IT2Rail

Newsletter

September 2016

Introduction & Background

In this newsletter you will find useful information about the project developments, including upcoming events and activities. The IT2Rail project ("Information Technologies for Shift2Rail") started on the 1st May 2015, with 27 partners full of ambition and is set to last for 30 months. As the project is now just passed its halfway point, this newsletter will describe the overall concepts, the developments so far, the challenges and the ambition for the final results.

IT2Rail is a first step towards achieving the objectives of the long term Shift2Rail Programme. More specifically, the 4th Innovation Programme (IP4), focusing on "IT Solutions for Attractive Railway Services". The overall aim is to provide a new seamless travel experience, giving access to a complete multimodal travel offer which connects the first and last mile to long distance journeys by:

- Transforming global travel interactions into a fully integrated and customised experience;
- Providing a door-to-door (D2D) multi modal travel experience, through services distributed by multiple providers;
- Helping operators to adapt their level of service, better to satisfy customer expectations and optimise their own operations.

The difference between IT2Rail and Shift2Rail IP4 is that the former simply represents the first stage (a subset) of the latter. As such, IT2Rail lays the foundations in terms of the IP4 technical framework and the relevant business applications which use the framework to solve the interoperability issues confronting external communications.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No: 636078

Analysis of the specific project challenges follow up on an analytical breakdown of 'multimodality' into two business model forms: 'comodality' and 'intermodality' (see definitions on page 3) since the respective technology challenges have different flavours even if the technology domains are common.

IT2Rail, as an initiating 'lighthouse' project for IP4 as a whole, restricts itself to tackling comodality only, but the common domains enable it to act as a precursor to later IP4 calls which will also tackle the Intermodality flavour.

Aside from its exclusive focus on 'comodality', IT2Rail scope is pitched at a much smaller scale than that of IP4, in line with respective budget allocations and in terms of the following dimensions:

- depth of functionality;
- geographical coverage in terms of passenger-flow 'corridors';
- number of transport modes;
- number of transport operators;
- full end to end coverage of travel 'processes' i.e. re-accommodation, after-sales transactions and payment/settlement solutions are not tackled in IT2Rail and are topics which are left for subsequent and dedicated IP4 calls.

To find out more about IT2Rail, the opportunities to meet the project partners and access the public deliverables, please visit our website on www.it2rail.eu. Enjoy the read!

credit: Fred de Gasquet

IT2Rail Challenges

credit: Patrick Messina

The IT2Rail project has to initiate the solutions to a number of IP4 challenges:

1. Different multimodal business models
2. Interoperability
3. Integration of urban smart ticketing with longer distance modes
4. User experience
5. Collaboration between stakeholders from different links in the supply chain and different transport sectors

Two forms of Multimodality: Comodality and Intermodality (definitions)

It is difficult to appreciate the scope and challenges of IT2Rail without first understanding the analytical breakdown of Multimodality into 2 basic business models:

If Multimodality is the possibility to shop and book and to travel using a combination of different modes of transport combined to offer a full travel solution for a customer's door-2-door mobility query;

Then:

Comodality is where the passenger selected travel solution consists of an aggregation of Transport Service Provider (TSP) products/services, performed in the distribution link of the supply chain. None of the contributing TSPs are aware of the contribution of the others: multiple 'tickets' (transport contracts) are established between the passenger and each contributing TSP, each guaranteeing arrival only at the destination of the service provided by each TSP.

Intermodality is where the passenger selected travel solution consists of an aggregation of TSP products/services performed by the contributing TSPs themselves at the start of the supply chain: commercial agreements between contributing TSPs define a single 'thru-fare' and the apportionment of ticket revenues between them: a single 'ticket' or transport contract is established which guarantees arrival of the passenger at the final destination.

Interoperability Challenge:

To establish a framework which will enable the business applications belonging to a critical mass of European travel and transport industry players to 'interoperate' so as to provide the customer with: comprehensive information on available transport options and the corresponding processes for their booking, payment, ticketing, consumption, modification, and, more exclusively for the business partners (e.g. transport service providers, distributors, retailers), their financial settlement.

To meet this challenge, the IT2Rail partners were confronted by a choice between:

- Initiating the development of a new set of cross-transport sector standards for each of the travel related processes (e.g. shopping, booking, payment, ticketing etc.)
- Initiating the development of a new 'meta-standard' capable of resolving the differences between transport sector specific, and even operator specific, standards (data formats and message protocols).
- The IT2Rail consortium planned the 'meta-standard approach' from the beginning, based upon a logical cost-benefit analysis: a meta-standard approach allowed current and ongoing investments in existing and emerging standards to be protected, and promised a near-zero-cost dialogue capability with any other member of an eco-system using the same 'meta-standard'. Indeed, the membership of such an eco-system could be derived from its Service Registry in which current members publish and annotate their services with terms belonging to the meta-standard 'ontology', thus affording some automated translation between different standards tackling the same or similar business process(es). Therefore, the minimum investment for any new eco-system player, would be equivalent to the cost of publishing and annotating their own relevant web-services / APIs in the Service Registry.

Later on, we will have a closer look at the added business value and rationale behind the semantic web technology deployed for the 'meta-standard' option behind the Interoperability Framework initiated by IT2Rail for IP4 as a whole.

credit: Fred de Gasquet

IT2Rail Concepts and Developments

Passenger centricity and Interoperability

A transport system is 'passenger-centric' when it supplies mobility services as products that are fully complementary and compatible among themselves, e.g. "multi-modal" *transportation* services, but also with a range of other non-transport services that passengers can source from specialised providers and assemble into personalised solutions to satisfy needs that originate in the activities they pursue in their daily lives, e.g. customer *experience* services.

In such a passenger-centric view, the passenger is therefore a consumer of services which exhibit the features of *network products*[1] in a market subject to an "externality" phenomenon whereby the value of a supplied product increases as a function of the availability of other such complementary and compatible products that can be combined with it to form a solution, i.e. with the extension of a 'network' of such product.

1 O. Shy – Economics of Network Industries – Cambridge University Press, 2001

Its effect is illustrated in the figure below where, as is the case for ICT-intensive products such as integrated mobility services, the cost of ICT interoperability is emphasised as a major component of the total cost of supply: the higher this cost is, the larger the threshold of the extension of the network that must be reached for further expansion to be self-sustained by market forces, and the lower its maximum self-sustained extension, i.e., for both equilibria, the higher the effort necessary from outside the market to correct the effect of its externalities.

In this view, the IT2Rail project recognises interoperability not only as a demanding engineering ICT challenge but also as a fundamental structural determinant of the economics of the realisation of the Single European Railway Area as an extension of the Citizens work and leisure environment, supplied by a Network Industry of specialised mobility services providers.

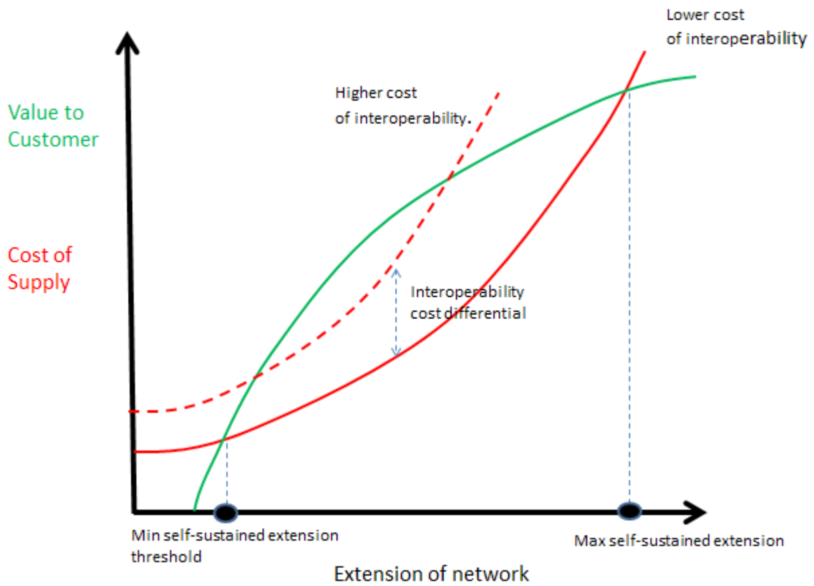


Figure 1

The Interoperability challenge

Interoperability refers to the ability of devices or systems to participate in the coordinated performance of distributed tasks and functions in the execution of some business process, exchanging data as a means, but not as the purpose of interoperability itself.

In fact, interoperability is predicated on the partners involved in the exchange of the data agreeing on the computational model that is applicable to such data and in processing them accordingly, i.e. according to some shared *logical interpretation* of what the exchanged data *mean* and what can be *meaningfully* done with them.

Experience accumulated over years of attempts at making systems not originally designed for distributed computing, interoperate through various forms of standardisation on common 'data exchange' formats and protocols has in fact provided ample evidence that by far the highest contributor to the costs of interoperability of such systems is the effort required to share and understand differing sets of assumptions about the interpretation of data, *whatever the standard, the format or the protocol* used for the exchange, implemented in participating applications – or, more correctly, made by their programmers: this is the problem of "semantic heterogeneity"[2].

Within IT2Rail, the interoperability challenge is redefined as that of providing technologies allowing *machines* to share and communicate those assumptions, and to use them to *automate* the process of mapping data *across* heterogeneous formats and protocols, so as to reduce the *cost* of interoperability. In a sense this could be considered as the problem of providing *machines* with an "understanding" of the problem domain that endows them with the ability to execute a form of "machine run-time standardisation" of data formats, based on this understanding.

2 V. Ventrone, S. Heiler - Semantic Heterogeneity as a Result of Domain Evolution. *SIGMOD RECORD*, 20, 4: pp. 16.20, 1991

"Semantics"

To illustrate with a simple example, let us suppose that a datum, such as a number, is exchanged between two systems, and that programmers have agreed to interpret the datum as representing the length in meters of a "radius". Because programmers share, through means totally external to the actual data exchange mechanisms, a basic knowledge of Euclidean geometry, they can both instruct machines, for whom the "meaning" of the concept "radius" in Euclidean geometry is actually completely unknown, to calculate derived results, such as the length of a circumference or the area of a square inscribed in such circumference, and they can also instruct machines to validate that a "radius" should not be measured in kilograms, etc.

The word "semantics", derived from the mathematical theory of formal logical systems, refers to what in this simple example is the *meaning* of the "radius" concept in Euclidean geometry, i.e. a formal definition in an axiomatic system.

We note that in this simple case agreeing on a common data "format", i.e. the fact that a given element in a data structure will contain an integer number representing the length of a radius, is sufficient to enable low-cost interoperability. But this is only because the cost of sharing the "semantics" implied in the exchange of the datum is negligible because it has, in fact, already been incurred in the educational systems through which the programmers have acquired formal, unambiguous knowledge of Euclidean geometry. In other words, the "semantics" is *assumed* to be shared and the cost of its sharing already "paid for".

In real, large-scale interoperability scenarios the situation is of course completely different.

IT2Rail Semantic interoperability

As discussed, interoperability requires two things:

1. The exchange of a *representation* of facts, events or phenomena of a problem domain: the "data".

2. A shared set of logical statements that describe the problem domain itself, in light of which the representation of facts, events of phenomena acquire meaning and can therefore be correctly interpreted: the "semantics".

Both elements are always present in any interoperability problem, although sometimes the "semantics" are only implied or are assumed to be known and understood.

The IT2Rail project adopts the following design principles:

1. The "semantics" of the problem domain is formally and explicitly described as a set of axioms of a formal logical system, independent on any specific syntactical representation of facts, events or phenomena, i.e. independent on data 'formats'. The axioms are expressed in a machine-readable language and are exchanged across networks using standard communications protocols.

2. Facts, event or phenomena about the problem domain are exchanged between systems as logical propositions of the axiomatic semantics. These propositions can also be exchanged across networks using standard communication protocols.

3. As a result, automated machine processing of the logical propositions according to the shared semantics is enabled so that systems can correctly interpret the exchanged data to a common meaning. For example, two different representations or 'formats' of a fact can be mapped automatically to one another as machine-processing of the axioms finds them to be equivalent ("equivalence" being a formal logical property).

To illustrate the principle in an actual case, suppose the following axioms have been defined using the OWL standard language[3]:

- (if something is a Vehicle, then it has an isTransportMode property whose value is either AIR or RAIL)

- (if a Vehicle stops at a StopPlace, then the StopPlace has an isStopPlaceType property whose value is that of the value of the isTransportMode property of the Vehicle)

- Airport is the subset of StopPlace instances whose isStopPlaceType property has the value AIR

With those three axioms a machine can automatically determine that if a Vehicle isTransportMode AIR and stops at a StopPlace, then the StopPlace is an Airport and vice-versa, if a StopPlace is an Airport then a Vehicle that stops there must have an isTransportMode property whose value is AIR. These statements are axioms in the sense that they always hold true irrespective of whether an actual Vehicle stops at an actual StopPlace, and irrespective of how an instance of the Vehicle or StopPlace are represented in data. As such, they capture fundamental knowledge about the problem domain, i.e. the "semantics"

3 Cfr: https://www.w3.org/OWL/

To see how this automation can be exploited in practice, let's suppose that in an exchange between two systems, two different structures are used to represent a StopPlace, and that a property in both structures must be set to indicate the "type" of StopPlace.

In system A, the data structure is as in the following fragment:

```
@RdfsClass("http://www.it2rail.eu/ontology/infrastructure#StopPlace")
public class StopPlace implements Identifiable {
    @XmlElement
    protected String stopPlaceType;

    @RdfProperty("http://www.it2rail.eu/ontology/infrastructure#isStopPlaceType")
    public String getStopPlaceType() {
        return stopPlaceType;
    }
```

While in system B the data structure is different and is the following:

```
@RdfsClass("http://www.it2rail.eu/ontology/infrastructure#StopPlace")
public class Infrastructure implements Identifiable {
    @XmlElement
    protected String typeOfInfrastructure;
    @RdfProperty("http://www.it2rail.eu/ontology/infrastructure#isStopPlaceType")
    public String getTypeOfInfrastructure() {
        return typeOfInfrastructure;
    }
```

As can be seen, both the class names (StopPlace in system A, Infrastructure in system B) and property names (stopPlaceType and typeOfInfrastructure, respectively) are different across the data structures. They are both annotated, however, with the same terms from the shared "semantics" (the name of the class in the @RdfsClass and the name of the property in the @RdfProperty annotations), so that automatic reasoning on the axioms that calculates the class and properties of an object, i.e. it is an instance of a StopPlace class and has a isStopPlaceType property whose value is AIR, can also automatically populate the two different structures with the correct and equivalent content. In other words, the annotations establish an equivalency between the data structures and their properties allowing automated "mapping" from one to the other.

Semantic Interoperability and Standardisation

As the previous example demonstrates, semantic interoperability still requires a level of agreement between participating systems: about the axioms, i.e. the explicit formalisation of common knowledge of the problem domain, and therefore on the terms or "vocabulary" in which these axioms are expressed and that are used in the process of annotation described previously.

However, the effort required to achieve this level of standardisation is now substantially reduced by two important factors:

- On one hand, the axioms can be written using a variety of commercial and open source tools in a standard machine language that allows for wide distribution over standard networks. This amounts to machines sharing an unambiguous and formal knowledge about the problem domain.

- On the other hand, the level of required standardisation is now at a much higher level of abstraction, precisely at the knowledge level, rather than at the implementation specifics of formats and protocols. Converging on common definitions of concepts and relationships that exist in the 'real' world regardless of how they are represented or implemented is not only a much more manageable proposition, but also a much more important task, particularly in an innovation endeavour, than is the discussion about technical implementation or technological details.

It should be noted in this respect that standardisation at the semantic interoperability level is now a part of the European Rolling Plan for ICT standardisation[4] in many of the areas covered by the plan, from eHealth interoperability, to eProcurement and eGovernement, to Smart Grids and Metering, and is also an important topic studied in a dedicated Work Package within the OneM2M consortium on "Industry 4.0" technologies.

The IT2Rail project, currently in its second year of development, is generating very promising results on the large scale applicability of semantic interoperability concepts and technologies in the multi-modal integrated end-to-end provision of customer-centred mobility solutions. The outcomes of this research and innovation activities will provide evidence-based results that can be incorporated in future standardisation programs.

Ticketing in IT2Rail: the disruptive concepts

At the heart of IT2Rail, Ticketing systems are one of the major enablers of multimodal transportation. Such systems are often, if not always, tailored to yield the best possible transportation solution to the traveller. In order to do so, they integrate various specificities (geographical, business, political, technical, etc.) that create high value services for the end-user.

Some ticketing systems, in particular in urban transportation or even interurban transportation, are not based on the traveller identity being linked to a resource (a seat, a vehicle etc.). In such systems, access control and fare product consumption are much elaborated and often require a specific technical infrastructure with fare media (e.g. contactless smart card, magnetic ticket),

4 Cfr. https://ec.europa.eu/digital-single-market/en/rolling-plan-ict-standardisation

security infrastructure, access systems... Lots of efforts are currently being put to achieve interoperability between such systems at regional scale and national scale. However, the considered interoperability relies much on the said existing technical infrastructure. It aims at solving fare media fragmentation (i.e. having numerous contactless smart cards) by unifying the fare media into a single one. It also aims at creating interoperable fare products by defining products that every actor of the eco-system has to support and implement.

Such interoperability is very interesting for the traveller but presents some major drawbacks. First, the larger the eco-system, the harder it gets for all stakeholders to cooperate in a competitive environment (and create interoperable products). If the considered scale is Europe-wide, it is clearly an issue. Second, it is a rather costly approach as legacy systems have to be adapted to handle the common fare media and fare products. This can be a blocking point for small public transport operators.

IT2Rail has chosen to take a complementary approach to ticketing interoperability. This approach is inspired by the air industry and the rail mainlines, where ticketing interoperability is independent from such technical infrastructure constraints and thus implemented in a different way. This approach is contractual: it aims at formalising the relationship between the transportation eco-system and the traveller by defining business processes with **open specifications and interfaces** and defining business artefacts shared between systems. In detail, the "ticket" is transformed into a set of three elements: The **Entitlement**, the **Token** and the **Embodiment**.

The **Entitlement** is a representation of the contract between customer, traveller and transport service provider. It is the main element of interoperability; it must be accessible and readable by every party involved in it. It must provide the traveller with the rights and duties regarding his/her travel. It identifies the actors involved and provides the traveller with information on every operation related to the contract such as after-sales processes. It lists the fare products that can be used in an identified itinerary. In IT2Rail, transport service providers issue or contribute to issuing entitlements for travellers.

The **Token** is the translation of the Entitlement into the technical infrastructure of the transport service provider. It is the element that is needed by the traveller in order to perform the travel. Of course as we stated previously, this element is strongly dependent on the various technical infrastructures that may be involved. This is why the **Token payload** (a part of the Token) is not standardised. It can take as many forms as ticketing systems. It can be the transport application in a ticketing system using a contactless smart card. It can be a QRCode image. However, in IT2Rail the Token payload is associated with **standardised metadata** referencing the way it has to be used. The payload and the metadata together constitute the Token. The separation between the Entitlement and the Token allows transport service providers to collaborate to one entitlement (contract/ticket) while maintaining their specificities expressed in the Token.

Lastly, the **Embodiment** is the physical object that supports the Token. It is used in the ticketing system for the validation process and interfaces itself with the ticketing system access systems (such as gate, bus validators etc.). The Embodiment has the necessary capabilities to interact with the ticketing system and therefore varies according to the ticketing systems (e.g. a contactless smart card, a magnetic ticket, a printed QRCode, an NFC Phone and more). In IT2Rail the Embodiment is not standardised but instrumented. Instrumentation of the Embodiment is the formal description of its communication and computation capabilities.

This allows ticketing systems to take advantage of the internet of things – dynamic interface technics to dynamically compute the necessity or not to issue a fare media for the traveller. For example, it is then possible to determine at shopping time if a customer NFC Phone has the capability to emulate a contactless smart card or if the ticketing system must issue a physical contactless smart card. The separation of the Token and the Embodiment allows different deployments between token and embodiment and, in the end, the virtualisation of the fare media **whenever possible**.

This interoperability scheme has some interesting characteristics. First the IT2Rail ticketing interoperability allows legacy systems to remain fully functional taking full advantage of each ticketing system's specificity. Secondly, it scales up horizontally as it is not intrusive in its constituents. Lastly, it allows mutualisation whenever possible by composition of fare products into an Entitlement, composition of Entitlements in an itinerary or mutualisation of the Embodiments.

User experience

As a "user-centric" project, IT2Rail aims at enhancing user experience. For this purpose, IT2Rail will develop the key concepts of a unique traveller identifier, smart device and virtualised data store.

The unique traveller identifier will let the user create its profile once and define a set of preferences, including travel choice, but also description of impairment to match with proposed services. This unique identifier will enforce security and reliability. This digital identity will be recognised and accessible by all multimodal service providers.

The smart device is the traveller's companion. This is a mobile application giving access to the whole IT2Rail functionality while hiding all the complexity of a multi modal environment. In particular, the smart device will help the user to search, book and pay for the travel. In addition, the smart device will assist the traveller during the travel experience, by providing guidance between the steps with the help of an indoor navigation module available in stations, and by presenting alerts about disruptive events that may affect the travel experience. In collaboration with other components, the smart device will manage validation and control of the traveller's ticket. More specifically, the smart device will handle the NFC payload of entitlement when available, replacing transporter contactless smart cards. It will enable the user to buy and get an NFC ticket whatever his/her device or phone operator is, and thus enabling the possibility to get an urban transport ticket for a foreign city, like if he/she lived in that city. In order to achieve this, the smart device will manage the installation of components mandatory to enable the use of the NFC validation, receive and store the token in the secure environment of the NFC chip and manage the interaction between the validation system and the NFC device mechanisms.

The virtualised data store, tied to the unique identifier will be a secured vault, where the entire user's data (preferences, travel tokens, payment means) are stored. The data will be used by other components of IT2Rail (ticketing, business analytics etc.).

Collaboration Challenge and System Modeling

The IT2Rail system is a complex one, created by different partners, with different areas of competence. The design and realisation of such a system requires the collaboration of a significant number of developers, who design and work on the various parts of which the system is composed. To manage the complexity of the development process, the IT2Rail project puts models at the core of the process, to facilitate the collaboration between partners, and to foster a common understanding of the system, its functions and its components. In particular, the project has decided to found the modelling activities on the Capella notation and associated tool (https://www.polarsys.org/capella). Capella was selected over other notations such as the Unified Modeling Language (UML, http://www.uml.org/) due to the familiarity of some project partners with it and to the availability of support for it within the consortium. The Capella model of the IT2Rail system serves several purposes:

1. It provides an abstract view—independent of implementation details such as the technology that is actually used to create the system—of the main functions performed by the system, and of how they are combined together to fulfil the goals of the system.

2. It defines a set of concepts that are shared among project partners, and which form the common knowledge and vocabulary that are essential to have constructive discussions about the interplay among the many parts of the system.

3. It gives a unitary view of the system, at the same time as it highlights the different parts of which it is made, and how they interact with each other.

4. It identifies the key information that flows through the system, thus providing the basis for the shared semantics that is at the core of the IT2Rail approach.

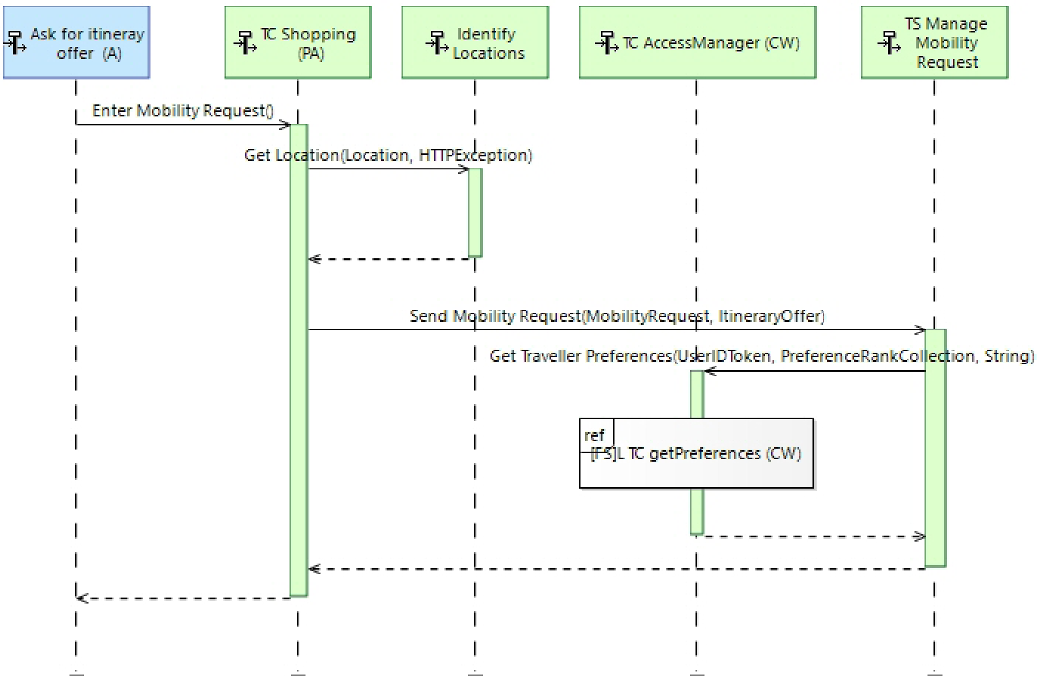


Figure 2. Snippet of Capella diagram depicting the retrieval of an offer by the user

To illustrate the points above, let us introduce a snippet of the Capella model, focusing on one of the first interactions between the user and the system, i.e., the request for alternatives for a trip. Figure 2 shows a so-called (in Capella parlance) functional scenario, which describes how the functions that are part of the system collaborate to provide the user with a set of offers that suit his/her needs.

The scenario involves several parts of the system: the Travel Companion (through its "Shopping" function), which collects the request from the user and asks the rest of the system to build the offers; the Interoperability Framework (which offers the "Identify Locations" function), which the Travel Companion then uses to transform a free-form string representing the origin and destination of the trip into semantically rich information, according to the approach described above; the Travel Shopper (providing function "Manage Mobility Request"), which builds the actual set of offers (the mechanisms through which the offer is build are not depicted in the figure). To build an offer that suits the user's needs, the Travel Shopper retrieves the relevant preferences of the user through a function provided by the Travel Companion, "Access Manager", which grants access to them. Let us remark that each function depicted in Figure 2 is built by a different partner of the IT2Rail project, which highlights the need for a common understanding of the concepts involved.

Figure 3 shows the "Mobility Request", i.e., the information that the Travel Companion sends to the Travel Shopper to fulfil the request by the user for a new set of offers. Diagrams such as the one depicted in Figure 3 are the basis for building the shared IT2Rail ontology that is at the core of the project.

The Capella model is used not only in the system design phase, and as a tool to share information among partners, but also in later phases, such as when testing the developed prototype. In fact, scenarios such as the one depicted in Figure 2 help project partners identify the relevant functions and interactions that need to be tested both separately—when performing unit testing—and in combination with one another—i.e., during the integration testing phase.

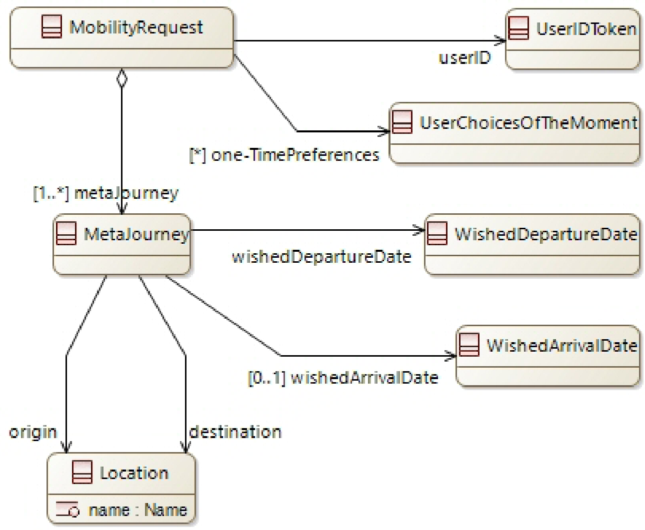


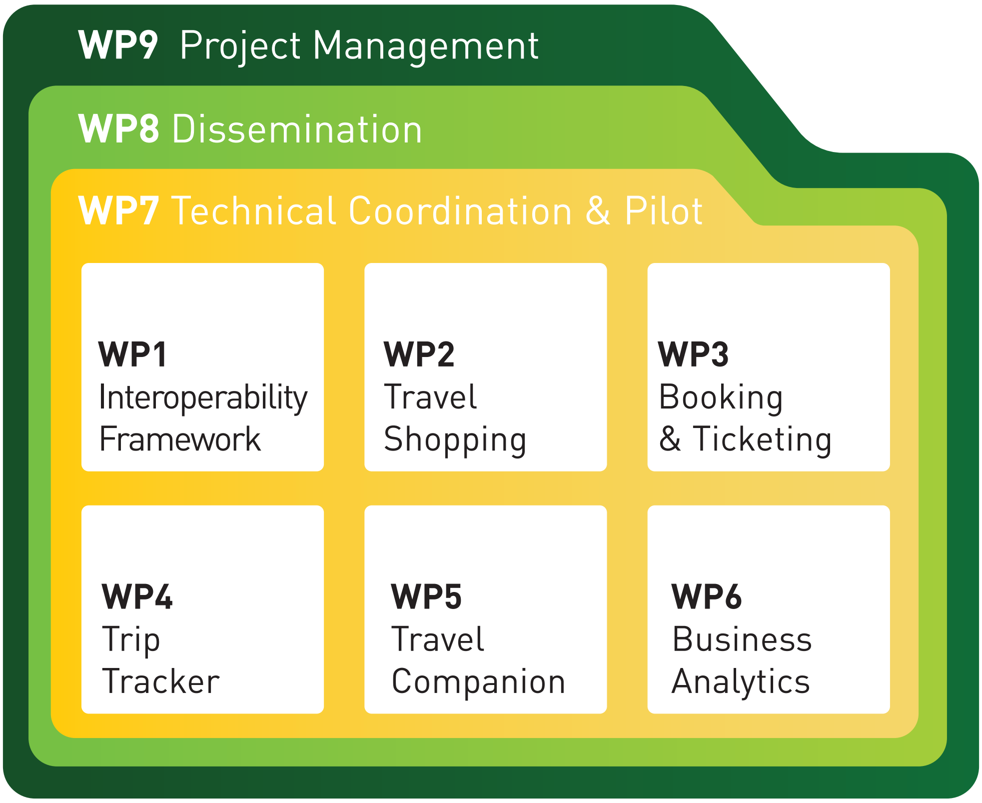
Figure 3. Snippet of Capella model representing the information associated with a mobility request

Project structure

To sum up, the main idea behind IT2Rail and IP4 in general, is to introduce a ground-breaking technical enabler based on two concepts:

- The traveller is placed at the heart of innovative solutions, accessing all multimodal travel services (shopping, ticketing, and tracking) as well as connected services (guidance, additional services etc.).
- An open published framework providing full interoperability whilst limiting impacts on existing systems, without the need for centralised standardisation.

In order to achieve this, IT2Rail is organised into six technical Work Packages, which are brought together by a Technical Coordination Work Package, as illustrated in the diagram below.



Past and upcoming events

credit: Patrick Messina

IT2Rail has been disseminated in high profile events like:

- 61st UITP World Congress & Exhibition in Milan – June 2015
- ICT on Trains in Birmingham – September 2015
- 22nd ITS World Congress in Bordeaux – October 2015
- IT-Trans 2016 in Karlsruhe –March 2016
- 6th Transport Research Arena (TRA) in Warsaw – April 2016
- 11th World Congress on Railway Research (WCRR) in Milan – June 2016
- Transport Publics in Paris –June 2016

In the coming months, you will have the opportunity to meet the IT2Rail partners and learn more about the project in the following events:

- InnoTrans 2016 in Berlin – 20-23 September 2016
- IT2Rail Mid-term conference in Brussels – 17 November 2016

For more details on these events please visit www.it2rail.eu

Facts and Figures

Total Budget:

€12
million
(€12m EU funded)

27
Partners

Duration:

30
Months

Project Start Date:
1st May 2015

Project End Date:
31st October 2017

Grant Agreement No:
636078

Partners

Project coordinator

www.it2rail.eu