

# INFORMATION TECHNOLOGIES FOR SHIFT TO RAIL

## D2.7 – Travel Shopping Ontology document (FREL)

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## **EXECUTIVE SUMMARY**

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This document presents the part of the IT2Rail ontology that concerns the Travel Shopping module. After a brief introduction, the document presents the modelling decisions that were taken. Then, the ontology concepts are explained in detail. Finally a lexicon with all Travel Shopping terms is provided.

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## LIST OF ABBREVIATIONS

ACK	Acknowledge
BA	Business Analytics
BT	Booking & Ticketing
CDT	Context Dimension Tree
CRUD	Create, Read, Update, Delete
CW	Cloud Wallet
E-R	Entity Relationship
GUI	Graphical User Interface
NACK	Not Acknowledge
PA	Personal Application
TC	Travel Companion
TS	Travel Shopper
TT	Trip Tracker
UI	User Interface
UUID	Universally Unique Identifier

## 1 INTRODUCTION

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This document presents the fragment of the IT2Rail ontology that concerns Travel Shopper (TS) module. In more details, the TS ontology introduces the concepts necessary to describe and semantically annotate the data that the TS module receives and exports from and towards the other IT2Rail functional areas and the external world.

These data are the information provided to describe which offer the customer wants to receive, and the details of the offers proposed by Travel Shopper. These details are a package of elements regarding each part of the travel. With all these information, the customer can choose the offer that best correspond to his will.

The document describes in Section 2 the design choices. Section 3 provides a formal description of the concepts included in the ontology and their relationships.

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## 2 METHODOLOGY

This section explains our design choices.

The needs of the traveller are :

- Going from some places to other ones around a given time;
- Detailing travel conditions he prefers (transportation mode, special condition...).

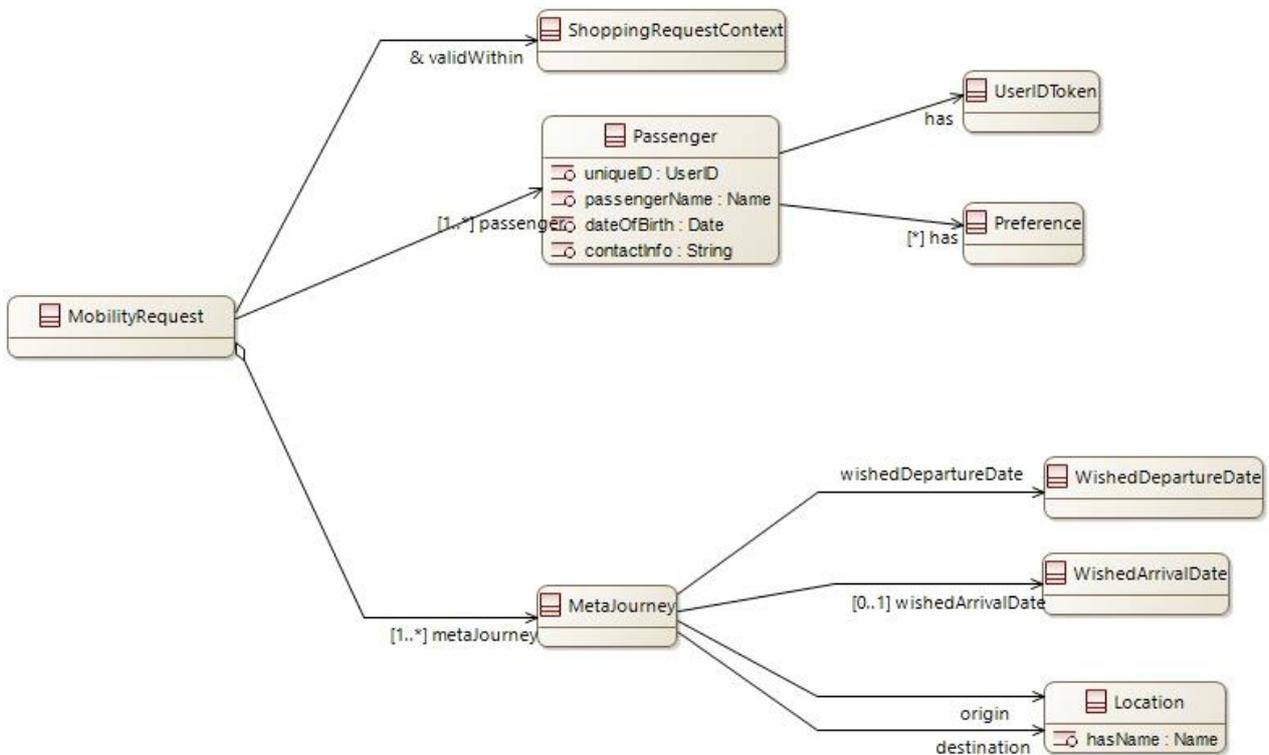
What can be offered to the customer is a set of products proposed by companies. These products (not ancillary product that are out of scope) are associated to paths between locations that link the origin and the destination of the traveller's trip. These products are also associated to the traveller as some offers are special to him, and not available to others travellers.

So inside the offer, there is a central element called Itinerary Offer Item, that link the traveller, the product proposed to him, and the travel episode this product applies to.

### 3 DESCRIPTION OF THE CONCEPTS

The following Capella class diagrams represent the concepts of the TS ontology and their relationships, formalised as properties.

This first diagram represents the mobility request that is sent to travel shopper to detail customer wishes.



**Figure 1: Mobility Request Model**

Basically, the Mobility Request is a list of Meta Journeys for a list of Travellers (including at least the User as Customer) in a Shopping context.

The Preferences are travel conditions that the customer desires which are valid for this trip, for instance direct travel.

The user ID token is a technical element that will be used by TS to get the user preferences from the TC Cloud (see WP5 for details).

The Meta Journeys list is the trip the user wants to do. Each Meta Journey is a couple of an origin and destination. Meta Journeys are put in the same request to reflect the wishes of the customer. For instance, if he wants to go from Paris to Berlin, and back to Paris, it will be one mobility request, with two Meta journeys: Paris-Berlin, and Berlin-Paris. If the user wants to do a more complex itinerary, he will provide a more complex list of journeys. For instance, if he wants to go from Berlin to Barcelona with a stop in Madrid, and go back directly to Berlin, his Meta journeys will be: Berlin-Madrid, Madrid-Barcelona and Barcelona-Berlin.

Origin and Destination are Locations. A Location is made of a name, and a set of GPS coordinates.

Besides an Origin and Destination, a Meta Journey also contains a wished arrival date or a wished departure date. Offers provided by TS will try to be as close as possible of these dates. Only wished arrival or departure date may be given.

This second diagram describes the itinerary offer, that is returned by TS to the TC, or other TS client (Booking and ticketing, trip tracking...) to be displayed to the customer.



The main idea behind this design is that the ItineraryOfferItem is the central element of an itinerary offer made to the customer. This object is an association of one or several Travel Episode(s) (A part of a travel), one or several product(s) (sold by a company or a broker) and one or several traveller(s) (who will benefit from the transportation service).

Note: for IT2RAIL, only one traveller (=User =Customer here) is considered, but the model of the Travel Offer is natively ready for several travellers.

The travel episode is the part of the travel between two stop-places. A stop place is the location where a traveller goes in or out of a vehicle. Between two stop-places, the traveller is inside a vehicle or he travels by his own means (by walking for instance). For instance, the traveller takes a bus, goes out at the bus stop of a train station, walks to the quay, and goes into the train. In that case, there are three travel episodes: one in the bus, one in walking, and one in the train. The one in walking will be used for navigation. A travel episode associated to a vehicle may contain a segment where the vehicle travels, an origin and a destination, and a planned departure date and a planned arrival date.

The Itinerary Offer is what the customer will buy. It is made of Itinerary Offer Items with fare rules, which are used to compute the price.

This third diagram describes the statistics data for the Metaroute Explorer. This data is provided by each travel expert and used by the Metaroute Explorer to generate the network reference resource.

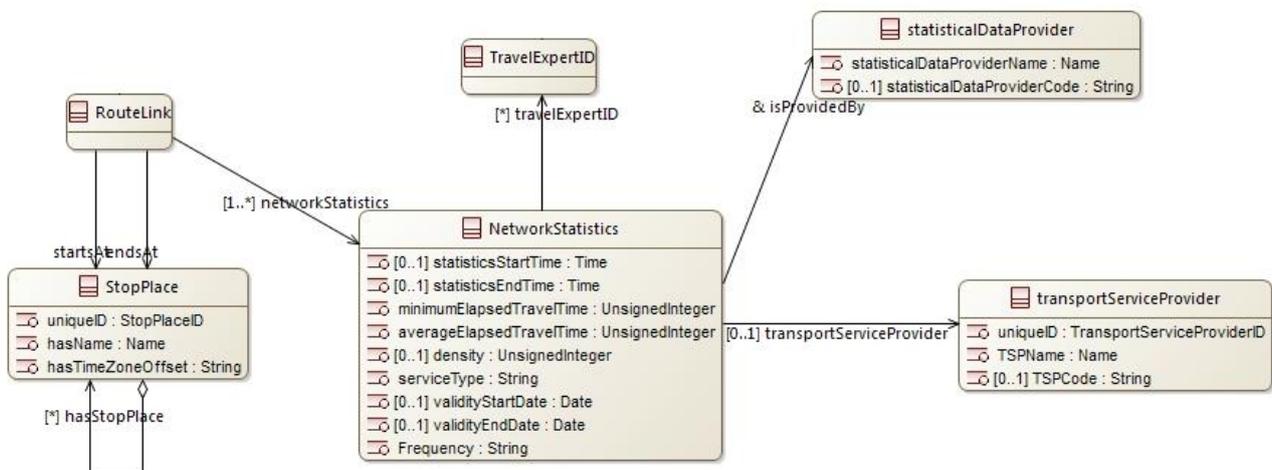


Figure 3: Statistical Data Model

## 4 GLOSSARY

Term	Definition
<b>AncillaryService</b>	a Type of Product that must be sold and consumed with a transportation product (out of the scope of IT2RAIL)
<b>DetailedQuotation</b>	Quotation corresponding to one or several products of the itinerary offer item for one of several travellers of this itinerary offer item
<b>DeviceInfo</b>	Device information used to perform the search transaction
<b>Fare Product</b>	A type of Product representing a Fare sold
<b>Fare Product Description</b>	Description of a Fare Product
<b>GlobalQuotation</b>	Total quotation of an ItineraryOfferItem
<b>InterchangeTravelEpisode</b>	A TravelEpisode associated with a default minimum connection time
<b>Itinerary</b>	A collection of Journeys with an Origin and Destination Location
<b>ItineraryOffer</b>	A collection of ItineraryOfferItems associated with the Itinerary
<b>ItineraryOfferItem</b>	An element of an ItineraryOffer describing a specific offer to travellers of Products on TravelEpisodes in a specific shopping process instance
<b>Journey</b>	A collection of Travel Episodes
<b>Location</b>	A Spatial Thing at given point on the surface of the Earth, associated with geoCoordinates and optionally an Address
<b>MetaJourney</b>	Is the couple Origin and Destination requested by the end-user
<b>Mileage</b>	Number of miles covered.
<b>MobilityRequest</b>	Is the Traveller's query for travel information about a specific Itinerary
<b>Network statistics</b>	Required data to build the network reference resource
<b>Price</b>	Monetary amount expressed in units of a currency
<b>Traveller</b>	The person performing travel on an Itinerary
<b>Planned Arrival</b>	Associative class representing the relation <code>departsAt(Vehicle, StopPlace)</code>
<b>Planned Departure</b>	Associative class representing the relation <code>departsAt(Vehicle, StopPlace)</code>
<b>Preference</b>	Is the Traveler-related information that represents its travel-related needs and choices
<b>Product</b>	Is a travel-related, purchasable Service or Good supplied by a service provider
<b>ProductProvider</b>	is contractually responsible for providing a Product to the Traveler
<b>Quotation</b>	Quotation of the itinerary offer
<b>Retailer</b>	Is an Organisation selling the Products of Transport Service Provider(s) using the services of Distributors. A Retailer may have a direct commercial relationship with a TSP whereby it acts as an appointed agent and/or it may have an indirect relationship with a TSPs whereby it uses the services of a Commercial Distributor. A TSP can play the role of a retailer
<b>Routelink</b>	An element of a transport infrastructure that connects two distinct StopPlace

<b>SalesConditions</b>	Is a subset of terms and conditions specifying the conditions to be allowed to book an ItineraryofferItem
<b>Segment</b>	Type of TravelEpisode for which one or more Product(s) are on offer by one and the same TransportServiceProvider
<b>ShoppingRequestContext</b>	Information specific to a given shopping request
<b>Statistics data provider</b>	Entity providing network statistics
<b>StopPlace</b>	Is an element of the TransportInfrastructure where Vehicle(s) may stop and where Traveler(s) may board or leave Vehicle(s).
<b>Tax</b>	Part of the Price of an ItineraryOfferItem related to charges and duties
<b>TransportationService</b>	Service (Flight, Rail, ...) that provides transportation on a TravelEpisode
<b>Transport Service provider</b>	Organisation providing either services and means for journeys using one or more modes of transports: aircrafts, trains, metros, coaches, buses; or possible other services connected to the journeys (e.g. trip tracking) ...
<b>Travel Episode</b>	A Travel Episode consisting of an ordered sequence of RouteLinks operated by the same Vehicle
<b>Travel Episode Endpoint</b>	Start or End of a Travel Episode, located at a Location
<b>TravelExpert</b>	Technical entity that render services to allow to build an offer. This entity may be deployed by a TSP or distributors thus relying on a TSP fare products and prices services
<b>TravelExpert ID</b>	Unique ID identifying a TravelExpert
<b>UserIDToken</b>	Unique string of characters identifying a unique user and containing the list of authorisations that guarantees the access to the list of functions for each component, and for different devices.
<b>Equipment</b>	Is a transportation mean used for carrying Traveller(s) and goods
<b>WishedArrivalDate</b>	ArrivalDateTime wished by the Customer
<b>WishedDepartureDate</b>	DepartureDateTime wished by the Customer

**Table 1: Glossary**

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## **5 REFERENCES**

[1] IT2Rail consortium. Deliverable D2.2: WP2 Specifications.

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