



Vlaamse
overheid

OSLO Passenger Transport Hubs: Thematic workshop 1

Welcome!

Thursday 19th of May 2022

Virtual workshop – Microsoft Teams

We start at 09:05am



Before we start...

Mute yourself during the meeting



Raise your **hand** before speaking. We encourage interaction!



Questions and suggestions can always be communicated via the **chat**.



yes/no questions can be answered via the chat:

Yes = +1
No = - 1
Neutral = 0

Objective

Giving a **summary** of the business workshop

Explanation and elaboration on **discussion points of last session**



Presentation of and gathering input on **the revised model** for this data standard

Topics

09:00 - 09:10 AM	Welcome and introduction	Arne Scheldeman (DF)
09:10 - 09:25 AM	Recap of last workshop	Arne Scheldeman (DF)
09:25 - 09:40 AM	UML	Arne Scheldeman (DF)
09:40 - 09:50 AM	Passenger Transport Hub intro	Alexis Driesen (DF)
09:50 - 10:50 AM	Discussion points	Arne Scheldeman (DF)
<i>10:50 - 11:05 AM</i>	<i>Break</i>	
11:05 - 11:20 AM	Passenger Transport Hub model	Arne Scheldeman (DF)
11:20 - 11:30 AM	Q&A en next steps	Arne Scheldeman (DF)

Who is who?

M U R A L

Recap of the business workshop



Topics of the business workshop



Introduction to the project and OSLO

- Green mobility data models for smart ecosystems.
- Translation of Hoppinpoints standard.
- GreenMov + Digital Flanders
- Open Standards for Linked Organisations (OSLO).
 - Semantic and Technical interoperability
 - Exchange and reuse of data



Hoppinpoints

- A type of Passenger Transport Hub, a node of different transport options adjusted to each other enabling users to change transport means smoothly.
- Model from which the Passenger Transport Hubs model is derived.



Passenger Transport Hubs Model

- Reuse of Flemish standard 'Hoppinpoints' to build a European standard.
- Presentation of the first draft of the model.
- Brainstorm about use cases and concepts using post-its in MURAL.

Scope of this project

Develop a semantic framework for mapping Passenger Transport Hubs and sharing data.

Develop a sustainable application profile and vocabulary for Passenger Transport Hubs.

We follow the OSLO methodology, which means:

- We start from use cases
- We align as much as possible with existing standards
- We define cases ourselves where necessary

Use cases business workshop

Infrastructure

I'm an old man and can't walk very far, I need time and place to rest (sit). Can I know if there are places to sit?	Extend this model with the classes and properties of Velopark, e.g. Bicycle Pump
As a senior citizen, I want to be sure I can sit comfortably while waiting for my shared car	As a traveler I want to charge my EV: availability, power

Availability

As a traveler, I would like to receive information of cross-country mobility services	I want to know if chances are high shared bikes will be available tomorrow at 4PM at Gent-Sint-Pieters station
As a traveller, I would like to know - the night before my trip - how probable it is to find a shared bike at specific transport hub	As a traveler I want to know if a taxi will be available at the time I arrive by bus.
The train I'm on is 30' minutes late, and I want to check if bikes will still be available when it arrives at the hub	As a traveler, I would like to know if bike sharing WILL be available at the time I arrive with the bus. (so predicted availability)

Real-time information

Possibility to communicate with other users of the application, f.a. communicate that due to bad weather the ferry service is temporary not	As a traveler I would like to be informed if there no service are provided due to detours or that my normal stop has been replaced
As a traveler, I would like to have my connected bus assured if my train is delayed.	I want to check if I should switch to a bus or take a shared bike next Monday when I arrive by train during rush hour
As a traveler, I would like to have correct information about temporary infrastructure in case of works/ events/...	As a traveler I would like to know if a certain stop is still on that location on the day that I travel

Accessibility

As an non-digital user, I would like to have to have a summary-export to PDF that can be printed out	As a wheelchair user I want to know what's the most efficient way to get from A-B in time and cost
I'm a blind person and want to know if guidelines are available from the train to the tram I want to take	

Others

As a frequent traveler I want to provide feedback on the conditions/properties of certain Hoppin Points	As a traveler, I would like to know time estimate of travelling between two addresses at a given time.
---	--

Data concepts

Infrastructure

hub Infrastructure (comfort, waiting acc...)	low emission zones
Bike sharing station #number of slots #number of bikes available	Benches
Number of parking spaces (car, bike, step,...)	Are there bikes for people with disabilities? Maybe wheelchairs
Number of charging points	

Travelling

Route planner	CO2 emission
What is the distance I can ride with the E-bike?	Travel info
Information how I can use the bike as a traveler	dynamic multi- parameter trip planning
Connections	

Availability

mobility services	Locations
availability forecasting models	what kind of bikes are available?

Persona

Operator: (who is responsible?)

Feedback

trip scoring (speed, cost, comfort, open-air,...)	user feedback
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Real-time information

real time schedules	Real time information
------------------------	--------------------------

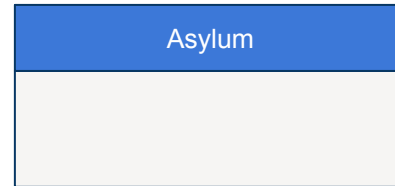
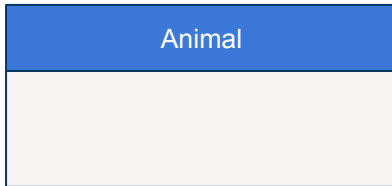
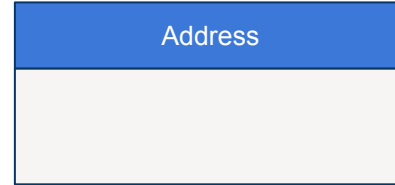
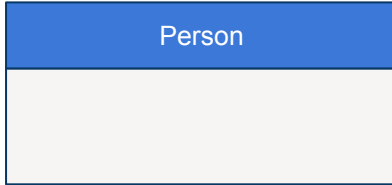
Versioning

versioning on objects

Unified Modeling Language (UML)



Concepts or Classes



Attributes

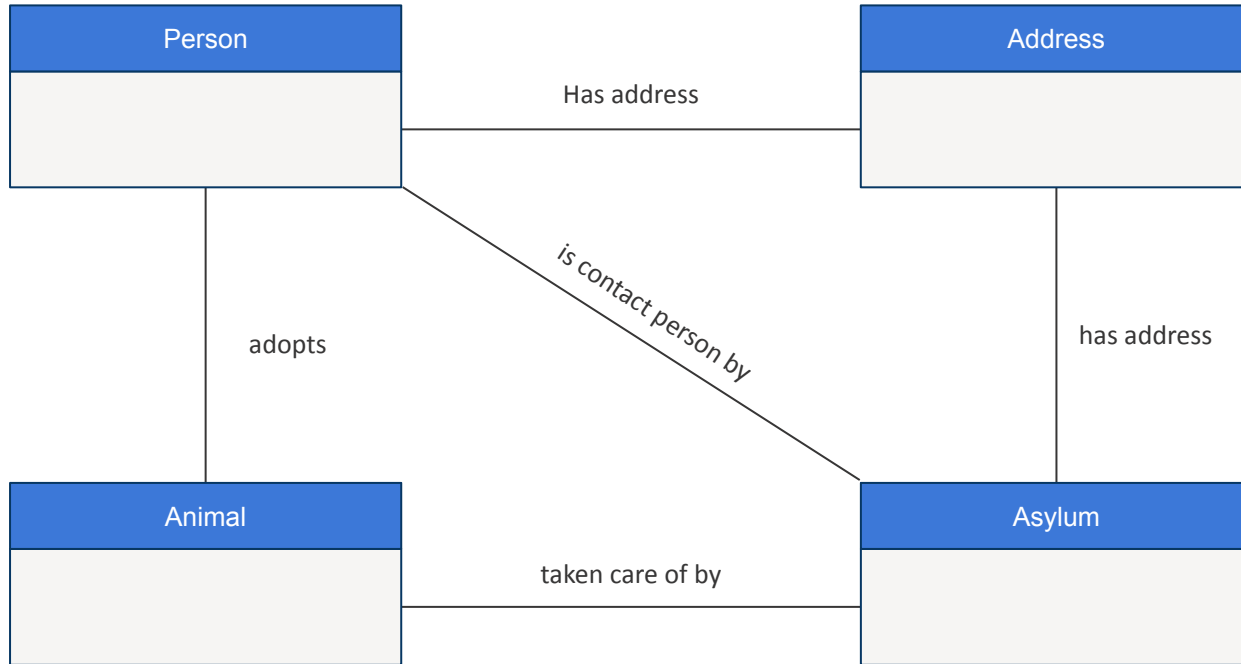
Person
identification name surname contactInformation

Address
street houseNumber boxNumber postalCode municipality country

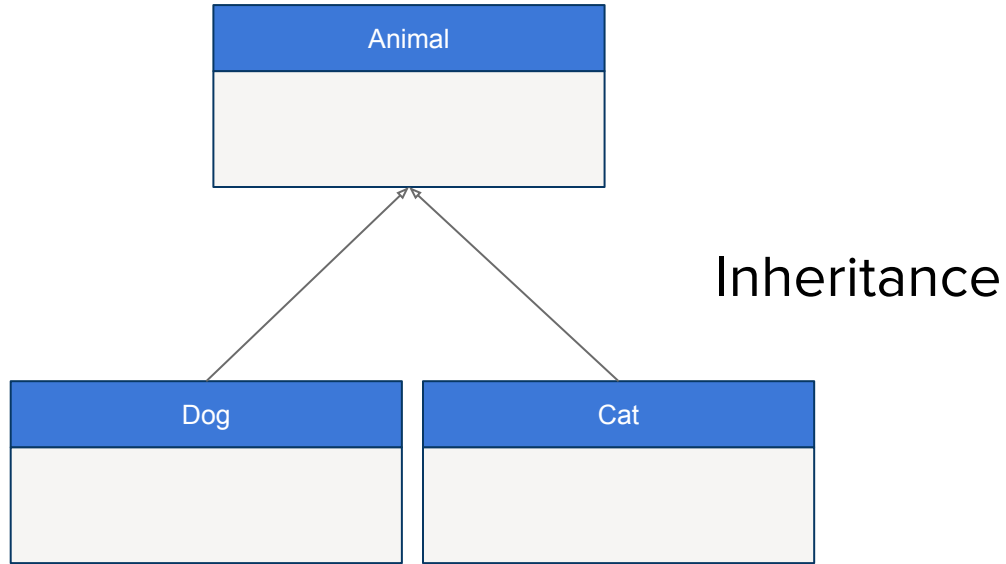
Animal
identification name type race birthDate picture

Asylum
identification name website contactInformation

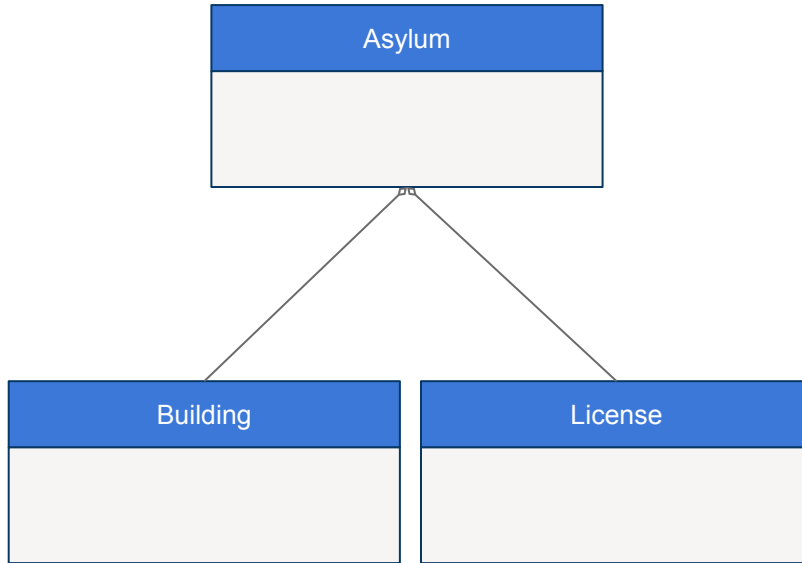
Association



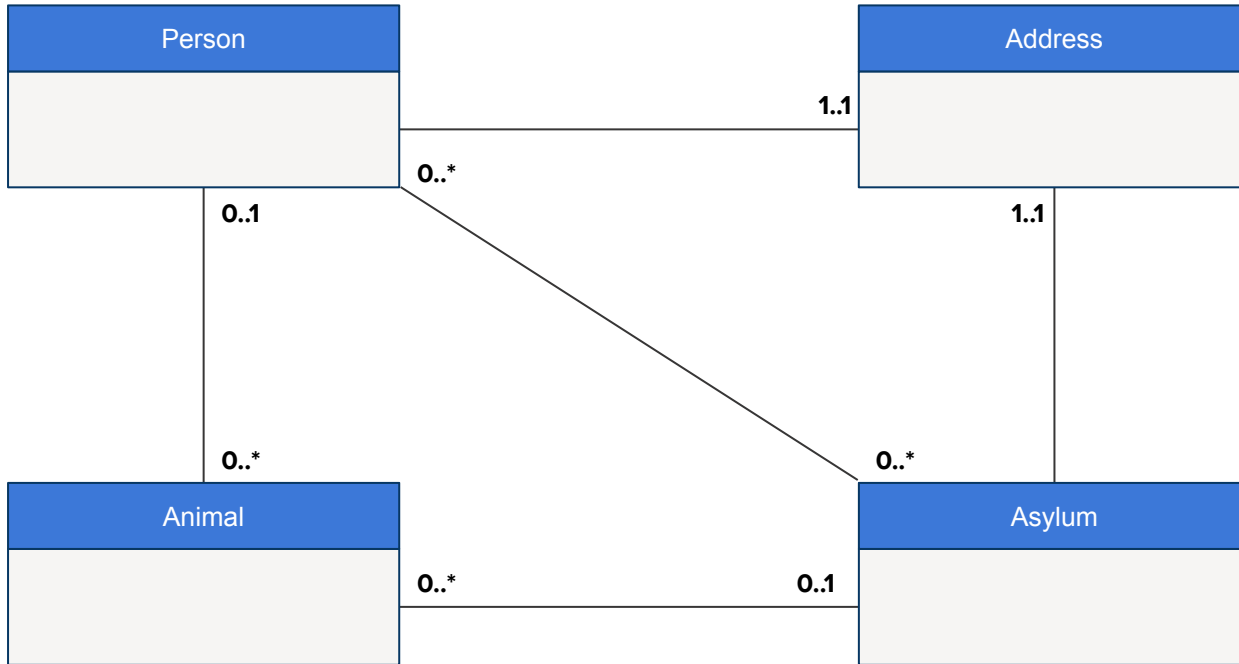
Generalisation



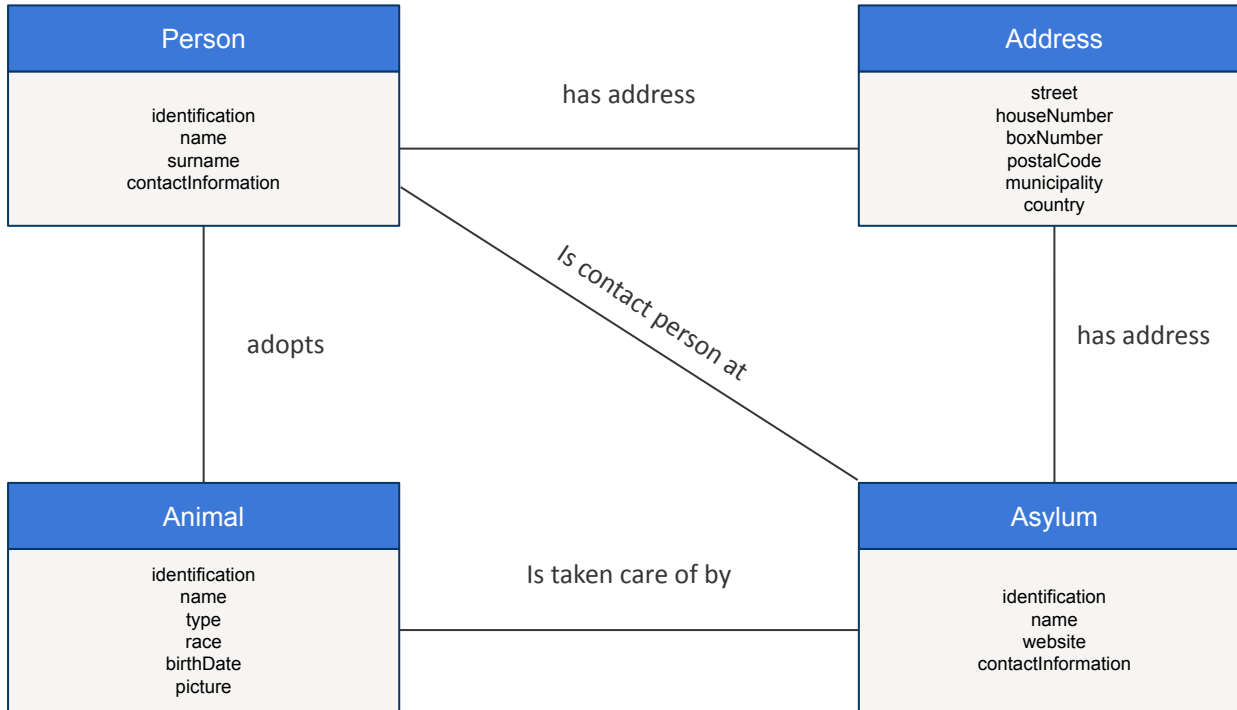
Aggregation



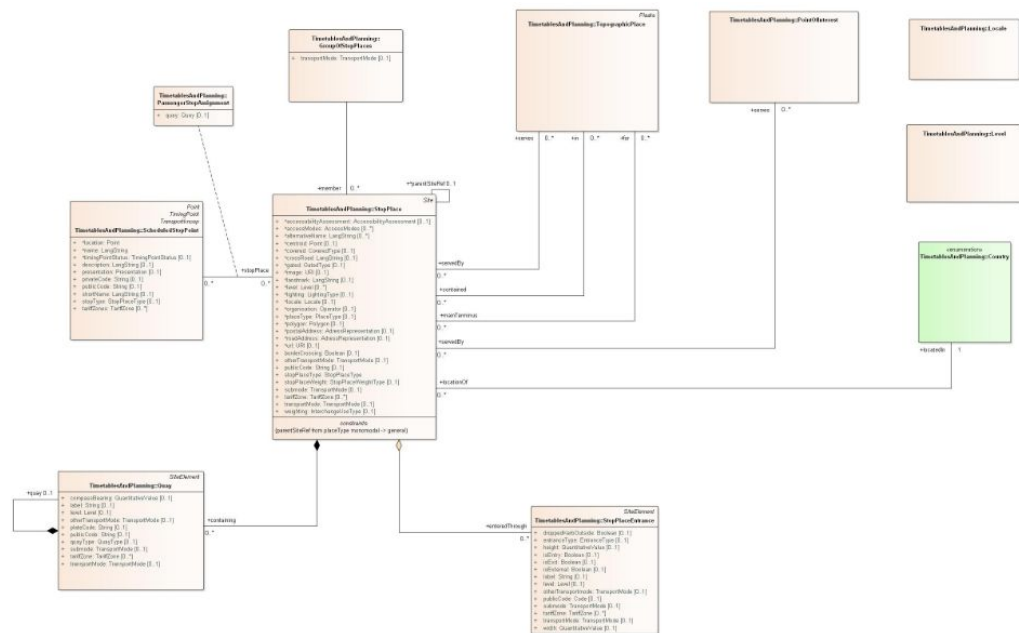
Cardinality



The model



UML & HTML



Stop Place

Description

A Stop Place represents a station, stop, port, airport or any physical point of access to the transport network.

Subclass of

Site

Properties

For this entity the following properties are defined: [access modes](#), [accessability assessment](#), [afbeelding](#), [alternative name](#), [border crossing](#), [centroid](#), [containing](#), [covered](#), [cross road](#), [entered through](#), [for](#), [gated](#), [in](#), [landmark](#), [level](#), [lighting](#), [locale](#), [located in](#), [organisation](#), [other transportmode](#), [parent site](#), [place type](#), [polygon](#), [postal address](#), [public code](#), [road address](#), [scheduled stop point](#), [serves](#), [serves](#), [stop place type](#), [stop place weight](#), [submode](#), [tariff zone](#), [transport mode](#), [url](#), [weighting](#).

Property	Expected Range	Cardinality	Description	Usage	CodeList
access_modes	Access Modes	0..*	Access modes by which the Stop Place may be accessed.		
accessability assessment	Accessibility Assessment	0..1	The overall accessibility characteristics of the Stop Place.		
afbeelding	URI	0..1	TODO		
alternative name	TaalString	0..*	Alternative name for the Stop Place.	Used for Stops that have multiple aliases.	
border crossing	Boolean	0..1	Indicates whether the Stop Place is a border crossing.		

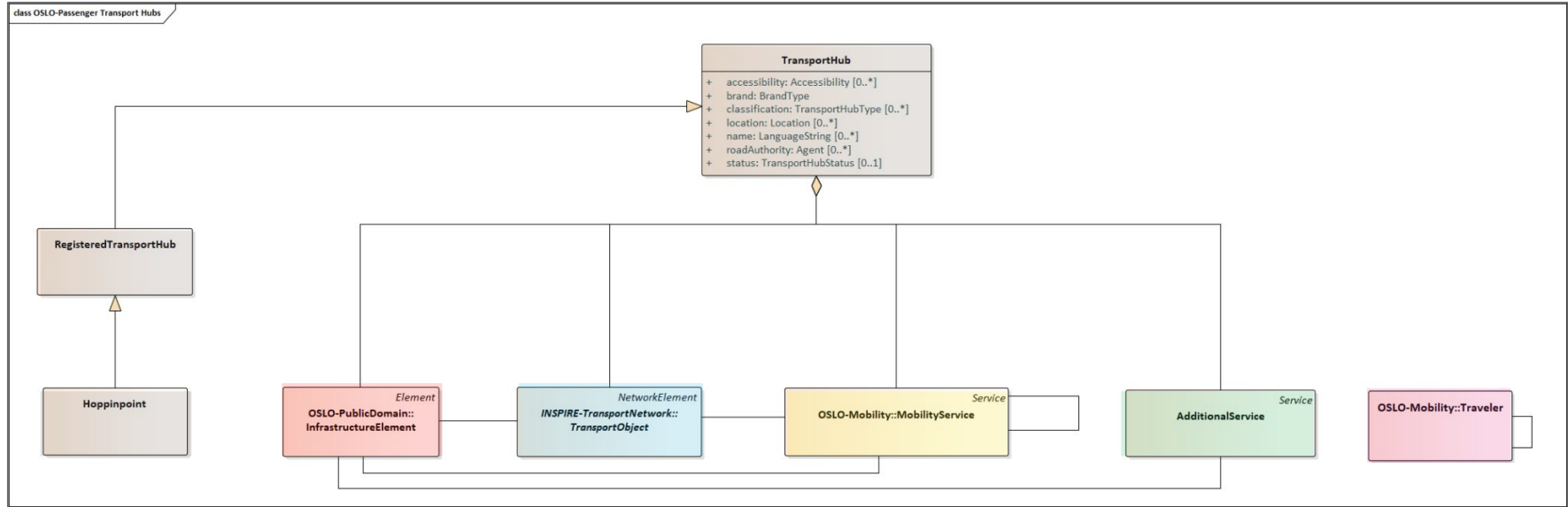
Passenger Transport Hubs



Reuse of Flemish standard

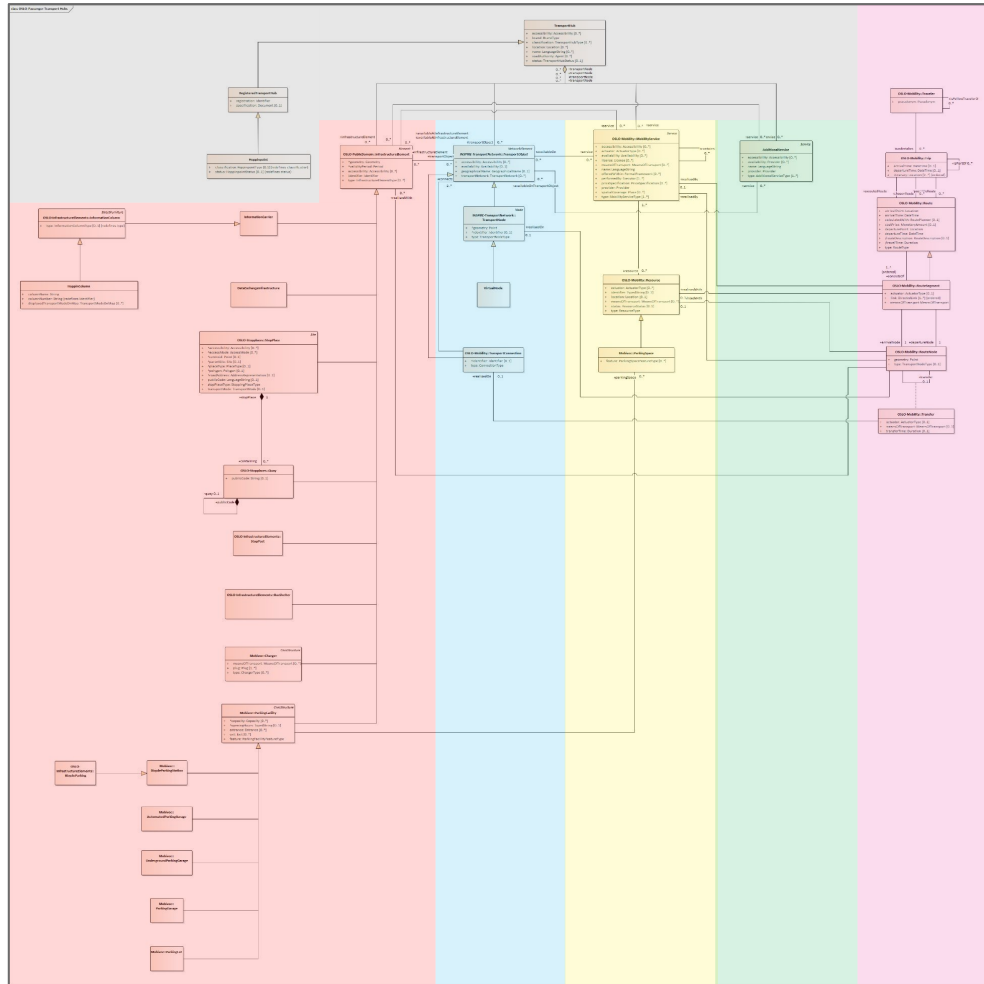
- Existing Flemish standard ([OSLO Hoppinpunten](#))
 - Basis of this track
 - Based on (inter)national standards
 - [Inspire \(transport networks\)](#)
 - [Mobivoc](#)
 - [NeTEx \(Stop Places\)](#)
 - [OSLO Mobiliteit: Trips en aanbod](#) (OSLO Mobility: Trips and offers)
 - [OSLO Mobiliteit: Planning en dienstregeling](#) (OSLO Mobility: Planning and schedule)
 - [OSLO Openbaar domein](#) (OSLO Public domain)

Foundation of the model



→ References to other models are also translated in English now

Full model




PURL.eu

PURLEU \ OPEN STANDARDS FOR LINKED ORGANISATIONS

Applicationprofiles
START WITH OUR APPLICATIONPROFILES

Vocabularies
DISCOVER OUR VOCABULARY

OSLO-Steps
AUTOMATED CUSTOMER JOURNEY


 PURLEU

ON THIS PAGE

Purleu


OSLO

With Open Standards for Linked Organisations on PURL.eu, we want to commit to an explicit standard for the exchange of information. All identifiers of information resources that are available via this domain in the form of a URI are persistent and semantically unambiguous. In other words, users of the URIs with the domain purleu.eu can assume that these identifiers will always exist and that, over time, these identifiers will always refer to one and the same object.

 OSLO

What is OSLO?

OSLO is the acronym for Open Standards for Linked Organisations. Many (public) organisations keep all kinds of data and exchange them with each other. In order to simplify, streamline and automate this process, OSLO, Open Standards for Linked Organisations, was created. This initiative wants to make the sharing of data and information run more smoothly by establishing the meanings of concepts, words and definitions (thus avoiding semantic discussions) and how to structure them in one's own databases or software packages. In this way, high-quality up-to-date data can be created and local shadow databases can be avoided.

 Applicationprofiles

> Timetables

> Air & Water - Core


> Consent

> Stopplaces

> Air & Water - Air Quality

> Vehicle scheduling

> Air & Water - Water Quality

 Vocabularies

> Air & Water - Core

> Consent

> Air & Water - Air Quality

> Air & Water - Water Quality

Overview

This document describes the usage of the following entities for a correct usage of the Application Profile:

| [AdditionalService](#) | [Agent](#) | [AutomatedParkingGarage](#) | [BicycleParking](#) | [BicycleParkingStation](#) | [BusShelter](#) | [Charger](#) | [CivicStructure](#) | [DataExchangeInfrastructure](#) | [Element](#) | [Executor](#) | [FormalFramework](#) | [HoppinColumn](#) | [Hoppinpoint](#) | [InformationCarrier](#) | [InformationColumn](#) | [InfrastructureElement](#) | [License](#) | [Location](#) | [MobilityService](#) | [Network](#) | [NetworkElement](#) | [Node](#) | [ParkingFacility](#) | [ParkingGarage](#) | [ParkingLot](#) | [ParkingSpace](#) | [PassengerTransportHub](#) | [Platform](#) | [PriceSpecification](#) | [Provider](#) | [PublicOrganisation](#) | [RegisteredPassengerTransportHub](#) | [Resource](#) | [Route](#) | [RoutePlanner](#) | [RouteSegment](#) | [Service](#) | [Site](#) | [StopPlace](#) | [StopPost](#) | [StreetFurniture](#) | [Transfer](#) | [TransportConnection](#) | [TransportNetwork](#) | [TransportNode](#) | [TransportNode](#) | [TransportObject](#) | [TransportRegion](#) | [Traveler](#) | [Trip](#) | [UndergroundParking](#) | [VirtualNode](#) |

This document describes the usage of the following datatypes for a correct usage of the Application Profile:

| [Accessibility](#) | [AddressRepresentation](#) | [Availability](#) | [Capacity](#) | [ContactInformation](#) | [DirectedLink](#) | [GeographicalName](#) | [Geometry](#) | [Identifier](#) | [LanguageString](#) | [Location](#) | [MonetaryAmount](#) | [OpeningHours](#) | [Period](#) | [Point](#) | [Polygon](#) | [RouteDescription](#) | [Timetable](#) |

Discussion Points



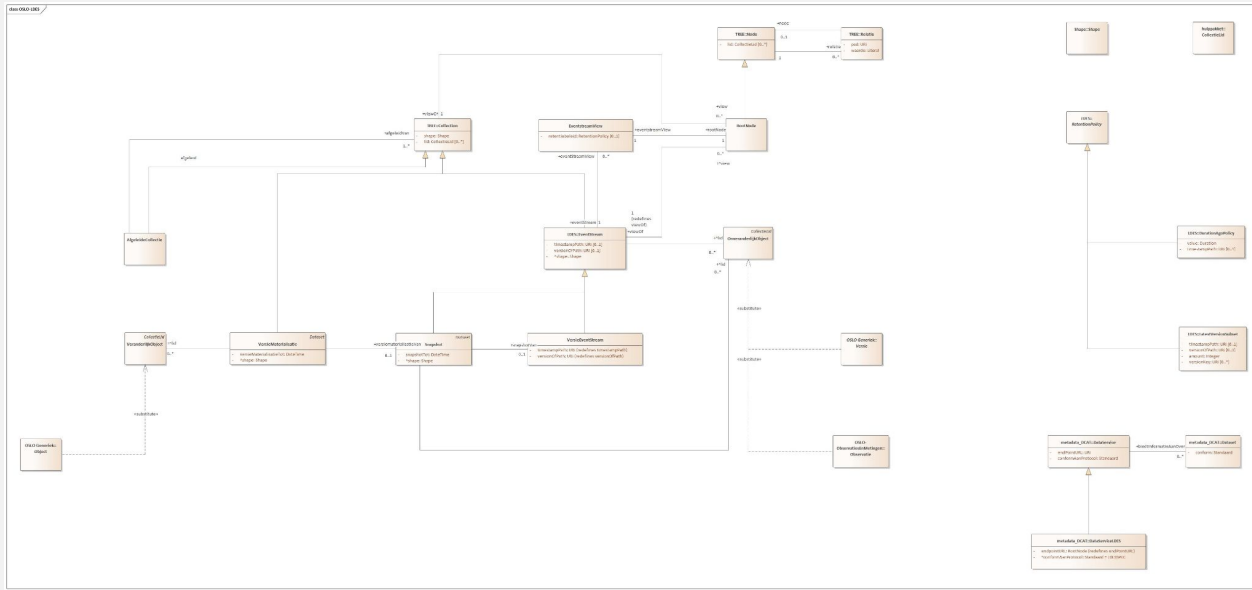
Versioning - OSLO LDES

Does this present the predicted or the real trip? What about occurring differences?

Versioning on objects

How would this model deal with traffic, or a strike causing blocked streets

- LDES = Linked Data Event Streams
- Collection of Versions, Observations etc (ImmutableObjects)
- Fragmentation: e.g. by pagination
- [OSLO-LDES](#): extension on [W3C-LDES](#) (also an extension, of [TREE](#))
- Usage: synchronising a replica OR direct querying



LDES data-example

- Assumption: we are going to synchronise our replica-database
 - E.g. by polling the EventStream
- Here: the Evenstream of OSLO PTH → Resource
- To ensure that it is up-to-date (in order that we always know the correct number of available bikes in a train station, e.g. Blue-bikes in this example).



LDES data-example

- Let's assume that our replica of the Resources database looks like this at **9am**.
- Two bikes are available at that moment:
 - Bike BB-LS-001
 - Bike BB-LS-002
- They are in BicycleParkingStation BPS123 (in Leuven station)
- And provided by MobilityService MS456 (Blue-bike service)

```
{
  "@context": "",
  "@graph": [
    {
      "@id": "http://example.com/id/resource/BB-LS-001",
      "@type": "Resource",
      "type": "Bike",
      "location": "http://example.com/id/bicycle-parking-station/BPS123",
      "identifier": "BB-LS-001",
      "status": "available",
      "service": "http://example.com/id/mobility-service/MS456"
    },
    {
      "@id": "http://example.com/id/resource/BB-LS-002",
      "@type": "Resource",
      "type": "Bike",
      "location": "http://example.com/id/bicycle-parking-station/BPS123",
      "identifier": "BB-LS-002",
      "status": "available",
      "service": "http://example.com/id/mobility-service/MS456"
    }
  ]
}
```

LDES data-example: Evenstream, Node

- When polling the PTH:Resource Eventstream e.g. at **9:15am** we see a new version for bike BB-LS-001
 - 1** The status of the bike changed from “available” to “inUse” at **9:05am**.
- The Evenstream (<https://example.com/ldes/mobility/resource>) presents updates page by page.
 - 2** Here the update was found on page 5 (the pages are called Nodes in LDES)
- REMARK: For illustrative reasons the page presents only one update, there could have been a lot more.

```
{
  "id": "https://example.com/ldes/mobility/resource?page=5",
  "type": "Node",
  "id": [
    {
      "id": "https://example.com/id/mobility/resource/64becaa0",
      "type": [
        "Resource",
        "VersieVolgensGeldigeTijd"
      ],
      "type": "Bike",
      "location": "https://example.com/id/mobility/bicycle-parking-station/BPS123",
      "id": "BB-LS-001",
      "status": "inUse",
      "service": "https://example.com/id/mobility/mobility-service/MS456",
      "Versie.isTijdspecialisatieVan": "https://example.com/id/mobility/resource/BB-LS-001",
      "VersieVolgensGeldigeTijd.creatie": {
        "Creatie.tijdstip": "20220515T09:05:00"
      }
    }
  ]
}
```

LDES data-example: Version

- Version is modelled according to [OSLO-Generics](#) (based on the [PROV-ontology](#)).
 - The update is of type VersionInvalidtime (i.e. the Version of this Resource in real-time).
- It remains a Resource, while the update is a Version and a Resource at the same time. Thus, it has attributes of both.
 - It has a version id, here implemented as a GUID.

Being a Version, it inherited the attributes of this class, like a pointer to the original Object and the time the Version was created (which is **9:05am**).
 -
 -

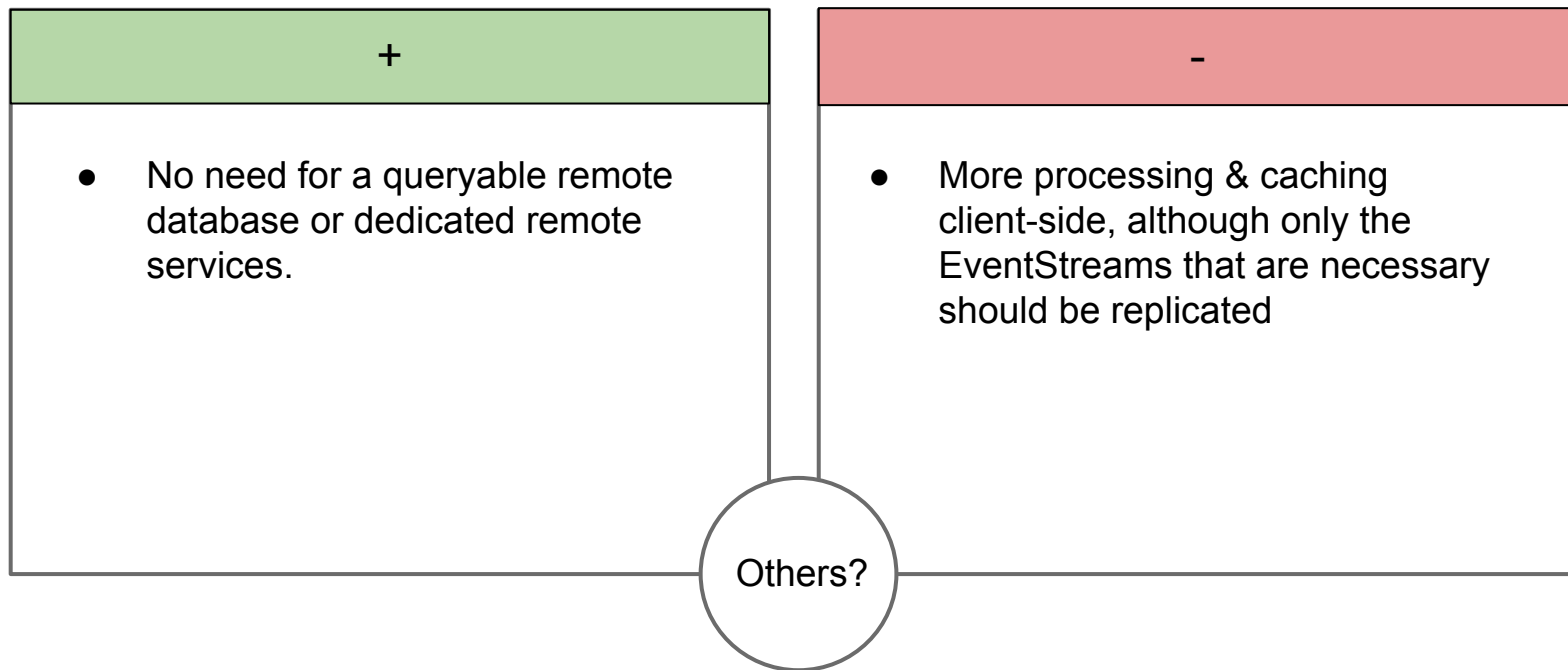
```
{
  "@id": "https://example.com/lDES/mobility/resource?page=5",
  "@type": "Node",
  "lid": [
    2
    {
      1
      "@id": "https://example.com/id/mobility/resource/64becaa0",
      "@type": [
        "Resource",
        "VersieVolgensGeldigeTijd"
      ],
      "type": "Bike",
      "location": "https://example.com/id/mobility/bicycle-parking-station/BPS123",
      "identifier": "BB-LS-001",
      "status": "inUse",
      "service": "https://example.com/id/mobility/mobility-service/MS456",
      3
      "Versie.isTijdspecialisatieVan": "https://example.com/id/mobility/resource/BB-LS-001",
      "VersieVolgensGeldigeTijd.creatie": {
        "Creatie.tijdstip": "20220515T09:05:00"
      }
    }
  ]
}
```

LDES data-example: Processing

- After processing the update, we see in our replica that only bike BB-LS-002 is still available
- A count for BicycleParkingStation BPS123 (in Leuven station) would show that the number of available bikes is now 1

```
{
  "@context": "",
  "@graph": [
    {
      "@id": "http://example.com/id/resource/BB-LS-001",
      "@type": "Resource",
      "type": "Bike",
      "location": "http://example.com/id/bicycle-parking-station/BPS123",
      "identifier": "BB-LS-001",
      "status": "inUse",
      "service": "http://example.com/id/mobility-service/MS456"
    },
    {
      "@id": "http://example.com/id/resource/BB-LS-002",
      "@type": "Resource",
      "type": "Bike",
      "location": "http://example.com/id/bicycle-parking-station/BPS123",
      "identifier": "BB-LS-002",
      "status": "available",
      "service": "http://example.com/id/mobility-service/MS456"
    }
  ]
}
```

LDES data-example: remarks



Real-time Capacity

I want to know if chances are high that a shared bike will be available tomorrow at 4pm at the Gent-Sint-Pieters station.

As a traveler I want to know if a taxi will be available at the time I arrive by bus.

The train I'm on is 30min late, and I want to check if bikes will still be available when it arrives at the transport hub.

Real-time capacity - calculation

Implicit

- + No change in the model.
- No explicit visibility of the amount of available resources.
- Summation of available resources needs to be calculated.

Explicit

- + Explicit visibility of the amount of available resources.
- Change in model: Extra attribute within class `MobilityService`: **`/realtimeResource`**
- Calculations of extra versions necessary each time a change within Resources happens.
- The amount of queries necessary to stay in sync

Real-time Capacity

I want to know if chances are high that a shared bike will be available tomorrow at 4pm at the Gent-Sint-Pieters station.

As a traveler I want to know if a taxi will be available at the time I arrive by bus.

The train I'm on is 30min late, and I want to check if bikes will still be available when it arrives at the transport hub.

Real-time capacity - Reservation

- Booking/reservation is included within OSLO Mobility: Trips & Offers.
- Reservation
 - Decision by the provider (ex. Velo, Bird, BlueBike)
 - They choose if reservations are possible AND for which time period
- English translation of OSLO Mobility - Trips and Offers is in the pipeline!

Real-time Information

Possibility to communicate with other users of the application, f.e. communicate that due to bad weather the ferry service is temporary not working, so that all users who are following the same trajectory can see this information (same as Waze)

As a traveler I would like to be informed if there no service are provided due to detours or that my normal stop has been replaced

I want to check if I should switch to a bus or take a shared bike next Monday when I arrive by train during rush hour.

As a traveler, I would like to have correct information about temporary infrastructure in case of works/ events/...

As a traveler, I would like to have my connected bus assured if my train is delayed

As a traveler, I would like to know if a certain stop is still on that location on the day that I travel

In essence, as a traveler, you would like to know if a certain mobility option WILL be available at the time you arrive at the certain point.

- How does the model satisfies this?:
 - All information is present about current state
 - Resources, Infrastructure, Services...
- Discussion:
 - Concepts like delay/incidents which make a service unavailable lack in the model.
 - To be included in this model?
 - Take it with us to another model?
 - Concepts
 - Canceled service
 - Delays
 - Incidents

Accessibility

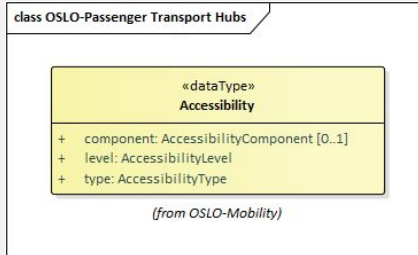
I'm a blind person and I want to know if guidelines are available from the train to the tram I want to take.

As a wheelchair user I want to know if the transport hub is accessible.

As a wheelchair user I want to know what the most efficient way to get from A-B in time and cost is.

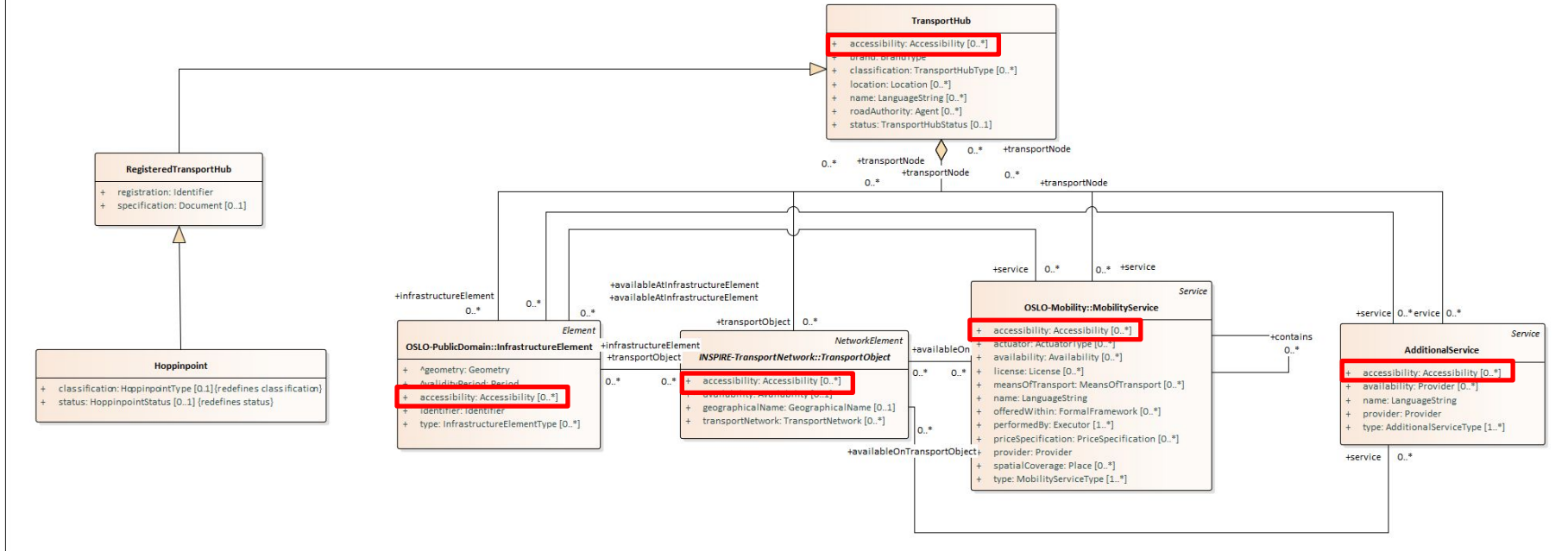
Accessibility within a transport hub is divided into three parts:

- **Level of accessibility:** e.g. Accessible with support, fully accessible...
- **Component of accessibility:** The component of the passenger hub to which the accessibility applies. E.g. infrastructure, mobility service...
- **Type of accessibility:** e.g. information accessible, service accessible, physically accessible...



Accessibility

class OSLO-Passenger Transport Hubs



Feedback

Trip scoring
(speed, cost,
comfort,
open-air...)

User
feedback



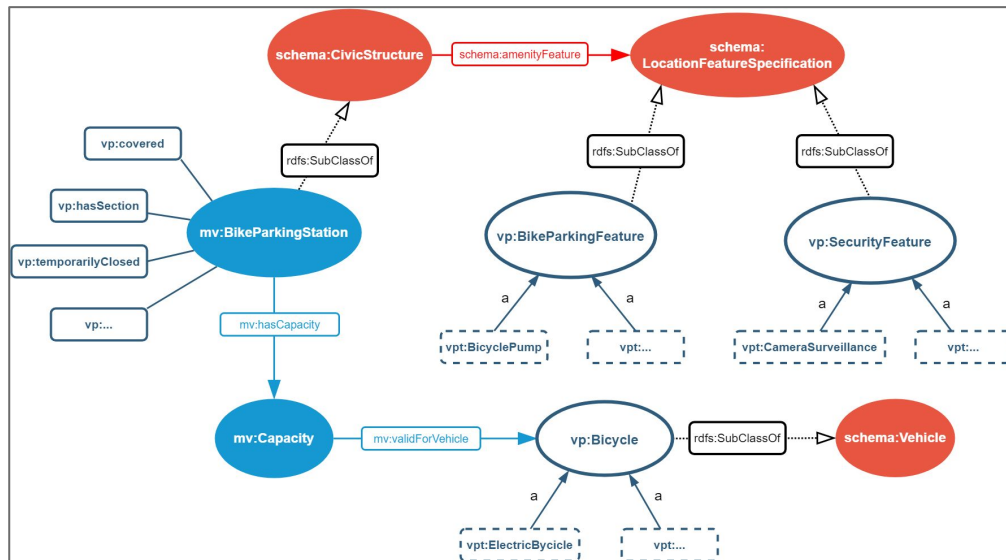
Feedback at the level of a Transport Hub is not in scope of this track

Hypothetically, if we were to include it:

- Feedback would be connected to the actual trip
 - Attributes on different classes:
 - Service
 - Infrastructure
 - Object
 - In the form of:
 - Star rating
 - Text
 - Very difficult to map and process non-structured feedback in text format

Data standard Velopark

- Data standard to effectively describe bicycle parking facilities
- The core of OVV is based on MobiVoc → Schema.org data model



Difference in modelling?

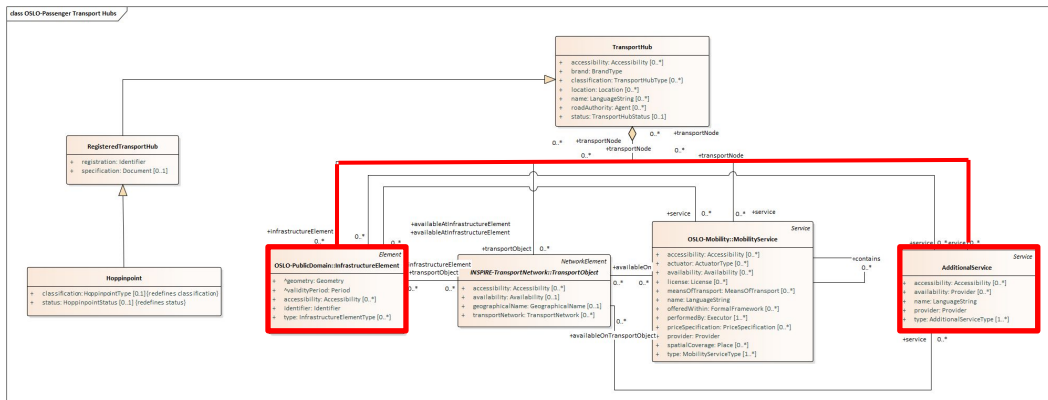
- Velopark: Features within Velopark are modelled as instances
- OSLO: Features are included as types, where an enumeration is created to include the different features.

How to include Velopark in OSLO?

- Include the features as AdditionalService of the InfrastructureElement.
 - BicyclePump as additional service on the BikeParkingStation

Data standard Velopark

- Data standard to effectively describe bicycle parking facilities
- The core of OVV is based on MobiVoc → Schema.org data model



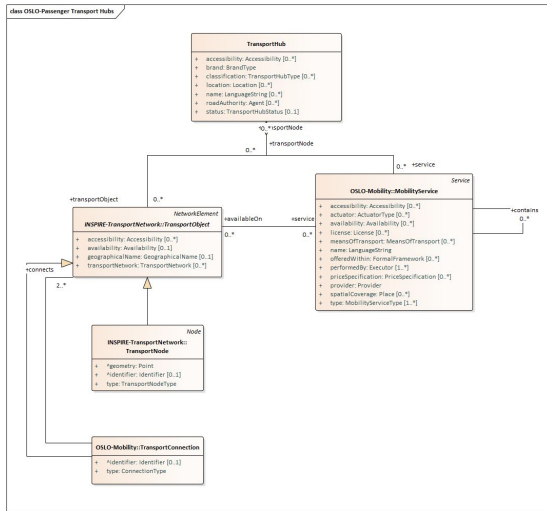
Difference in modelling?

- Velopark: Features within Velopark are modelled as instances
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How to include Velopark in OSLO?

- Include the features as AdditionalService of the InfrastructureElement.
 - BicyclePump as additional service on the BikeParkingStation

Transport hub & Route planning



Route within the Transport Hubs

- Possibility to calculate the distance between mobility services based on the nodes connected to the specific services and their connection.

Route planning - Shortest path

- If the Transport Hub is the starting point of the Traveler's trip, then the node of the first mobility service will be used within the path. However, the calculation itself is a black box and out of scope of this track.

Passenger Transport Hubs model



Vlaanderen
verbeelding werkt



Q&A and Next Steps



Vlaanderen
verbeelding werkt



What do we do...?

Don't we have to add ...?

Can't we better ...?

What about ...?

Didn't we forget ...?



Next steps



Process the input.



Distribution of a report from this workshop. Feedback is certainly welcome!



Further investigation and preparation of the second thematic workshop.

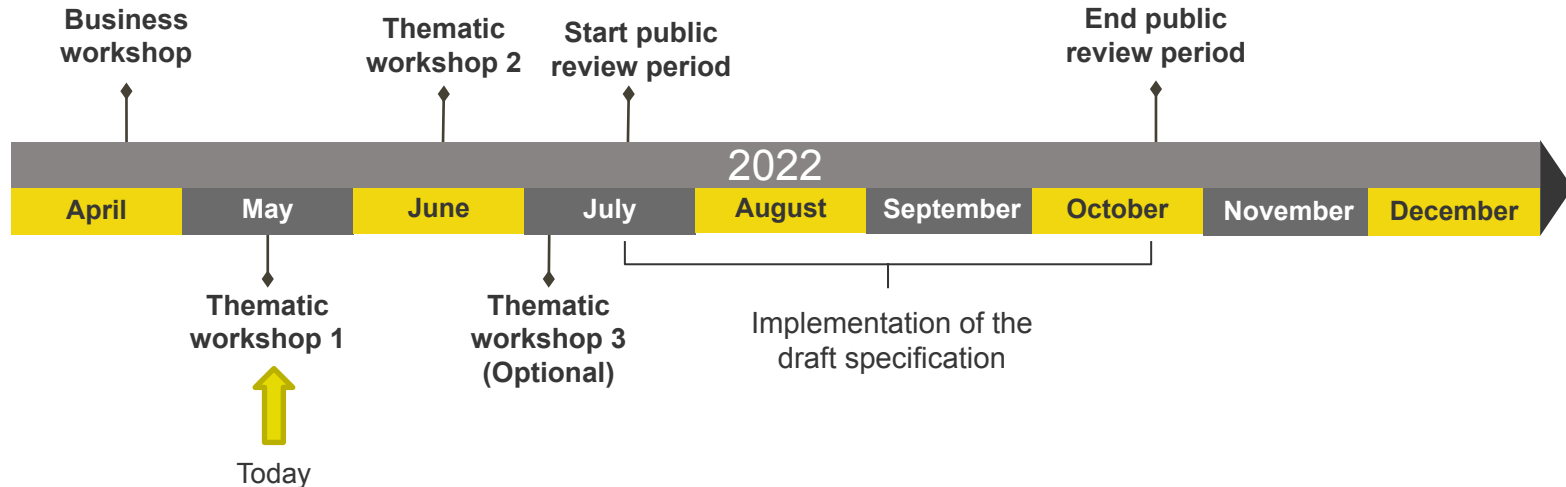


Information gathering via GitHub!

Planning

Thematic workshop 23th of June (09:00am - 12:00am)

Register via the following link:



How to collect the presentations/report?

- Follow the steps in the intro on the [GitHub page](#).



Feedback & cooperation



Feedback can be provided by e-mail to the following persons:

- digitaal.vlaanderen@digitaal.vlaanderen.be
- laurens.vercauteren@vlaanderen.be
- arne.scheldeman@vlaanderen.be



Feedback/input can be provided via GitHub:

<https://github.com/Informatievlaanderen/OSLOthema-passengerTransportHubs>

Through the creation of **issues**

Thank you!



Vlaanderen
verbeelding werkt

