

S2R-OC-IP4-01-2018: Semantic framework for multimodal transport services

Specific Challenge:

The topic addresses the IP4 “interoperability framework”, one of the key research and innovation areas of IP4 described in the S2R Master Plan. The challenge for the interoperability framework is to provide seamless connectivity (using open semantic web standards and technologies), in order to address the diversity and variability of standards and protocols of different transport modes managing data coming from different environments⁴².

The IP4 transport ecosystem is expanding the scope through different complementary projects, and new services, modes, operators, providers and functionalities are incorporated; accordingly the ontologies are enriched, and the reliability of the interoperability framework mechanisms must be reinforced. The specific challenges of this call are the following:

- Improving performance and scalability of the interoperability framework to sustain a large deployment.
- Support the market uptake by simplifying/automating all the necessary steps (e.g. creation of ontologies, discovery, annotation, mapping) which are needed to integrate new services and sub-systems in the IP4 ecosystem.

Scope:

In order to address the challenges described above, the proposals should address all the following work streams, in line with the S2R MAAP:

1) Performance :

Optimize performance and scalability of the interoperability framework⁴³, exploiting new techniques developed over the last few years in semantic architectures and standards. The project will explore different options, such as: alternative architecture, new software paradigms (such as application containers, dynamic resizing, in-memory processing), parallel computing mechanisms, etc.

2) Automation for an easy integration of new services or sub-systems :

Propose mechanisms to automate the generation of ontologies (esp. lightweight ontologies), the annotation, the mapping and translation between different systems, etc.

For all these activities, the project should cover the following aspects: state of the art and best practices, realistic target performances and definition of KPIs, but also implementation of proof of concepts (including tests and validation), and finally recommendations.

The proposed options must remain compatible (as much as possible) with the approach currently developed within IP4², to allow the adaptation of the interoperability framework mechanisms developed in the parallel complementary project CONNECTIVE (S2R-CFM-IP4-01-2017).

The project is expected to reach TRL up to 4.

⁴² Information on previous S2R activities on the interoperability framework, including public deliverables and brochures, can be found on the S2R website.

⁴³ Please check the latest IP4 documentation available on the Shift2Rail website at <http://.....>

The action stemming from this topic will also be complementary to actions carried out within the following topics:

- S2R-CFM-IP4-01-2017: Connecting and Analysing the Digital Transport Ecosystem (CONNECTIVE)

As specified in section 2.3.1 of S2R AWP for 2018, in order to facilitate the contribution to the achievement of S2R objectives, the options regarding 'complementary grants' of the S2R Model Grant Agreement and the provisions therein, including with regard to additional access rights to background and results for the purposes of the complementary grant(s), will be enabled in the corresponding S2R Grant Agreements.

Expected Impact:

The overall objective of the Interoperability Framework is to maximize the development of new products and services by removing technological or standardization barriers, reducing integration costs and time to market and allowing new market players to participate in the ecosystem. It would then shield travelers and service providers from the complexity and fragmentation of the transport market. This project will contribute to this objective with two specific impacts:

- The improvement of the Interoperability framework will ensure that it can reach the requested performance and scalability to become a viable technical backbone for the IP4 multi-modal web of transport
- Automating some of the underlying mechanisms will reduce efforts and costs for the integration of new systems/services/actors in the transport ecosystem.

Type of Action: Research and Innovation Action