Towards smart mobility APIs

16.12.2020
Webinar 10.00-11.30

Practicalities

Please keep your **microphone and video off** at all time

The **moderator** will guide you through the meeting. The meeting will be **recorded** *(please signal if you disagree)*

Please don't hesitate to **comment** or ask **questions**, or to use the **chat box**.

All **slides** will be sent to you afterwards

Agenda

1. Introduction & importance of standardisation - Peter Van der Perre (ITS.be) & Paul Theyskens (Department MOW)
2. Oslo Mobility & next steps - Dimitri Schepers (Informatie Vlaanderen)
3. GBFS, MDS, TOMP - Stijn Vernaillen (City of Antwerp)
4. GTFS, Transmodel, NetEX & Siri - Tim Coninx (De Lijn)
5. DATEX - Peter Van der Perre (ITS.be)
6. Discussion and next steps

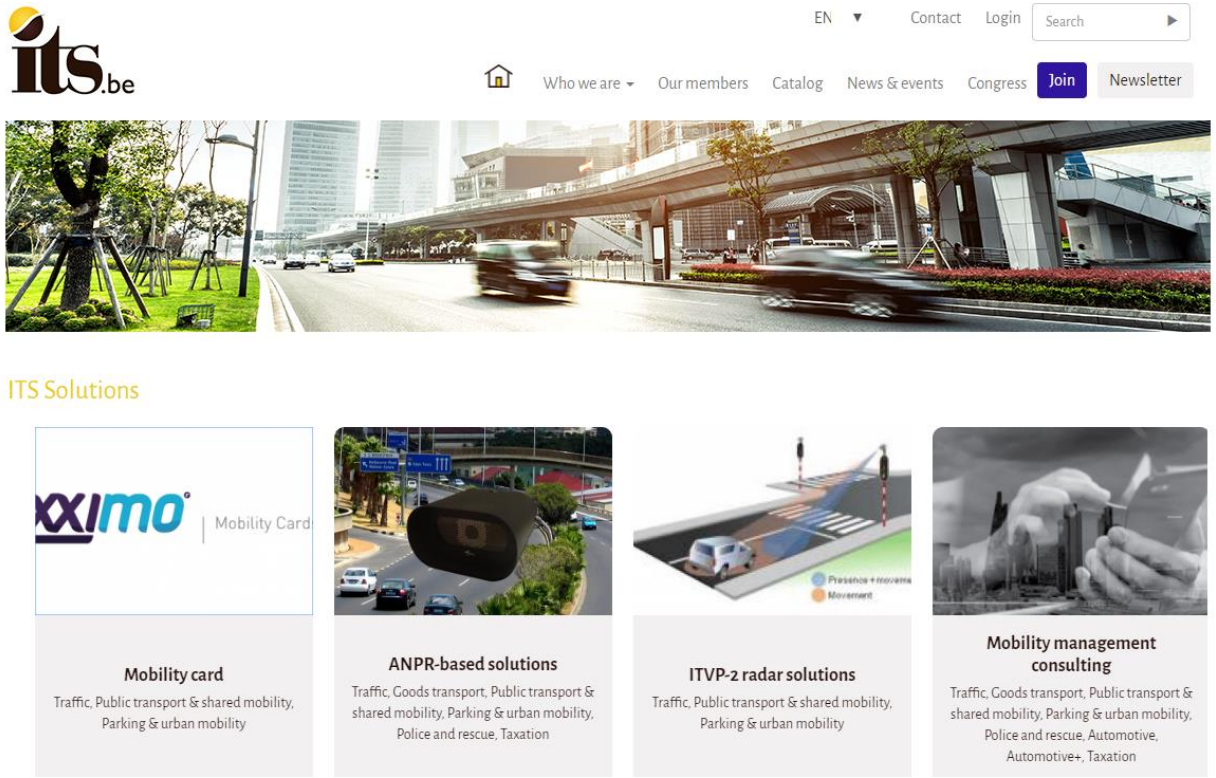
(1. how to follow and 2. how do we develop and/or endorse standards in Belgium and the regions)

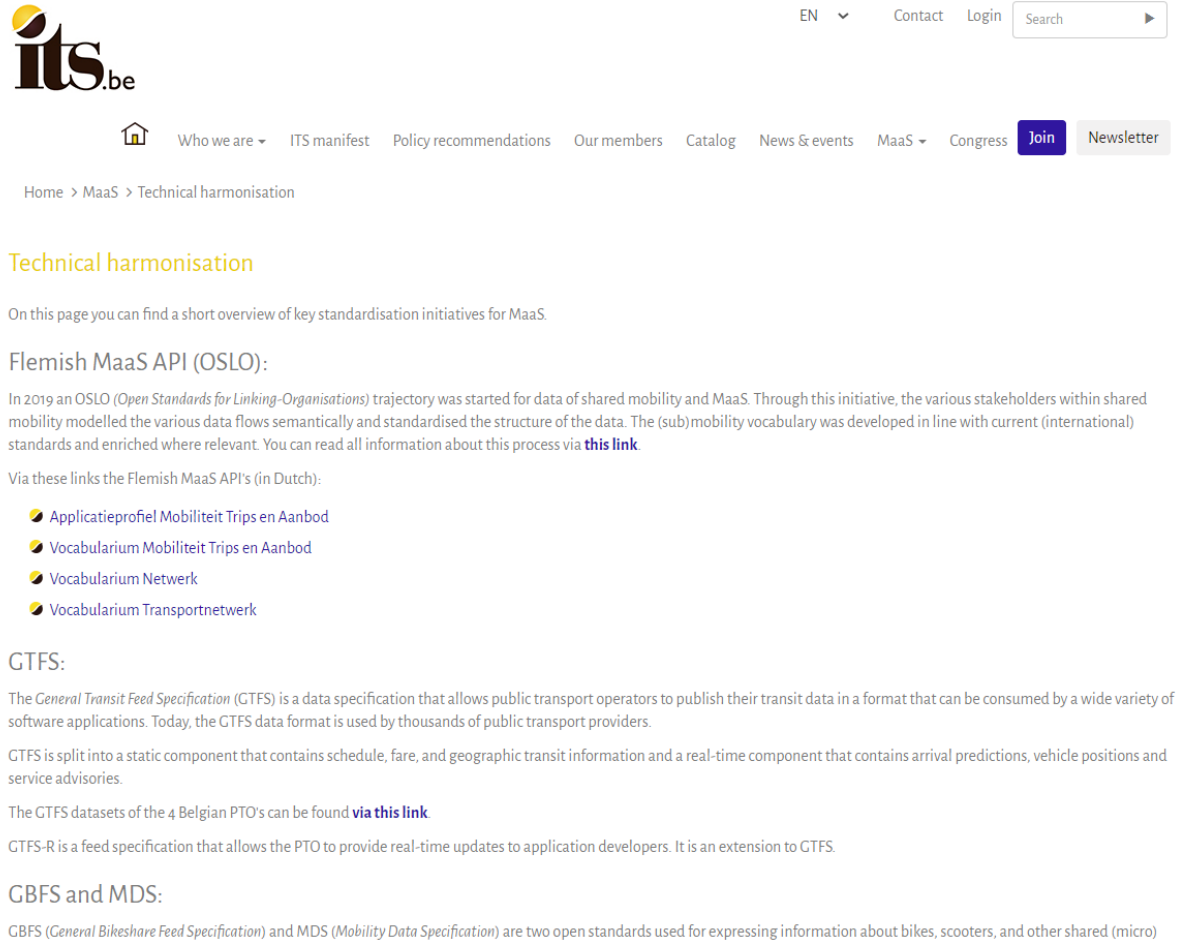
Introduction & importance of standardisation

Peter Van der Perre (ITS.be) & Paul Theyskens (Department MOW)

ITS.be

"sustainable mobility enabled by technology - impartial, public-private, multimodal"





https://www.its.be/maas/technical-harmonisation

Priority domains

- Multimodality
  - MaaS - Mobility as a Service
  - MMM - Multimodal Mobility Management
- Automotive
  - ACE - Autonomous, Connected and Electrical vehicles
  - RUC - Road User Charging extensions

Action plan enablers

- Legal and fiscal enablers
  - eg mobility budget
- Market development
  - eg various forms of support for MaaS providers
- End-user awareness
  - eg organisation of end-user experiences
- Technical enablers
  - eg standards and harmonised specifications
- Infrastructure
  - eg mobility hubs

ITS.be chairs all Belgian mirror groups of the CEN and ISO ITS standardisation bodies

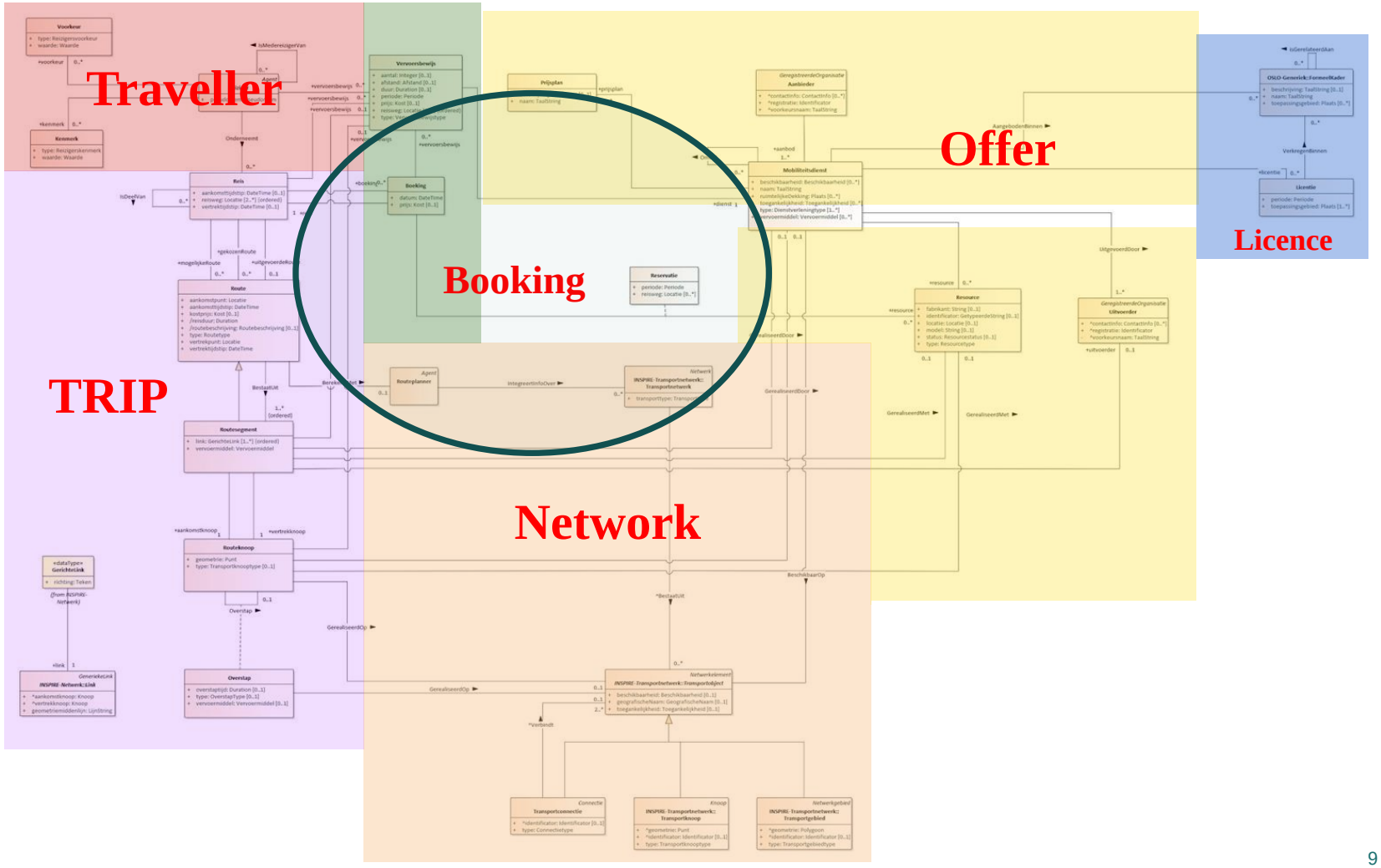
- *CEN TC 278*
- *ISO TC 204*

Importance of standards, enabler of interoperability

1. Value creation
   - Co-creation - essential for combimobility
   - Interoperability and faster innovation
   - Level playing field

2. Scale
   - Larger market
   - Lower cost
   - Higher quality

OSLO Semantic Ontology and Standards



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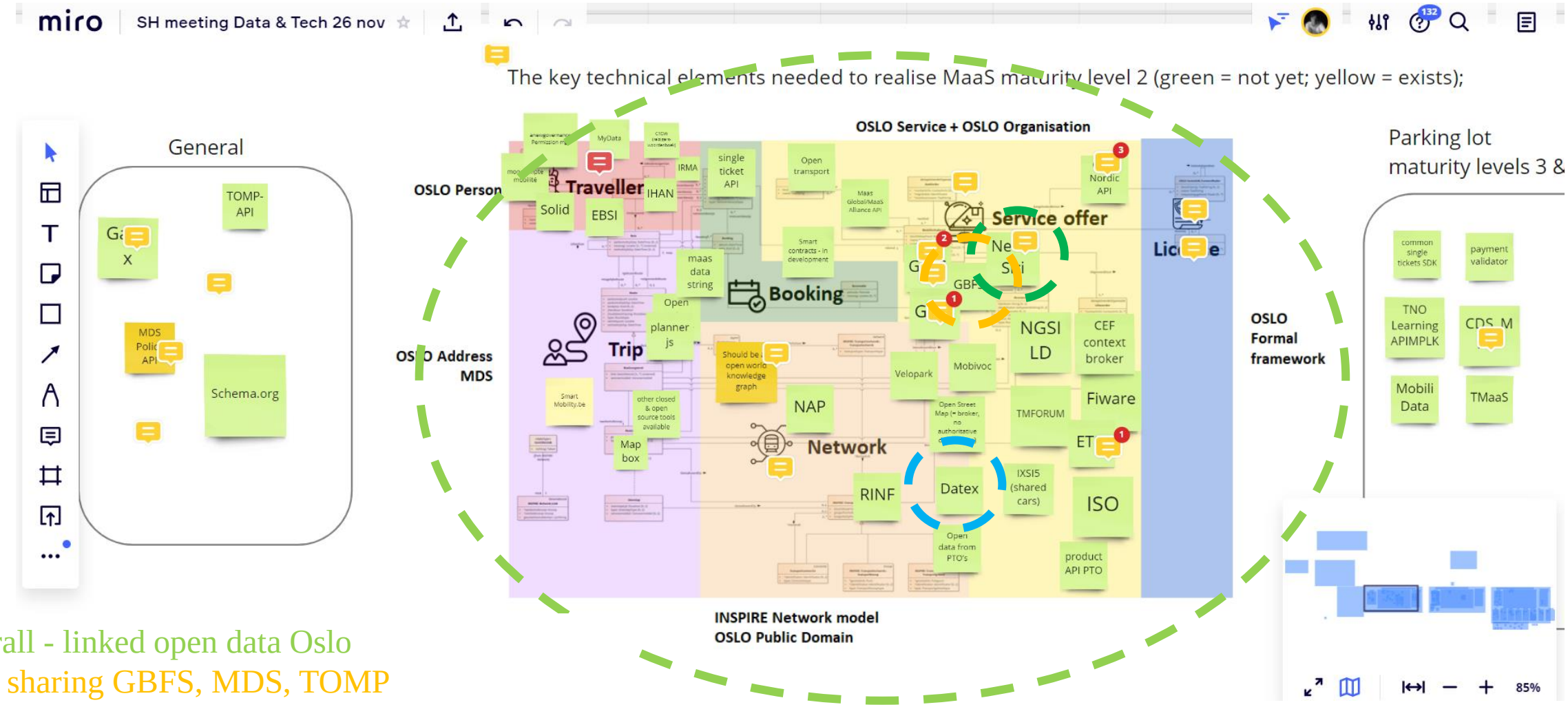
OSLO is a continuous evolution Standard, now working on Bike networks, Hoppin Points, NeTEx and these are basic building blocks for interoperability.

Starting from Oslo Mobility (see further)

1. Traveller
2. Network
3. Service offer
4. Trip
5. Booking

Multitude of emerging standards - a selection …



Overall - linked open data Oslo

Bike sharing GBFS, MDS, TOMP

Public transport GTFS, Transmodel, NetEX & Siri

Automotive DATEX

Planned activities in Flanders 2021 on MaaS Standards

- OSLO Bikes, Hoppin Points, AWV, BIM, Netex
- NeTEx fares to be decided
- OSLO on-boarding of market players, through datamapping, compliance checking and interoperability roadmapping and subsidies
- Technical working group in Flemish 'Maas Governance co-creation project' will evolve technical Governance Code of conduct
- *Standards working group for NL/VL formed and roadmap to be defined*
- *Benelux Living Lab for Cross Border MaaS*

The ecosystem builds the infrastructure for re-use of public and private data - Flanders Data Utility service

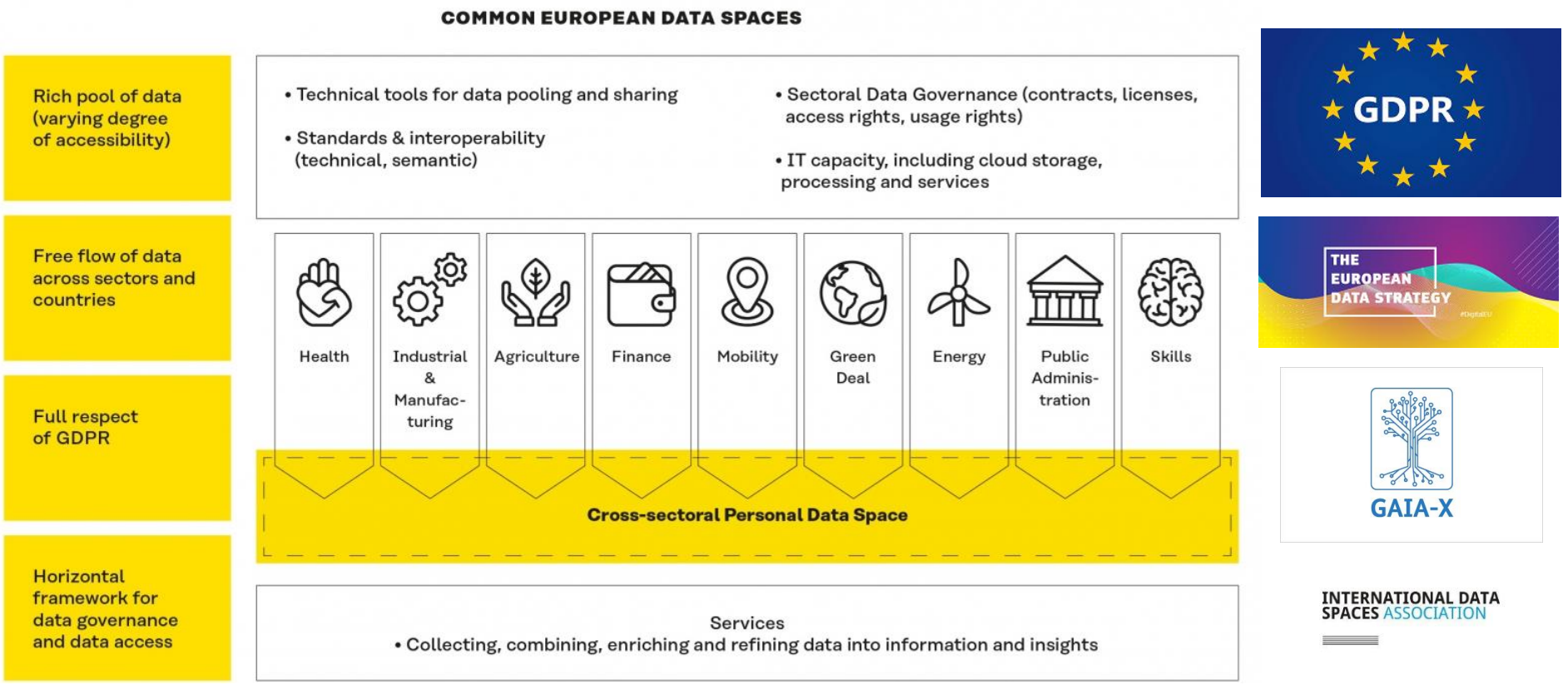
Real-time sensor data and City Data(parking)

Authentic data sources and Bbse data

Re-use at Hoppin points and other re-users like MaaS

Infrastructure Standards Fiware NGSI-LD, JSON, other
In collaboration with Flanders VLOCA open city architecture.

Target Model - Mobility DataSpace - Gaia-x - IDSA architecture

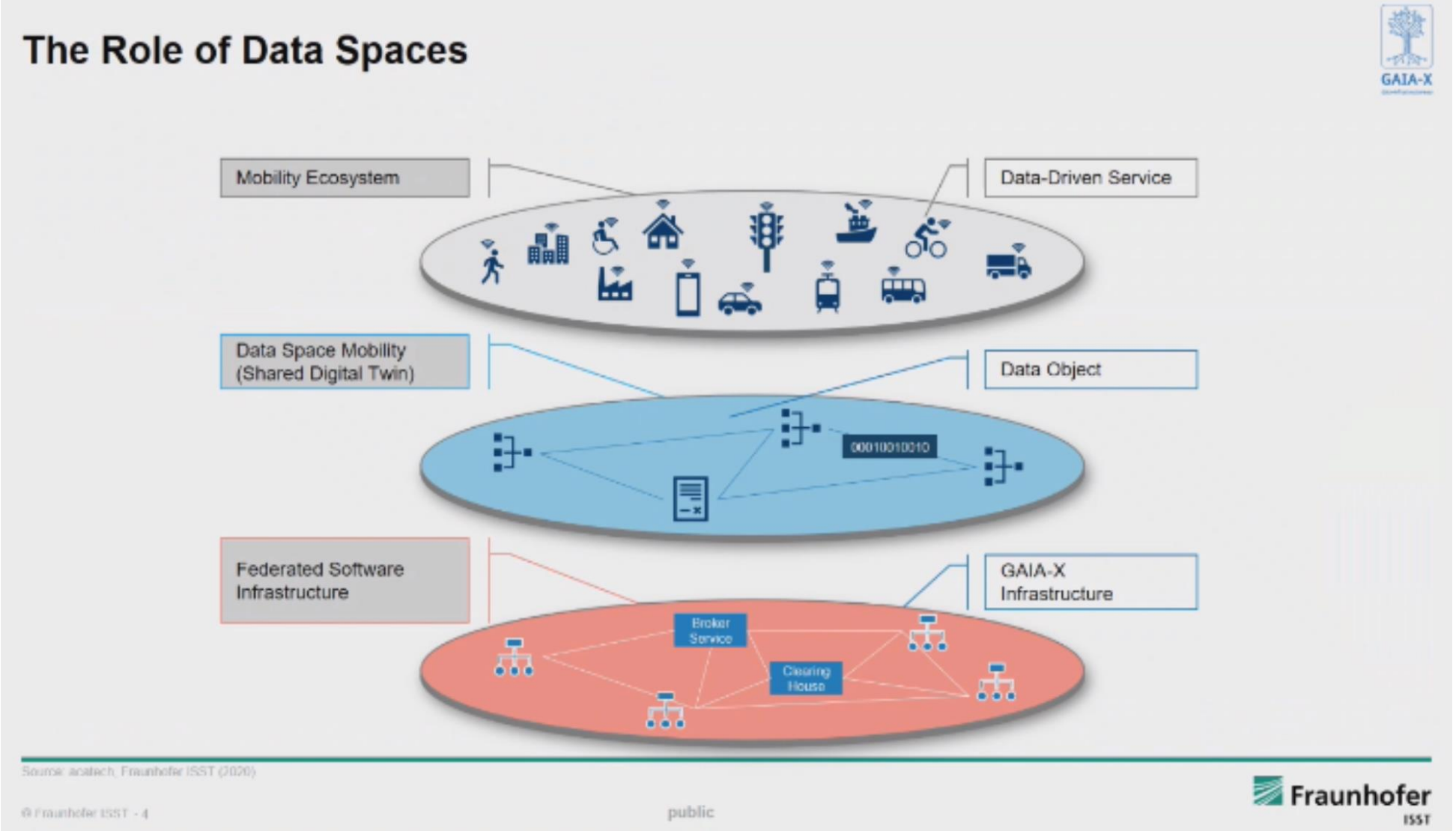


GDPR

THE EUROPEAN DATA STRATEGY

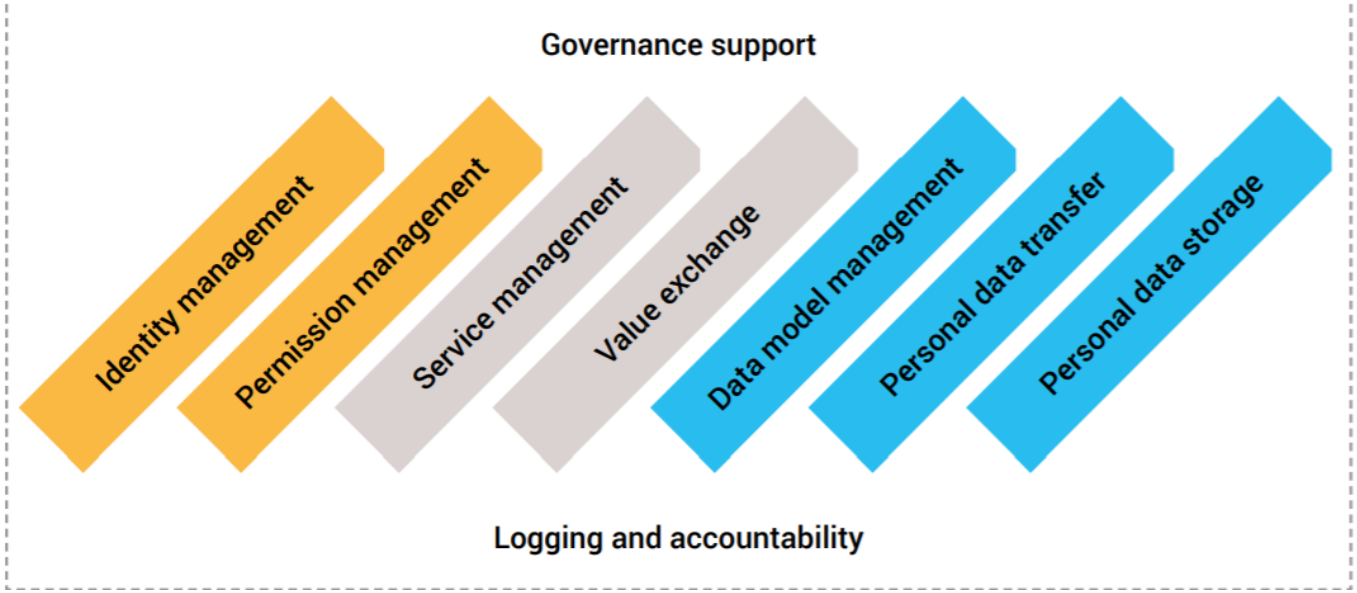
GAIA-X

INTERNATIONAL DATA SPACES ASSOCIATION

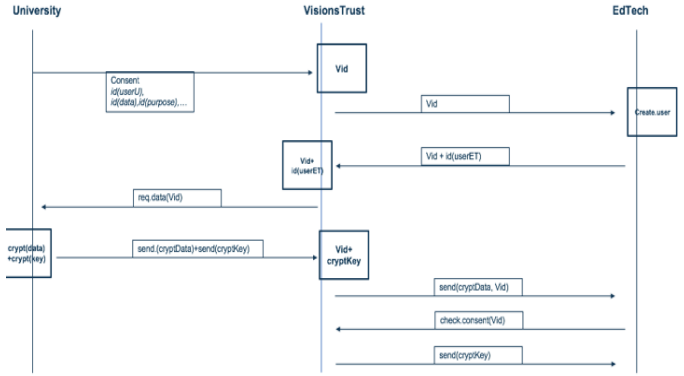


Standards to be studied
Fraunhofer and Fiware

MyData interoperable services -standards

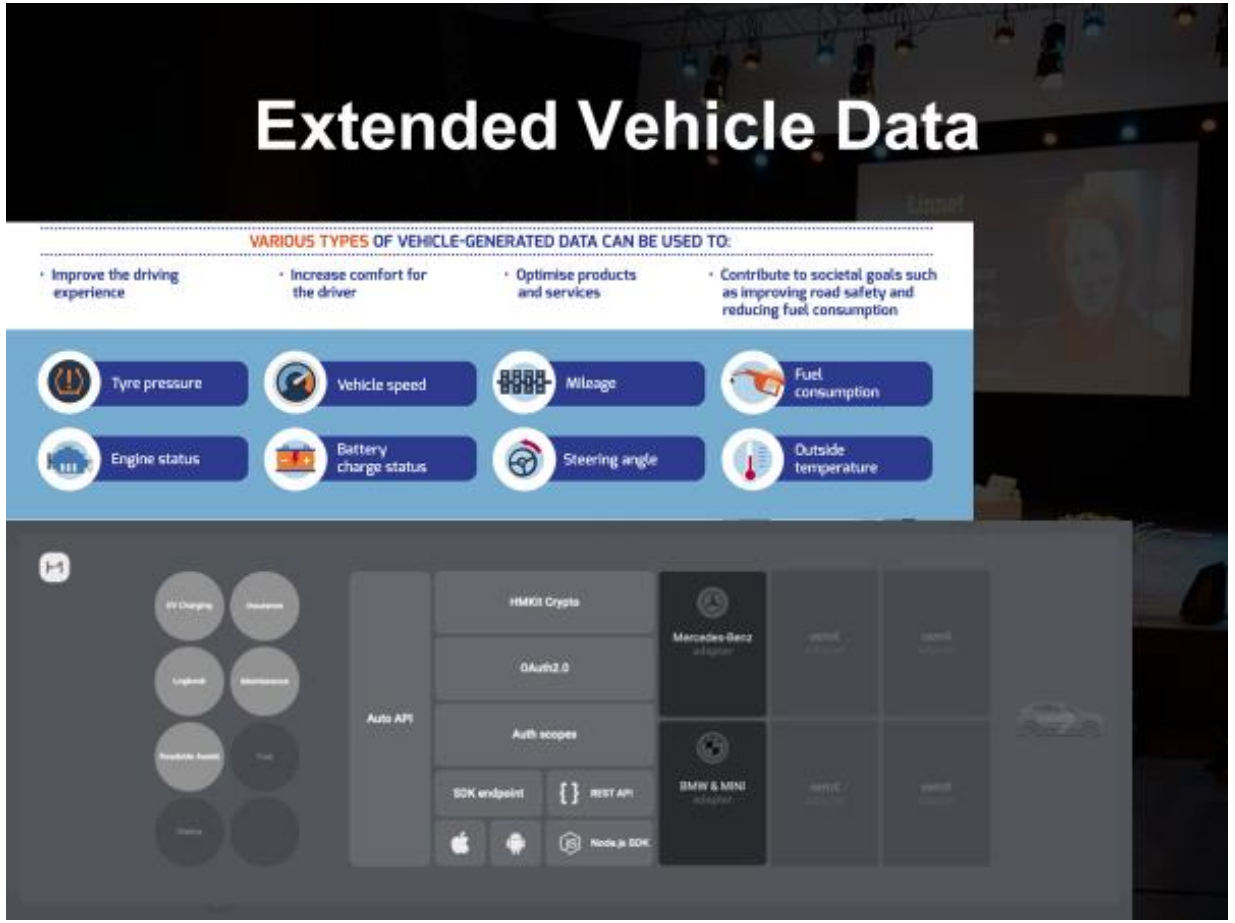


- *DID SSI services*
- *Consent Receipt*
- *Open RDF Semantics (OSLO person)*



Standards needed:
1.Data model for consent
    1. http://api.consentreceipt.org/doc/
2.API to manage consents (check and update)
3.API to create users
4.Data model for ID
5.Open collectively defined semantic standard (RDF) for data sources, data flow and processing

Car data standards

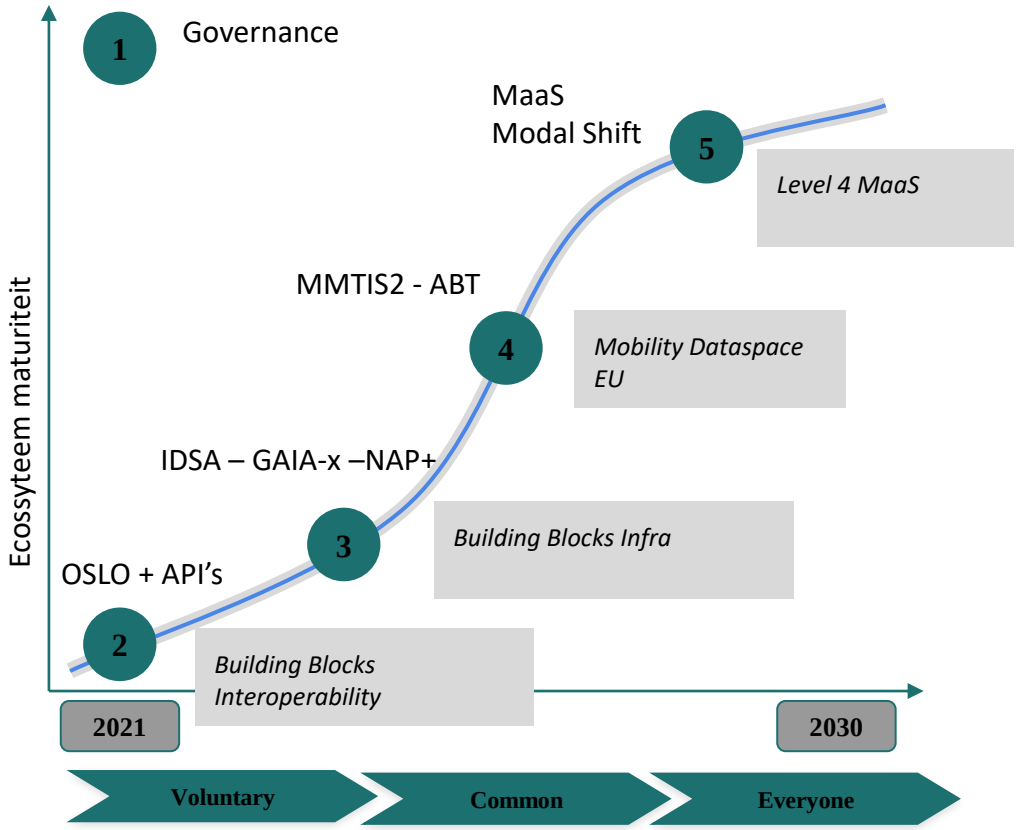


Status of the market - level 2 MaaS

level 2 - single ticket API for De Lijn and NMBS, Bluebike

Vlaanderen
is mobiliteit & openbare werken

MaaS Ecosystem - Possible roadmap L3-4



1 **Governance**
MaaS softlaw governance level 4 roadmap
Governance Horizon Europe
EU Data Act en Single EU ID (Data Sharing)

2 **Building blocks interop**
OSLO roadmap + MyData + Benelux Lab
Align ISA + W3C + NeTEx tarifs
roadmap product API, Tarifs API, TOMP API

3 **Building Blocks Infra**
NAP=NeTEx evolution to realtime event broker en NGSI
Study TOMP API - IDSA and Gaia-x Cloud EU + MyData
Flemish Data Space - MaaS

4 **Mobility Dataspace EU**
MMTIS 2 - interoperable ticketing
Account based Ticketing – travel rights
Personalised services

5 **Level 4 MaaS**
MaaS Modal Shift – Big Data + AI
MaaS B2C all modes
Personal DataSpaces integrated with Mobility DataSpaces

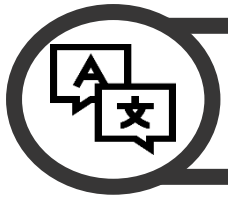
Oslo Mobility & next steps

Dimitri Schepers (Informatie Vlaanderen)

https://data.vlaanderen.be/

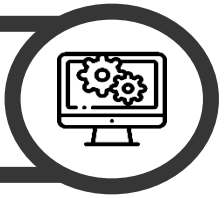
Open **S**tandards
for
Linked **O**rganisations

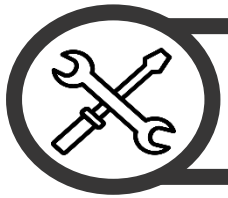
OSLO



Semantic interoperability

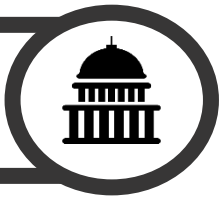
Technical interoperability



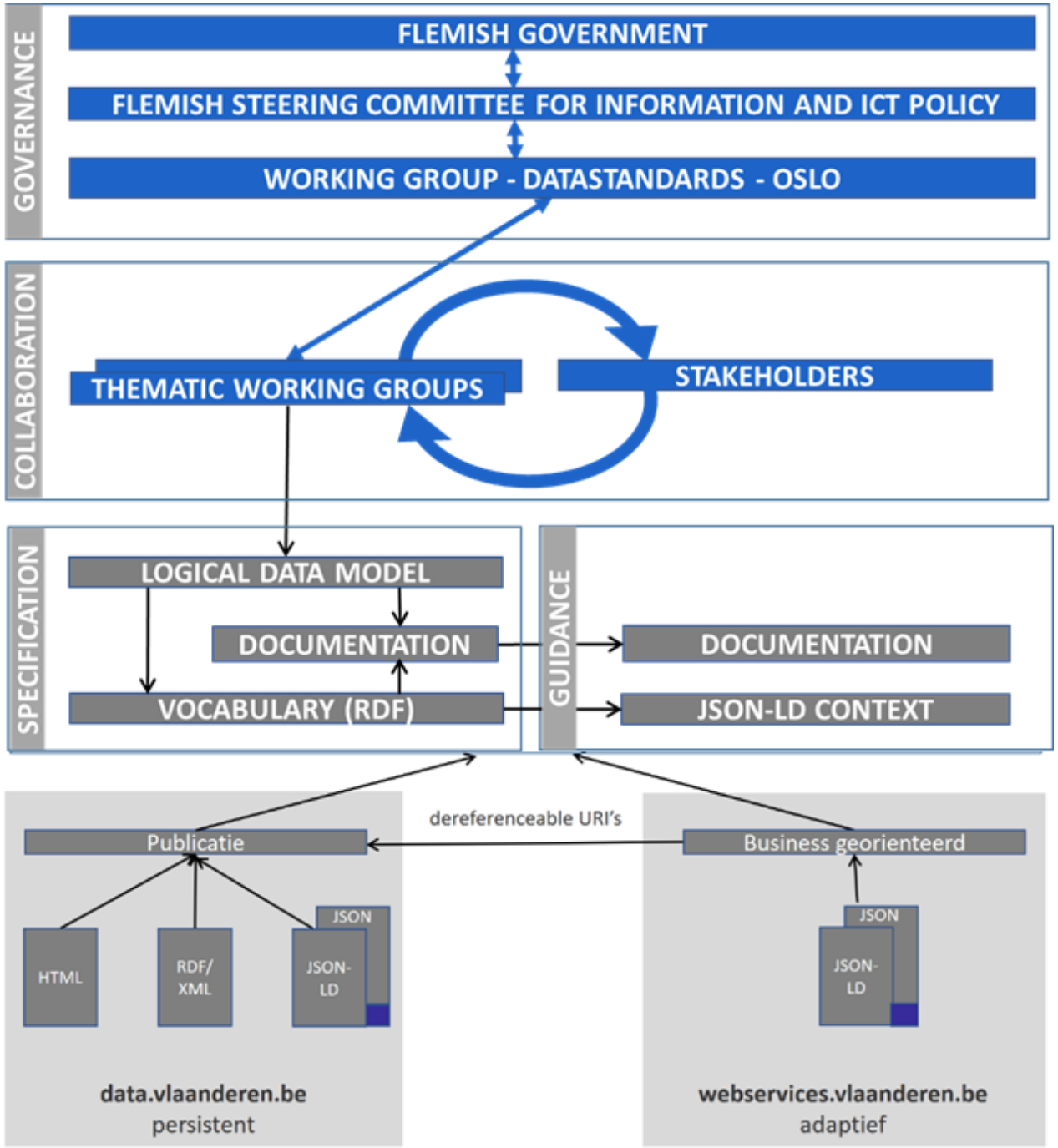


Tools

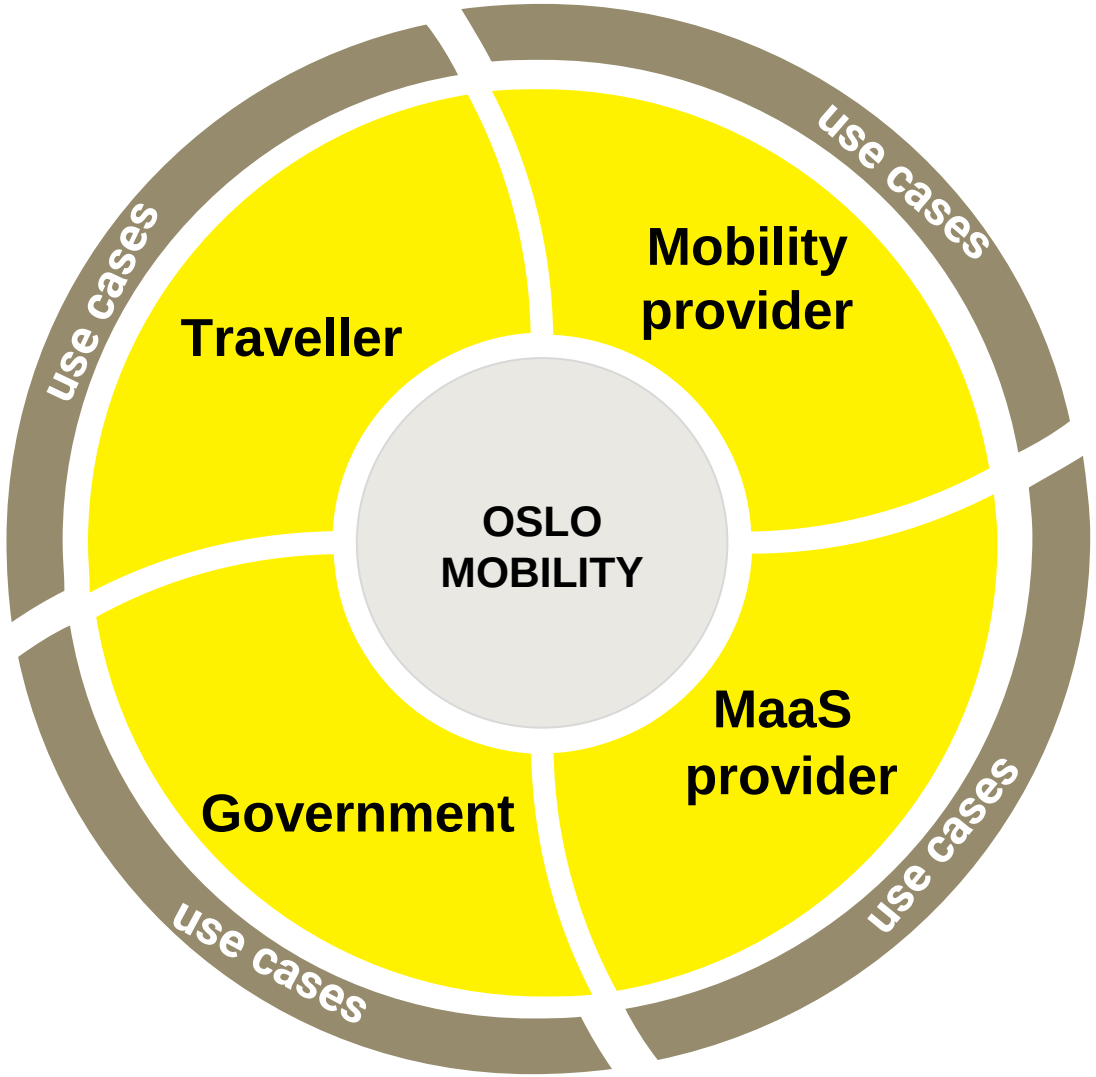
Support & governance

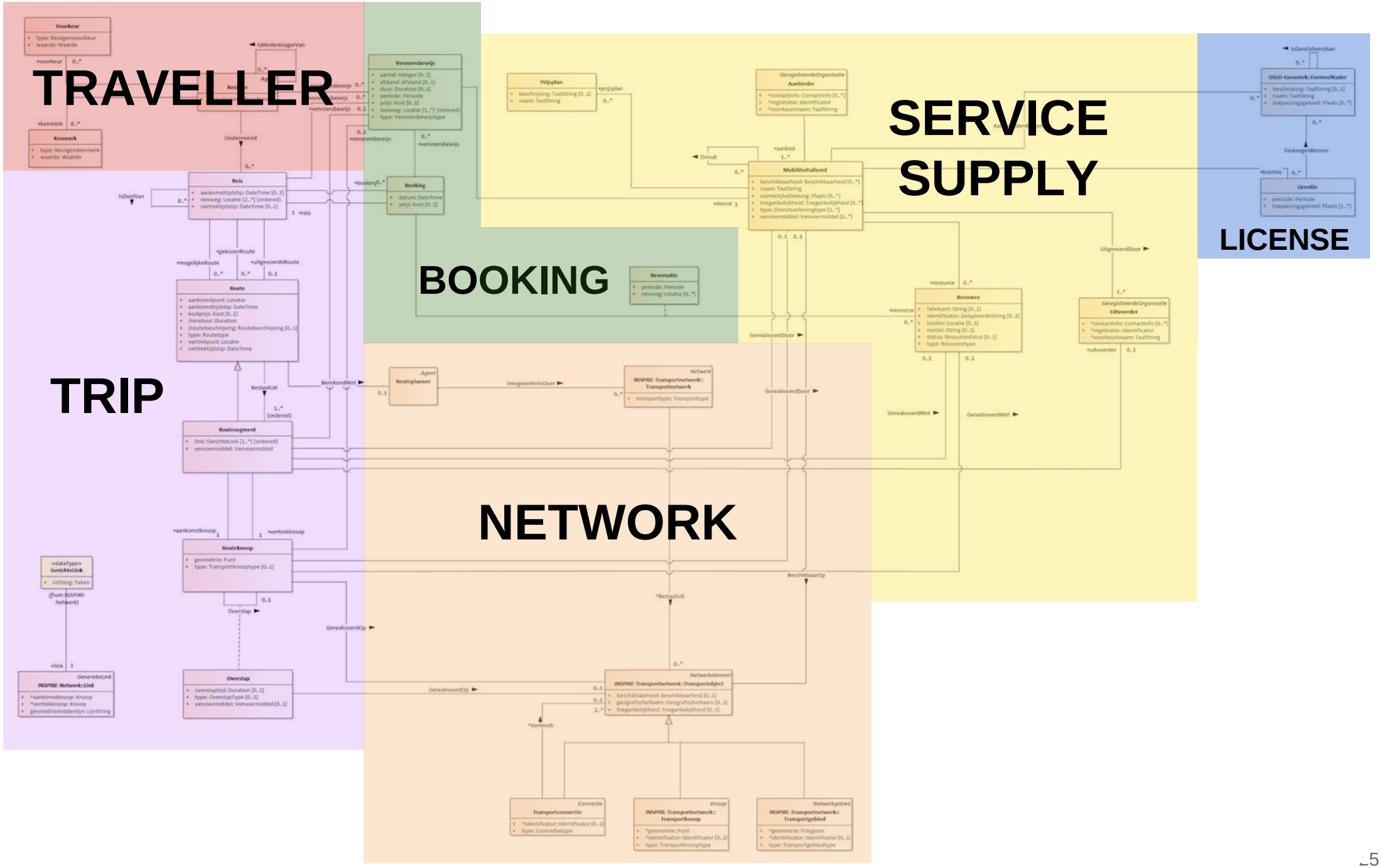


Use cases


GOVERNANCE
FLEMISH GOVERNMENT
FLEMISH STEERING COMMITTEE FOR INFORMATION AND ICT POLICY
WORKING GROUP - DATASTANDARDS - OSLO
COLLABORATION
THEMATIC WORKING GROUPS
STAKEHOLDERS
SPECIFICATION
LOGICAL DATA MODEL
DOCUMENTATION
VOCABULARY (RDF)
GUIDANCE
DOCUMENTATION
JSON-LD CONTEXT
dereferenceable URI's
Publicatie
Business georienteerd
HTML
RDF/ XML
JSON
JSON-LD
JSON
JSON-LD
data.vlaanderen.be
persistent
webservices.vlaanderen.be
adaptief

Use cases Oslo Mobility




TRAVELLER
SERVICE SUPPLY
LICENSE
BOOKING
TRIP
NETWORK

New Oslo initiatives/components

- Oslo OV tijdstabellen (NetEX)
- Oslo Fietsinfrastructuur
- Oslo Mobiliteitsprofiel
- Oslo Mobipunten
- …

GBFS, MDS, TOMP

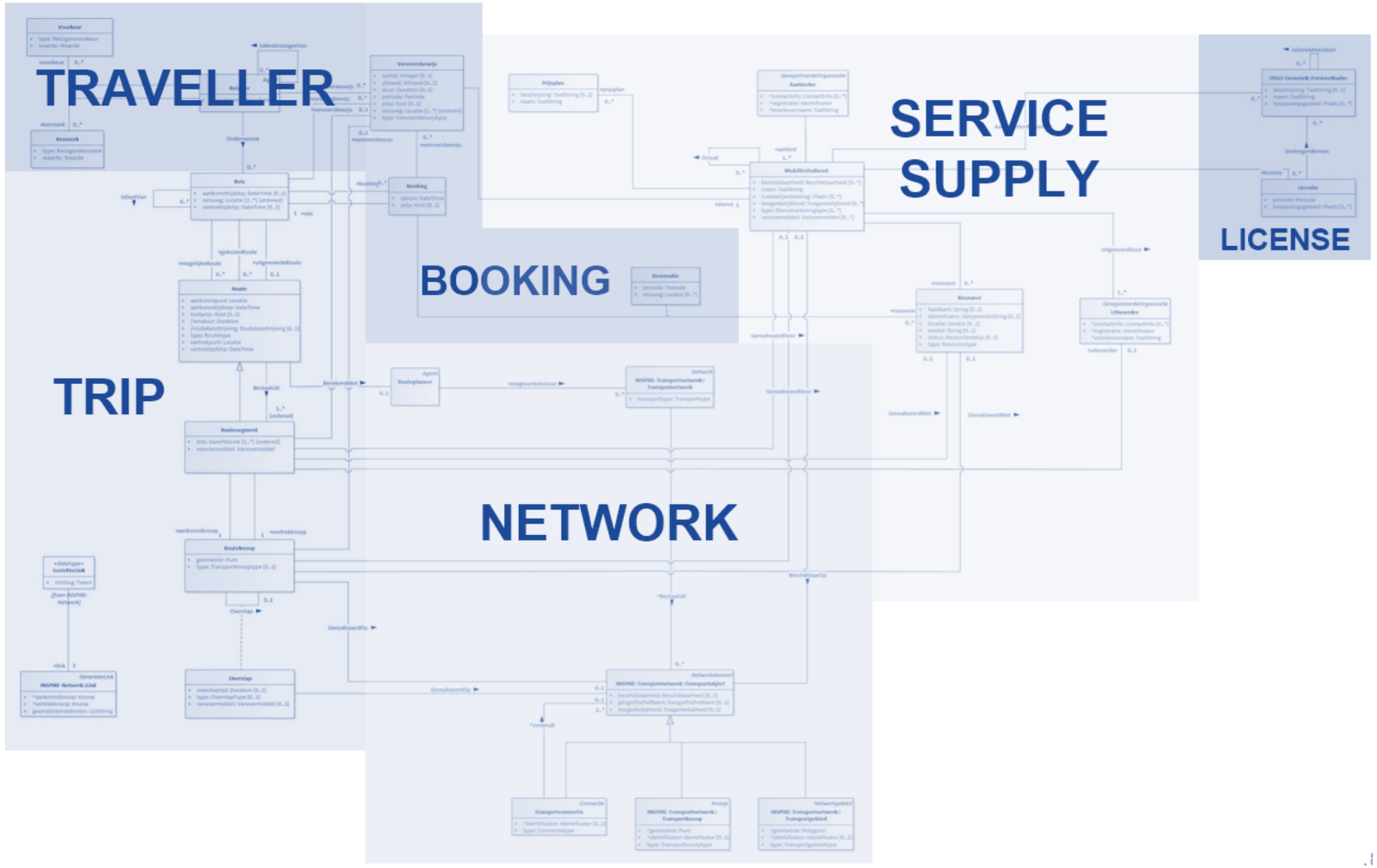
Stijn Vernaillen (City of Antwerp)

GBFS, MDS, TOMP - what is it?

- GBFS - NABSA
  - https://github.com/NABSA/gbfs
  - Providers usin GBFS: https://github.com/NABSA/gbfs/blob/master/systems.csv
- MDS - OMF
  - https://github.com/ellis-assoc/mobility-data-specification
  - 26 USA-cities, 4 non-us cities, Automotus, **Bird**, BlueSystems, Coord, Ford, Lacuna, RideReport, Roundtrip, Spin, Stae, Waymo
- TOMP API – TOMP WG
  - https://github.com/TOMP-WG
  - Participants: Radiuz, Nazza, Trevvel/Paxx, TURNN, Cargoroo, University of Twente, Stapp.in, Stichting OpenGeo, Mobiliteitsfabriek, **Taxistop**, PON (Next Urban Mobility, Shuttel, Dockr, Check), XXImo Mobility, Innovactory, DAT.Mobility, SBB/MOVI+, Urbee, Mobike, RET, HTM, NS, Cityway, European Travellers Club
- CDS-M – TOMP WG
  - https://github.com/TOMP-WG/CDS-M

- Components (bold = see next slides)
  - GBFS
    - X
  - MDS
    - X
  - TOMP
    - X

OSLO Mobiliteit Trip en Aanbod



Modi

- Public Transport
- Shared Micromobility
- Shared Cars
- Taxi/Ridehailing
- Private cars/vehicles

Stakeholder

- Transport Operator
- Mobility provider
- Government

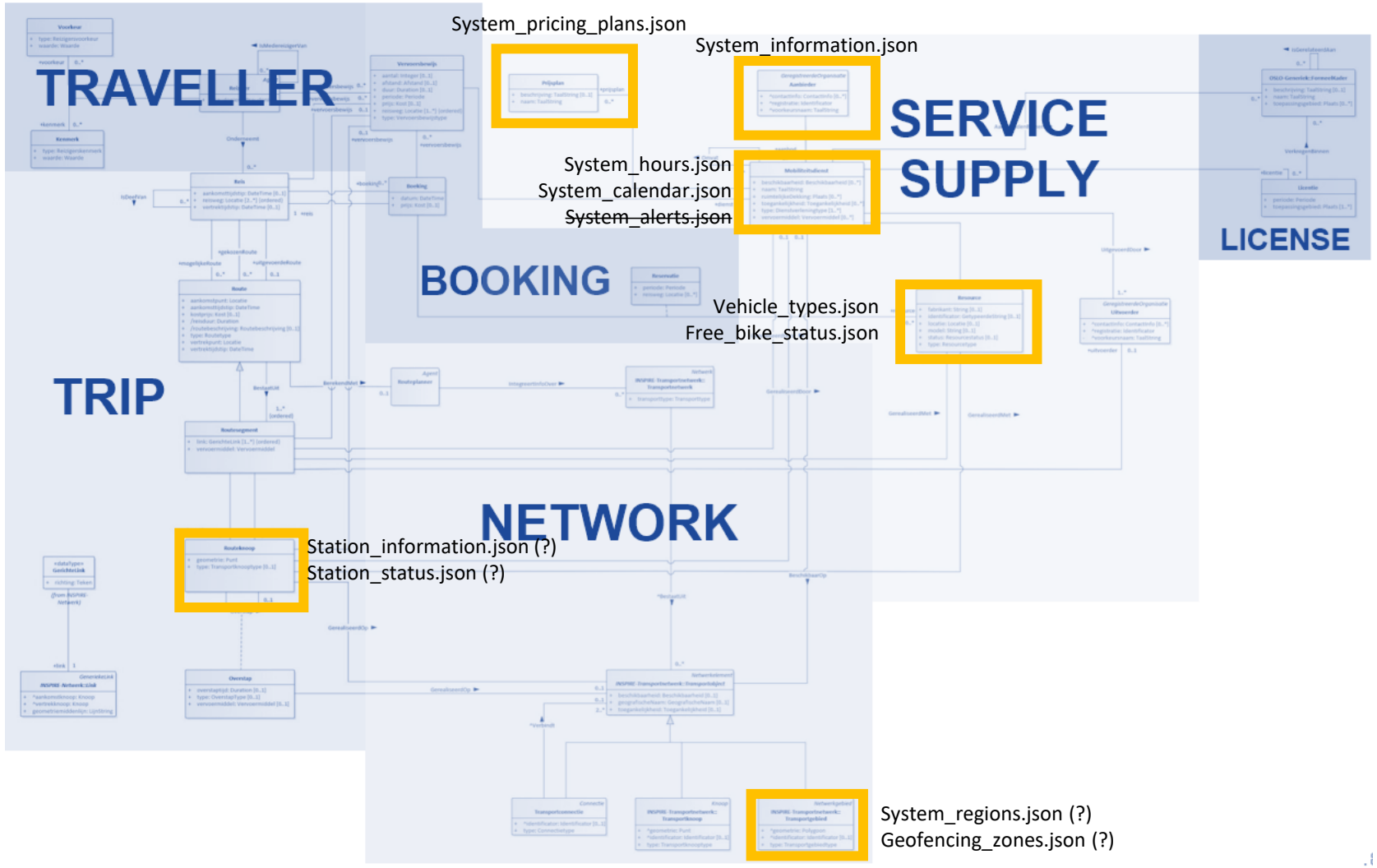
Functionality

- Route planning
- Ticketing
- Incentives
- Governance
- Analytics

Data

- Realtime
- Near-realtime (less then 1h old)
- Delayed (24h)
- Historic (+24h)
- Static

NABSA - GBFS



Modi

- ~~Public Transport~~
- **Shared Micromobility**
- ~~Shared Cars~~
- ~~Taxi/Ridehailing~~
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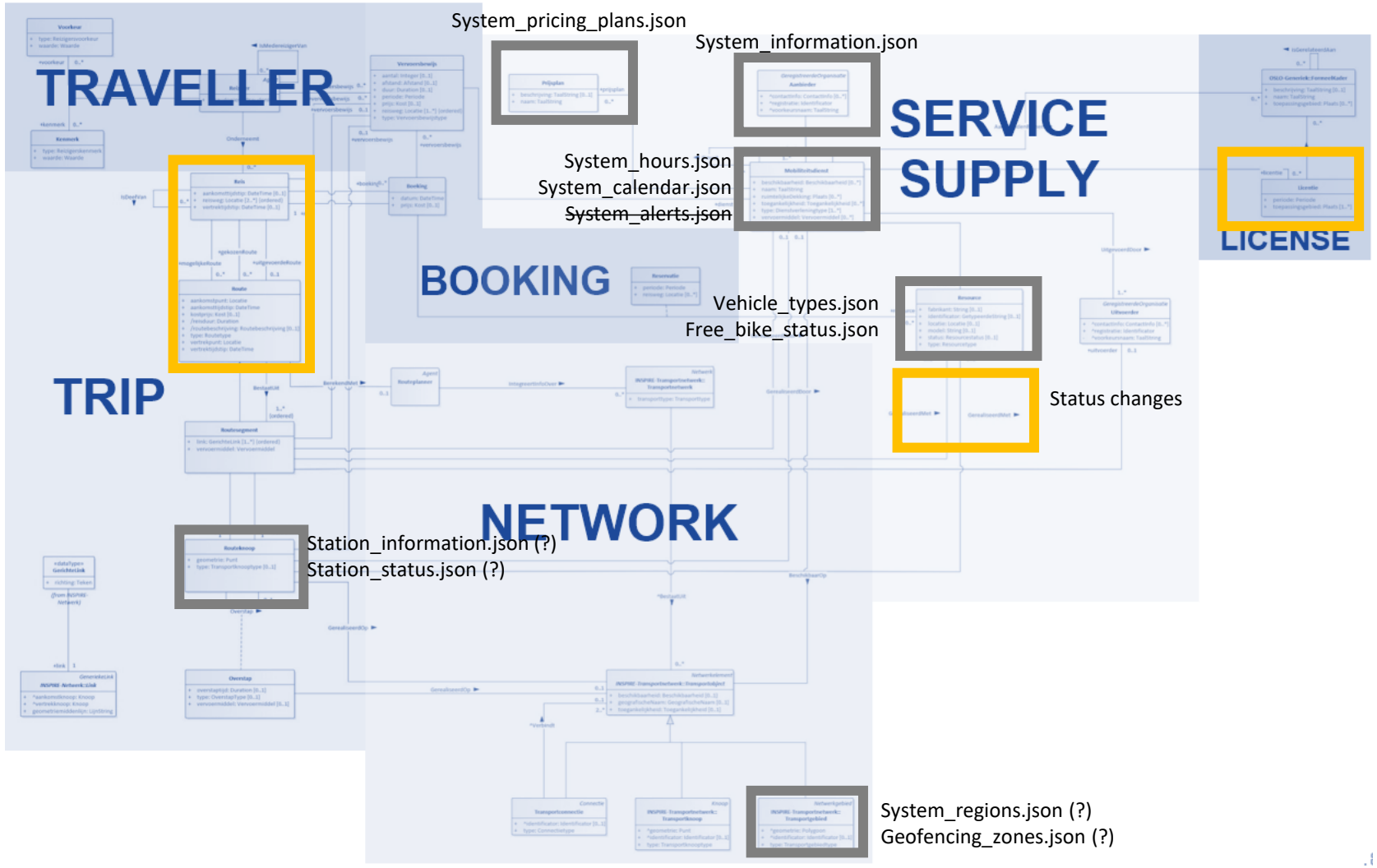
- **Static**

OpenMobilityFoundation - MDS



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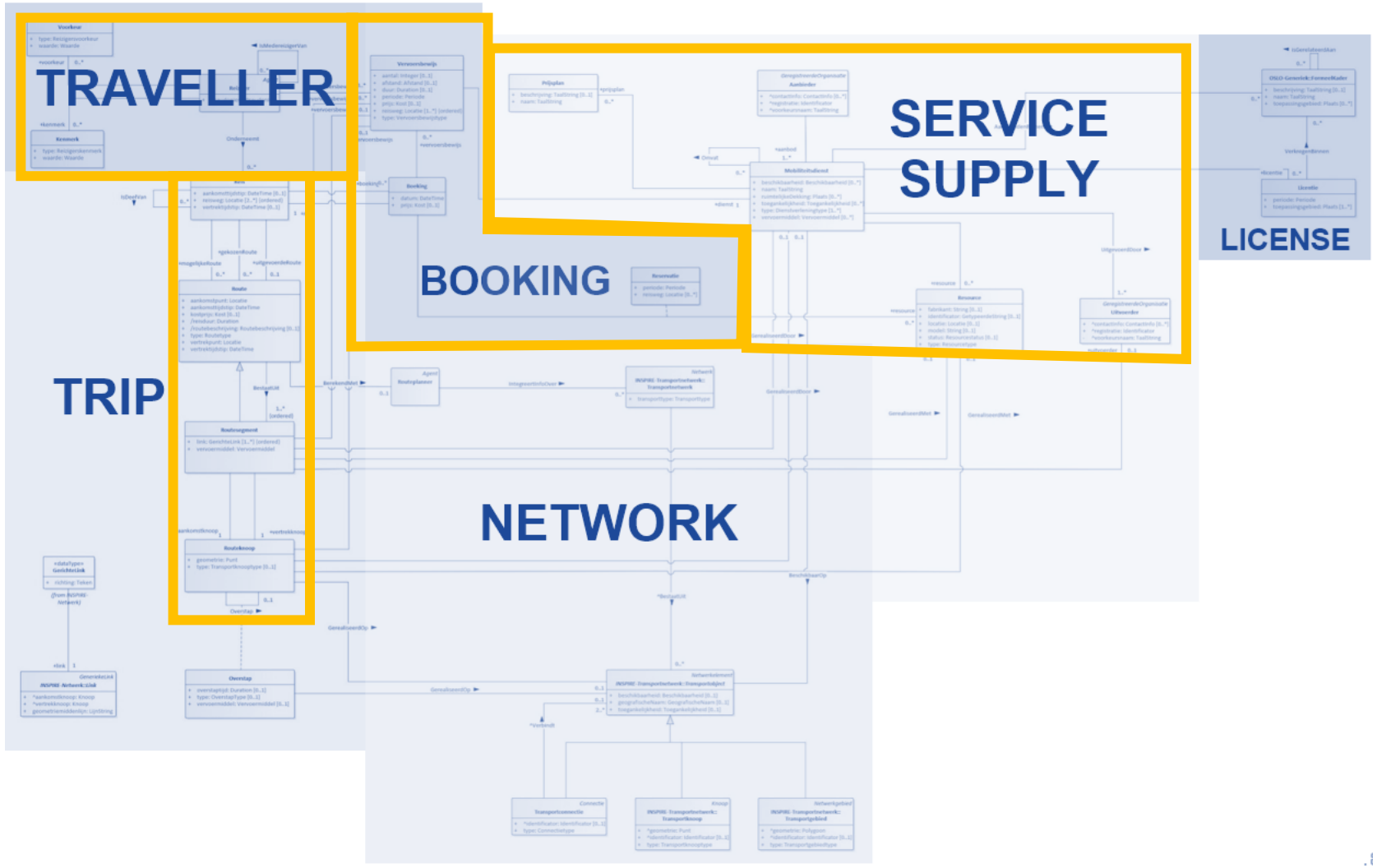
TOMP Working Group – TOMP API



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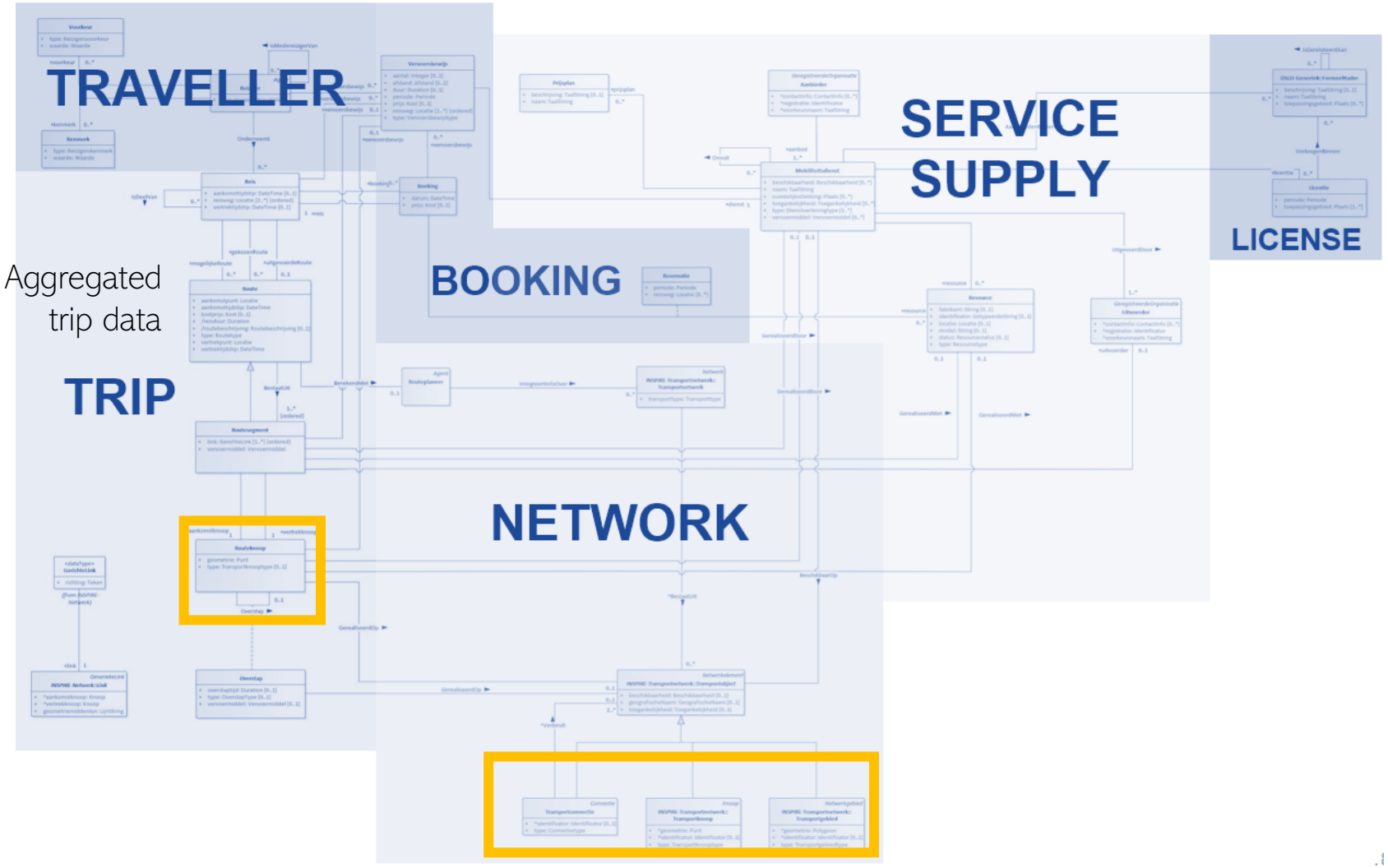
TOMP Working Group – CDS-M



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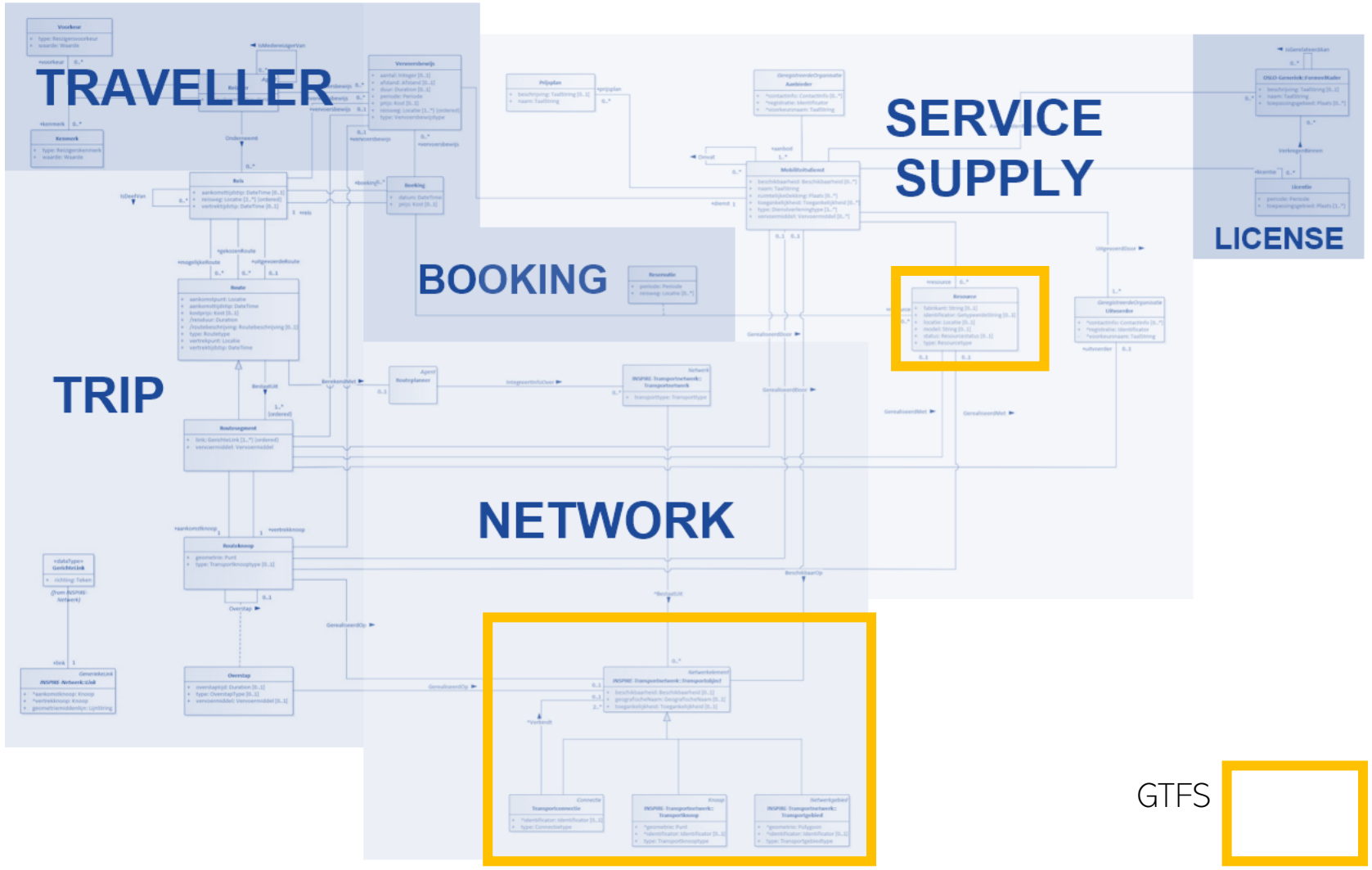
FiWare– NGSI ?



GTFS

Modi

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- Shared Micromobility
- Shared Cars
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- Private cars/vehicles

Stakeholder

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- ~~Mobility provider~~
- Government

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- ~~Governance~~
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- Historic (+24h)
- ~~Static~~

GTFS, Transmodel, NetEX & Siri

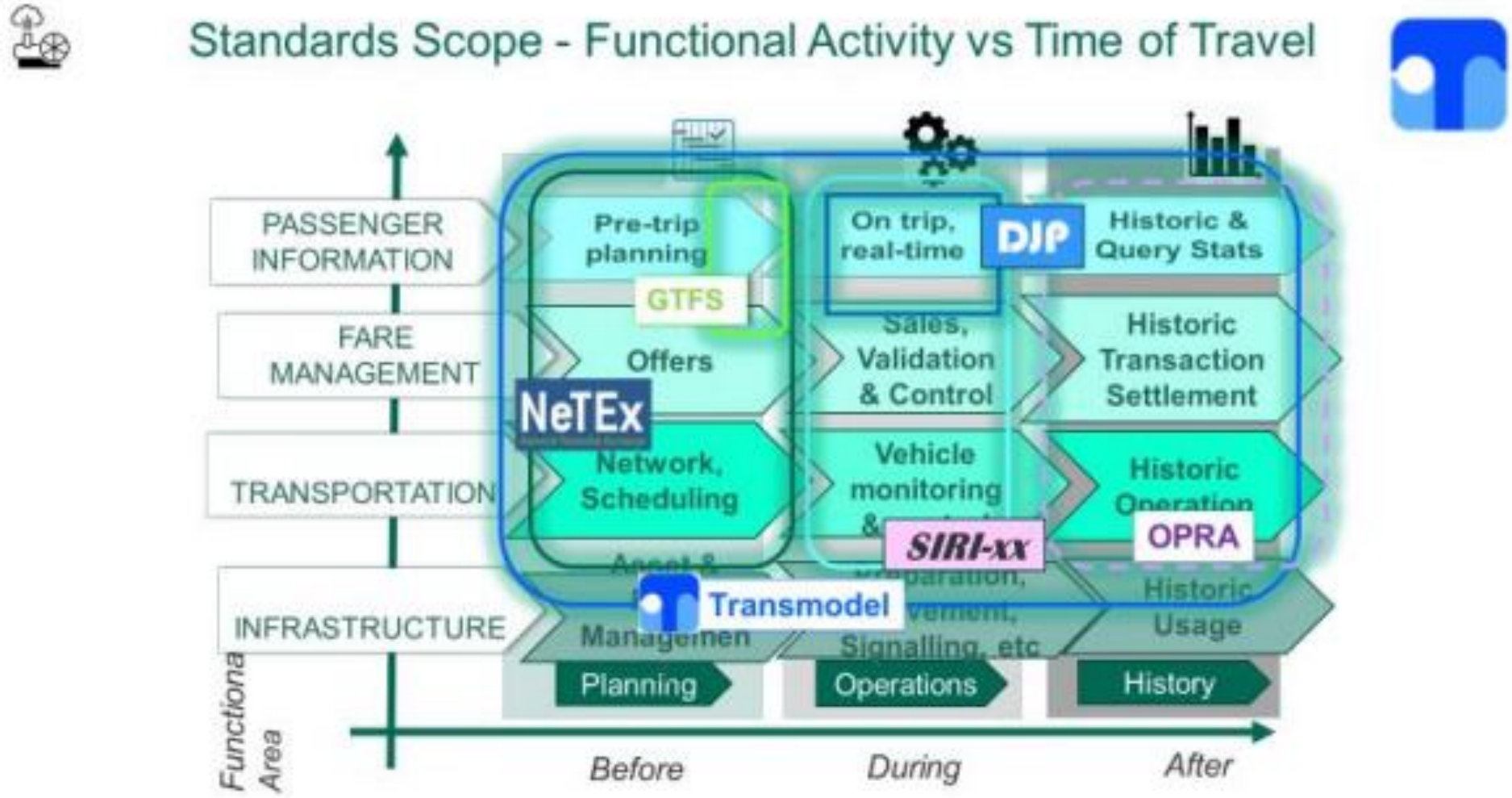
Tim Coninx (De Lijn)

GTFS, Transmodel, NetEX & Siri - what is it?

- GTFS = General Transit Feed Specification
  (General <> Google)
  - De-facto google standard
  - developers.google.com/transit/
- Transmodel = European reference data model
  - CEN Reference standard
  - Transmodel (transmodel-cen.eu)
- NeTEx & Siri = Network Transport Exchange
  - CEN Technical standard – XML
  - NeTEx (netex-cen.eu)
  - SIRI = CEN norm protocol as real-time addendum on NeTEx

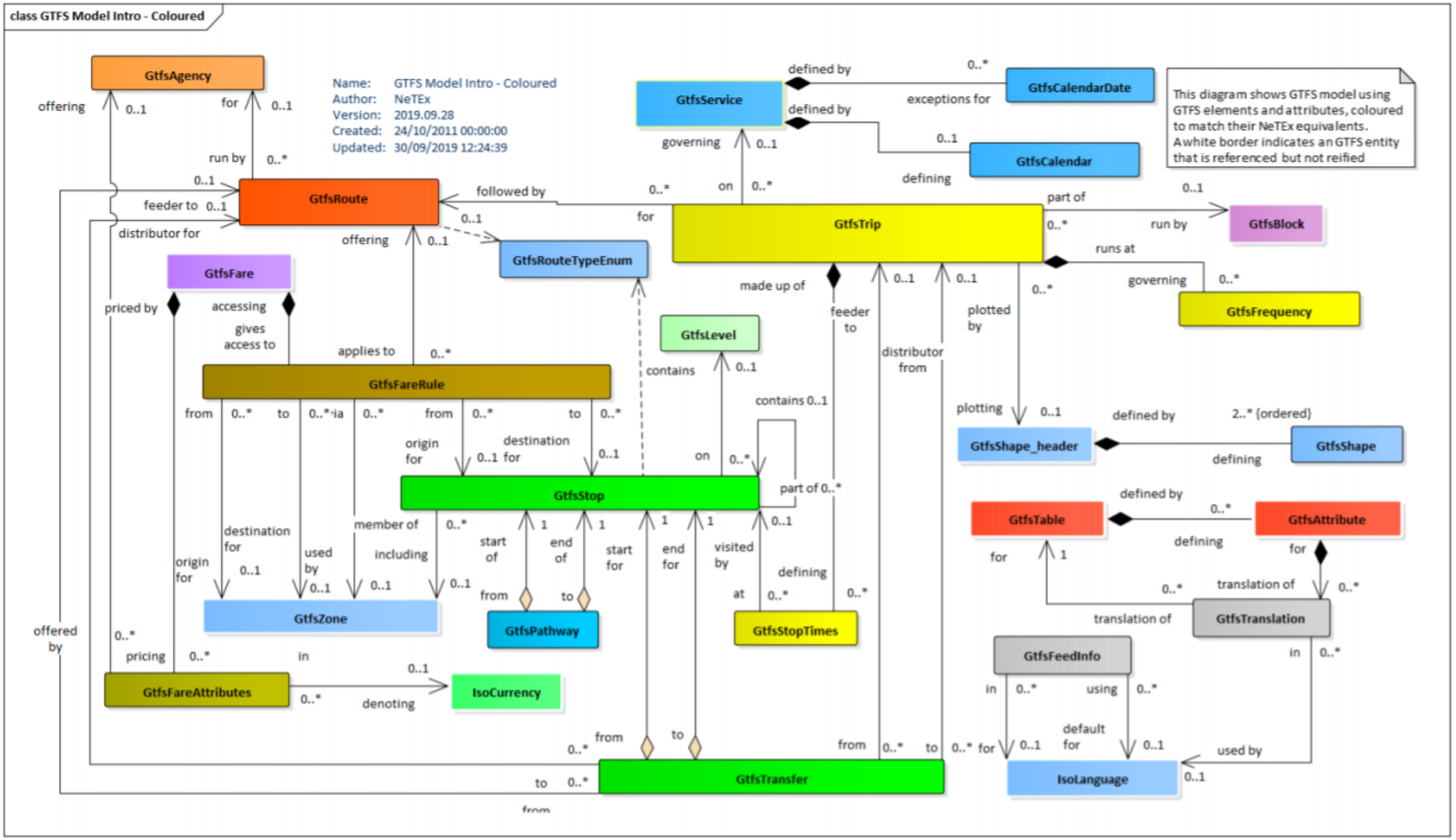
How does it compare?

Figure 12 Relative scope of different PT standards

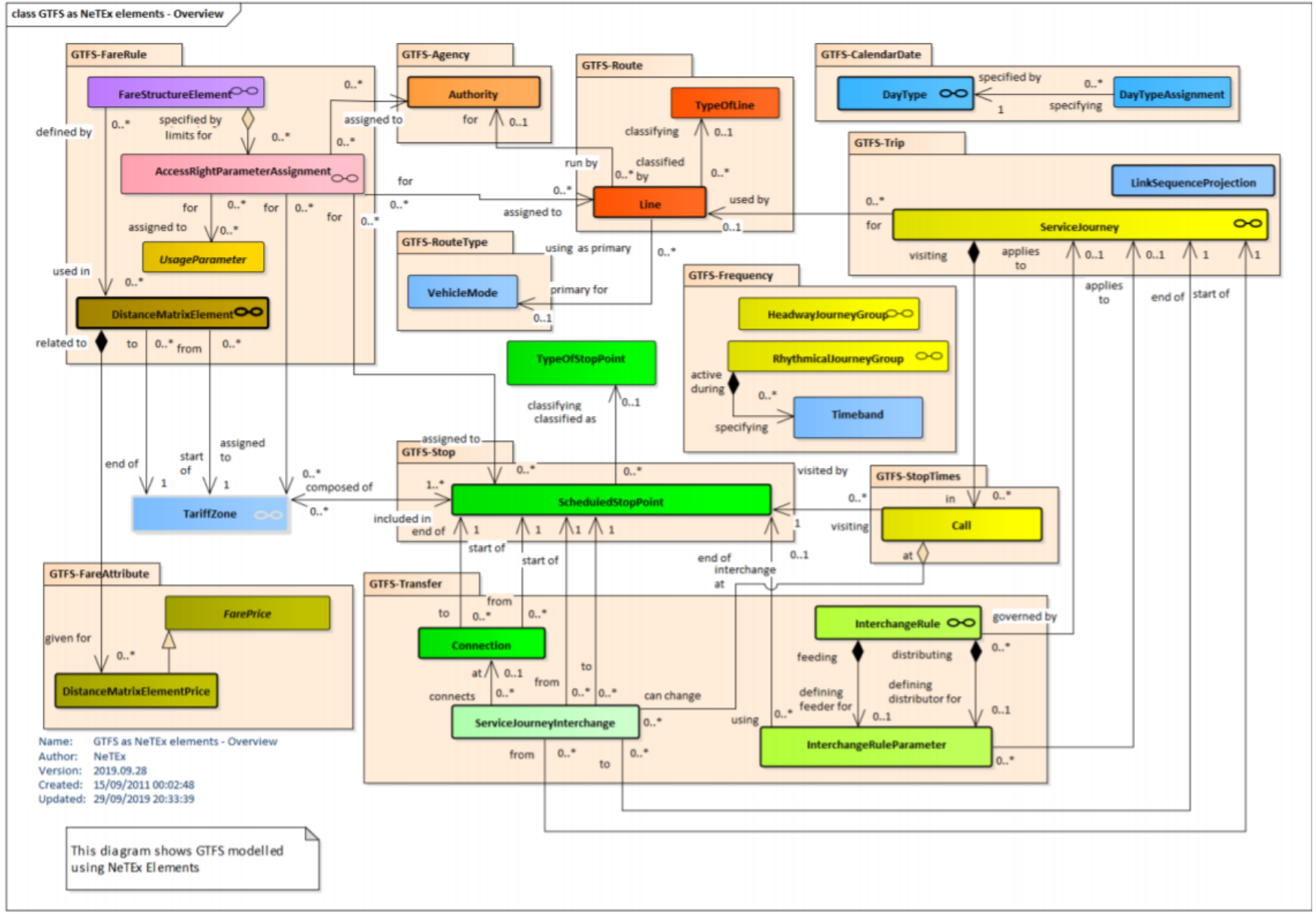


http://www.transmodel-cen.eu/wp-content/uploads/sites/2/2019/10/StandardsHarmonisation-2019-njsk-v1.0.pdf

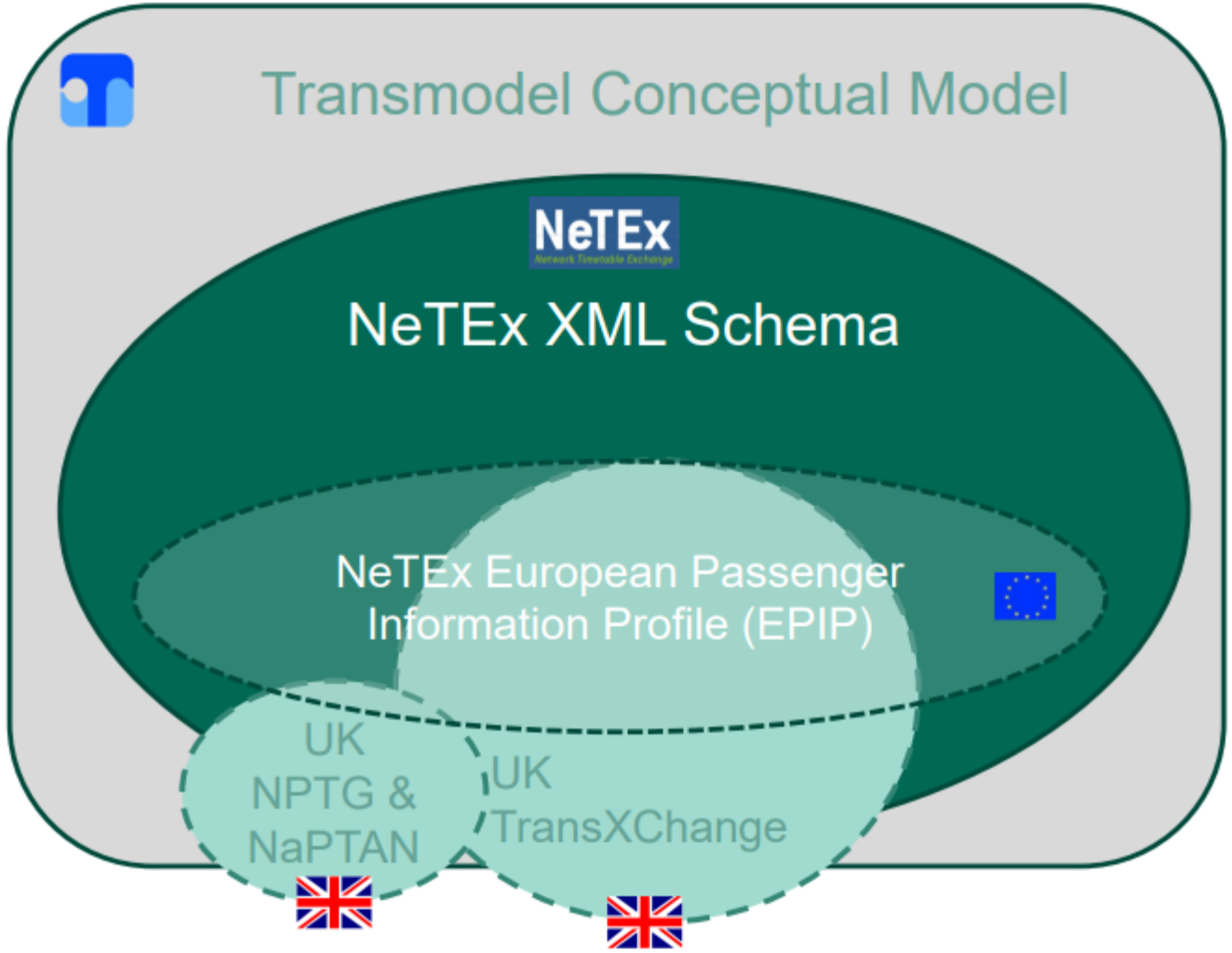
Relation between GTFS and NeTEx



Relation between NeTEx and GTFS



Relation EPIP / NeTEx

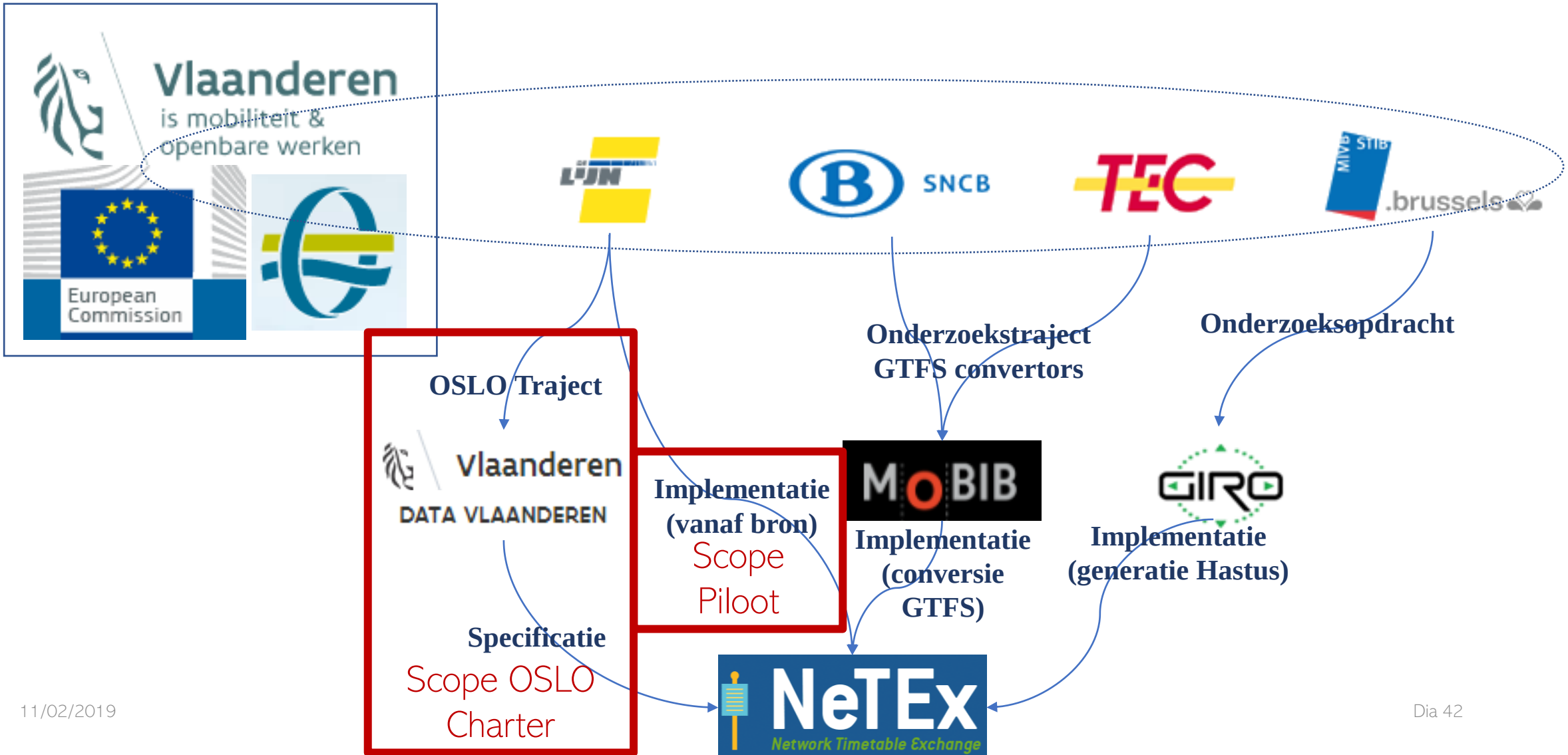


http://netex.uk/farexchange/doc/2019.07.16_Workshops/DFT-Workshop2-Routes_and_Timetable-2019.07.16-v02.pdf

Example “mismatch” EPIP – GTFS

Figure 9 — Stop Place nesting example

ITS Subactivity 4.5 – Belgium PSA



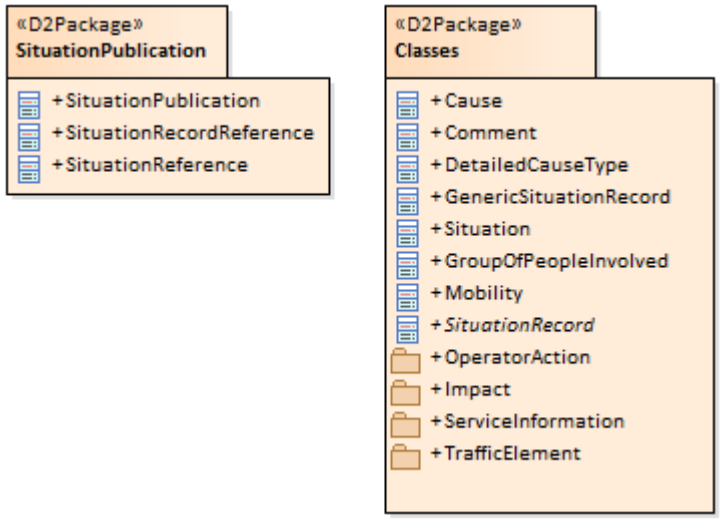
DATEX

Peter Van der Perre (ITS.be)

DATEX - what is it?

- DATEX = data exchange for traffic and travel information
- CEN standard (CEN TC 278) => mandatory in public tenders)
- https://datex2.eu
- Components (bold = see next slides)
  - Part 1: Context and framework
  - Part 2: Location referencing
  - **Part 3: Situation publication**
  - Part 4: Variable Message Sign (VMS) publications
  - Part 5: Measured and elaborated data publications
  - **Part 6: Parking publication**
  - Part 7: Common data elements
  - Part 8: Traffic management publications and urban extensions
  - Part 9: Traffic signal management publications
  - **Part 10: Energy infrastructure publication**
- Examples of actual use
  - https://opendata.vlaanderen.be (AWV / Vlaams Verkeerscentrum)
    - real-time traffic information
    - real-time traffic data
    - real-time messages on VMS (Variable Message Signs) on motorways (RSS)
    - real-time occupancy of truck parkings

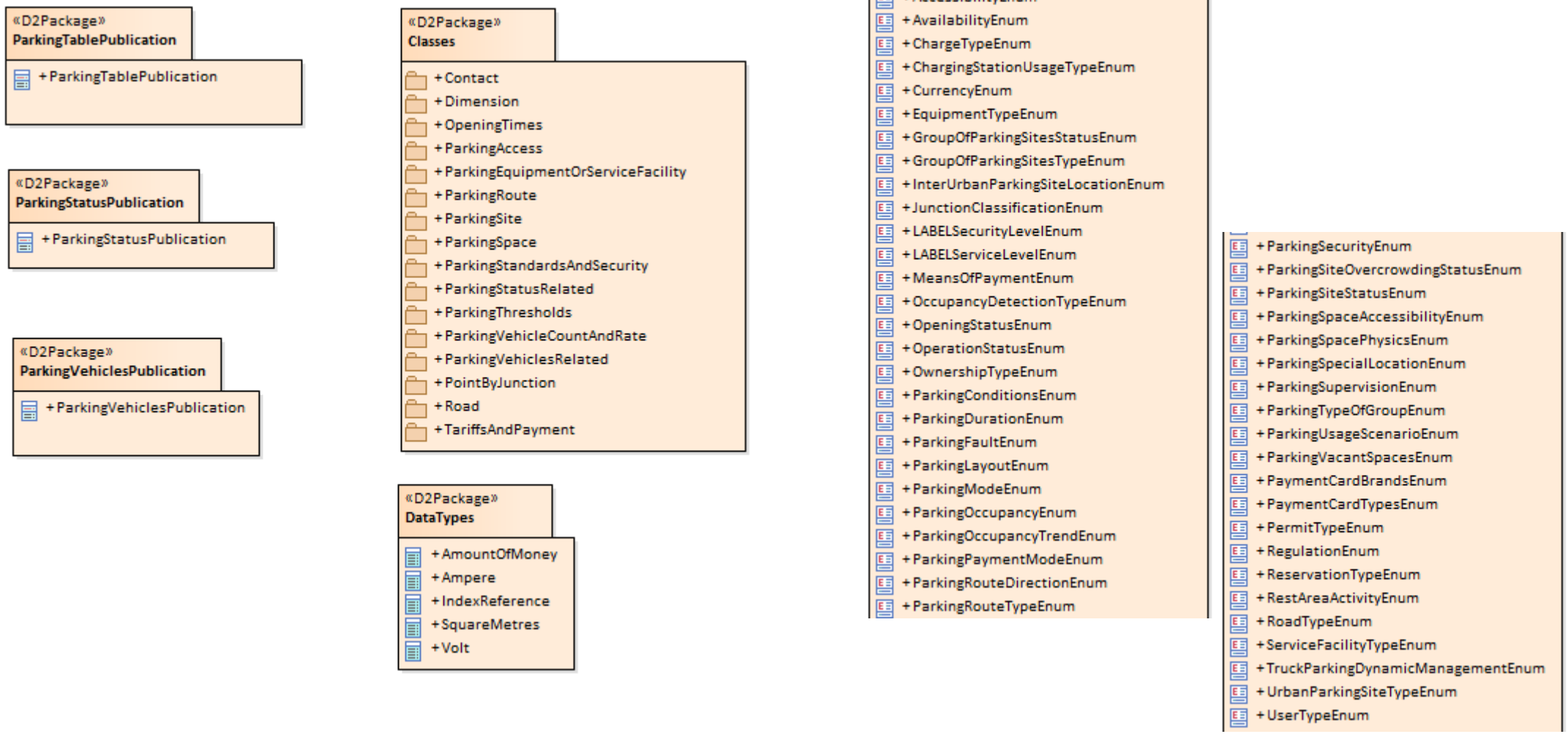
DATEX Part 3 ‘Situation publication’



Enumerations

AbnormalTrafficTypeEnum
AnimalPresenceTypeEnum
AuthorityOperationTypeEnum
CommentTypeEnum
ComparisonOperatorEnum
DangerousGoodsRegulationsEnum
DirectionCompassEnum
DisturbanceActivityTypeEnum
EnvironmentalObstructionTypeEnum
EquipmentOrSystemFaultTypeEnum
EquipmentOrSystemTypeEnum
FuelTypeEnum
GeneralInstructionToRoadUsersTypeEnum
GeneralNetworkManagementTypeEnum
InformationStatusEnum
InfrastructureDamageTypeEnum
InjuryStatusTypeEnum
InvolvementRolesEnum
LoadTypeEnum
MaintenanceVehicleActionsEnum
MobilityEnum
MonthOfYearEnum
NonWeatherRelatedRoadConditionTypeEnum
ObstructionTypeEnum
OperatorActionOriginEnum
OperatorActionStatusEnum
PersonCategoryEnum
PlacesEnum
PollutantTypeEnum
PoorEnvironmentTypeEnum
PoorEnvironmentTypeEnum
PrecipitationTypeEnum
ProbabilityOfOccurrenceEnum
RelativeTrafficFlowEnum
ReroutingManagementTypeEnum
RoadMaintenanceTypeEnum
RoadOperatorServiceDisruptionTypeEnum
RoadOperatorServiceDisruptionTypeEnum
RoadOrCarriagewayOrLaneManagementTypeEnum
RoadsideAssistanceTypeEnum
RoadsideServiceDisruptionTypeEnum
RoadworksDurationEnum
RoadworksScaleEnum
SeverityEnum
SourceTypeEnum
SpeedManagementTypeEnum
SubjectTypeOfWorksEnum
TrafficConstrictionTypeEnum
TrafficFlowCharacteristicsEnum
TrafficStatusEnum
TrafficTrendTypeEnum
TrafficTypeEnum
TransitServiceInformationEnum
TransitServiceTypeEnum
UrgencyEnum
UrlLinkTypeEnum
ValidityStatusEnum
VehicleEquipmentEnum
VehicleObstructionTypeEnum
VehicleStatusEnum
VehicleTypeEnum
VehicleUsageEnum
WeatherRelatedRoadConditionTypeEnum
WeekOfMonthEnum
WinterEquipmentManagementTypeEnum

DATEX Part 6 ‘Parking publication’


«D2Package»
ParkingTablePublication
+ParkingTablePublication
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ParkingStatusPublication
+ParkingStatusPublication
«D2Package»
ParkingVehiclesPublication
+ParkingVehiclesPublication
«D2Package»
Classes
+Contact
+Dimension
+OpeningTimes
+ParkingAccess
+ParkingEquipmentOrServiceFacility
+ParkingRoute
+ParkingSite
+ParkingSpace
+ParkingStandardsAndSecurity
+ParkingStatusRelated
+ParkingThresholds
+ParkingVehicleCountAndRate
+ParkingVehiclesRelated
+PointByJunction
+Road
+TariffsAndPayment
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DataTypes
+AmountOfMoney
+Ampere
+IndexReference
+SquareMetres
+Volt
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Enumerations
+AccessCategoryEnum
+AccessEquipmentEnum
+AccessibilityEnum
+AvailabilityEnum
+ChargeTypeEnum
+ChargingStationUsageTypeEnum
+CurrencyEnum
+EquipmentTypeEnum
+GroupOfParkingSitesStatusEnum
+GroupOfParkingSitesTypeEnum
+InterUrbanParkingSiteLocationEnum
+JunctionClassificationEnum
+LABELSecurityLevelEnum
+LABELServiceLevelEnum
+MeansOfPaymentEnum
+OccupancyDetectionTypeEnum
+OpeningStatusEnum
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+ParkingDurationEnum
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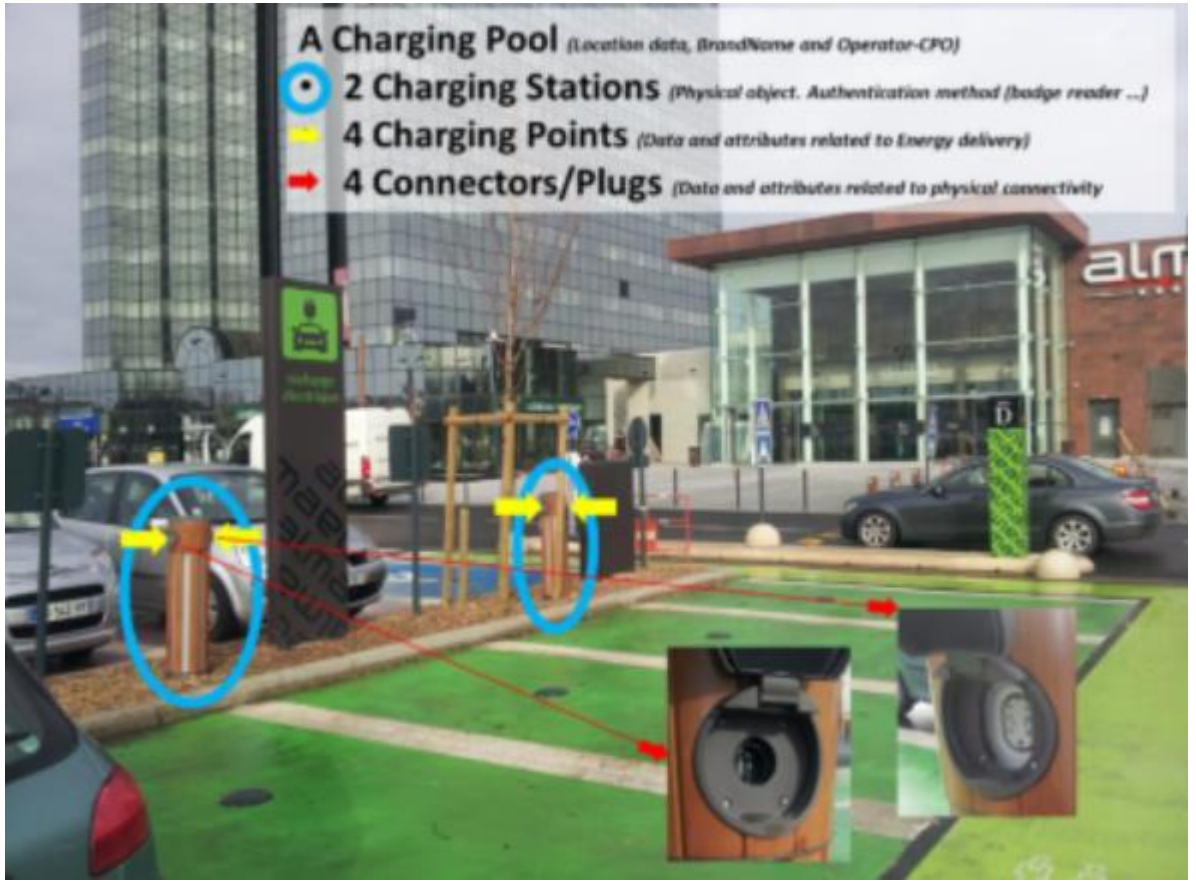
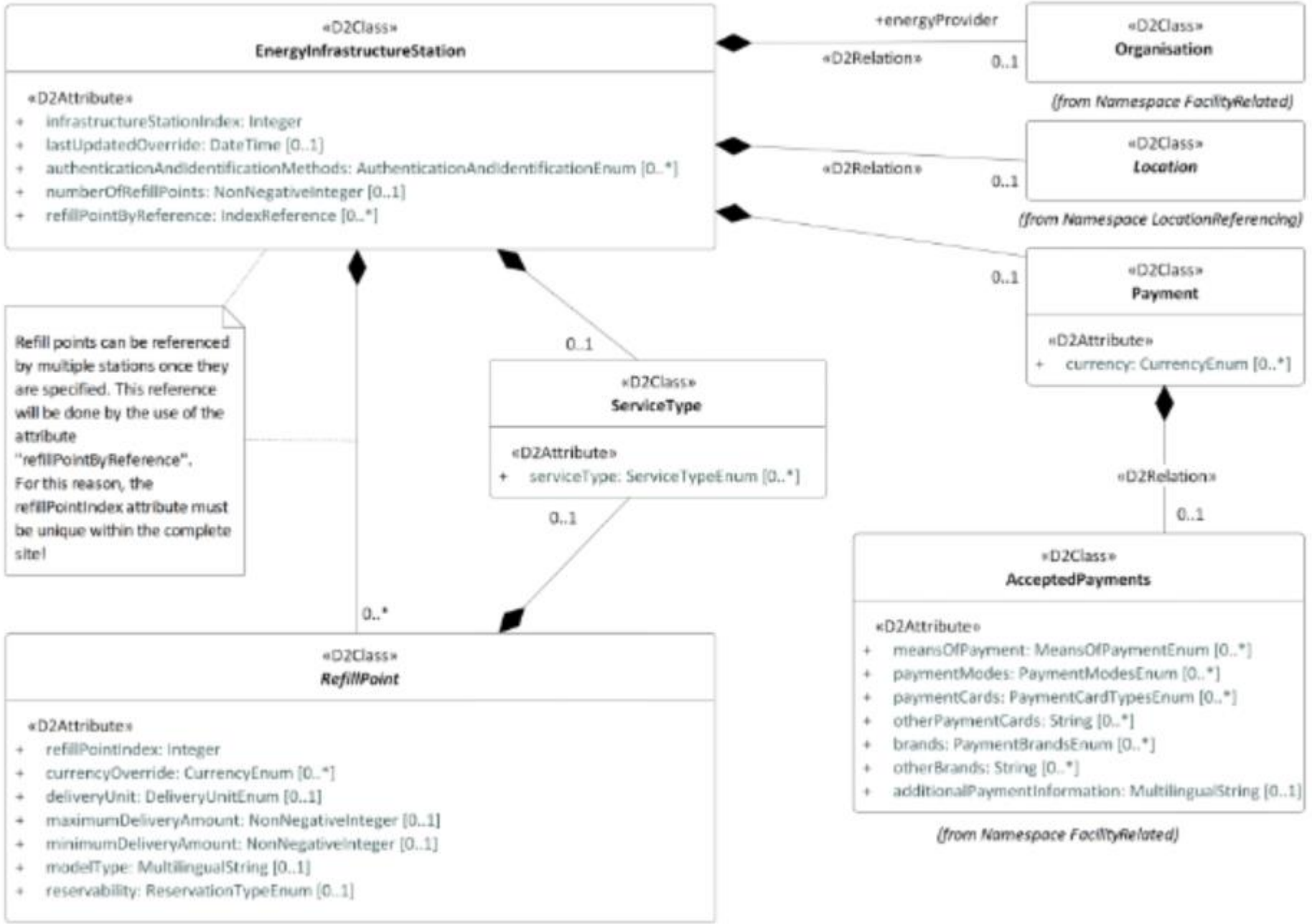
+ParkingLayoutEnum
+ParkingModeEnum
+ParkingOccupancyEnum
+ParkingOccupancyTrendEnum
+ParkingPaymentModeEnum
+ParkingRouteDirectionEnum
+ParkingRouteTypeEnum
+ParkingSecurityEnum
+ParkingSiteOvercrowdingStatusEnum
+ParkingSiteStatusEnum
+ParkingSpaceAccessibilityEnum
+ParkingSpacePhysicsEnum
+ParkingSpecialLocationEnum
+ParkingSupervisionEnum
+ParkingTypeOfGroupEnum
+ParkingUsageScenarioEnum
+ParkingVacantSpacesEnum
+PaymentCardBrandsEnum
+PaymentCardTypesEnum
+PermitTypeEnum
+RegulationEnum
+ReservationTypeEnum
+RestAreaActivityEnum
+RoadTypeEnum
+ServiceFacilityTypeEnum
+TruckParkingDynamicManagementEnum
+UrbanParkingSiteTypeEnum
+UserTypeEnum

DATEX Part 10 ‘Energy infrastructure publication’





Specialisations

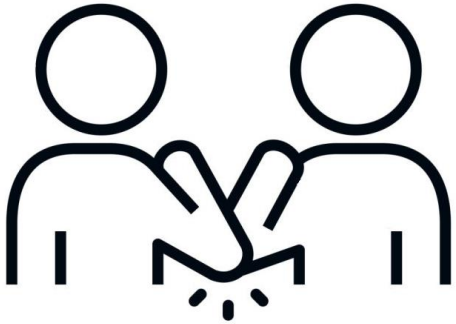
- *OrganicGassRefillPoint*
- *DieselRefillPoint*
- *PetrolRefillPoint*
- *HydrogenIRefillPoint*
- *ElectricChargingPoint*

Discussion

1. how to follow and 2. how do we develop and/or endorse standards in Belgium and the regions

Upcoming meetings 2020 - 2021

17/12 14h Webinar harmonisation of electromobility information *(more info)*



Thank you for participating!

The link with all presentation will be sent to you