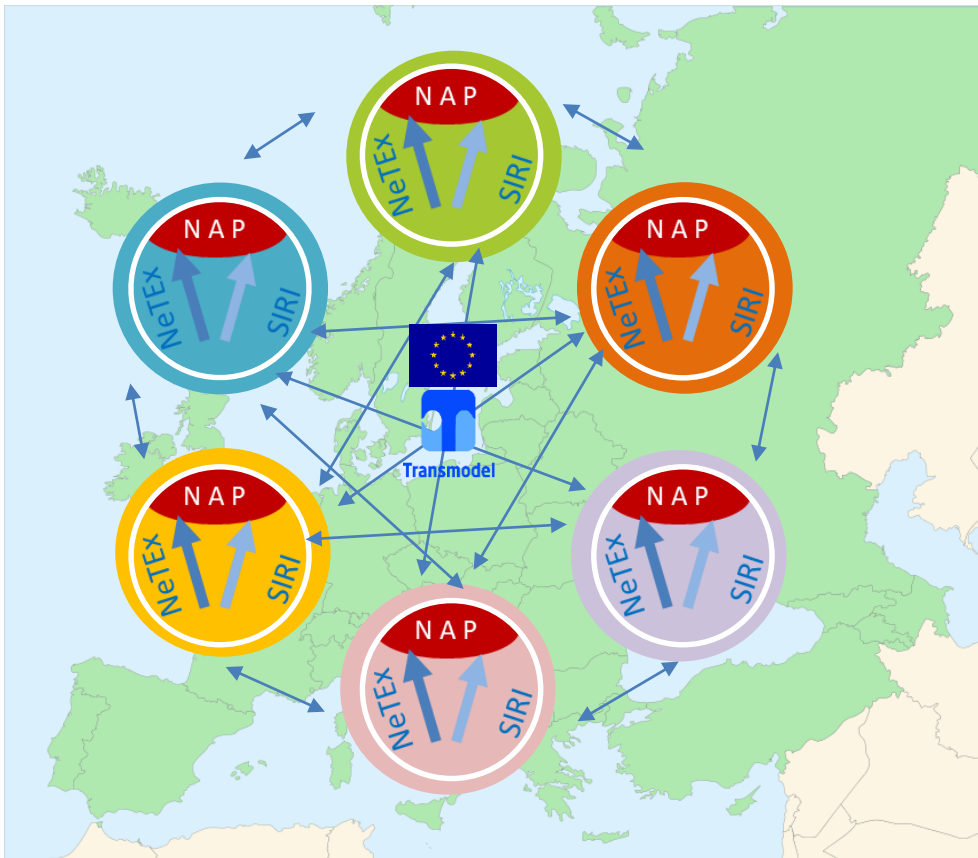
Benefits: easy extensions

- Generic concepts allow for more specific additions
- Modular structure allows for extensions without change of the core structure

Conventional public transport
(incl flexible transport)



Basis for the National Access Points



The Delegated Regulation (adopted in May 2017)

- supplementing the Directive 2010/40/EU
- dedicated to the provision of EU-wide multimodal travel information services

Requires that

Each Member State shall provide a National Access Point

- where **static** scheduled data for public transport should be exchanged using 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

And for **dynamic** data : SIRI is recommended



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Contact

kbouree@wanadoo.fr