DIL demonstration

DIL project meeting

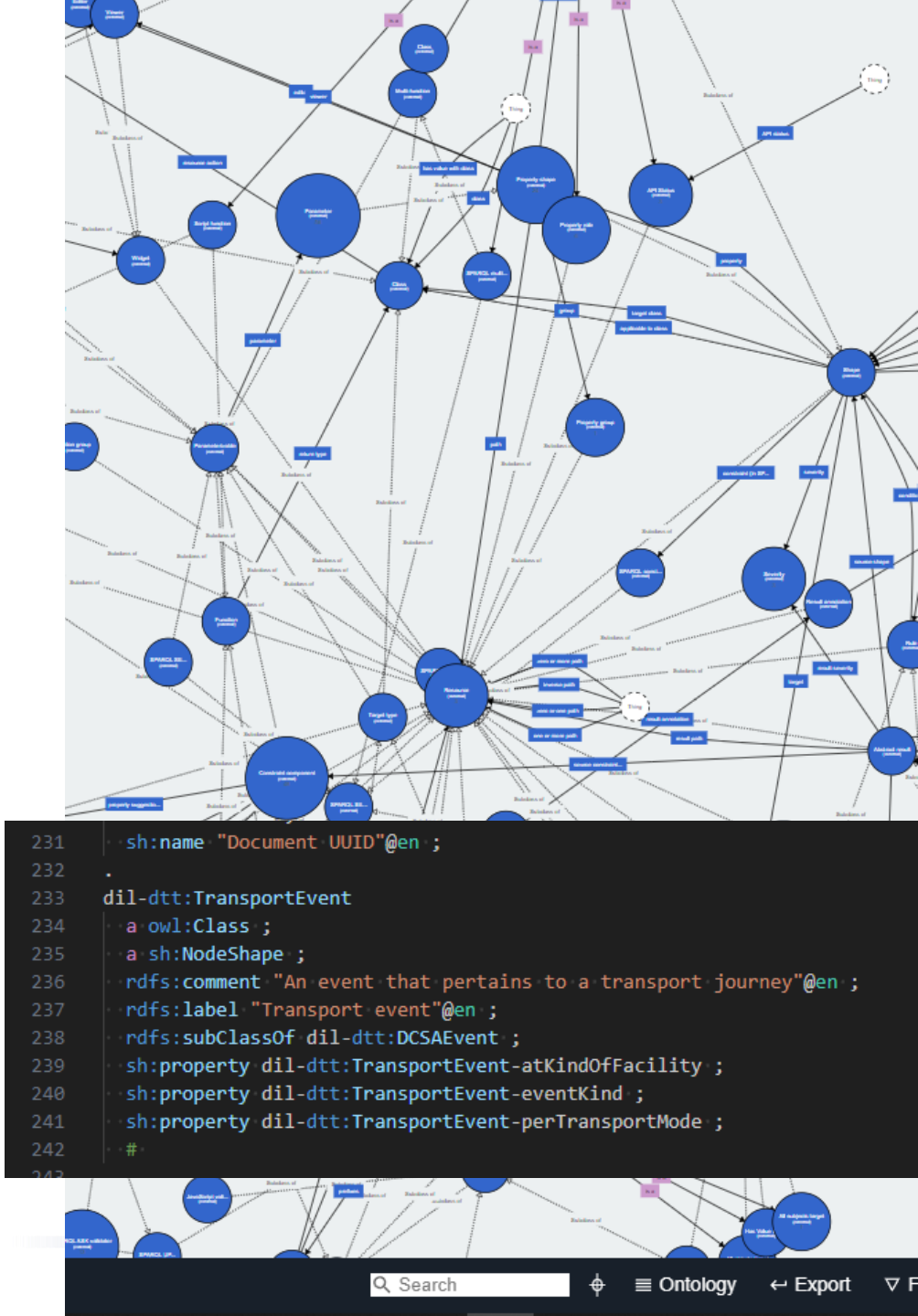
21 december 2023

TNO innovation for life

Input: the DCSA ontologie

- Ontology representation of DCSA model as provided by Jan and Eliana
- Files:
  - dil-dtt.ttl
  - dcsa_lists.ttl
- Inhoud:
  - 17 owl classes
  - 17 node shapes, 20 property shapes
  - 8 concept schemes and ~80 concepts (codes)
  - Namespace used:
    - https://identifier.connekt.nl/dil/ont/dil-dtt/
    - https://identifier.connekt.nl/dil/ont/dil-dtt-lists/

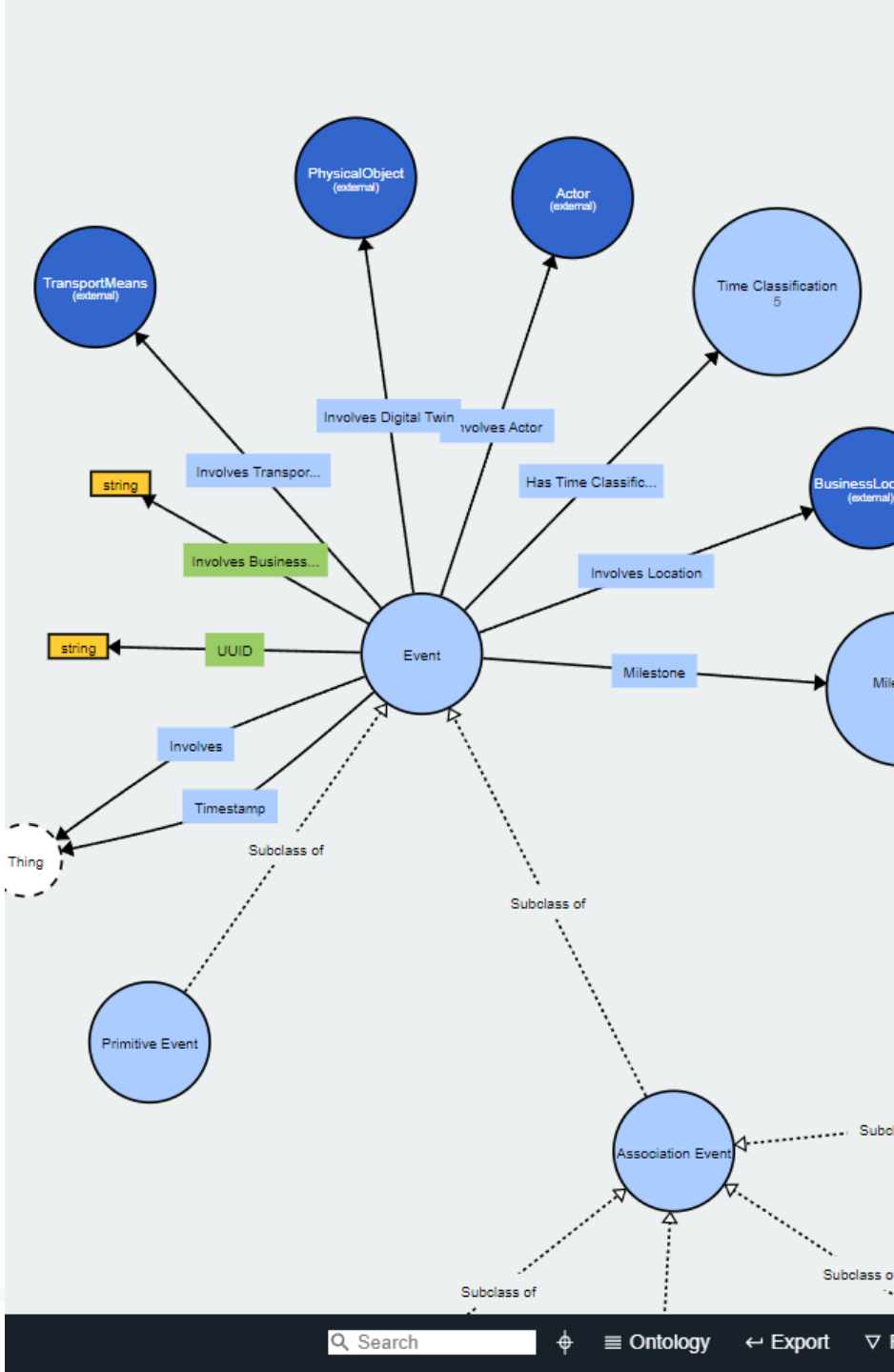
- Ontologie in STH geladen zonder aanpassingen



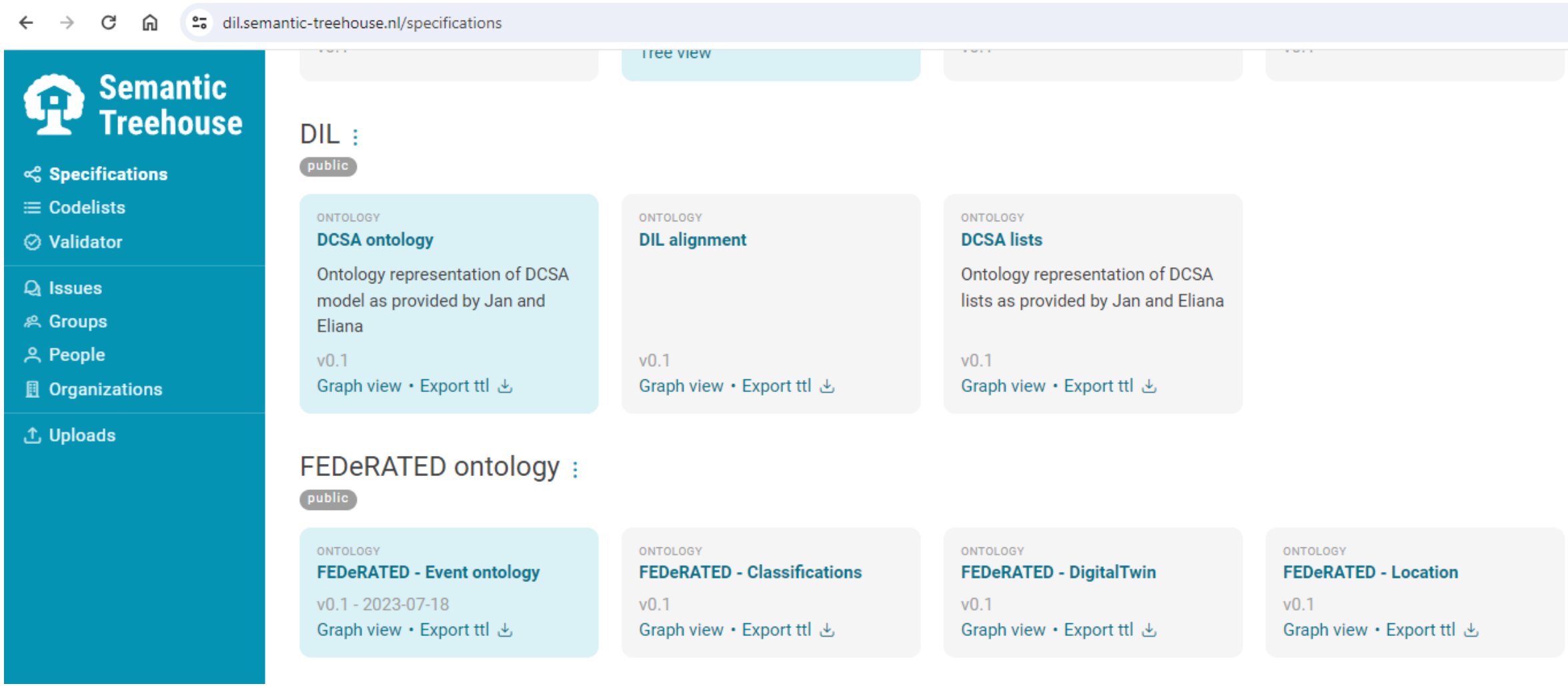
Input: the FEDeRATED ontologie

- Verschillende modules:
  - Event ontologie
  - Digital Twin ontologie
  - Location ontologie
  - …
- Namespaces:
  - federated: https://ontology.tno.nl/logistics/federated/Event#
  - …
- Ontologie in STH geladen zonder aanpassingen

- Root class voor events: federated:PrimitiveEvent



Inputs imported into STH

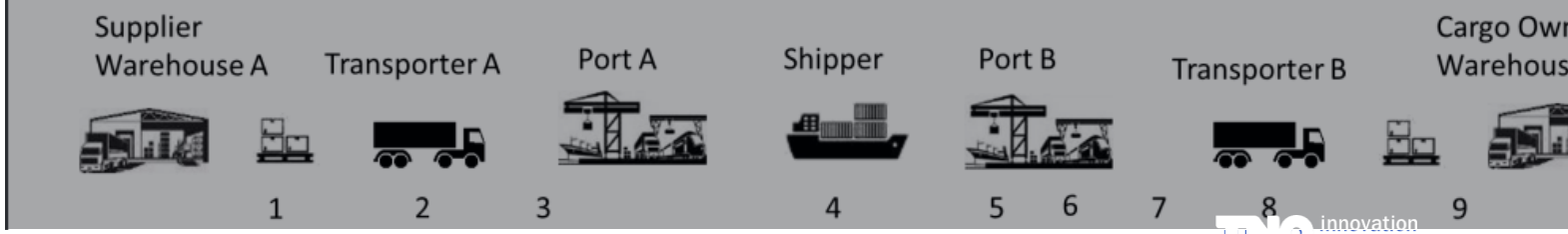


Event use cases

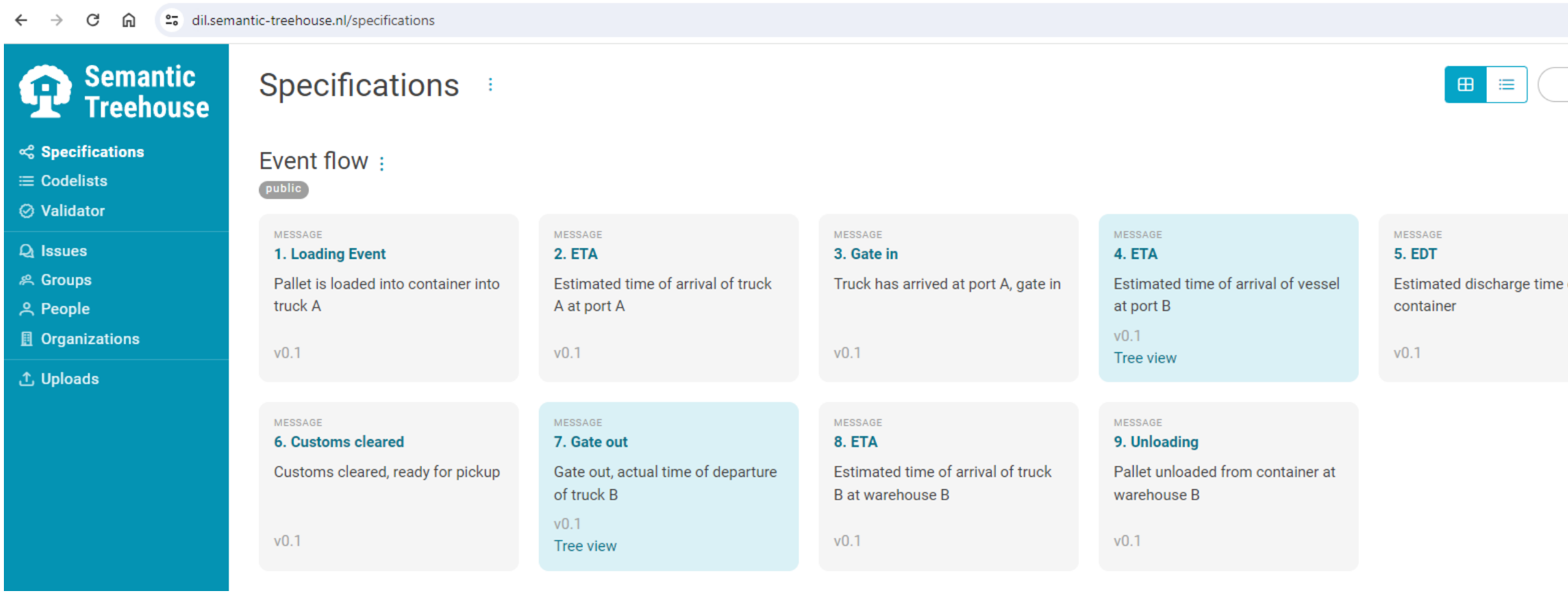
- Specify event message types
- Combining generic wrapper and domain specific payloads
  - Generic: FEDeRATED event
  - Domain specific: DCSA payload

- Explicitly **model the payload** for these event types; part of the demo are #4 (ETA) and #7 (Gate out)
- **Output schema's** for different syntaxes (including XML, JSON and RDF)
- Schema can be used in API specs to **configure data space connectors**

		Event Message				
		Generic BDI Wrapper		Domain Specific Payload Data		
#	Event	Format	Data	Format	Data	Sender
1	Pallet is loaded into container into truck A	BDI	**Event ID, Event Type: Loading Event** Object: Pallet, Pallet ID Object : Container, Container ID Location: Warehouse A, Transport Means: Truck Time	GS1	EPCIS event Product data GTIN	Warehouse A
2	Estimated time of arrival of truck A at port A	BDI	**Event ID, Event Type: ETA** Object : Container, Container ID Location: Port A, Transport Means: Truck Time	OTM	OTM event Truck + Trailer ID Vehicle Data, Cargo Data Route Data, Shipment Data	Transporter A
3	Truck has arrived at port A, gate in	BDI	**Event ID, Event Type: Gate in** Object : Container, Container ID Location: Port A, Transport Means: Truck Time	DCSA	DCSA event Transport Journey Equipment Journey Shipment Journey	Port A, Terminal A
4	Estimated time of arrival of vessel at port B	BDI	**Event ID, Event Type: ETA** Object : Container, Container ID Location: Port B, Transport Means: Vessel Time	DCSA	DCSA event Transport Journey, Itinerary Equipment Journey Shipment Journey	Shipper
5	Estimated discharge time of container	BDI	**Event ID, Event Type: EDT** Object : Container, Container ID Location: Port B Time	DCSA	DCSA event Transport Journey Equipment Journey Shipment Journey	Port B, Terminal B
6	Customs cleared, ready for pickup	BDI	**Event ID, Event Type: Customs Cleared** Object : Container, Container ID Location: Port B Time	DCSA	DCSA event Transport Journey, Customs Data Equipment Journey Shipment Journey	Port B, Terminal B
7	Gate out, actual time of departure of truck B	BDI	**Event ID, Event Type: Gate Out** Object : Container, Container ID Location: Port B, Transport Means: Truck Time	DCSA	DCSA event Transport Journey Equipment Journey Shipment Journey	Port B, Terminal B
8	Estimated time of arrival of truck B at warehouse B	BDI	**Event ID, Event Type: ETA** Object : Container, Container ID Location: Warehouse B, Transport Means: Truck Time	OTM	OTM event Truck + Trailer ID Vehicle Data, Cargo Data Route Data, Shipment Data	Transporter B
9	Pallet unloaded from container at warehouse B	BDI	**Event ID, Event Type: Unloading event** Object: Pallet, Pallet ID Location: Warehouse B Time	GS1	EPCIS event Product Data GTIN	Warehouse B



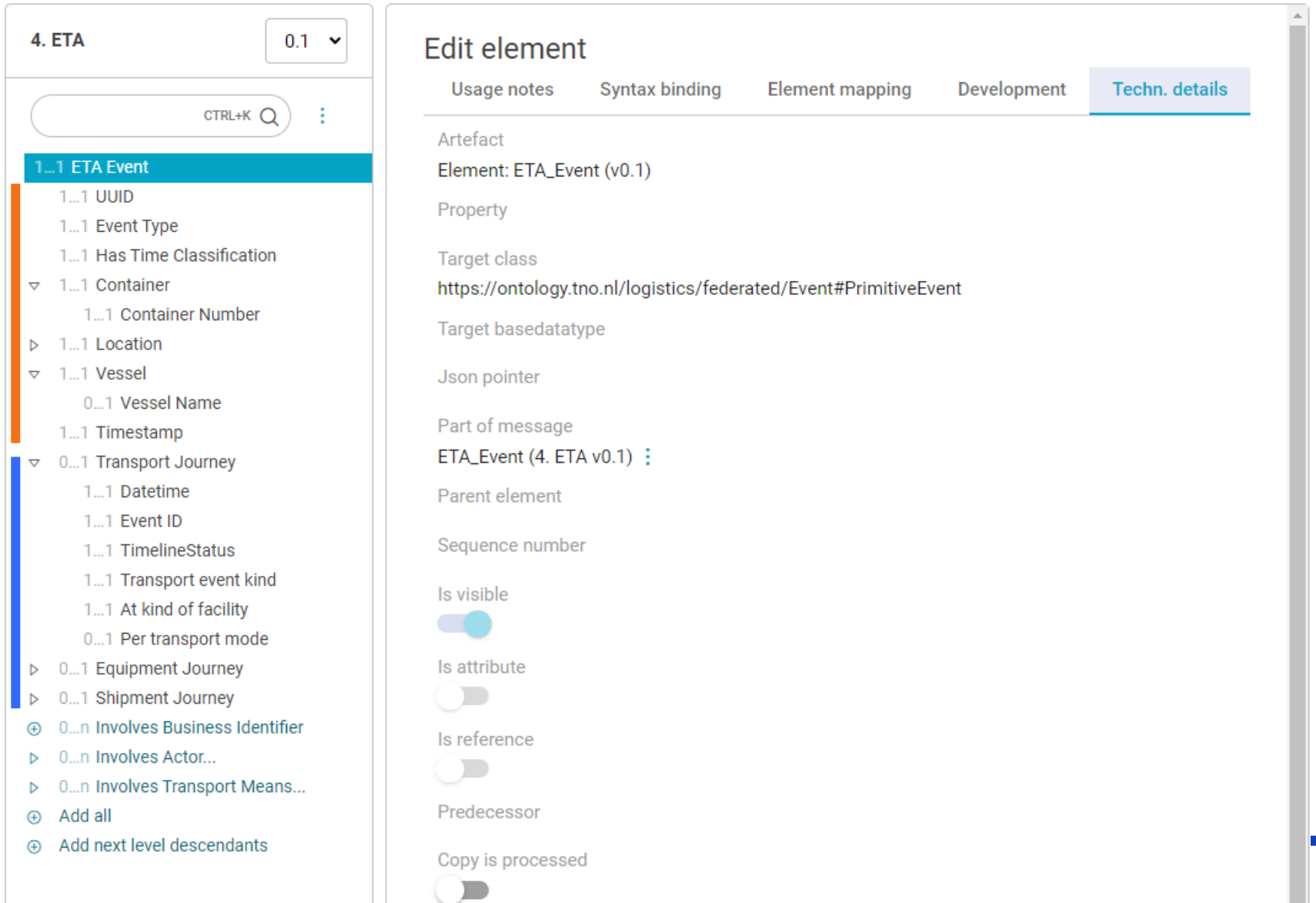
Modelled event types (#4 and #7)



Event type #4 | ETA Event

FEDeRATED

DCSA



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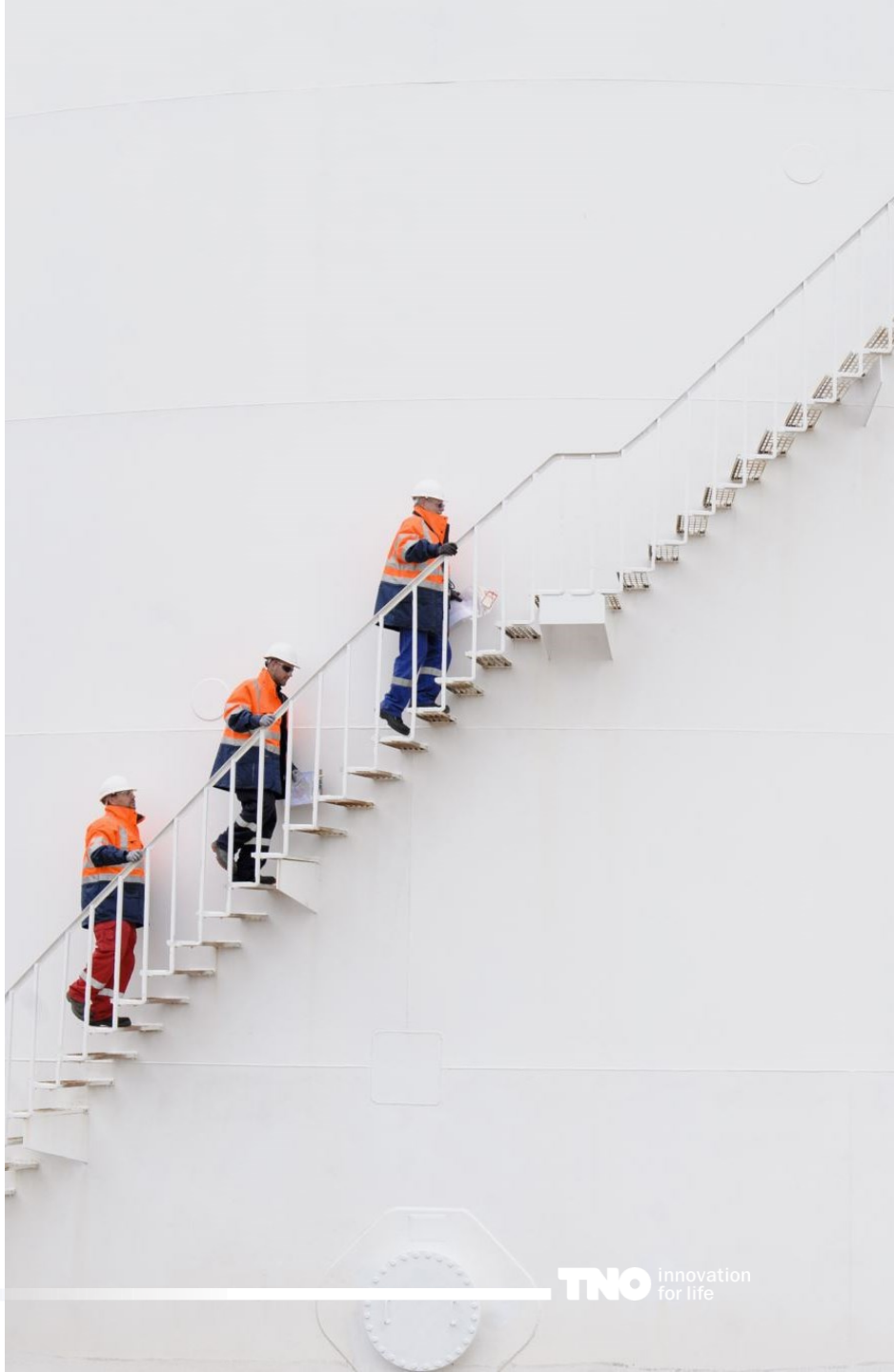
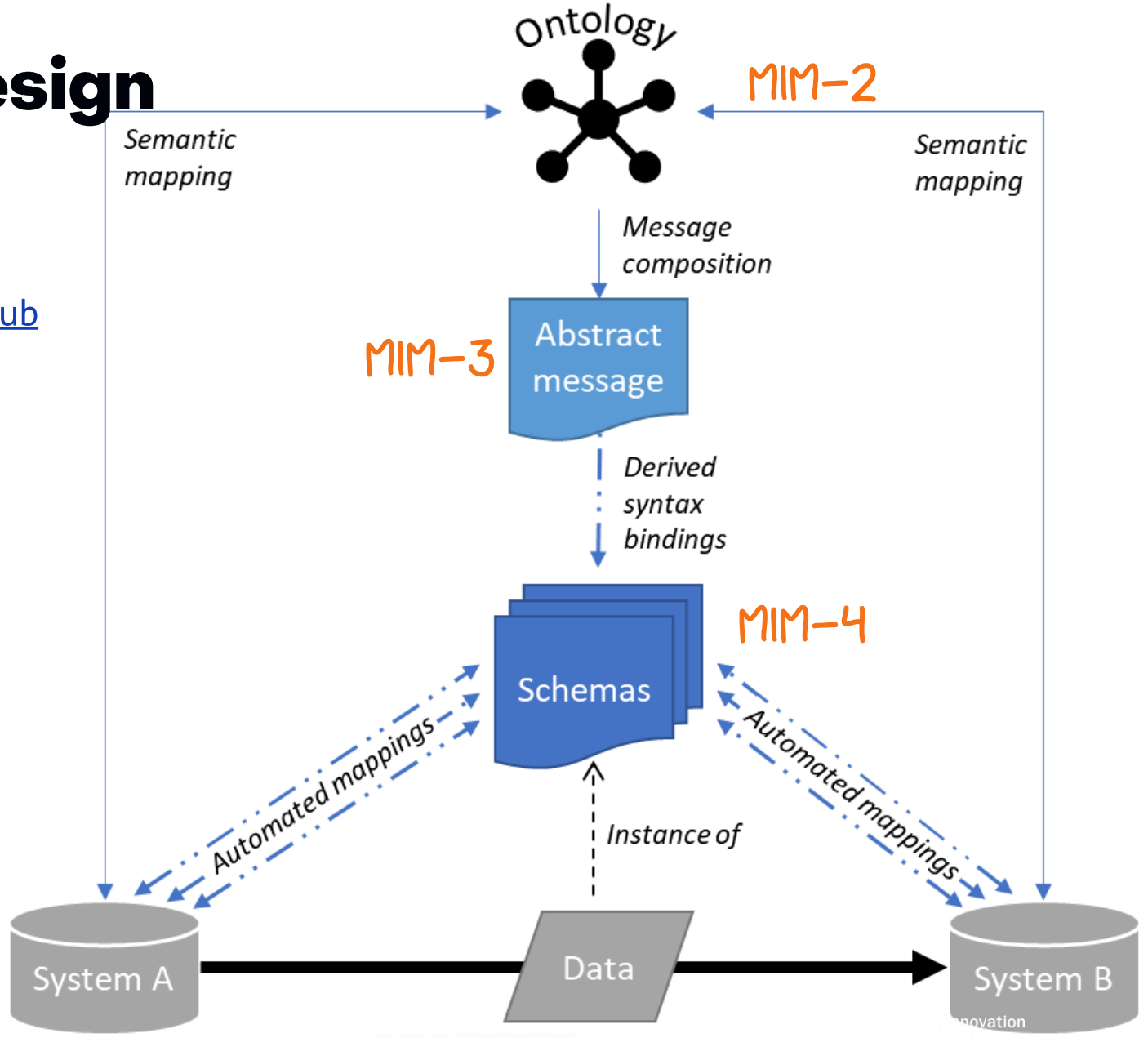
Next steps

- Write down (3-pager) what we realized
- Prepare for demonstration of the storyline for:
  - January: meeting with broader audience
  - February: Data Sharing Festival
- Finalize helm charts



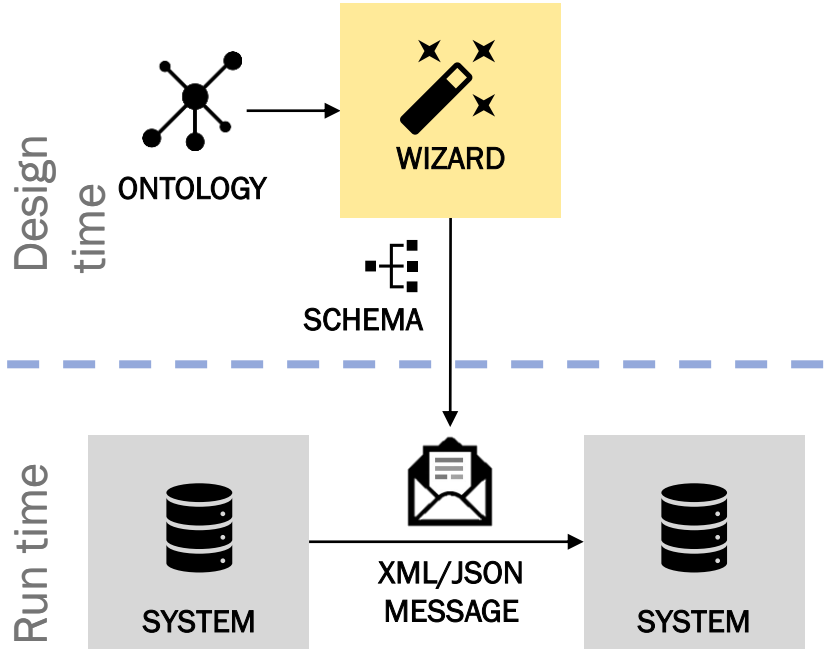
Ontology-driven API design method & tool

- FIT wizard artikel
- https://www.semantic-treehouse.nl/vocabulary-hub



Traditional approach

- Generate schemas for traditional message based data exchange
- Resulting schemas can be used for:
  - API specifications (e.g. OpenAPI)
  - Data validation
- The Wizard keeps link between schema elements and the classes/properties from ontology



Towards linked data

- The link between schema elements and ontology classes/properties is used to generate a mapping specification
- Mapping is formalized in RDF Mapping Language (RML)
- An RML engine is used to transform message data to triples according to the ontology
- This approach allows for a large set of heterogeneous data sources being mapped to the same ontology