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Deliverable 3.1

Interim Report on Regulatory Environment

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Executive Summary

A **positive policy environment**, with commercial realities considered, will facilitate the acceptance and implementation of effective governance for the underlying Interoperability Framework (IF) Assets. To best enable a governance framework that defines the proper rules for administration, process and change management, this deliverable identifies the interactions of the regulatory environment, standardization bodies and industry initiatives that will impact the use of **new semantic technologies that can deliver a seamless customer experience.** The work so far was carried out based on the survey of available information sources as well as well as interaction with other projects and focus groups that are impacted by the Regulatory and Standards environments.

Some key regulatory provisions considered for analysis and input were:

- **Passenger rights** (all applicable regulations for all modes of transportation): integration of booking and ticketing paves the way to integrated service contracts, therefore homogeneous (information on) compensations in case of delays, or substitution means in case that one travel "leg" should be unavailable. Additionally, aspects of Consumer Protection and Liability were also considered in this context.
- **Accessibility**-related (PRM – all applicable regulations for all modes of transportation): Analysis of the related information and regulatory requirements for the non-discriminatory provision of transport services, where the integration of successive modes is considered.
- **Telematics Applications - Rail** (Telematics TSIs for Rail Passenger and Freight): Analyse the Technical Specifications for Interoperability regarding requirements for Open and Private data provision concerning Operations, Service Disruptions, Timetables, Reservation/Ticketing, etc.
- **Personal data protection and Privacy:** Analyse the legal background requirements regarding privacy and personal data protection along all steps of the multimodal travel chain. This is mostly applicable to the users of the IF Assets who will develop new products and services. Recommendations will be given for the application of such Regulations.

The result of the analysis is presented in the concluding part of the present report, and sorts out:

- current rules and regulations that shall be followed by the IF, in order to be compliant, especially, with European policies, and
- Standards that should be adhered to by the IF, for it to be embraced by implementors.

A "spinoff" from the analysis is the list of rules and regulations to be observed by implementors, but not directly affecting the IF. This "spinoff" will be further developed under deliverable 3.2.

Abbreviations and Glossary

Acronym	Definition
ADR	Alternative Dispute Resolution
CCM	Change Control Management
CEN	European Committee for Standardisation (French: Comité Européen de Normalisation)
CENELEC	European Committee for Electrotechnical Standardisation (French: Comité Européen de Normalisation Électrotechnique)
CER	Community of European Railway and Infrastructure Companies
CIRSRT	Computerised Information & Reservation System for Rail
CIV	Convention Internationale pour le transport des Voyageurs
CJEU	Court of Justice of the European Union
COTIF	Convention concerning International Carriage by Rail
CRS	Computerised Reservation System
EC	European Commission
ESO	European Standardisation Organisation
ETSI	European Telecommunications Standards Institute
EU	European Union
ERA	European Union Agency for Railways
IEEE	Institute of Electrical and Electronics Engineers
IF	Interoperability Framework as established under Shift2Rail IP4
IF Assets	The Interoperability Assets are the components that will be developed under Shift2Rail IP4 that will be reused for future development.
IM	Infrastructure Manager
IPR	Intellectual Property Rights
ISO	International Organisation for Standardisation
MS	Member State
NEB	National Enforcement Body
NSO	National Standardisation Organisation
ODR	Online Dispute Resolution
OWL	Web Ontology Language
PRM	Persons with Reduced Mobility Regulation (EC) No 1107/2006

PSC	Public Service Contract
RISC	Railway Interoperability and Safety Committee (RISC)
RU	Railway Undertaking
SDO	Standards Developing Organisation
SDR	Special Drawing Right
TAF-TSI	COMMISSION REGULATION (EU) No 1305/2014 of 11 December 2014 on the technical specification for interoperability relating to the telematics applications for freight subsystem of the rail system in the European Union and repealing the Regulation (EC) No 62/2006
TAP-TSI	Commission Regulation (EU) 2016/527 of 4 April 2016 amending Regulation (EU) No 454/2011 on the technical specification for interoperability relating to the subsystem 'telematics applications for passenger services' of the trans-European rail systems
TFEU	Treaty on the Functioning of the European Union
TSI	Technical Specifications for Interoperability for the trans-European Rail Network
UIC	International Union of Railways (French: Union Internationale des Chemins de Fer)
UITP	International Association of Public Transport (French: Union Internationale des Transports Publics)
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities
UNIFE	Association of the European Rail Industry (French: Union des Industries Ferroviaires Européennes)
WS	WebService
XML	eXtensible Markup Language
XSD	XML Schema Definition
WSDL	Web Service Definition Language
DCAT-AP	Data Catalogue Vocabulary (DCAT) Application Protocol
API	Application Programming Interface
SGML	Standard Generalized Markup Language

1. INTRODUCTION

This interim deliverable presents an analysis of some of the most relevant Regulations and Standards and Industry Initiatives that will impact the governance rules of the Interoperability Framework Assets. It has a focus on the transport and public administration domains, but also considers Regulations and Standards that are applicable to end-users of the Assets (i.e. developers of products and services as well as future IP4 development.) This document is produced within WP3 of the H2020 project GoF4R[1] (Governance of the Interoperability Framework for Rail and Intermodal Mobility).

This deliverable addresses the actual 'State of the Art' of the Regulatory Environment – namely, those Regulations and Standards that must be considered for establishing the governance rules for the IF Assets. The objective is not to present a comprehensive overview of EU legislation and standards in the transport or data privacy sectors, nor is it meant to comprise a complete legal catalogue of the existing laws and standards. It does, however, present the pertinent rules, regulations and standards that need to be taken into consideration for IF Asset compliance.

The final deliverable will take into consideration the possible future evolution of Regulations and Standards as well as providing a set of recommendations to be considered by end-users (and further development projects) with the IP4 Technologies, particularly supporting the Travel Companion.

1.1 METHODOLOGY

The methodology used to create this interim report was based on desk research that had been collected from different written sources (e.g. EU and national legislation, standardisation documents, research projects, etc.) and from the interaction with the ST4RT, Co-Active and ATTRACkTIVE partners. Furthermore, interaction and collaboration with the IT2RAIL partners and IP4 ecosystem was necessary to define the applicable scope for the governance of the IF Assets. Specific attention has also been given to the current and up-coming European regulatory framework. The interaction with the GoF4R and IT2RAIL partners has been supported by (but not limited to) formal and informal collaboration meetings.

The analysis of the collected information had been done with the help of the project partners, who have indicated, to the best of their knowledge, the relevance of each project regarding the GoF4R activities.

It is foreseen to conduct personal interviews with key Stakeholders within the Commission, the European Union Agency for Railways and other relevant Standards bodies and will be undertaken for the final analysis contained in Deliverable 3.2 (Final Report on the Regulatory Environment).

1.2 DOCUMENT CONTENT AND STRUCTURE

The body of the deliverable is a synthesis of the research that was conducted, with only the most relevant Regulations and Standards directly applicable to the Interoperability Framework. Others which indirectly impact the Interoperability Framework within the wider context of a European seamless travel and Multi-Modal Travel Information are presented in Annex I of GoF4R Deliverable

[1] http://www.gof4r.eu/

D4.1[2]. Annexes of the current deliverable contain supplemental research on topics that can be taken into consideration. The document and Annexes will be updated after consultation with WP5 and other stakeholders and will contain recommendations for future developers of the products and services which will use the IF.

Annexes have been added that contain the more extensive baseline research that has been conducted during the development of this deliverable. Those annexes are as follows:

Annex I	**Introduction to Standardisation**
Annex II	**Passenger with Reduced Mobility Rights**
Annex III	**Antitrust Legislation, parts 1 and 2**
Annex IV	**Passenger Rights in Railway and Inland Water Transport (European and Slovakian)**

The main body of the deliverable comprises:

Chapter 2 – Regulatory Impact on the Interoperability Framework: addressing the IF Assets, their composition, and their relationship between the Assets and their potential users.

Chapter 3 – Regulatory Environment: addressing the various Directives, Regulations and TSIs that relate directly to the IF Assets and their Governance. Each entry will address the scope, geographic coverage, stakeholders impacted, IF Assets that may be impacted (and how) and Governance implications.

Chapter 4 – Standardisation: addressing the various standards bodies and industry conventions that will be used by or relate directly to the IF Assets and their Governance. Where relevant, each entry will address the scope, geographic coverage, stakeholders impacted, IF Assets that may be impacted (and how) and Governance implications.

Chapter 5 – Conclusions and next steps

[2] IFG-WP4-D-CEF-036-03 D4.1 - INITIAL SEMANTIC INTEROPERABILITY TECHNOLOGY MARKET WATCH

2. REGULATORY IMPACT ON THE INTEROPERABILITY FRAMEWORK

2.1 UNDERSTANDING THE IF ASSETS

To do a fair analysis of the Regulatory impact on the IF, it is first necessary to understand the composition and purpose of the IF Assets that will need to be governed.

The fundamental objective of the IF is to provide the ability for heterogeneous systems to perform coordinated computational tasks distributed over a network. This entails that:

- The computational assumptions, purpose and intent of data, however they might be exchanged and *whatever* their format, must be "understood" by systems, i.e. both the data and *their interpretation* (or "semantics") must be available to machines. The *interpretation* must be *automated* without the need to embody it in computer code. There must be no need, therefore, to adapt computer code to work with any given data exchange mechanism or data representation of business concepts, phenomena or events.
- There must be minimal, possibly zero, need to *move* data before it is actually needed, and then *only* of the data that is actually needed for a given computational tasks

The IF developed within Innovation Programme 4 of Shift2Rail (IP4 - IT Solutions for Passenger Services) and its 'Lighthouse Project' IT2Rail realises the objective by providing specific tools and technologies that allow different actors engaged in transportation to describe explicitly and to share the *semantics* of their interactions. These tools and technologies are collectively called the "IF Assets" and provide the means to interpret the variety of data formats and protocols into information understandable by myriad proprietary business applications. enable developers to provide seamless mobility services, foster the development of multi-modal travel services.

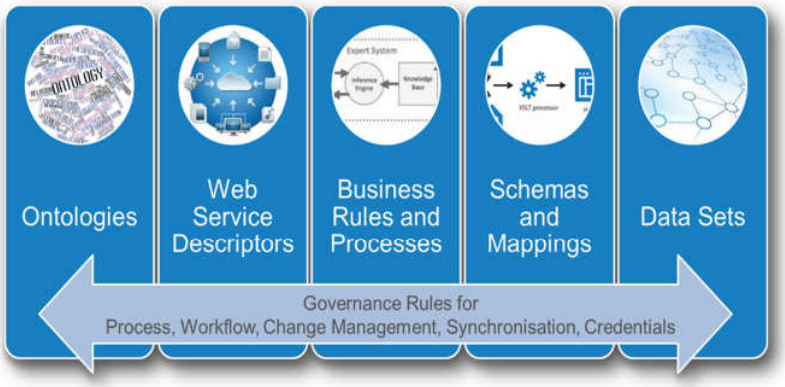


Figure 1- The IF Technology Assets

The following list contains a description of those assets:

- ***Ontologies***: formal specifications of shared conceptualizations of specific domains (or a part of them). An example is the IT2Rail ontology that is an OWL specification of the set of concepts and relationships among them that the IT2Rail partners have proposed as a conceptualization of the transportation domain.

- ***Web Service Descriptors***: metadata descriptions of the functionalities offered by specific Web services and their binding information. An example is a Travel Expert service descriptor that contains a pointer to the WSDL specification of the Travel Expert Web service and the

specification of the offered functionalities each described by a name, required/optional parameters, output, supported passenger categories and WS security protocol.

- ***Business Rules and Processes***: inference rules and processes that characterize a specific standard and/or a system adopting it. An example is the business process enabled by the Full-Service Model (FSM) specification where the booking of a railway ticket is articulated into three main steps named offering, pre-booking and booking.

- ***Schemas and Mappings***: are schemas or mappings between schemas/ontologies aiming at supporting the technical interoperability between services/systems in the transportation domain adopting different standards. Examples are the UIC918 suite of standards in XSD Schema and its mappings against the IT2Rail ontology.

- ***Data Sets***: data sets associated with their semantics, i.e. "annotated" semantic graphs, providing certain specific information of the transportation domain that needs to be shared by all actors engaged in distributed computational task, e.g. coding conventions used for common objects, such as Stop Places, by different systems or transportation modes. This asset type presents two levels to be managed and governed: the semantics of the dataset and the data included into the dataset. An example of this asset type is a NeTEx dataset containing Stop Places of a specific transportation mode and it is described by means of a DCAT-AP metadata description annotated with the common ontology.

To promote the market uptake of the IF, the governance must create confidence amongst the diverse relevant actors (IF assets customers and end users) by assuring stability, usability, update and by providing free, non-discriminatory access to the IF Assets. GoF4R aims at defining the governance of the IF to promote a large acceptance of the semantic web for transportation, thus encouraging the market uptake of the IF and boosting innovation while removing the barriers for new actors to enter the mobility market.

2.2 THE IF ASSET MANAGER AND REGULATORY COMPLIANCE

To be widely accepted the IF Assets should be accessible, usable, stable and updated as much as possible, and the workflow for versioning, review and publication should be managed. One of the objectives of the IF governance process that GoF4R will be to define a workflow that can be applied to each asset type.

Under the Shift2Rail Lighthouse project IT2RAIL, a tool has been established to manage and publish these assets. The IT2Rail Semantic Assets Manager, fully described in IT2Rail D1.2 "Semantic Web Service Registry", is the component devoted to governing the process of maintaining a shared repository of the mentioned asset types. It is an organized collection and storage of these assets, enhanced by tools to support a workflow process for review, versioning, approval and publishing of the assets. In more details, in the IF tools each asset extension contains a core component allowing business logic of an asset type to be altered with the use of several call-back methods, comprehending in particular the asset manager which is used to override the existing methods to handle the CRUD (create, read, update and delete) business logic of an asset type. One of the objective of the IF governance process that GoF4R will define concerns the design of this workflow that can be different for each asset type.

The following part of the document provides an overview of the existing regulation; it shall be noted, however, that most of it covers aspects not applying to the IF, such as the data exchange and the rights and duties of the involved actors. GoF4R specifically addresses the ***rules and processes*** which need to be applied to the functioning of the Asset Manager. Therefore, the asset manager respects all existing rules, regulations, laws and expectations that relate directly or indirectly to the IF assets.

For instance, it is imperative for the rail sector that the published base Ontologies be fully aligned with the semantic content of the TAF and TAP TSI technical documents[3] as published by the European Union Agency for Railways (ERA). It will be up to the Governance structure to assure that the Assets are compliant with myriad Regulations concerning Interoperability, Open Data, Copyright, Data Privacy, Anti-Trust and applicability of Standards.

2.3 THE REGULATORY CHALLENGE

According to W3C, "To be effective and implementable, **rules, regulations, laws and expectations need to align with the technology** to which they are intended to apply. However, new technologies often allow novel communication means, where the causality, responsibility, speed of access, and distribution policies are widely different from those available in non-Internet communication. **A mismatch of governance and actual usage often leads to mandated requirements which cannot be easily and consistently interpreted**."[4]

Provided that it complies with European legislation applying to the various modes of transport, to be effective, the IF governance framework must match the technology and address only those obstacles that are within its authority (i.e. pertaining to the Assets, themselves.) The rationale behind GoF4R is to develop a lean framework based on a full analysis of ***how*** this technology will be used and by ***whom***. It is essential that the governance framework does not include new mandatory requirements that could hinder the expected market uptake of the IF.

Regulatory requirements such as privacy, copyright, accessibility and open data were considered in the analysis, with attention to making the IF components available and easy to deploy. The governance model and processes, as proposed, will create the environment for potential market uptake well beyond the lifecycle of the project by creating confidence in the quality and sustainability of the IF Assets.

2.4 APPLICABILITY TO THE IF

This deliverable will undertake to identify those pertinent Regulations and Standards which directly impact the governance of the IF Assets and develop compliance recommendations for Users of those Assets when deploying the IF in new products and services.

[3]Technical Documents for the TAP-TSI Baseline Version 1.3.0, http://www.era.europa.eu/Document-Register/Pages/TAP-TSI-Technical-Documents.aspx

[4] Larry Masinster, W3C Editor's Draft (https://www.w3.org/2001/tag/doc/governanceFramework-2012-07-19.html)

3. EUROPEAN REGULATORY FRAMEWORK

The Regulatory Framework that was considered in this deliverable comprises an analysis of those Regulations that have a direct impact on the IF and its assets. This chapter specifically addresses the **Regulations and Technical Specifications for Interoperability (TSIs)** that must be considered for developing the governance model, rules and processes applying to the European interoperable rail network. Below is a list of definitions of the elements comprising our research for the Regulatory Environment:

Directive

A "Directive" is a legislative act that sets out a goal that all EU countries must achieve. However, it is up to the individual countries to devise their own laws on how to reach these goals. One example is the EU consumer rights directive, which strengthens rights for consumers across the EU, for example by eliminating hidden charges and costs on the internet and extending the period under which consumers can withdraw from a sales contract.[5]

Regulation

A Regulation is generally defined as "A rule of order having the force of law, prescribed by a superior or competent authority, relating to the actions of those under the authority's control.[6]" Its application is mandatory within a certain domain and geographic area. Regulation can support legislation.

TSI

Technical specifications for interoperability (TSIs) mean the specifications by which each subsystem or part of subsystem is covered in order to meet the essential requirements and to ensure the interoperability of the European Community's high speed and conventional rail systems.[7]

In Europe, a Regulation is a kind of EU wide legislation which is mandatory in all Member States without modification – e.g. REGULATION (EU) 2016-2338 concerning the opening of the market for domestic passenger services by rail, while a Directive is another kind of EU legislation which provides a certain flexibility to Member States in the transposition of the legislation in their national legislation – e.g. DIRECTIVE (EU) 2016/797 on the Interoperability of the rail system within the European Union. A directive and in this case its relevant TSIs (Technical Specifications for Interoperability) leave the responsibility to Member States to define within certain guidelines the scope of application of the TSIs. For example, metro and tram/light rail are excluded from the scope of the TSI, but Member State can also exclude some parts of the mainline rail infrastructure or some regional/local rail rolling stock (and reversely some Member States can apply some TSIs to metro and/or tram/light rail lines).

[5] https://europa.eu/european-union/eu-law/legal-acts_en

[6] http://legal-dictionary.thefreedictionary.com/Government+regulation

[7] http://www.era.europa.eu/core-activities/interoperability/pages/technicalspecifications.aspx

3.1 RAIL DIRECTIVES

The main directive related to railway transport in Europe is the Directive on Interoperability, the DIRECTIVE 2008/57/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008, amended by Commission Directive 2011/18/EU, on the interoperability of the rail system within the Community. In its Annex II, the Directive identifies the subsystems of the railway system:

(a) structural areas:
- — infrastructure,
- — energy,
- — control-command and signalling,
- — rolling stock;

(b) functional areas:
- — traffic operation and management,
- — maintenance,
- — telematics applications for passenger and freight services.

For each subsystem (with the exception of maintenance), a specific Technical Specification for Interoperability (TSI) has been prepared, according to requirements defined in the Directive itself. They are now part of the regulatory framework. Especially relevant to GoF4R is the TAP (Telematic Applications for Passenger) and the TAF TSI (Telematic Applications for Freight). The reason that Freight is mentioned here is that the TAF TSI specifically deals with the operational solutions (i.e. Train delays, schedules, etc. that feed passenger information systems relying on the IF.

Some additional TSIs refer to specific aspects like Persons with Reduced Mobility.

The Directive also defines the Essential Requirements which need to be fulfilled. They include general requirements and requirements specific to each subsystem.

The essential requirements related to Telematic Applications for Freight and Passenger are:

Technical compatibility

The essential requirements for telematics applications guarantee a **minimum quality of service for passengers** and carriers of goods, particularly in terms of technical compatibility.

Steps must be taken to ensure:

- **that the databases, software and data communication protocols are developed in a manner allowing maximum data interchange between different applications and operators, excluding confidential commercial data**,
- **easy access to the information for users**.

Reliability and availability

The methods of use, management, updating and maintenance of these databases, software and data communication protocols must guarantee the efficiency of these systems and the quality of the service.

Health

The interfaces between these systems and users must comply with the minimum rules on ergonomics and health protection.

Safety

Suitable levels of integrity and dependability must be provided for the storage or transmission of safety-related information.

Requirements relevant to GoF4R have been highlighted.

In 2019, Directive 2008/57/EC will be finally repealed and replaced by the new Directive:

DIRECTIVE (EU) 2016/797 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on the interoperability of the rail system within the European Union

This directive fully excludes "urban rail" from its scope of application, while before it was only optional for Member States. As regard the European interoperable rail network, the envisaged subsystems are the same, apart from splitting the control-command and signalling subsystem:

— trackside control-command and signalling,

— on-board control-command and signalling,

The essential requirements are basically the same, but it is worth to mention the new essential requirement Accessibility, which is also relevant to GoF4R. In general, the requirement states:

The 'operations' and 'telematics applications for passengers' subsystems must provide for the necessary functionality required to facilitate access for persons with disabilities and persons with reduced mobility on an equal basis with others by way of the prevention or removal of barriers, and by way of other appropriate measures.

In the case of the Telematics Applications for Passenger services, it states:

Appropriate steps must be taken to ensure that telematics applications for passenger subsystems provide for the necessary functionality required to ensure accessibility for persons with disabilities and persons with reduced mobility.

This new essential requirement will have an impact in the revised version of the TAP TSI and possibly on the PRM TSI. The following new requirement related to the Rolling Stock subsystem about Safety is also relevant:

Passengers must be given easily understandable and comprehensive information about rules applicable to them both in railway stations and in trains.

3.2 REGULATIONS ON PASSENGER RIGHTS

Due to the distinct characteristics of the different transport modes and their markets, both for the industries (differences in company size, revenues or number of routes) and passengers (differences in length, price and conditions of the trip), the precise contents of these rights vary, but the typology of rights guaranteed by the existing regulations for transport by air, rail, sea and inland waterway and bus and coach are comparable, although with specific provisions for local public transport. *A European Vision for Passengers: Communication on Passenger Rights in all transport modes* provides an overview of the rights that apply to all modes:

1 Right to non-discrimination in access to transport
2 Right to mobility accessibility and assistance at no additional cost for disabled passengers and passengers with reduced mobility (PRM)
3 Right to information before purchase and at the various stages of travel, notably in case of disruption
4 Right to renounce travelling (reimbursement) when the trip is disrupted
5 Right to the fulfilment of the transport contract (rerouting or rebooking) in case of disruption
6 Right to get assistance in case of long delay at departure or at connecting points
7 Right to compensation
8 Right to carrier liability towards passengers and their luggage
9 Right to a quick and accessible system of complaint handling
10 Right to full application and effective enforcement of EU passenger rights.[8]

Currently, EU passenger rights apply independently to each transport mode under a single contract of carriage. Passenger rights are not guaranteed if a disruption occurring during one segment of the journey affects the next leg of the trip, if the latter is operated with another transport mode – even if the passenger has booked the whole trip as a single contract. BEUC, the European Consumer Organisation, has listed the following problems as most common regarding multimodal journeys:

Figure 2 Passenger Rights

- Missed connections due to delays that occurred in the first segment of the trip;
- Lack of assistance for passengers in cases of missed connections;
- Consumers are not sure who to complain to in case something goes wrong during their multimodal journey;
- Problems with checking-in after changing the mode of transport;

[8] COM(2011) 898 final: A European Vision for Passengers: Communication on Passenger Rights in all transport modes

- Timetables not matching and not adapted to the passenger's change of transport mode;
- Lack of cooperation or sufficient exchange of information between operators responsible for different segments of the multimodal journey;
- Lack of efficient cooperation between the national authorities dealing with the enforcement of passenger rights;
- Lack of information that is complete allowing consumers to easily compare different offers (total cost of the trip, its duration, possibility to cancel or modify the trip etc.);
- Often information on travel schedules and fares provided to consumers is not complete.[9]

In addition, assistance to passengers with a disability or with reduced mobility is not guaranteed during multimodal connections. The EC acknowledges these issues and is therefore examining different policy options to better protect passengers in the EU when using multimodal transport:

Option 1: Self-regulation ("codes of good conduct" or "codes of good practices")
Option 2: Soft laws, guidance and recommendations
Option 3: New legislative instrument defining the respective scope of application of modal passenger rights Regulations in case of multimodal transport
Option 4: New rules specific to multimodal journeys (legislative instrument).[10]

[9] BEUC (2017): Multimodal journeys. How to make sure passengers are better protected?

[10] An impact assessment study was launched in 2016, followed by an open public consultation and a targeted consultation of professional stakeholders.

3.2.1 (Air) Common Rules on Compensation and Assistance

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°261/2004	Air[11]	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 261/2004 establishes minimum rights for passengers when they are denied boarding against their will or when their flight is cancelled or delayed.

The Regulation applies to flights departing from any airport situated in the EU, and to flights from a third country to an EU airport, if operated by an EU carrier.[12]

It contains the following provisions:

> **Information:** Passengers have the right to be informed on their passenger rights[13] and the contact details of the National Enforcement Bodies (NEB)s.
>
> **Denied boarding, delay or cancellation**: If passengers are denied boarding[14] or their flight is cancelled, they have the right to choose between re-routing or a refund. In case of long (at least 5 hours) delays, passengers may also opt for a refund. A refund must be paid within 7 days and, where relevant, includes a free journey back to the initial departure point. Re-routing should be offered under comparable travel conditions at the earliest opportunity or at a later date of the passenger's convenience at no extra cost. In some cases, (delay of two hours or more, depending on flight distance[15]) passengers may be entitled to additional

[11] COM (2013) 130 final: Where a part of the journey is carried out, in accordance with a contract of carriage, by another mode of transport or by helicopter, this Regulation shall apply for the whole journey and the part of the journey carried out by another mode of transport shall be considered as a connecting flight.

[12] Provided that passengers have a confirmed reservation and present themselves on time for check-in. The Regulation does not apply to passengers that travel for free or at a reduced fare not (in)directly available to the public; or if passengers have already received benefits (compensation, re-routing, assistance) under relevant law of a non-EU country.

[13] A printed or electronic notice must be clearly displayed at the airport check-in desk and be shown at check-in kiosks in the airport and online. If passengers were denied boarding, their flight was cancelled, or they experienced a delay of more than 2 hours at departure or arrive with a long delay at their final destination, the operating carrier must give them a written notice describing the rules for compensation and assistance.

[14] The carrier must first call for volunteers to surrender their seats in exchange for benefits. If there are not enough volunteers, the carrier may deny boarding to passengers against their will.

[15] 2 hours or more (flights of 1.500km or less), 3 hours or more (intra-EU flights of more than 1.500km and all other flights between 1.500 and 3.500km) and 4 hours or more (all other flights)

assistance such as meals and refreshments, access to communication (two free phone calls, telex or fax messages, or e-mails) and, if necessary, accommodation.[16]

Compensation: In addition, passengers may be entitled to a financial compensation of between €250 and €600[17] – depending on flight distance and length of delay – if they are denied boarding, if the flight was cancelled or if it arrives more than 3 hours late at the final destination.[18] There will be no compensation if the cancellation (or long delay) is due to extraordinary circumstances (e.g. bad weather), if passengers were informed at least 2 weeks beforehand or if the carrier offered them an alternative flight with a similar schedule.

Upgrading and downgrading: If an air carrier places a passenger in a lower class than indicated on the ticket, the passenger is entitled to reimbursement of part of the ticket price.[19] If a passenger is placed in a higher class, he/she may not be charged extra.

Complaints: Passengers should first contact the airline or airport (and submit an air passenger rights EU complaint form). If the issue is not resolved, they can contact the NEB. If needed, they can also pursue the matter through alternative dispute resolution or in court.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The Regulation requires Member States to designate national enforcement bodies (NEBs) to enforce it and to lay down effective, proportionate and dissuasive penalties in their national law. Passengers may submit complaints about alleged infringements to the NEB.

The Commission Communication of 11 April 2011 showed how the provisions of the Regulation were being interpreted in various ways, due to grey zones and gaps in the text, that enforcement varied between Member States, and that it is difficult for passengers to assert their individual rights. The proposal for an amendment (2013) introduces the following changes:

- Better definition of 'extraordinary circumstances'
- Right to compensation in case of long delays (cf. Sturgeon case)
- Time threshold for compensation (cancellation or long delay) increased to 5 hours for intra-EU flights and to 5/9/12 hours depending on the distance for extra-EU journeys
- Right to re-routing (after a delay of 12 hours) on other carriers or transport modes, if needed
- Single time threshold for the right to care (2 hours for flights of all distances)
- Missed connecting flight: right to care and (in case of a single contract) compensation

[16] The right to accommodation includes transport to and from the airport and the place of accommodation.

[17] 250€ for all flights of 1.500km or less; 400€ for all intra-EU flights of more than 1.500km and all other flights between 1.500 and 3.500km; 600€ for all other flights. These amounts may be reduced by 50% if the delay in arrival (after re-routing) does not exceed 2 hours (flights of 1.500km or less), 3 hours (intra-EU flights and all other flights between 1.500 and 3.500km) or 4 hours (all other flights). The Regulation provides no deadline to pay compensation.

[18] The CJEU (Sturgeon case) has ruled that passengers whose flight arrival is delayed by at least three hours also have a right to compensation – even though Regulation 261/2004 did not explicitly include compensation for delays.

[19] Reimbursement – 30% of the ticket price (flights of 1.500km or less), 50% (intra-EU flights of more than 1.500km and other flights between 1.500 and 3.500km), 75% (all other flights) – must be paid within 7 days.

- Rescheduling with a notice of less than 2 weeks: similar rights to delayed passengers
- Right to disembark after 5 hours of tarmac delay
- Partial ban of the 'no show' policy (denied boarding to passengers who do not take the outward journey of a return flight)
- Right to information about a disruption as soon as that information is available
- Promotion of out-of-court complaint handling (ADR)
- Extension of the role of NEBs to monitor compliance with Regulation 2027/97 (and the Montreal Convention): claims for delayed, lost or damaged baggage
- Enhanced coordination and exchange of information between NEBs
- Right to information, at reservation, about the airline's complaint handling procedures
- Promotion of electronic means to submit complaints
- Deadline for airlines to respond to complaints set at 2 months
- Airlines may limit the cost of accommodation in case of major disruptions to three nights and 100€/night per passenger – except for PRM
- No obligation to provide accommodation in case of flights of less than 250km on aircrafts with max. 80 seats (other than connecting flights) – except for PRM
- Obligation for airports and airlines to set up contingency plans to optimise care and assistance to stranded passengers
- Obligation for airlines to correct spelling mistakes free of charge up to 48h before departure
- Right to full compensation for loss of or damage to mobility equipment (by compelling air carriers to automatically offer the option to make a special declaration of interest – for free)
- More transparency with regard to baggage allowances (at booking and at the airport)
- Measures with regard to the carriage of musical instruments
- Liability limits are adapted in accordance to general price inflation.

The proposal is currently being examined by the EU legislature. In the meantime, the Commission has issued Interpretative Guidelines (2016) to facilitate and improve the application of the Regulation in the short term and to promote best practices, taking into account case-law that has had a decisive impact on the interpretation of the Regulation.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

3.2.2 (Air) Carrier liability in the event of accidents

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°889/2002, amending Council Regulation (EC) N°2027/92	Air	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulations 889/2002 and 2027/92 deal with air carrier liability in the event of accidents:

Liability towards passengers: There are no financial limits to liability for passenger injury or death. For damages up to 100 000 SDRs, the carrier cannot contest claims. Above that amount, it can defend itself by proving it was not negligent or at fault. The carrier must make an advance payment to cover immediate economic needs.

Liability in case of delays: The carrier is liable for damage in case of delay unless it took all reasonable measures to avoid the damage or it was impossible to take such measures. Liability is limited to 4 150 SDRs for passenger delay and 1 000 SDR for baggage delay.

Liability towards luggage: The carrier is liable for destruction, loss or damage to baggage up to 1 000 SDRs: for checked baggage even if not at fault, unless the baggage was defective; for hand luggage only if at fault. If travelling with expensive items, passengers may, for a fee, request a higher compensation limit. To do this, they should make an advance declaration to the airline at the latest when they check in.

Complaints: To file a claim for lost or damaged luggage, passengers should write to the airline within 7 days, or within 21 days of receiving their luggage if it was delayed. Actions to claim damages must be brought to court within two years.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

MS are not required to establish NEBs to ensure the correct application of this Regulation (contrary to other passenger rights regulations). However, the proposal for an amendment (2013) foresees that the role of NEBs that currently monitor compliance with Regulation 261/2004 should be extended to include claims for delayed, lost or damaged baggage. The proposed amendment also introduces the following changes:

- Right to full compensation for loss of or damage to mobility equipment for passengers with a disability or PRM (by compelling air carriers to automatically offer the option to make a special declaration of interest – at no additional cost)
- Liability limits adapted in accordance to general price inflation.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

3.2.3 (Air) Common rules for the operation of air services

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°1008/2008	Air	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 1008/2008 defines common rules for the operation of air services in the EU. It regulates the licensing of Community air carriers and the pricing of intra-Community air services. Article 23 deals with information and non-discrimination.

> **Non-discriminatory contract conditions:** When buying a ticket, passengers may not be charged a higher price because of their nationality or where they are buying the ticket from.
>
> **Pricing:** The published fare shall include the applicable air fare as well as any taxes, charges, surcharges and fees that are unavoidable and foreseeable. The final price shall at all times be indicated and details must be given on its components. Optional price supplements shall be communicated clearly at the start of the booking process and their acceptance by the customer shall be on an 'opt-in' basis.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

3.2.4 (Air) Community list of air carriers subject to an operating ban

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°2111/2005	Air	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 2111/2005 provides rules on the establishment of a Community list of air carriers which, for safety reasons, are subject to an operating ban in the Community; and on informing air passengers of the identity of the air carrier operating the flights on which they travel.

> Ticket sellers, tour operators and travel agents must **inform passengers** which airline is planned to be used for their travel when they make their bookings. Passengers must be informed of any changes as soon as possible and, at the latest, at check-in or when boarding. They are entitled to reimbursement or re-routing if the airline is placed on the banned list after they make their booking.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

3.2.5 (Air) Code of Conduct for computerised reservation systems

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°80/2009	Air (+rail)	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 80/2009 sets out a harmonised Code of Conduct for computerised reservation systems (CRS) to ensure fair competition and protection of consumers' rights. It applies to air transport (and rail transport when combined with a flight) and addresses the following key points:

- System vendors may not attach any unfair or unjustified conditions on airlines or on their own subscribers; or prevent an airline from using other reservation systems.
- System vendors must display available services and fares in a non-discriminatory way and load and process data provided by airlines with equal care and timeliness.
- They must clearly indicate the extent of a capital holding they have in an airline or vice versa.
- They must clearly indicate in the display airlines that are banned from operating in the EU.
- The Regulation also prescribes that personal data may only be processed for the purposes for which they were given (i.e. making a reservation or issuing a ticket).[20]

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

In 2009, the Commission adopted an explanatory note explaining how it interprets the concept of a 'parent carrier' which may have a decisive influence on the running of the system vendor's business.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

[20] Computerised air ticket reservation systems – Summary of Regulation (EC) 80/2009

Associated Legislation and Conventions

The Montreal Convention (Convention for the unification of certain rules for international carriage by air, 2001) applies to all international carriage of persons, baggage or cargo. Regulation N° 2027/97 lays down the obligations of Community air carriers in relation to liability in the event of accidents to passengers. Regulation (EC) N° 889/2002 amends Coun cil Regulation (EC) N° 2027/97, aligns it with the provisions of the Montreal Convention and extends the application of the Convention's rules to air services provided within the territory of a Member State.

Passengers who travel by air as part of a package trip enjoy additional rights under Directive (EU) No 2015/2302 on package travel and linked travel arrangements.

The EC has encouraged airlines and airports to prepare voluntary commitments[21] to improve their quality of service.

[21] Airport Voluntary Commitment on Air Passenger Service – Airline Passenger Service Commitment on Air Passenger Service

3.2.6 Rail

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°1371/2007	Rail	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

EU rail passenger rights generally apply to all rail journeys within the EU. National governments can decide to exempt domestic rail services (regional, urban, suburban transport) and international services that start or finish outside the EU. Nonetheless, certain provisions are mandatory for all kinds of railway services within the EU.[22]

It contains the following provisions:

Information: Passengers have the right to be informed on their passenger rights, contact details of the NEBs and conditions of access for PRM and disabled persons. Passengers must also be informed comprehensively on applicable transport conditions, both pre-journey (general contract conditions, fastest trip and lowest fares, facilities for PRM, possibility to take bicycles, services on board, first and second class, possibility to file complaints and to reclaim lost luggage, information on disruptions and delays) and during the journey (services on board, next station, main connecting services, delays, security and safety issues).

Non-discriminatory contract conditions: When buying a ticket, passengers may not be charged a higher price because of their nationality or where they are buying the ticket from.[23] The Regulation also specifies how railway undertakings shall distribute tickets[24] and which information should be included on the ticket and luggage registration voucher. In order to

[22] MS may grant an exemption: to purely domestic railway traffic (for a period of five years, which may be renewed twice); to urban, suburban and regional services; to rail services of which a significant part is operated outside the EU (for a period of five years, which may be renewed). During the first five years of application, MS granted extensive exemptions and only small improvements are expected in the near future (COM (2015) 117 final). The following provisions apply to all railway traffic within the EU: rules on availability of tickets, through tickets and reservations (Art 9); liability of railway undertakings for passengers and their luggage (Art 11); minimum level of insurance for railway companies (Art 12); right to transport of PRM (Art 19); information on accessibility of rail services (Art 20(1)); and obligations on passengers' personal security (Art 26).

[23] This is not explicitly mentioned in the rail passenger rights Regulation (contrary to other modes), but (direct or indirect) discrimination on grounds of nationality is contrary to article 18 TFEU.

[24] I.e. at least via one of the following: ticket offices or selling machines; telephone, Internet or any other widely used IT; on board trains. For PSC services: at least via one of the following: ticket offices or selling machines; on board trains. Tickets should be offered on board, unless this is not possible for reasons relating to security, antifraud policy, compulsory train reservation or reasonable commercial grounds. Where available, through tickets and reservations should be offered.

provide information and to issue tickets, railway undertakings and ticket vendors should use CIRSRT (Computerised Information and Reservation System for Rail Transport).

Delay or cancellation: If a train is delayed or cancelled, passengers have the right to adequate and timely information.[25] In case of a delay at arrival of more than 1 hour, passengers have the right to choose between re-routing – at the earliest opportunity or at a later date of their choice, under comparable conditions, at no extra cost – or a refund (sometimes in full, sometimes only for the part of the journey not made). A refund, where relevant, includes a free journey back to the initial departure point. Passengers must also be offered additional assistance such as meals and refreshments[26] and, if necessary, accommodation. At the request of the passenger, the railway undertaking shall certify on the ticket that the service has been delayed, cancelled or has led to a missed connection.

Compensation: If passengers decide to continue their journey in spite of delay, or accept alternative transport, they may be entitled to a financial compensation of 25% to 50% of the ticket price – depending on the length of delay.[27] If they were informed of a delay before buying the ticket, they will not receive compensation. The CJEU has ruled that the exception of 'force majeure' does not apply for rail.[28]

Liability towards passenger and luggage: If a passenger is injured or killed in a train accident, they (or their dependants) are entitled to compensation, with an advance payment within 15 days cover immediate needs.[29] If registered luggage is lost or damaged during the trip, passengers have a right to compensation, unless it was inadequately packed, unfit for transport or had a special nature.[30] If a passenger is killed or injured in a train accident, they (or their dependants) are entitled to compensation for lost or damaged hand luggage (registered or not).[31] In other cases, the carrier is not liable for loss of or damage to hand luggage, unless the passenger proves it is due to the fault of the carrier.

[25] They must be informed of a delay or cancellation as soon as possible.

[26] In relation to the waiting time, and provided that they are available or can reasonably be provided

[27] 25% in case of a delay of 1-2 hours, 50% in case of a delay of more than 2 hours. Passengers with a travel pass or season ticket may also request compensation for recurrent delays. Carriers may introduce a minimum threshold to pay compensation (that may not exceed 4EUR). Compensation must be paid within 1 month in vouchers and/or other services (if conditions are flexible) or, in money if the passenger requests it.

[28] However, the Commission is examining the possibility to give the rail sector the same treatment as other modes, i.e. not to compensate passengers for delays caused by extraordinary circumstances.

[29] The carrier is not liable if the accident is caused by circumstances not connected with the operation of the railway or by the behaviour of a third party, which the carrier could not avoid; or due to the fault of the passenger. The amounts of damages are to be determined in accordance with national law.

[30] If they can prove the value: up to 1.300EUR per piece; if they can't prove the value: 330EUR per piece

[31] Up to a maximum of 1.500EUR

Complaints: Passengers should first contact the railway company, who must have a complaint handling system in place.[32] If the issue is not resolved, they can contact the NEB. If needed, they can also pursue the matter through alternative dispute resolution or in court.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The Regulation requires Member States to designate national enforcement bodies (NEBs) to enforce it and to lay down effective, proportionate and dissuasive penalties in their national law. Passengers may submit complaints about alleged infringements to the NEB.

The Report on the Application of Regulation 1371/2007 (COM(2013) 587 final) concluded that the overall application of the Regulation is satisfactory, but that the extensive use of exemptions is a serious obstacle to fulfilling its objectives and that enforcement is lagging behind in some MS.

The EC envisages to revise the rights of railway passengers and started the process by issuing the Regulation proposal 2017/0237 as a draft. The current proposal aligns rail with general aspects of passenger rights on other modes and addresses five main issues:

- Uniform application of the rules (long distance domestic and cross-border urban, suburban and regional services can no longer be exempted)
- Information (improved information on passenger rights, e.g. by printing it on the ticket; passengers using connected services must be informed whether these rights apply to the whole journey or only to each segment separately) and non-discrimination (discrimination on the basis of nationality or residence is explicitly prohibited)
- Strengthening the rights for persons with disabilities or reduced mobility (mandatory right to assistance, full compensation for loss or repair of mobility equipment, provision of information in accessible formats, disability awareness training for rail staff)
- Enforcement, complaint-handling procedures and sanctioning (clear deadlines for complaint handling and responsibilities/competences of NEBs)
- Proportionality and legal fairness (a "force majeure" clause: railway companies will not be obliged to pay compensation in case of delays caused by natural disasters).

The Commission's proposal must now be examined and shall be amended – following the normal EU process for EU legislation - before adoption by the European Parliament and the Council (i.e. the EU Member States)[33].

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs,

[32] The carrier has to notify the passenger within 1 month of receipt of the complaint; and has to provide the passenger with a final reply within 3 months of receipt of the complaint.

[33] Cf. https://ec.europa.eu/transport/themes/passengers/news/2017-09-28-european-commission-modernises-european-rail-passenger-rights_en

ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms and eventual updates to the Regulation.

Associated Legislation and Conventions

Regulation (EU) N°1371/2007 builds on the existing system of international law contained in Appendix A, "Uniform rules concerning the Contract for International Carriage of Passengers and Luggage by Rail (CIV)" to the Convention concerning International Carriage by Rail (COTIF) of 9 May 1980, as modified by 1999 Protocol. Except where MS decide to opt for derogations, the Regulation extends the scope of this Convention, which makes reference only to international railway services, to domestic and urban, suburban and regional rail passengers' transport services, provided by railway undertakings[34] licensed in accordance with Directive 95/18/EC.[35]

More detailed requirements regarding the provision of travel information are set out in the technical specifications for interoperability (TSIs) referred to in Regulation (EU) N°454/2011.

Passengers who travel by rail as part of a package trip enjoy additional rights under Directive (EU) No 2015/2302 on package travel and linked travel arrangements.

[34] Most urban rail operators are not “railway undertakings” and are not licensed, so they are not covered by the legislation.

[35] Council Directive 95/18/EC of 19 June 1995 on the licensing of railway undertakings

3.2.7 Bus and Coach

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EU) N°181/2011	Bus and Coach	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 181/2011 covers the rights of passengers travelling by bus or coach. These rights mainly apply to regular (i.e. provided at specified intervals, along specified routes, with predetermined stopping points) long-distance (more than 250km) bus and coach services starting or finishing in an EU country. Some rights apply to all regular services.[36] Some also apply to 'occasional services'.[37] MS can decide to exempt (for 4 years, may be renewed once) purely domestic regular services and regular services where a large part of the route – including a scheduled stop – is outside the EU.[38] Most local bus services (by far the largest part of bus services) have to follow public service obligations and are exempted from this legislation: they have to cope with the rules of Regulation 1370/2007 on public passenger transport services by rail and by road.

It contains the following provisions:

Information: Passengers have the right to adequate information throughout their travel. This includes the right to be informed on their passenger rights and the contact details of the NEBs, and on conditions of access for PRM and disabled persons.

Non-discriminatory contract conditions: When buying a ticket, passengers may not be charged a higher price because of their nationality or where they are buying the ticket from. For long-distance trips (more than 250km), the carrier shall issue a ticket to the passenger (which may be in electronic format), unless other documents give entitlement to transport.

[36] Non-discriminatory transport conditions; PRM access at no additional cost, financial compensation for loss or damage to mobility equipment; travel information and information on passenger rights; complaint handling mechanism; NEBs

[37] Non-discriminatory transport conditions; provision of a ticket or entitlement; compensation and assistance in case of death, injury, loss or damage caused by accidents; financial compensation for loss or damage to mobility equipment. Occasional services are services where the group of passengers is constituted on the initiative of the customer or the carrier himself, provided that the service starts or finishes in an EU MS.

[38] COM (2016) 619 final: In 2015, 12 MS were applying exemptions of the first type; 13 MS were applying exemptions of the second type. These exemptions have expired on 28 February 2017 at the latest, and may be renewed once.

Delay or cancellation: If a (long-distance) bus/coach service is delayed or cancelled, passengers have the right to adequate and timely information.[39]

If a long-distance service (more than 250km) is cancelled, if departure is delayed for more than 2 hours, or in case of overbooking, passengers have the right to choose between re-routing – at the earliest opportunity under comparable conditions, at no extra cost – or a refund. A refund, where relevant, includes a free journey back to the initial departure point.[40] If a long-distance journey (more than 250km) was scheduled to last more than 3 hours and departure is delayed by at least 90 minutes, or cancelled, passengers are also entitled to additional assistance such as meals and refreshments[41] and, if necessary, accommodation.[42]

Compensation: If a long-distance service (more than 250km) is cancelled, if departure is delayed for more than 2 hours, or in case of overbooking, and the carrier fails to offer passengers the choice between re-routing or a refund, they have the right to claim not only a refund but also a compensation worth 50% of the ticket price.[43]

Liability in case of accidents: In case of injury or death resulting from a bus accident during a long-distance journey (more than 250km), passengers (or their successors) have a right to compensation. Passengers are also entitled to compensation if their luggage or other belongings are lost or damaged in a bus accident on a long-distance journey. For PRM, compensation for loss of or damage to wheelchairs or other mobility equipment will cover the full cost of replacement or repair. In case of accidents, where necessary, the carrier also has to provide immediate assistance: first aid, food, clothes, transport and accommodation[44]. Compensation in the case of accidents is not automatic; it must be claimed in national courts. Conditions and amounts are governed by national law.

Complaints: Passengers should first contact the carrier, who must have a complaint handling system in place.[45] If the issue is not resolved, they can contact the NEB. If needed, they can also pursue the matter through alternative dispute resolution or in court.

[39] They must be informed of a delay or cancellation no later than 30 minutes after the scheduled time of departure. The estimated departure time must be communicated as soon as that information becomes available. In case of a missed connection, the carrier or terminal should inform passengers of alternative connections.

[40] This provision does not apply if passengers have an 'open ticket' with no specified departure time, except for passengers who have a season ticket or travel pass. In those cases, payment shall be proportional to the full cost of the pass or ticket. Reimbursement shall be made within 14 days – in money, unless the passenger agrees to another form of reimbursement.

[41] In relation to the waiting time, and provided that they are available or can reasonably be provided

[42] Carriers are not obliged to provide accommodation if the delay was caused by severe weather conditions or natural disasters. They may limit accommodation to 2 nights, at a maximum rate of 80EUR per night.

[43] Compensation must be paid within 1 month.

[44] Accommodation may be limited to 2 nights and a maximum of 80EUR per passenger per night.

[45] The complaint must be sent to the carrier within 3 months; the carrier then has to notify the passenger within 1 month of receipt of the complaint; and has to provide the passenger with a final reply within 3 months of receipt of the complaint.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The Regulation requires Member States to designate national enforcement bodies (NEBs) to enforce it and to lay down effective, proportionate and dissuasive penalties in their national law. Passengers may submit complaints about alleged infringements to the NEB.

In January 2016, the Commission consulted various organisations representing passengers and the industry to evaluate the application of the Regulation. Passengers' representatives regretted the extensive use of exemptions (which makes it very difficult for passengers to know which rights they have in which MSs) and the fact that most of the Regulation's provisions apply only to long-distance regular services (which accounts for only a very small part of regular bus and coach journeys). The Report on the implementation of Regulation 181/2011 (2016) concluded there was no need for any amendments of the Regulation, but that the current Regulation should be applied more effectively.[46]

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

Associated Legislation and Conventions

Passengers who travel by bus or coach as part of a package trip enjoy additional rights under Directive (EU) No 2015/2302 on package travel and linked travel arrangements.

[46] COM(2016) 619 final

3.2.8 Maritime and Inland Waterway

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°1177/2010	Water	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 1177/2010 covers the rights of passengers when travelling by sea and inland waterway.

With some exceptions[47], the Regulation applies to passenger services where the port of embarkation is in a MS, passenger services from a port in a third country to an EU port if operated by an EU carrier, and cruise services[48] with a port of embarkation in the EU.

It contains the following provisions:

Information: Passengers have the right to adequate information throughout their travel. This includes the right to be informed on their passenger rights and the contact details of the NEBs, and on conditions of access for PRM and disabled persons.

Non-discriminatory contract conditions: Carriers shall issue a ticket to the passenger (which may be in electronic format), unless other documents give entitlement to transport. When buying a ticket, passengers may not be charged a higher price because of their nationality or where they are buying the ticket from.

Delay or cancellation: If the ship is delayed or cancelled, passengers have the right to adequate and timely information.[49] In case of a cancellation or a delay at departure of more than 90 minutes, they must be offered a choice between re-routing – at the earliest opportunity under comparable conditions, at no extra cost – or a refund. A refund, where

[47] The Regulation does not apply to small ships that can carry up to 12 passengers and/or have no more than 3 crew members, most historical ships, excursion and sightseeing ships other than cruises, and services that cover a distance of less than 500m one way. In addition, MS may exempt – provided that the rights of passengers are adequately ensured under national law – seagoing ships of less than 300 gross tons operated in domestic transport until 17 December 2014 and for an indefinite period of time passenger services covered by public service obligations, public service contracts or integrated services. However, none of the MS have made use of these exemptions (COM(2016) 274 final).

[48] Cruise ship passengers have no right to re-routing and reimbursement in case of cancelled or delayed departures and no right to compensation in case of delay in arrival.

[49] They must be informed of a delay or cancellation no later than 30 minutes after the scheduled time of departure. The estimated departure and arrival time must be communicated as soon as that information becomes available. In case of a missed connection, the carrier or operator should inform passengers of alternative connections.

relevant, includes a free journey back to the initial departure point.[50] Passengers will also be offered additional assistance such as meals and refreshments[51] and, if necessary, accommodation.[52] Such assistance is not due if the passenger is informed before purchasing the ticket or if the cancellation or delay is caused by the fault of the passenger.

Compensation: In case of a delay on arrival of at least 1 hour, passengers may be entitled to a compensation of 25% resp. 50% of the ticket price[53] (depending on the length of the delay and the length of the scheduled journey). If the delay is caused by weather conditions or extraordinary circumstances, if the passenger is informed before purchasing the ticket, or if the cancellation or delay is caused by the fault of the passenger, compensation is not due.

Complaints: Passengers should first contact the carrier or terminal operator, who must have a complaint handling system in place.[54] If the issue is not resolved, they can contact the NEB. If needed, they can also pursue the matter through alternative dispute resolution or in court.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The Regulation requires Member States to designate national enforcement bodies (NEBs) to enforce it and to lay down effective, proportionate and dissuasive penalties in their national law to sanction operators that breach it. Passengers may submit complaints about alleged infringements to the NEB. Where a MS has decided to exempt certain services, it will need to ensure that a comparable mechanism of enforcement of passenger rights has been put in place.

In its Report on the Application of Regulation 1177/2010 (2016), the Commission considers that overall implementation of the Regulation is satisfactory and that at this stage, no amendments are needed, even though the level of application varies significantly between MS and between carriers.[55]

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets

[50] The refund must be made within 7 days, in cash, by electronic bank transfer, bank order or bank cheque; or, if the passenger agrees, in vouchers and/or other services if the conditions are flexible.

[51] In relation to the waiting time, and provided that they are available or can reasonably be provided

[52] Accommodation may be offered on board or ashore (it then includes transport to and from the port terminal). The carrier is not obliged to offer free accommodation if the cancellation or delay is caused by weather conditions endangering the safe operation of the ship; and The carrier may limit the total cost of accommodation ashore to 80EUR per night per passenger, for a maximum of 3 nights.

[53] 25% if the delay in arrival exceeds 1-2-3-6 hours in case of a scheduled journey of up to resp. 4-8-24-more than 24 hours; 50% if the delay in arrival exceeds 2-4-6-12 hours in case of a scheduled journey of up to resp. 4-8-24-more than 24 hours. Passengers with a travel pass or season ticket may also request compensation for recurrent delays. Carriers may introduce a minimum threshold to pay compensation (that may not exceed 6EUR). Compensation must be paid within 1 month in vouchers and/or other services (if conditions are flexible) or in money if the passenger requests it.

[54] The complaint must be sent to the carrier within 2 months; the carrier has to notify the passenger within 1 month of receipt of the complaint; and has to provide the passenger with a final reply within 2 months of receipt of the complaint.

[55] COM(2016) 274 final

who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

3.2.9 Liability of carriers in the event of accidents by sea

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°392/2009	Water	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 392/2009 covers the rights of passengers travelling by sea in the event of accidents. The Regulation applies to all carriers in international carriage, and certain types of domestic carriage – provided that the ship is flying the flag of a MS or is registered in a MS; or the contract of carriage has been made in a MS; or the place of departure and/or arrival is in a MS.

It covers liability of the carrier in respect of passengers, their luggage and their vehicles, as well as mobility equipment, in the event of (shipping and non-shipping) accidents.

It contains the following provisions:

Information: The carrier must inform passengers on their rights in the event of accidents, prior to or on departure.

Liability towards passengers: In the case of injury or death resulting from an accident at sea, passengers (or their successors) have a right to compensation, except if the incident is due to extraordinary circumstances beyond the carrier's control. In case of a non-shipping accident, the passenger has to prove that it was caused by the carrier's fault or neglect.

Liability towards luggage: In case of luggage (cabin luggage, vehicles, other luggage) being lost or damaged in an accident at sea, passengers are entitled to compensation. For PRM, compensation for loss of or damage to wheelchairs or other such equipment will cover the full cost of replacement or repair. In case of a shipping accident, compensation is not due if the carrier proves that it occurred without his fault or neglect. In case of a non-shipping accident, the passenger has to prove that it was caused by the carrier's fault or neglect.

Advance payments: Passengers have a right to receive an advance payment from the carrier to cover immediate needs in case of injury or death caused by shipping accidents.

Complaints / claims: Claims for loss or damage during accidents at sea can be brought to court within 2 years. The passenger must inform the carrier in writing of damaged or lost luggage as soon as possible, at the latest within 15 days of disembarkation or delivery.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

Associated Legislation and Conventions

Regulation 392/2009 incorporates certain provisions of the 1974 Athens Convention (as amended by the 2002 Protocol) relating to the carriage of passengers and their luggage by sea. Carriers have the right to limit their liability for accidents in accordance with the International Convention on Limitation of Liability for Maritime Claims (1976), as amended by the 1996 Protocol.

Passengers who travel by ship as part of a package trip enjoy additional rights under Directive (EU) No 2015/2302 on package travel and linked travel arrangements.

3.2.10 Associated legislation on consumer protection

When buying goods and services anywhere in the EU (in this case, meaning the 28 MS + Iceland, Liechtenstein and Norway), consumer rights apply.[56]

Some provisions are also relevant with regard to travel services.

The Package Travel Directive (Directive 2015/2302) rules on package travel and linked travel arrangements cover not only traditional package holidays, but also give protection to consumers who book other forms of combined travel, such as flights plus hotel or car rental put together on a website or through linked websites.[57]

The following legislation on consumer rights may also be relevant:

- Consumer Rights Directive (Directive 2011/83/EU)
- Consumer Sales and Guarantees Directive (Directive 1999/44/EC)
- Unfair Contract Terms Directive (Council Directive 93/13/EEC)
- Price Indication Directive (Directive 98/6/EC)
- Unfair Commercial Practices Directive (Directive 2005/29/EC)
- Misleading and comparative advertising Directive (Directive 2006/114/EC).

With regard to dealing with infringements of existing (Passenger and Consumer) rights regulations, the following legislation is relevant:

- Consumer Protection Cooperation Directive (Directive 2006/2004)

[56] https://europa.eu/youreurope/citizens/consumers/shopping/index_en.htm and https://ec.europa.eu/info/consumers_en provides an overview

[57] Cf. https://ec.europa.eu/info/live-work-travel-eu/travelling-within-eu/package-travel-and-timeshare/package-travel-and-timeshare-policy-information_en for an overview

- Injunctions Directive (Directive 2009/22/EC).

In case of complaints or problems, consumers have a number of different options: informal dispute resolution, out-of-court procedures and formal legal action. The following EU legislation is relevant in this context:

- Alternative Dispute Resolution (Directive 2013/11/EU)
- Online Dispute Resolution (Regulation 524/2013)
- Small Claims Procedure (Regulation 861/2007).

3.3 REGULATION ON PROVISION OF EU-WIDE MULTIMODAL TRAVEL INFORMATION SERVICES

Regulation/Standard/Convention	Mode	Geographic Applicability
Commission delegated regulation - C(2017)3574	All	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	✓

Scope and Stakeholders

The Commission Delegated Regulation (EU)[58] (released on 31st May 2017) focuses on the priority action "provision of EU-wide multimodal travel information services" mentioned in the Directive 2010/40/EU[59]. It establishes the specifications necessary to ensure the accessibility, exchange and update of static and dynamic transportation data for the provision of multimodal information services in the European Union.

A by-product of the EU Digital Single Market Strategy, the Delegated Regulation establishes the necessary requirements to make available accurate and timely information across borders. Its objective is to "ensure the accessibility, exchange and update of travel information and traffic data and distributed journey planning for the provision of multimodal information services in the EU… The relevant stakeholders include transport authorities, transport operators, travel information service providers, infrastructure managers and transport on demand service providers, etc."

The objective is to support the interoperability and quality of multimodal information services across Europe. As such, it shall provide the framework to supply easily accessible and reliable information for travellers.

The relevant interoperability frameworks underpinning the Delegated Regulation include Directive 2007/2 EC[60] (INSPIRE Directive) which creates a EU-wide spatial data infrastructure to share information related to transport networks and the TAP-TSI, which is addressed in chapter 3.5.2.

[58] Commission Delegated Regulation (EU) C (2017) 3574 Final supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services. Available at: https://ec.europa.eu/transport/sites/transport/files/c20173574-multimodaltravelinformationservices-delegatedregulation.pdf

[59] Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:207:0001:0013:EN:PDF

[60] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1520958059859&uri=CELEX:32007L0002

Impacts and Considerations for the Governance of the IF Assets

There are two main policy aspects that need to be taken into consideration related to the IF Assets:

- **Data Exchange**: Where stakeholders continue to use national and/or proprietary formats for exchanging data, which hinders interoperability and system integration. The move toward legislation and industry-level standardisation must be considered, namely the use of TAP TSI for railways, INSPIRE for spatial data, Priority action 'B' for road and IATA for aviation. These standards, datasets and schemas must be included as IF Assets and should be monitored and updated continuously.

- **National Access Points**: The Regulation calls for the establishment of National Access Points:

  - (Article 3.1) "**Each Member State shall set up a national access point**. The national access point shall constitute a single point of access for users to at least the static travel and traffic data and historic traffic data of different transport modes, including data updates, as set out in Annex I[61], provided by the transport authorities, transport operators, infrastructure managers or transport on demand service providers within the territory of a given Member State."

  - (Article 4.4) "**APIs** that provide access to static travel and traffic data listed in Annex I via the national access point **shall be publicly accessible** allowing users and end-users to register to obtain access."

  - (Article 3.4) "**Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the metadata** in order to allow users to discover and use the datasets made accessible through the national access points".

    In its Article 4 on *Accessibility, exchange and re-use of **static** travel and traffic data*, the Regulation makes reference to several specifications and standards that shall have to be applied:

  - (Article 4.1): Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the static travel and traffic data and historic traffic data listed in point 1 of Annex I, of the different transport modes by using:
    a) for the road transport, the standards defined in Article 4 of Commission Delegated Regulation (EU) No 2015/962;
    b) for other transport modes, the following standards and technical specifications: NeTEx CEN/TS 16614 and subsequent versions, technical documents defined in Commission Regulation (EU) No 454/2011 and subsequent versions, technical documents elaborated by IATA or any machine-readable format fully compatible

[61] Annex 1 of Commission Delegated Regulation (EU) …/... supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services. Available at: https://ec.europa.eu/transport/sites/transport/files/c20173574-multimodaltravelinformationservices-delegatedregulation-annex.pdf

and interoperable with those standards and technical specifications;

c) for the spatial network the requirements defined in Article 7 of Directive 2007/2/EU.

- (Article 4.2): The relevant static travel and traffic data listed in point 1 of Annex I that are applicable to NeTEx and DATEX II shall be represented through minimum national profiles.
- (Article 4.3): Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the static travel and traffic data through the national access point in the required formats in line with the following timetable:
    a) for the travel and traffic data set out in point 1.1 of Annex I for the comprehensive TEN-T network, by 1 December 2019 at the latest;
    b) for the travel and traffic data set out in point 1.2 of Annex I for the comprehensive TEN-T network, by 1 December 2020 at the latest;
    c) for the travel and traffic data set out in point 1.3 of Annex I for the comprehensive TEN-T network, by 1 December 2021 at the latest;
    d) for the travel and traffic data set out in points 1.1, 1.2 and 1.3 of Annex I for the other parts of the Union transport network, by 1 December 2023 at the latest.

In its Article 5 on *Accessibility, exchange and re-use of **dynamic** travel and traffic data*, the Regulation makes reference to several specifications and standards that shall have to be applied:

1. (Article 5.1): Where the Member States decide to provide the dynamic travel and traffic data of different transport modes listed in point 2 of Annex I through the national access point, transport authorities, transport operators, infrastructure managers or transport on demand service providers shall use:
    a) for the road transport the standards defined in Articles 5 and 6 of Commission Delegated Regulation (EU) 962/2015,
    b) for the other transport modes: SIRI CEN/TS 15531 and subsequent versions, technical documents defined in Commission Regulation (EU) No 454/2011 or any machine-readable format fully compatible and interoperable with those standards or technical documents.

- (Article 5.2): The relevant travel and traffic data referred to in point 2 of Annex I applicable to SIRI and DATEX II shall be represented through minimum national profiles determined by Member States accessible through the national access point.

GoF4R will use the National Access Points as a use case in WPs 4 and 5 in order to publish the related datasets and manage the NAP access requirements.

3.4 REGULATIONS ON PERSONS WITH REDUCED MOBILITY (PRM)

People with a disability and PRM should get the same opportunities for travel as anyone else, at no extra cost

Persons with a disability and PRM can't be stopped from buying a ticket, making a reservation or getting on board of an airplane, train, bus, coach or ship because of their disability or reduced mobility – unless it is physically impossible or there are security concerns.

Disabled travellers or travellers with reduced mobility are generally[62] entitled to assistance, free of charge:

- getting on and off the train / bus / coach / airplane / ship
- on board during the journey
- at the airport, bus terminal, port or station before and after the journey.

In order to receive the necessary assistance, they should contact the transport company and explain which kind of assistance they need:

1. at least 48 hours before the journey when travelling by plane, train or ship
2. at least 36 hours before the journey when travelling by bus or coach.

Transport companies are not obliged to provide help with eating, taking medication etc. If a passenger with a disability needs this type of help, the carrier might require that they be accompanied by another person. In some cases, this companion may travel for free or at a reduced price.[63]

Associated Legislation and Conventions

In its Charter of Fundamental Rights, the EU has considered the accessibility of people with disabilities to be a fundamental right (Articles 21 and 26).

The EU has also ratified the United Nations Convention on the rights of persons with disabilities (UNCRPD).

The proposal for a European Accessibility Act aims to improve the functioning of the internal market for accessible products and services by removing barriers created by divergent legislation. It does not cover every product of service but focuses on computers, telephones, televisions, media services, ***transport***, banking services, e-books and e-commerce.

[62] With some exceptions or other provisions in some cases, especially for local public transport.

[63] Cf. https://europa.eu/youreurope/citizens/travel/transport-disability/reduced-mobility/index_en.htm

3.4.1 Rights of disabled persons and persons with reduced mobility when travelling by air

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°1107/2006	Air	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 1107/2006 covers the rights of disabled persons and persons with reduced mobility when travelling by air.

The Regulation applies to flights from and within the European Union (EU), as well as to flights from a third country to the EU, if operated by an EU carrier. It contains the following provisions:

Right to access to transport without any discrimination: Air carriers, ticket vendors and tour operators may not refuse to accept a reservation or embark persons with a disability or reduced mobility – unless this is strictly necessary to comply with safety requirements established by law (to meet these safety requirements, the carrier may request the person to be accompanied by someone to assist them), or if the aircraft is physically too small. In case of denied boarding, the person must immediately be informed of the reasons and has the right to reimbursement or re-routing (the right to re-routing or a return flight conditional upon safety requirements). Reasonable efforts must be made to offer an acceptable alternative.

Right to information: This includes the right to be informed on conditions of access for PRM and disabled persons. This information must be available in appropriate, accessible formats.

Right to special assistance: Disabled persons and PRM have the right to assistance, free of charge, getting on and off the plane, during the flight and in airports before and after the flight.[64] To get the best assistance, they should contact the airline, ticket seller or tour operator at least 48 hours before the trip[65] and present themselves at an agreed time ahead of the departure time at a designated point.

[64] The annexes to Regulation 1107/2006 list the types of assistance to be provided by airports and air carriers. Airlines do not have to provide help with eating, drinking, taking medication or using the toilet during the flight. If such assistance is needed, they may request that the person with a disability / reduced mobility be accompanied. It is recommended (but not obligatory) that such a companion travels for free or at a significantly discounted rate.

[65] Even if they have not done this, reasonable efforts should be made to provide assistance (SWD(2012) 171 final – Interpretative Guidelines on the application of Regulation 1107/2006). It is important to note that the Regulation does not impose an obligation to provide evidence of disability or reduced mobility.

Right to compensation for loss or damage to mobility equipment: If mobility equipment or assistive devices are lost or damaged while being handled at the airport or transported on board, the passenger shall be compensated according to international and national law.

Complaints: In case of problems while travelling, persons with disabilities or PRM should tell the airport or the air carrier concerned. If they are not satisfied with their reply, they can contact the NEB in the country where the incident happened.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The Regulation requires Member States to designate national enforcement bodies (NEBs) to enforce it and to lay down effective, proportionate and dissuasive penalties in their national law. Passengers may submit complaints about alleged infringements to the NEB.

In 2012, the European Commission published guidelines on the interpretation of the regulation. These addressed practical problems and uncertainties that remained for both air carriers and passengers with a disability or reduced mobility.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

The Semantic terminology contained in the PRM Regulation must be included in the Ontology(ies) for future use by applications for booking, traveling, etc.

Associated Legislation and Conventions

The proposal for a revision of Regulation 261/2004 and 2027/97 adds the right to full compensation for loss of or damage to mobility equipment (by compelling air carriers to automatically offer the option to make a special declaration of interest – at no additional cost).

3.4.2 Rail passengers' rights and obligations

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EU) N°1371/2007	Rail	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 1371/2007 covers the rights of passengers – including the rights passengers with a disability or reduced mobility – when travelling by rail. National governments can decide to exempt domestic rail services (regional, urban, suburban trains) and international services that start or finish outside the EU. Certain provisions are mandatory for all kinds of railway services within the EU provided that the transport services are operated by railway undertakings.[66]

Chapter V contains the following provisions:

Right to access to transport without any discrimination: Railway undertakings, ticket vendors and tour operators may not refuse to accept a reservation or to provide a ticket to persons with a disability or reduced mobility, nor may they require such persons to be accompanied by another person – unless this is strictly necessary to comply with the company's access rules. In case of denied boarding, the person must immediately be informed of the reasons and has the right to reimbursement or re-routing. Reasonable efforts must be made to offer an acceptable alternative. Tickets and reservations shall be offered to disabled persons and PRM at no extra cost.

Right to information: This includes the right to be informed on conditions of access for PRM and disabled persons. This information must be available in appropriate, accessible formats.

Right to special assistance: Disabled persons and PRM have the right to assistance, free of charge, getting on and off and changing trains, on board and at the station before and after the journey. In unstaffed stations, accessible information should be displayed on the nearest staffed station and available assistance. To get the best assistance, the disabled person or PRM should contact the railway company, ticket seller or tour operator at least 48 hours before the trip (where the ticket permits multiple journeys, one notification shall be sufficient) and present themselves at an agreed time (not more than one hour) ahead of the departure

[66] MS may grant an exemption: to purely domestic railway traffic (for a period of five years, which may be renewed twice); to urban, suburban and regional services; to rail services of which a significant part is operated outside the EU (for a period of five years, which may be renewed). The following provisions apply to all railway traffic within the EU: right to transport of PRM (Art 19); information on accessibility of rail services (Art 20(1)).

time at a designated point. Even if they have not done this, railway undertaking and station manager should still make all reasonable efforts to help them.[67]

Right to compensation for loss of or damage to mobility equipment: Where a railway undertaking is liable for loss of, or damage to mobility equipment or other specific equipment used by a disabled person or PRM, no financial limit is applicable.

Complaints: In case of problems while travelling, persons with disabilities or PRM should tell the station authorities or the railway company concerned. If they are not satisfied with their reply, they can contact the NEB in the country where the incident happened.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

The EC envisages to revise the rights of railway passengers. The Regulation proposal 2017/0237 intends to strengthen the rights for persons with disabilities or reduced mobility (mandatory right to assistance, full compensation for loss or repair of mobility equipment, provision of information in accessible formats, disability awareness training for rail staff).

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

The Semantic terminology contained in the PRM Regulation must be included in the Ontology(ies) for future use by applications for booking, traveling, etc.

Associated Legislation and Conventions

Railway undertakings and station managers should take into account the needs of disabled persons and persons with reduced mobility, through compliance with the PRM TSI.

[67] This is, contrary to other modes, not explicitly mentioned in the rail passenger rights Regulation, but is included in the Interpretative Guidelines (COM(2015) 4089 final).

3.4.3 Rights of passengers in bus and coach transport

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EU) N°181/2011	Bus and Coach	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 181/2011 covers the rights of passengers – including the rights of disabled passengers and passengers with reduced mobility – when travelling by bus and coach. For bus, most provisions apply to services operated on more than 250 km long lines. In addition, MS may exempt domestic regular services from these provisions, provided that the level of protection of disabled persons and PRM under national rules is at least the same as under the Regulation.

Chapter III contains the following provisions:

Right to access to transport without any discrimination: Carriers, travel agents and tour operators may not refuse to accept a reservation, provide a ticket or take on board persons on the grounds of their disability or reduced mobility – unless this is strictly necessary to comply with legal health and safety requirements, or where the infrastructure cannot guarantee safe transport. In such cases, coach and bus companies must allow PRM to be accompanied – free of charge – by a person of their choice to assist them. In case of denied boarding, the person must immediately be informed of the reasons and has the right to reimbursement or re-routing. Reasonable efforts must be made to offer an acceptable alternative. Tickets and reservations shall be offered to disabled persons and PRM at no extra cost.

Right to information: This includes the right to be informed on conditions of access for PRM and disabled persons. This information must be available in appropriate, accessible formats.

Right to special assistance:[68] MS are required to designate bus and coach terminals where passengers with disabilities or reduced mobility may receive appropriate assistance. Disabled persons and PRM have the right to assistance, free of charge, at such designated terminals and on board buses and coaches. They have to notify the ticket seller at the time of reservation of any special needs in terms of seating. For any other assistance they should notify the carrier or terminal operator at least 36 hours in advance and present themselves at an agreed time (not more than one hour) ahead of the departure time at a designated

[68] These rights only apply to long-distance journeys (more than 250km).

point. Even if they have not done this, the carrier and terminal operator still have to make all reasonable efforts to help them to board, alight and travel.

Right to compensation for loss of or damage to mobility equipment: Where a carrier or terminal operator has caused loss of or damage to mobility equipment, they have to pay a compensation corresponding to the replacement value or the costs relating to its repair. They must also make every effort to rapidly provide (temporary) replacement equipment.

Complaints: In case of problems while travelling, persons with disabilities or PRM should tell the terminal authorities or the bus company concerned. If they are not satisfied with their reply, they can contact the NEB in the country where the incident happened.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

The Semantic terminology contained in the PRM Regulation must be included in the Ontology(ies) for future use by applications for booking, traveling, etc.

Associated Legislation and Conventions

Regulation (EC) N° 661/2009 stipulates the accessib ility requirements that all new buses and coaches shall fulfil in order to authorize their sale, registration or putting into service within the EU.

3.4.4 Rights of disabled persons and persons with reduced mobility when travelling by sea or inland waterway

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) N°1177/2010	Water	Europe (28 MS + Iceland, Norway, Switzerland)

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓				✓	✓

Scope and Stakeholders

Regulation 1177/2010 covers the rights of passengers – including the rights of disabled passengers and passengers with reduced mobility – when travelling by sea and inland waterway.

Chapter II contains the following provisions:

Right to access to transport without any discrimination: Carriers, travel agents and tour operators may not refuse to accept a reservation, to provide a ticket or to embark persons on the grounds of their disability or reduced mobility. Tickets and reservations shall be offered at no extra cost under the same conditions as to other passengers. Carriers can ask persons with a disability or PRM to be accompanied by another person if necessary for safety reasons, or because of the way the ship or the port infrastructure are designed. This companion will travel for free. In case of denied boarding, the person must immediately be informed of the reasons and has the right to reimbursement or re-routing. Reasonable efforts must be made to offer an acceptable alternative.

Right to information: This includes the right to be informed on conditions of access for PRM and disabled persons. This information must be available in appropriate, accessible formats.

Right to special assistance: Disabled persons and PRM have the right to assistance, free of charge, getting on or off a ship, changing ships, on board and at the port. They have to notify the ticket seller at the time of reservation of any special needs in terms of accommodation, seating, assistance, or if they need to bring or medical equipment. For any other assistance they should notify the carrier or terminal operator at least 48 hours in advance and present themselves at an agreed time ahead of the embarkation time at a designated point. Even if they have not done this, the carrier and terminal operator still have to make all reasonable efforts to help them to board, disembark and travel.

Right to compensation for loss of or damage to mobility equipment: Where a carrier or terminal operator has caused loss of or damage to mobility equipment, they have to pay a compensation corresponding to the replacement value or the costs relating to its repair. They must also make every effort to rapidly provide (temporary) replacement equipment if needed.

Complaints: In case of problems while travelling, persons with disabilities or PRM should tell the port authorities or the carrier concerned. If they are not satisfied with their reply, they can contact the NEB in the country where the incident happened.

Governance Rules and Change Management Processes

Follows the normal EU Regulatory change management Process and has limited impact on the IF Assets.

Impacts and Considerations for the Governance of the IF Assets

The Regulation does not have a direct impact on the IF Assets as it affects the carriers and those providers who must comply with the terms of the legislation. Therefore, it is the users of the IF Assets who need to be cognisant of the terms within the Regulation. This applies to carriers, entrepreneurs, ticket vendors and service providers who will be using the Assets (including new IP4 development.) It may be possible to codify and publish the rules as a part of the data sets. The aforementioned stakeholders will be responsible for making sure that they are in compliance with the terms of and eventual updates to the Regulation.

The Semantic terminology contained in the PRM Regulation must be included in the Ontology(ies) for future use by applications for booking, traveling, etc.

Associated Legislation and Conventions

The following EU legislation also regulates several aspects of the accessibility of persons with disability or reduced mobility to ships: Directive 2009/45/EC on safety rules and standards for passenger ships, Directive 1999/35/EC on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services and Directive 98/41/EC on the registration of persons sailing on board passenger ships operating to or from ports of the Member States of the Community.

3.5 TECHNICAL SPECIFICATIONS FOR INTEROPERABILITY (TSI)

The Technical Specifications for Interoperability (TSIs) are specifications that are maintained by the ERA. They consist of the rules, procedures and data definitions to ensure the interoperability of the European high-speed and conventional Rail system.

Of interest to GoF4R are the two TSIs for Telematics Applications:

- TAP-TSI: applications for passenger services, including systems providing passengers with information before and during the journey, reservation and payment systems, luggage management and management of connections between trains and with other modes of transport;
- TAF-TSI: applications for freight services, including information systems (real-time monitoring of freight and trains), marshalling and allocation systems, reservation, payment and invoicing systems, management of connections with other modes of transport and production of electronic accompanying documents.[69]

Although GoF4R (and IP4 in general) is limited to Passenger-related technology development, the TAF-TSI plays a key role in defining the operational processes and data exchange that must be implemented by the mainline rail stakeholders to comply with the Regulations (urban rail is excluded from the scope of the TSIs). These data, when combined with that of the TAP-TSI comprise a core base of the semantic definitions comprising the IF Asset "Ontology." This is also the case with the PRM TSI, contained in this chapter.

3.5.1 Telematics Applications Freight (TAF-TSI)

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) No 1305/2014	Rail	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	

Scope and Stakeholders

This TSI concerns the Telematic Applications subsystem for freight services and falls under 1(b) of Annex II to Directive 2001/16/EC - interoperability of the trans-European conventional rail system.

It states that the commercial operation of trains, wagons and Intermodal units throughout the Trans-European rail network requires efficient interchange of information between the different Infrastructure Managers, Railway Undertakings and other service providers. Performance levels,

[69] European Commission, Transport and Mobility, https://ec.europa.eu/transport/modes/rail/interoperability/interoperability/telematic_applications_en

safety, quality of service and cost depend upon such compatibility and interchange as does, in particular, the interoperability of the Trans-European conventional rail system.

The technical specification for interoperability also has an impact on the conditions of use of rail transport by users. In this respect the term users is understood to mean not only infrastructure managers or railway undertakings but also all other service providers such as wagon companies, Intermodal operators, customers and application developers.

It ensures the efficient exchange of information between IMs and RUs by defining the process rules, messaging formats and data definitions to achieve technical compatibility between legacy applications systems of the stakeholders. The functional areas of the TAF-TSI which must be contained in the IF are as follows:

- Reference Files (Codified, unique Reference points for Stations and for Company identification)
- Train Running Information and Train Delay Cause (for use in applications that feed Passenger Information Systems)
- Train Forecast (for use in applications that feed Passenger Information Systems)
- Service Disruption (for use in applications that feed Passenger Information Systems)
- Train Transport Identifier (for use in applications that feed Passenger Information Systems)

Governance Rules and Change Management Processes

The Regulation itself is undergoes the normal Regulatory change management system. However, the Technical Documents, administered by the ERA, undergo periodic review and publication. The pertinent technical document for the TAF-TSI is ERA-TD-105: TAF TSI - Annex D.2: Appendix F - TAF TSI Data and Message Model, Version 2.0[70]. The annexes to this document are in the form of an XSD (W3C Schema) that contains the baseline data definitions and corresponding datatypes and references required for data exchange under the TAF-TSI regime.

During the current deployment phase of the TAF-TSI, modifications must be made to the technical document in order to adapt to changing technology and business need. The Change Management is handled by the ERA under the auspices of the joint TAP-TAF Change Control Management (CCM) Working Party which meets semi-annually. This Working Party is comprised of members from the Representative Organisations, the ERA, Member State Representatives and invited experts, such as the UIC.

The XSD comprising the Technical Document is issued for publication periodically depending on need and is approved through the Railway Interoperability and Safety Committee (RISC). The current version is Baseline 2.1.

[70] http://www.era.europa.eu/Document-Register/Documents/ERA_Technical_Document_TAF_D_2_Appendix_F_v2_0.pdf

Impacts and Considerations for the Governance of the IF Assets

The Regulation, particularly the Technical Document(s), has a direct impact on the content and composition of the IF Assets by:

- Defining the content of the baseline IF Ontology
- Possibly defining Web Services for publication as an IF Asset
- Publishing the baseline version 2.1 XSD as an IF Asset
- Possibly publishing mapping between the TAF-TSI version 2.1 XSD and legacy application formats as IF Assets
- Possibly publishing enhanced datasets as IF Assets

GoF4R must consider the CCM process when developing its own rules for Change Management and validation. It must consider how to best synchronise its own published content with that of the current Technical Documents that are in force.

3.5.2 Telematics Applications Passenger (TAP-TSI)

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) No 527/2016	Rail	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓	✓	✓	✓	✓

Scope and Stakeholders

This TSI concerns the Telematic Applications subsystem for Passenger services and falls under Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community.

Whereas the TAF-TSI mostly concerns data exchange for operational purposes, the TAP-TSI aims to include more information and processes that will enhance the passenger experience. As stated in the Regulation, the exchange of computerised and harmonised data will make it possible to increase transparency and will make it easier to plan, reserve and make journeys by train in Europe. It will also strengthen passengers' protection and enhance informed consumer choice by making it possible for rail companies and ticket vendors to fulfil their obligations under Regulation (EC) No 1371/2007 on rail passengers' rights and obligations[71].

As seen in the figure below, the TAP links directly other pertinent Regulations by fulfilling some of the necessary requirements.

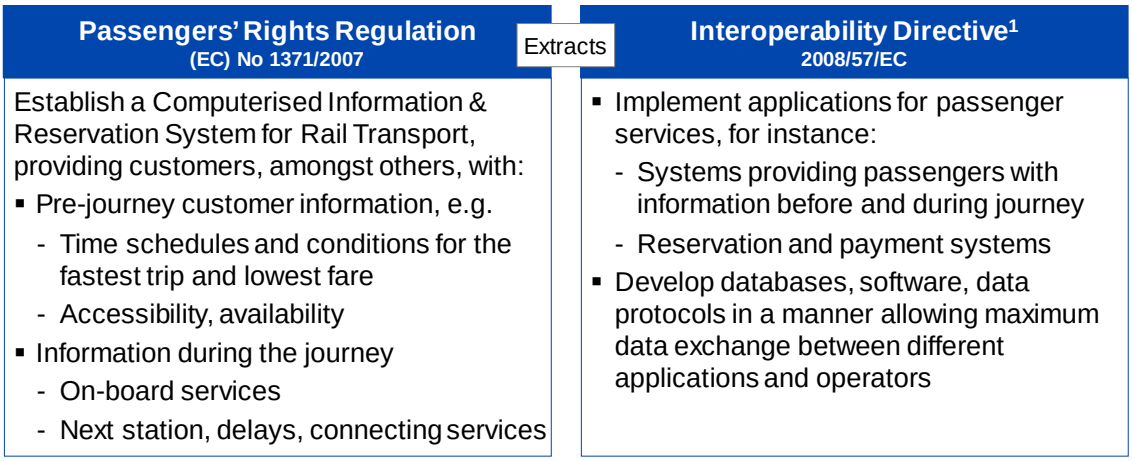


Figure 3 - Relationship to other Regulations

[71] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007R1371&from=EN

The purpose of this TSI is to define procedures and interfaces between all types of actors to provide information and issue tickets to passengers via widely available technologies. It should include the exchange of information for the following aspects: systems providing passengers with information before and during the journey, reservation and payment systems, luggage management, issuing of tickets via ticket offices, ticket selling machines, on board trains, telephone, Internet or any other widely available information technology, management of connections between trains and with other modes of transport.[72]

It ensures the efficient exchange of information between stakeholders by defining the process rules, messaging formats and data definitions to achieve technical compatibility between legacy applications systems of the stakeholders. In addition to the functional areas of the TAF-TSI mentioned in the preceding chapter, the functional areas of the TAP-TSI which must be considered for the IF are as follows:

- Retail Reference Files (Codified, unique Reference points for Stations, Bus Stops and for Company identification)
- Exchange of Timetable data
- Exchange of Tariff data
- Handling of information on contact details of the railway undertaking
- Handling of information concerning conditions of carriage
- Handling of information concerning carriage of registered luggage
- Handling of information concerning carriage and assistance of persons with reduced mobility (PRM)
- Handling of information concerning the carriage of bicycles
- Handling of information concerning the carriage of cars
- Handling of availability/reservation
- Handling of security elements for product distribution
- Delivery of the product to the customer after its purchase (fulfilment)
- Handling of information provision in the station area
- Handling of information provision in the vehicle area

Governance Rules and Change Management Processes

The Regulation itself undergoes the normal Regulatory change management system. However, the Technical Documents, administered by the ERA, undergo periodic review and publication. The pertinent technical documents for the TAP-TSI Baseline Version 1.3.0 are:

1. Directory of passenger code lists for the ERA technical documents used in TAP TSI (1.3.4.pdf) and (1.3.4.xsd);
2. ERA Technical Document TAP B.1 (v 1.2.0) Computer generation and exchange of tariff data meant for international or foreign sales – open time tickets;
3. ERA Technical Document TAP B.2 (v 1.2.0) Computer generation and exchange of tariff data meant for international and foreign sales – integrated reservation tickets (IRT);

[72] Official Journal of European Union, (5) L123/11, 12.5.2011, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0454&from=EN

4. ERA Technical Document TAP B.3 (v 1.2.0) Computer generation and exchange of data meant for international or foreign sales – special offers;
5. ERA Technical Document TAP B.4 (v 1.3.0) Implementation guide for EDIFACT messages covering timetable data exchange;
6. ERA Technical Document TAP B.5 (v 1.3.0) Electronic reservation of seats/berths and electronic production of travel documents - exchange of messages;
7. ERA Technical Document TAP B.6 (v 1.2.0) Electronic seat/berth reservation and electronic production of transport documents - transport documents (RCT2 standard);
8. ERA Technical Document TAP B.7 (v 1.2.0.pdf) and (v 1.3.0.xsd) - International rail ticket for home printing;
9. ERA Technical Document TAP B.8 (v 1.2.0) Standard numerical coding for Railway Undertakings, Infrastructure Managers and other companies involved in rail-transport chains;
10. ERA Technical Document TAP B.9 (v 1.2.0) Standard numerical coding of locations;
11. ERA Technical Document TAP B.10 (v 1.3.0.pdf) and (v 1.3.0.xsd) - Electronic reservation of assistance for persons with reduced mobility - exchange of messages;
12. ERA Technical Document TAP B.30 (v 1.2.0); Schema - messages/datasets catalogue needed for the RU/IM communication of TAP TSI.

In addition to the Technical Documents listed above, TAP shares a common dictionary with the TAF, that is in the form of an XSD (W3C Schema), containing the baseline data definitions and corresponding datatypes and references required for data exchange under the TAF-TSI regime. The current baseline in 1.2.

During the current deployment phase of the TAP-TSI, modifications must be made to the technical document in order to adapt to changing technology and business need. The Change Management is handled by the ERA under the auspices of the joint TAP-TAF Change Control Management (CCM) Working Party which meets semi-annually. This Working Party is comprised of members from the Representative Organisations, the ERA, Member State Representatives and invited experts, such as the UIC.

The Technical Documents are issued for publication periodically depending on need and are approved through the Railway Interoperability and Safety Committee (RISC).

Impacts and Considerations for the Governance of the IF Assets

The Regulation, particularly the Technical Document(s), has a direct impact on the content and composition of the IF Assets by:

- Defining the content of the baseline IF Ontology
- Possibly defining Web Services for publication as an IF Asset
- Publishing the baseline version 2.1 XSD as an IF Asset
- Publishing the baseline 1.3 Technical documents as IF Assets
- Possibly publishing mapping between the TAF-TSI version 2.1 XSD and legacy application formats as IF Assets
- Possibly publishing enhanced datasets as IF Assets

GoF4R must consider the CCM process when developing its own rules for Change Management and validation. It must consider how to best synchronise its own published content with that of the current Technical Documents that are in force. This will be taken into consideration when developing the IF Asset CCM procedures.

3.5.3 Accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility (PRM TSI)

Regulation/Standard/Convention	Mode	Geographic Applicability
REGULATION (EU) No 1300/2014	Rail	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓		✓		✓	✓

Scope and Stakeholders

As described by the ERA, "this TSI covers the aspect of "Accessibility for Persons with Reduced Mobility" for the Infrastructure, the Rolling Stock and, to a minor extent, the Telematics Applications for Passenger subsystems as defined in Directive 2008/57/EC[73]. The objective of this TSI is to enhance the accessibility of rail transport to persons with reduced mobility including persons with disabilities. This includes the accessibility of the public areas of stations and of Rolling Stock. This also includes the functional and operational rules related to the provision of assistance to passengers."[74]

Although this TSI broadly addresses specifications for infrastructure and rolling stock, it specifically provides for the provision of supplying information and assistance to Persons with Reduced Mobility, considering the public use of that infrastructure and rolling stock. Thus, there is a direct linkage to the TAP TSI for the provision of such information. The table below addresses the corresponding parameters of each TSI that must be considered.

PRM TSI Parameter		TAP TSI Parameter
Station accessibility Assistance to board and alight the train		Handling of information concerning carriage and assistance of persons with disabilities and persons with reduced mobility
Access and reservation		Handling of availability/reservation
Customer information		Handling of information provision in the vehicle area

Figure 4 Corresponding TSI Parameters

[73] Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (OJ L 191, 18.7.2008, p. 1)

[74] http://www.era.europa.eu/document-register/documents/draft_prm_tsi_version_2.0.pdf

In addition to the relationship with the TAP TSI, the PRM also cites specific requirements for providing PRM-related data in the following Infrastructure and Rolling Stock Registers:

- **Infrastructure register**: The characteristics of the infrastructure that must be recorded in the "register of railway infrastructure" are listed in the Commission implementing decision 2011/633/EU6.[75]

- **Rolling Stock register**: The characteristics of the rolling stock that must be recorded in the "European register of authorised types of vehicles" are listed in the Commission implementing decision 2011/665/EU7.[76]

These Registers are maintained by ERA and contain pertinent data that is described in defined formats, with defined coding. The PRM data described in these Registers can be referenced (or published) by the IF Assets for use by the Stakeholders. Most importantly, the semantic objects contained in the PRM shall be included in the reference Ontology, at a minimum.

Another important Parameter of the PRM TSI that is closely related to the IF is contained in Article 7 of the Regulation, regarding the Inventory of Assets specifically related to PRM which states:

1) Each Member State shall ensure that an inventory of assets is established and implemented with a view to:

   a) Identifying barriers to accessibility;
   b) Providing information to users;
   c) Monitoring and evaluating progress on accessibility.

2) The Agency shall set up and run a working party in charge of making a proposal for a recommendation as regards the minimum structure and content of data to be collected for the inventories of assets. The Agency shall submit a recommendation to the Commission, including on content, data format, functional and technical architecture, operating mode, rules for data input and consultation, and rules for self-assessment and designation of the entities responsible for data provision. In order to identify the most viable solution, the recommendation shall take into account the estimated costs and benefits of all the technical solutions considered. It shall include a proposal for the timing of the establishment of the inventories of assets.

3) On the basis of the recommendation referred to in paragraph 2, chapter 7 of the Annex shall be updated in accordance with Article 6 of Directive 2008/57/EC… [77]

Impacts and Considerations for the Governance of the IF Assets

The Regulation, particularly the Technical Document(s) as maintained by ERA, has a direct impact on the content and composition of the IF Assets by:

- Defining the content of the baseline IF Ontology

[75] Commission Implementing Decision 2011/633/EU of 15 September 2011 on the common specifications of the register of railway infrastructure (OJ L 256, 1.10.2011, p. 1–25)

[76] Commission Implementing Decision 2011/665/EU of 4 October 2011 on the European register of authorized types of railway vehicles (OJ L 264, 8.10.2011, p. 32–54).

[77] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014R1300&from=EN

- Possibly publishing the datasets for the Inventories of Assets and Registers
- Possibly publishing enhanced datasets as IF Assets

GoF4R must consider the CCM process when developing its own rules for Change Management and validation. It must consider how to best synchronise its own published content with that of the current Technical Documents that are in force. This will be taken into consideration when developing the IF Asset CCM procedures.

3.6 REGULATORY FRAMEWORK ON PERSONAL DATA PROTECTION

Although it is not envisioned at this juncture to publish any personal data within the IF Assets themselves, further development of applications based on those Assets (including further development within IP4) will necessarily have to store and process some amounts of personal data. This section will provide an overview of the applicable legislation concerning the processing rules for personal information and lay the groundwork for recommendations to be made for developers and other users of the IF. These recommendations will be further refined in deliverable D.3.2.

The European Union, since its inception, has taken a very strict stance on the protection of personal data. As seen in Article 16 (ex Article 286 TEC) of the Treaty on the Functioning of the European Union (TFEU), the following principles are outlined:

1. "Everyone has the right to the protection of personal data concerning them";
2. "The European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall lay down the rules relating to the protection of individuals with regard to the processing of personal data by Union institutions, bodies, offices and agencies, and by the Member States when carrying out activities which fall within the scope of Union law, and the rules relating to the free movement of such data. Compliance with these rules shall be subject to the control of independent authorities."[78]

Several Directives have been issued since the TFEU concerning data privacy. These Directives provide the legal framework for the act, without imposing any solution for their enactment. It is therefore up to the individual Member States to enact national legislation to comply with the Directive. This is quite different from Regulations, which become law with no need for the Member States to enact implementation measures.

Subsequently, the relevant EU framework was established comprising the following legislation, with Directive 95/46/EC as the overriding Directive in this regard:

Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data[79];

Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data[80];

Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive)[81];

[78] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT

[79] http://ec.europa.eu/justice/policies/privacy/docs/95-46-ce/dir1995-46_part1_en.pdf

[80] https://edps.europa.eu/data-protection/our-work/publications/legislation/regulation-ec-no-452001_en

[81] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2009.337.01.0011.01.ENG

Directive 97/66/EC of the European Parliament and of the Council of 15 December 1997 concerning the processing of personal data and the protection of privacy in the telecommunications sector has been repealed in 2002 by Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications;[82]

Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC, Directive 2002/58/EC and Regulation (EC) No 2006/200430.[83]

[82] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31997L0066

[83] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0011:0036:en:PDF

3.6.1 General Data Protection Regulation (GDPR)

Regulation/Standard/Convention	Mode	Geographic Applicability
Regulation (EC) 2016/679	General	European Citizens with Global reach

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
				✓	✓

Scope and Stakeholders

Due to the quickly changing ICT environment and evolution of the internet, the new GDPR was enacted in order to create a strong and coherent data protection framework. Its goal is to harmonise data protection laws across Member States and ensure a common Regulatory framework. The GDPR will come into force on 28th May 2018 and will completely replace **Directive 95/46/EC**. As a Regulation, it becomes directly binding for the Member States as written.

In the preamble (10) of the Regulation, the GDPR states:

"In order to ensure a consistent and high level of protection of natural persons and to remove the obstacles to flows of personal data within the Union, the level of protection of the rights and freedoms of natural persons with regard to the processing of such data should be equivalent in all Member States. Consistent and homogenous application of the rules for the protection of the fundamental rights and freedoms of natural persons with regard to the processing of personal data should be ensured throughout the Union. Regarding the processing of personal data for compliance with a legal obligation, for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller, Member States should be allowed to maintain or introduce national provisions to further specify the application of the rules of this Regulation. In conjunction with the general and horizontal law on data protection implementing Directive 95/46/EC, Member States have several sector-specific laws in areas that need more specific provisions. This Regulation also provides a margin of manoeuvre for Member States to specify its rules, including for the processing of special categories of personal data ('sensitive data'). To that extent, this Regulation does not exclude Member State law that sets out the circumstances for specific processing situations, including determining more precisely the conditions under which the processing of personal data is lawful.[84]

The Regulation applies to organisations located within the EU but it will also apply to organisations located outside of the EU if they offer goods or services to, or monitor the behaviour of, EU data subjects. It applies to all companies processing and holding the personal data of data subjects residing in the European Union, regardless of the company's location.[85]

[84] http://ec.europa.eu/justice/data-protection/reform/files/regulation_oj_en.pdf

[85] EUGDPR.org, https://www.eugdpr.org/gdpr-faqs.html

Article 6 of the Regulation sets out the conditions for Lawfulness of processing:

Processing shall be lawful only if and to the extent that at least one of the following applies:

- the data subject has given consent to the processing of his or her personal data for one or more specific purposes;
- processing is necessary for the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract;
- processing is necessary for compliance with a legal obligation to which the controller is subject;
- processing is necessary in order to protect the vital interests of the data subject or of another natural person;
- processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller;
- processing is necessary for the purposes of the legitimate interests pursued by the controller or by a third party, except where such interests are overridden by the interests or fundamental rights and freedoms of the data subject which require protection of personal data, in particular where the data subject is a child.[86]

Furthermore, the GDPR leads to a new concept in European data protection law: “pseudo anonymisation” – i.e. making data neither anonymous nor identifying in directly manner. The GDPR defines ”Pseudo anonymization” as “the processing of personal data in such a way that the data can no longer be attributed to a specific data subject without the use of additional information set, the “additional information” must be “kept separately and subject to technical and organisational measures to ensure non-attribution to an identified or identifiable person.” Practically, it is a privacy-enhancing technique where directly identifying data is held separately and securely from processed data to ensure non-attribution.

This aspect is relevant also taking into consideration the data shared in the European interoperability framework. Pseudo anonymisation implies, in detail, the separation of data from direct identifiers so that the connection to an identity is not possible without additional information that is considered separately. Pseudo anonymisation , particularly in the transport data management of the European Interoperability Framework, may significantly decrease the risks associated with data elaboration, while maintaining the data’s utility. GDPR creates incentives for controllers to realize collection of pseudonymize data. Although pseudonymous data are not exempt from the Regulation altogether, the GDPR loosens several requirements on controllers that use this specific technique.

Pseudo anonymisation is not on its own a sufficient technique to exempt data from the scope of the Regulation. GDPR also states that data which have undergone pseudo anonymisation, which could be attributed to a natural person using additional information, should be considered to be information on an identifiable natural person” (i.e., personal data). Thus, pseudo anonymisation is not intended to preclude any other measures of data protection. The Regulation recognises the ability of pseudo anonymisation to help protect the rights of individuals while also enabling data utility. Thus GDPR

[86] http://ec.europa.eu/justice/data-protection/reform/files/regulation_oj_en.pdf , I 119/35

allows controllers who pseudonymise personal data to obtain a relevant margin to process the data for a different purpose than the one for which they were gathered. Much research has been carried out about the extent to which pseudonymised data can be reidentified. This issue is of critical importance because it determines whether a processing operation will be subject to the provisions of the Regulation. The key distinction between pseudonymous data, which is regulated by the GDPR, and anonymous data, which is not, is whether the data can be reidentified with a sensible effort.

The GDPR introduces pseudo anonymisation into European data protection law, as a means of protecting the rights of individuals while also allowing controllers to benefit from data utility. Although pseudonymised data still falls within the scope of the Regulation, some provisions are entwined in order to stimulate controllers' usage of this technique. Thus, controllers that pseudonymise their data sets will find it easier to be allowed to exploit personal data for different purposes and for scientific and historical research, as well as meeting the Regulation's data security and data by requirements of design.

Impacts and Considerations for the Governance of the IF Assets

If the IF contains any datasets that include personal information, then the Asset Manager must be in compliance with the terms of the Regulation or else be subject to significant penalties. However, it is the users of the IF Assets that will be heavily impacted. The following provisions introduced in this legislation will have a direct impact on the developers of products and services such as the Travel Companion that is envisioned in IP4. The most notable provisions that need to be taken into account are:

1. **The Right of Access** (Article 15) which gives the EU citizen the right to get access to their personal data and information about how these personal data are being processed.
2. **Right to erasure** (Article 17) gives the citizen the right to choose 'to be forgotten,' and have their personal data erased, without undue delay, as long as they have they met the legitimate criteria as stipulated in the Article.
3. **Data portability** (Article 20) gives the citizen the right to freely transfer their data from one processing system to another.

3.6.2 ePrivacy Regulation

Regulation/Standard/Convention	Mode	Geographic Applicability
The (new) ePrivacy Regulation will repeal the (current) ePrivacy Directive (Directive 2002/58/EC).	General	European Citizens with Global reach

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
				✓	✓

Scope and Stakeholders

One of the most important types of e-records, that should be involved in e-Privacy management issue, is the Passenger Name Record (PNR) which is the travel record for passengers, used mostly by airline and travel agency databases. PNR information can take into consideration Passenger's full name, Date of birth, home and work address, telephone number, e-mail address, passport details, credit card details or method of payment, the names and personal information of emergency contacts, as well as details on any special meal requirements or seating preferences or any other similar requests. Databases of PNR data are usually managed through a centrally hosted system, within a specific international reservation system. The sharing of passenger data amongst multiple data controllers and processors may lead to relevant privacy risks, on the basis that not all of these actors may apply or guarantee the same adequate privacy preservation policies. Moreover, by collecting and correlating information like "special meal requirements" or "seating particularities" or even by "efficient" use of the same individual's name (profiling), inferences may be made about such sensitive issues as religion or health conditions of the passengers.

The risk to privacy related to PNR processing has recently been deliberated by the EU Court of Justice (CJEU). CJEU's Opinion 1/15 was issued on 26 July 2017 and was in relation to the lawfulness of EU's PNR Agreement with Canada. Specifically, CJEU adjudicated that the processing of PNR data generally pursues a different objective from that which was intended as collected by air carriers, and thus requires a different legal basis." It also requested stricter adherence to the data protection right: PNR processing, as performed today, is an intrusive type of personal data processing elaboration due to the fact that PNR data may reveal considerable detail about an individual, such as their travel habits, relationships, and financial situation, which may also include sensitive information.

The importance of passenger data (today, PNR) processing in the fight against terrorism is unquestionable particularly considering the sensitiveness of the airports, railway stations as focal point of passenger transit of the European intermodal framework. Apparently, however, PNR processing is considered by the CJEU to be so risky for the protection of fundamental rights that careful scrutiny needs to be made to relevant regulatory text. In summary, while e-records, such as

the PNR, are important data for the smooth operation of the service providers, they do not provide sufficient privacy to the end users. Different transport service operators may only require access to defined subsets of the e-record in order to offer their services aiming at improving the transport service customization. In addition, sensitive personal information contained in the e-record may be relevant for third parties for undesired purposes, such as identity theft, unsolicited marketing (spam) etc. A cancelled or completed trip does not erase the record since copies of the PNRs may be retained indefinitely by airlines, and travel agencies or for post trip requirements or to meet local legal requirements. It is important to safeguard and protect such on-line info and therefore, more research needs to be done in terms of preserving and protecting the privacy of the sensitive personal data contained in existing e-records, whilst preserving the efficiency of online operations and services.

Impacts and Considerations for the Governance of the IF Assets

If the IF contains any datasets that include personal information, then the Asset Manager must be in compliance with the terms of the Regulation or else be subject to significant penalties. However, it is the users of the IF Assets that will be heavily impacted. The following provisions introduced in this legislation will have a direct impact on the developers of products and services such as the Travel Companion that is envisioned in IP4.

3.6.3 Security of Network and Information Systems (the NIS Directive)

Regulation/Standard/Convention	Mode	Geographic Applicability
Directive 2016/1148	General	European Citizens with Global reach

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
				✓	✓

Scope and Stakeholders

The Directive on Security of Network and Information Systems defines the inputs for the spread of a relevant common environment of network and information systems security in the European Union.

This challenging goal considers the following relevant aspects:

- Enhancing cyber security proficiency in each nation of the EU.
- Enhancing cooperation activity that has a specific relation with the cyber security amongst EU member states.
- Developing and pushing the establishment of specific security measures and incident reporting constrains for Operators of Essential Services (OESs) in Critical National Infrastructure (CNI) and Digital Service Providers (DSPs).

In particular, the NIS Directive has been adopted by the European Parliament on 6 July 2016, and entered into force in August 2016. EU Member States must transfer it into national laws no later than May 2018, and in the following six months, each nation must identify the OESs to which it applies. Practically, Member States must define their own rules regarding financial penalties and must take the measures needed to guarantee its implementation. It is necessary to underline how it applies only to providers of essential services to customers based in the European Union.

Transport has been considered for the NIS as one of the most relevant sectors because of their significant technical focus on Information and Communication Technology (ICT). Therefore, for the Interoperability Framework Governance it is necessary to take into consideration the implementation of NIS on the Critical National Infrastructure of transport (in particular ICT infrastructure) as it will impact cyber security protection conditions for the European intermodal framework and related governance requirements.

Further consideration must be given to how the implementation of the Directive impacts sensitive points of intermodal transport (railway stations, airports, ports, parking area, metro stations). The Directive will provide incentives for the investment in cyber security solutions

on the critical transport infrastructure in order to implement prevention and detection of malicious intrusion and identify unusual patterns of data traffic in order to avoid unauthorized take-over of the control of the transport systems.

The main subjects of interest in the Directive that enter in force are the OESs, namely public or private entities that match all of the following base conditions:

- Operators offering a service that is relevant for the society and the economy.
- Services provided specifically depend on NIS.
- Incidents to the network and information systems of that service could have significant effects on its relevant provision.

Each Member State must acknowledge the OESs no later than November 2018.

Considering the Directive transport applications, organisations that provide both essential and non-essential services – such as airports – security requirements will only be valid pertaining to the essential services. The NIS Directive provides a strict definition of interested transport providers for which security requirements would be implemented (NSI Annex 2):

- Air carriers (freight and passenger air transport)
- Maritime carriers (sea and coastal passenger water transport companies and sea and coastal freight water transport companies)
- Railways (infrastructure managers, integrated companies and railway transport operators)
- Airports
- Ports
- Traffic management control operators
- Auxiliary logistics services (warehousing and storage, cargo handling and other transportation support activities)

Finally, it is necessary to note that the NIS incident reporting requirements in the Directive not only pertain to “cyber security” but also include any incident concerning the network and related information system security that is considered to guarantee essential services which may be part of the reporting activity.

Specifically, power failures, hardware failures, malware, intrusions and viruses must be considered.

4. STANDARDISATION

4.1 BACKGROUND

In general, the European Union has made proposals for improving standardisation within the internal European market through **Directives**. However, in 2012, for the first time the EU adopted a Regulation on European Standardisation, the Regulation (EU) 2025/2012[87].

Standardisation is normally applied on a voluntary basis. When standardisation is developed from a mandate given by the EU to the European Standards Organisations (ESO)s for facilitating the application of EU legislation, the relevant standards are qualified as "**harmonised standards**". A harmonised standard is also applied on a voluntary basis, but **when quoted in a TSI, application becomes mandatory** within the same scope as the one of the TSI. This is also the case of the TAF and TAP-TSI, whereas the Technical Documents referenced in Chapter 3 are also mandatory.

It has to be noted that the European Union publishes every year its "Annual Union work programme for European standardisation" as a "Communication from the Commission" which is a **policy document expressing its own thinking with no mandatory authority** and which has no legal effect (for 2017 see footnote 88).

4.2 STANDARDISATION VS SPECIFICATIONS

Standards, in the proper meaning of such term, can only be produced by organisations, which received a specific authorisation for doing such task, so becoming Standardisation Organisations. They can operate within a defined geographical area (where the standards they publish have validity) and in a specific domain (competence).

A Standards Organisation is a neutral party with a specific process and procedure for adoption. Standards are normally used as a basis for coherent implementation.

Specifications, on the other hand, can be developed by an entity (normally an Industry-specific representative organisation) and are viewed as working documents. There is little difference in the content of a Standard or Specification – the main difference is in how they are produced and validated.

[87] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:EN:PDF

[88] http://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52016DC0357&rid=1

4.3 RELEVANT STANDARDS AND SPECIFICATIONS

The main entities with direct applications for the IF are:

4.3.1 W3C

Regulation/Standard/Convention	Mode	Geographic Applicability
W3C standards for: **1. Semantic Web** **2. XML** **3. Web of Services**	General	Global

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	

Scope and Stakeholders

The main reference for all web issues is the World Wide Web Consortium (W3C)[89], which is an international open community that develops open specifications[90] to ensure the long-term growth of the Web. W3C operates under a Code of Ethics and Professional Conduct.

W3C is the main body for defining the architecture and underlying standards for interoperability of the World Wide Web (www). As described on their website, "W3C standards define an Open Web Platform for application development that has the unprecedented potential to enable developers to build rich interactive experiences, powered by vast data stores that are available on any device. Although the boundaries of the platform continue to evolve, industry leaders speak nearly in unison about how HTML5 will be the cornerstone for this platform. But the full strength of the platform relies on many more technologies that W3C and its partners are creating such as the Semantic Web stack, XML, and a variety of APIs.

W3C develops these technical specifications and guidelines through a process designed to maximize consensus about the content of a technical report, to ensure high technical and editorial quality, and to earn endorsement by W3C and the broader community. "[91]

Some of these technology standards are used exclusively to power the IF and provide the basis for the underlying technologies are used by the IF Assets. Furthermore, the products and services that will be developed under IP4 and outside application developers will use the W3C standards as a basis for development. The most pertinent W3C specifications in the context of the IF are:

[89] World Wide Web Consortium: www.w3.org
[90] http://www.w3.org/TR/
[91] https://www.w3.org/standards/

Semantic Web

Semantic Web technologies are the backbone for the development work that is being applied in IP4. These technologies make it easier for computers to communicate seamlessly (and discover data) over networks or enterprises, by making data 'machine readable.' This is achieved by 'Linking' data. The components of the Semantic Web suite of [de facto] standards are as seen below.

RDF: Linked data must be defined in Resource Description Framework (RDF) and published. The RDF will make your data 'discoverable' to machines with the application of the other semantic web technologies.

OWL: The Web Ontology Language (OWL) provides a structured way to build vocabularies and semantic repositories (called 'Ontologies') for the Semantic Web. Clear, semantic definition helps data integration by eliminating ambiguities found using natural language. This Ontology structure comprises the basis for the IF Asset 'Ontology.'

SPARQL: In order to discover data found on the Web (or in a database) the Protocol and RDF Query Language (SPARQL) is used. Using SPARQL, Web Data can be extracted by using the triple stores (structured, semantic definitions) as defined in the RDF, as described above.

Additional standards which will be applied to the IF Assets are:

XML: The Extensible Markup Language (XML) is a simple text-based format for representing structured information: documents, data, configuration, books, transactions, invoices, and much more. It was derived from an older standard format called SGML (ISO 8879), in order to be more suitable for Web use.92

All published resources in the IF Asset 'Schemas and Mappings' will be published according to the W3C Standards.

Web of Services: Web of Services refers to message-based design frequently found on the Web and in enterprise software. The Web of Services is based on technologies such as HTTP, XML, SOAP, WSDL, SPARQL, and others. The IF Assets will be using the above-mentioned technologies for deployment. These will be applied in the Webservice Asset.

4.3.2 Other Organisations Creating Specifications that are applicable to the IF

There are other entities which are developing specifications, open standards or inputs for standards and which are not officially recognised within the International Standardisation Organisations, the European Standardisation Organisations and the National Standardisation Organisations. These entities are developing, coordinating, promulgating, revising, amending, reissuing, interpreting, or otherwise producing technical specifications that are intended to address the needs of a group of affected adopters. These specifications can be seen as "de facto" standards. Sometimes these de facto standards are useful inputs for standardisation. In such cases, a cooperation liaison can be set up between these entities and official Standardisation Organisations.

[92] https://www.w3.org/standards/xml/core

For the rail sector and public transport, the main associations which impact standardization activities are the following:

UIC

The UIC, French acronym which stands for “Union Internationale des Chemins de fer”, is the International Union of Railways, an international body of the railway undertakings (mainline transport operators), infrastructure managers and regional rail associations.

The mission is to promote rail transport at world level with the objective of optimally meeting current and future challenges of mobility and sustainable development. Furthermore, the mission includes the promotion of interoperability and, as a SDO, the preparation of IRS (International Railway Solution) technical documents for railways.

UIC has an official strategic liaison with IEC and ISO for cooperation in the preparation of IEC and ISO standards.

Examples of cooperation areas are the on-board train communication network and on-board multimedia. www.uic.org

UITP

The UITP, French acronym which stands for “Union Internationale des Transports Publics”, is The International Association of Public Transport.

UITP is a non-profit advocacy organization for operators and public transport authorities, as well as for the manufacturing industry and all other public transport stakeholders (academics, consultants...). Located in Brussels, the association was founded in 1885 and represents an international network of 1,400 member companies located in 96 countries. UITP covers all modes of passenger public transport e.g. metro, tramway, light rail, regional and suburban railways, bus and waterborne transport (and taxi).

UITP cooperates mostly with CLC TC9X, CEN TC256 and CEN TC278 at European level.

In the European Union, UITP brings together more than 400 urban, suburban and regional public transport operators and authorities from all member states and is consequently recognised as a key interlocutor for the European regulators and standardisation bodies, e.g. as a rail representative association and especially through its “Urban Rail Platform” created jointly with UNIFE (see below) and with the participation of the European Commission. www.uitp.org

UNIFE

UNIFE, based in Brussels, is the organisation representing the European Rail Industry since 1992. All segments of the rail supply industry are represented in the membership: system integrators, railway infrastructure supply companies, rolling stock as well as subsystem and signalling suppliers and engineering companies joining under the UNIFE umbrella to collaborate on common challenges and issues facing the rail supply industry. UNIFE’s purpose is to represent its members’ interests at international and EU level. An example of inputs for standards produced by UNIFE are the TECRECs (Technical Recommendations), which sometimes evolved into CEN-CENELEC TR and/or TS. www.unife.org

OTIF

OTIF, the Intergovernmental Organisation for International Carriage by Rail, was set up on 1 May 1985 as a consequence of the Convention of 9 May 1980 (COTIF). Its predecessor was the Central Office for International Carriage by Rail which was set up in 1893. It is the oldest international organisation in the sector. It now has 50 Member States, including one Associate Member (Jordan). The Organisation has its headquarters in Berne, Switzerland, and has legal personality under international law and in the national laws of its Member States.

OTIF develops unified railway regulations to connect Europe, Asia and Africa. It uses simple and effective tools to promote, improve and facilitate international carriage by rail.

OTIF provides legal and technical interoperability for international carriage by rail. It works in close partnership with the European Union, the European Union Agency for Railways, the International Rail Transport Committee (CIT), the International Union of Railways (UIC), the Organization for Co-operation between Railways (OSJD) and the United Nations Economic Commission for Europe (UNECE).

Its basic legal instrument is the Convention concerning International Carriage by Rail (COTIF 1999) and its seven Appendices. The Protocol of 3 June 1999 (Vilnius Protocol) modified the COTIF, which objective is to develop the uniform legislation applying to the carriage of passengers and freight in international through traffic by rail, e.g. the contracts of carriage for the international carriage of passengers and goods (CIV and CIM uniform rules, respectively). The CIV Uniform Rules ("RU CIV 1999") entered into force on 1 July 2006 in 33 Member States of OTIF and also became de facto applicable in Greece and Belgium. The CIV/CIM Uniform Rules apply to about 270,000 km of rail routes and on several thousand kilometres of shipping routes, inland waterways and (in domestic carriage) road.
Since the ratification of the Vilnius Protocol by the European Commission in 2011, the Committee of Technical Experts of OTIF must help ensuring consistency between the COTIF rules and the Technical Specifications for Interoperability (TSIs) and certification procedures established by the European directives. www.otif.org

Other organisations or "platforms" worth mentioning are:

- **OSPT** Alliance aiming (among the others) to define a new open standard for secure cost-effective, and flexible transit fare collection solutions through a global, multi-provider community. In particular, its CIPURSE open standard provides an advanced foundation for developing highly secure, interoperable, and flexible transit fare collection solutions. It is built on proven standards, including ISO 7816, AES-128, ISO/IEC 14443-4 for securing multiple payment types.

- **CNA**, Calypso Networks Association, is dedicated to extend the partners cooperation and guarantee the evolution of Calypso specifications and their promotion on a global scale. Calypso is a set of technical specifications describing a fast and secure contactless transaction between a terminal and a portable device; it corresponds to the level 3 in the ticketing transaction layers scheme, which is really the heart of a transaction, on which the performances and reliability of a whole ticketing system rely. It is where the security, the efficiency and the speed of a transaction are defined. It is based on two patents, Session and Ratification, invented by Calypso founders. Calypso technology represents a coherent aggregation of its specifications with the use of all existing

standards at the levels of the communication interface, of the card mapping and file organization, of the card data structure.

- **STA**, the Smart Ticketing Alliance which is a platform for cooperation and a coordinated approach for establishing ticketing interoperability for the Public Transport sector; This includes the establishment of a trust scheme that mirrors the schemes used in the mobile phone industry, banking sector and with other stakeholders. Founding members were UITP, Calypso, ITSO, AFIMB and VDV eTicket Service. STA considers it is essential that public authorities and users can be confident in the quality of contactless communication between contactless readers and fare media. Certification is the appropriate means to give trust. The STA certification program established by STA consists of a Group of Certification Bodies (STA GCB) bringing together certification bodies authorized to certify compliance of transportation and acceptance media with the CEN technical specification TS 16794 about contactless communication. The objective of the STA Group of Certification Bodies is to establish a common approach to conformity certification and the technical equivalence of certification carried out by the STA Group of Certification Bodies' members. The members will work collectively to achieve these aims but remain independent certification bodies being responsible for their own decisions and for the control of their different certification marks. The STA Group of Certification Bodies (STA GCB) works as a platform to ease mutual recognition between the member certification bodies (and the testing laboratories for product testing) and to limit the costs of those agreements. A primary goal of the STA GCB is to ensure that the certification bodies and the associated testing laboratories operate on a common basis.

- **GlobalPlatform**, presented as the standard developer for Secure Digital Services and Devices, has the goal to develop specifications, which are today highly regarded as the international de facto standard for enabling digital services and devices to be trusted and securely managed throughout their lifecycle. GlobalPlatform protects digital services by standardizing and certifying a security hardware/firmware combination, known as a secure component, which acts as an on-device trust anchor. This facilitates collaboration between service providers and device manufacturers, empowering them to ensure adequate security within all devices to protect against threats. GlobalPlatform specifications also standardize the secure management of digital services and devices once deployed in the field. Altogether, GlobalPlatform enables convenient and secure digital service delivery to end users, while supporting privacy, regardless of market sector or device type. Devices secured by GlobalPlatform include smartphones, tablets, set top boxes, wearables, connected cars, other Internet-of- Things (IoT) devices and smart cards.

- **ORACLE** corporation, developing the first autonomous database cloud and managing the Java Card Platform providing an open, interoperable environment enabling the development and deployment of portable trusted identity services to individuals and personal devices;

- **IETF**, the Internet Engineering Task Force, develops and promotes voluntary Internet de facto standards, in particular the specifications that comprise the Internet protocol. The IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It follows open and well-documented processes (e.g. RFC 2026 (BCP 9)).

- **NFC** Forum provides specifications which help the ecosystem harmonize today's diverse contactless technologies for Near Field Communications (NFC). NFC is a standards-based short-

range wireless connectivity technology that makes life easier and more convenient for consumers around the world by making it simpler to make transactions, exchange digital content, and connect electronic devices with a touch. NFC is compatible with hundreds of millions of contactless cards and readers already deployed worldwide. NFC technology enables short-range wireless interaction between consumer electronics, mobile devices, personal computers, electrical appliances, and NFC-compatible tags.

- **IEEE** 'The world's largest technical professional organization for the advancement of technology' through publications, conferences, technology standards, and professional and educational activities, and technology standards.

4.3.3 Specifications that are recommended to be used by the IF Assets

4.3.3.1 Full Service Model (FSM)

Regulation/Standard/Convention	Mode	Geographic Applicability
FSM http://www.cer.be/full-service-model-fsm	Rail/Multimodal	Europe and Global

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	✓

Scope and Stakeholders

The FSM Initiative is an IT-Framework developed by ticket vendors and railways to facilitate online distribution services. The goal of the FSM (Full Service Model) initiative is to ease online services distribution in order to guarantee the benefit of the travelers. In detail the initiative can contribute to the innovative definition of door-to-door travel solutions. With this particular scope, ticket vendors and railways have realized an Open-IT-framework (taking into consideration IT specifications) that can be embedded in already existing IT-systems of distribution. When implemented, FSM can work as an adapter and enable data sharing between different distribution systems.

Through the FSM, ticket vendors and railways have the final scope to complete the different array of individual bilateral solutions needed to finally realize the connection between distribution systems. FSM interests the entire value chain of distribution services taking into consideration the after sales processes. It covers all businesses offering travel services and the travel distribution services.

In particular FSM Initiative has realized an API (Application Programming Interface) that permits Distributors and Rail Service Providers (RSPs) to make us of the common Sales and After-Sales interactions. RSPs may be rail carriers or firms that are not specifically carriers but offer to the market IT services for carriers

FSM APIs is designed to work with the already existing systems realized by Distributors and RSPs. The FSM API will not need to substitute the implemented APIs, that RSPs are able to provide to Distributors, especially if the on-going APIs have functions that are outside the scope of FSM. RSPs and Distributors could opt the utilization of a ‘hybrid’ model, where the FSM API is used for specific elements of the distribution process and existing proprietary APIs are taken into consideration for other aspects.

Impacts and Considerations for the Governance of the IF Assets

GoF4R must consider the FSM process when developing its own rules for Change Management and validation.

4.3.3.2 RailTopoModel - Railway infrastructure topological model (RTM)

Regulation/Standard/Convention	Mode	Geographic Applicability
RTM	Rail	Global

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	✓

Scope and Stakeholders

The aim of RailTopoModel is to offer a global graphical description of railway networks and related events to support and ease the development of several business activities directly related to the rail sector. Firstly, its goal is to guarantee that this particular model will provide in the present and in the near future a relevant help to the business necessities. To obtain this result the model will need to take into consideration the following aspects:

- The model provides a topological description of the iron connections that are completely linked and can be showed with a scheme. It provides the display of track locations considering the whole array of level detail, from corridors down to tracks
- The model guarantees that data will be aggregated and disaggregated, while operating connections between detail “scales”, the scope is to finally obtain that data consistency is maintained across all scales
- The model ensures that all the permitted routes are identified, based on network topology and other available info, for example events (such as track possessions), power supply basic elements, signalling assets
- The model provides a multiple referencing system in order to ensure consistency during the transformation between two referencing systems. Relevant cases of implementation are the following:
    - Linear referencing-using mileposts and “rail addresses”
    - positioning-using geographic reference systems
    - Scheme coordinates
- The model organises and geographically locates “point”, “linear” and “areal entities”

This model is structured with the idea to be updated with new elements to assist business uses as they will be developed.

Impacts and Considerations for the Governance of the IF Assets

GoF4R must consider the RailTopoModel process when developing its own rules for Change Management and validation.

4.3.3.3 Open Travel Alliance (OTA)

Regulation/Standard/Convention	Mode	Geographic Applicability
OTA	Multimodal	Global

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	✓

Scope and Stakeholders

The Open Travel Alliance (OTA) is a self-funded, non-profit organization that includes most of the major airlines, car rental companies, hoteliers, suppliers of leisure, travel agencies, GDSs, technology providers, and other parties that work on the creation and implementation of broad industry and open specifications of e-business. OTA mission is to engineer specifications for solving the problems inherent with connecting multiple systems within the complex travel distribution arena. Its activity comprehends the creation of electronic message structures to facilitate communication between the disparate systems in the global travel industry. These specifications generate a shared e-business language and are intended to push on the development of systems that can create innovative collections of services to meet in a better way the requests and specific expectations of travellers and the travel sector at large.

Impacts and Considerations for the Governance of the IF Assets

GoF4R must consider the OTA process when developing its own rules for Change Management and validation.

4.3.3.4 Open API for distributed journey planning (CEN)

Regulation/Standard/Convention	Mode	Geographic Applicability
CEN/TS 17118:2017	Multimodal	Europe

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓	✓		✓	✓	✓

Scope and Stakeholders

This Technical Specification, developed by TC 278 (Intelligent transport systems) WG 3 (Public transport), defines a schema for establishing an Open API for Distributed Journey Planning (OJP) that can be implemented by any local, regional or national journey planning system in order to exchange journey planning information with any other participating local, regional or national journey planning system.

Schema XSD files are available to facilitate work by those wishing to implement the standard described in the published Technical Specification.

The OJP initiative was born to answer the exigence to exchange accurate and timely information about public transport (PT) services and to implement systems able to provide Multi-modal information for longer-distance journeys.

Several systems have been developed to answer to this requirement, based on different architecture, but he nature of the enquiries sent between the systems, and the content of the responses sent in return, were essentially the same. This suggested that it would be possible to define a single Open Journey Planning API to support all distributed journey planning systems.

OJP allows a system to engineer just one interface that it can make available rather than having to engineer separate APIs for each bipartite exchange arrangement that may be required with other systems.

The establishment of Open APIs has been enabled by an increasingly standardised Public Transport sector, applying the principles set out in the “Public Transport Reference Data Model” (Transmodel) EN standard, and its related implementation Standards and specifications.

Impacts and Considerations for the Governance of the IF Assets

The ITS Directive Delegated Regulation for provision of EU-wide multimodal travel information services, discussed in chapter 3.3, is the legal framework for travel data access and distributed journey planning in Europe. This initiative provides the necessary requirements to make EU-wide multimodal travel information services accurate and available across borders. One of the key requirements concerns linking travel information services for distributed journey planning. Upon

request, travel information service providers shall provide to another information service provider ‘routing results’ based on static, and where possible, dynamic information. The ‘routing results’ shall be based on:

- the enquirers start and end points of a journey along with the specific time and date of departure or arrival, or both;
- possible travel options along with the specific time and date of departure or arrival, or both, including any possible connections;
- the handover points between travel information services;
- in case of disturbances, alternative possible travel options along with the specific time and date of departure or arrival, or both, and any connections, where available.

The Delegated Regulation recommends that the CEN OPEN API standard for distributed journey planning is used by local, regional and national travel information service providers.

This Standard must be considered for the IF Governance and the associated Schema(s) data shall be published in the Asset Manager. The change management processes of the standard shall be considered so that the published data are synchronised. Furthermore, any datasets published shall be in the correct format.

4.3.3.5 UIC 918

Regulation/Standard/Convention	Mode	Geographic Applicability
UIC Leaflet 918 (Suite)	Rail	Global

Scope of Application to the Interoperability Framework Assets					
Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
✓		✓	✓	✓	✓

Scope and Stakeholders

UIC Leaflet 918-0 contains the general regulations for the electronic reservation of seats/berths and the electronic production of travel documents. It is supplemented by the following two leaflets:

- UIC Leaflet 918-1 which deals with the procedures for exchanging reservation messages,
- UIC Leaflet 918-2 which describes the RCT2 standard applicable to all the transport documents produced electronically

The specifications contained in these leaflets enable a railway undertaking (RU) to reserve seats/berths in an inventory which is managed by another RU and to issue travel documents (in particular, reservation tickets and combined tickets) produced electronically from data transmitted by the electronic system of another RU.

The set of UIC 918 Leaflets is widely used throughout the European railway industry and by third parties who are in the distribution chain. These leaflets, which define industry-adopted coding structures and data exchange formats, provide the interoperability basis for data exchange as defined the TAP-TSI. The content of these leaflets, therefore, are also contained in the ERA technical documents as described in the previous chapter Telematics Applications Passenger (TAP-TSI).

Impacts and Considerations for the Governance of the IF Assets

WP5 has adopted a use case for the IF Governance concerning the semantic transformation of reservation request/response messages between systems utilising different standards. This particular use case considers the translation of messaging between the FSM formats used by the multimodal travel industry and the UIC 918 formats used by the European railway community. It is evident that FSM has completely different semantics from UIC 918, but their interconnection is essential to allow some railways/ticket vendors to start using FSM without losing the ability of exchanging reservations with those still using UIC 918.

In most cases there is no one-to-one correspondence between a message in UIC 918 specification and a message in FSM. For instance, one single FSM message can request a booking for a journey of two segments, i.e. on two consecutive trains, and this should necessarily be converted in two UIC 918 reservation messages, one per each train. On the reverse side, one UIC 918 reservation request

completes the sales transaction, while the FSM workflow, even in the simple case of direct booking, requires at least the two steps of pre-booking and confirmed booking.

If one wants to build a system capable of interconnecting a partner “speaking FSM” with a partner “speaking UIC 918”, it needs something much more complex than a simple message converter, it needs a logic (therefore lines of code) capable of knowing both workflow rules, storing messages, creating intermediate messages and completing the transaction on basis of intermediate answers.

The analysis of the governance of the IF that GoF4R will perform should therefore consider the problem of knowing both UIC 918 and FSM workflow rules.

This use case will aid WP5 in determining the proper rules and processes to apply to the following IF Assets, based on a real-world example:

- ***Reference Ontology***: by identifying Change Management procedures that will include the semantic references for the UIC 918 and FSM standards
- ***UIC 918 and FSM XSD Schemas:*** by developing procedures and rules for publishing and maintaining the current schemas and mappings
- ***Lookup and Master Data*** (e.g., dataset containing country codes used in UIC 918 messages): by developing procedures and rules for publishing and maintaining the Master Data
- ***UIC 918 and FSM workflow rules:*** by applying the Business Rules and Processes contained in the 918

Potential barriers of use may concern IPR.

5. CONCLUSIONS

In the analysis above, the relevance of regulations, standards, industry conventions, etc. has been checked individually against:

- the Interoperability Framework Assets, namely ontologies, web services, business rules, schemas & mappings, data sets, and
- products & services expected to use the IF.

Standards and industry conventions are not regulations in the strict sense, but not abiding by certain widespread standards or specifications would compromise the adoption of the interoperability framework. These de facto standards are therefore to be considered in what is termed, broadly, as the "regulatory environment".

Early in the research, it was noted that some Regulations, Standards and industry Conventions relate directly to the IF Assets (TAP-TSI, W3C, etc.), while most Regulations are related to the services and products that will be developed using the IF Assets (Data Privacy, Anti-Trust, etc.). The analysis confirmed this, and also showed that the ontologies will be systematically impacted: true to the Latin saying "nemo censetur ignorare legem" [93] applicable in Europe, the analysis reveals that the ontologies must "know" the regulations, by including all semantic definitions referenced in the

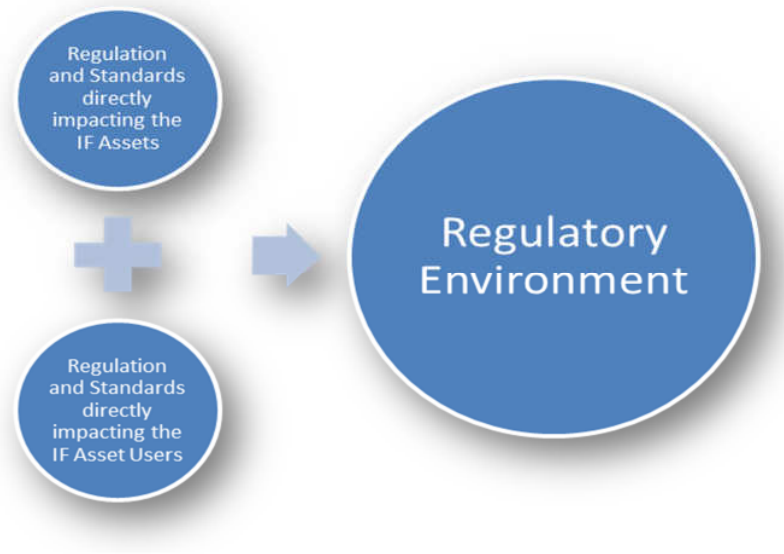


Figure 5 Regulatory Environment

regulations.

The fine line between Regulations affecting the IF ***Assets*** and those affecting IF ***Asset Users*** is not easily drawn:

[93] (en) nobody is thought to be ignorant of the law

- ontologies, web services, business rules, schemas & mappings are integral parts of the IF Assets; any regulation (or standard, etc.) affecting these is relevant to the IF Assets as a whole.
- Products & services, if based on the IF Assets, are the responsibility of the asset user(s), therefore having no direct impact on the IF Assets themselves.

The “gray zone” is data sets . It is not foreseen at this moment to publish any data set with any personal or confidential information (personal details, credit card information, etc.) in the Asset Manager. This information will be used and persisted in future product development in IP4 and beyond, such as the Travel Companion. However, we understand that “Data Sets” include both data definitions (metadata) and actual data (values). Whenever a regulation affects Data Sets, it may prescribe metadata, in which case the IF Asset Manager must address compliance. Therefore, the governance should only assure that the ***specific metadata requirements*** have been fulfilled. It may also place certain restrictions (or provide guidelines) on data content of the datasets, if such content comes under the jurisdiction of certain Regulations (i.e. data privacy, etc.)

The summary table below lists the components of the Regulatory Environment and indicates their respective relevance to IF Assets:

Type	Name	Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
Directive	NIS Directive					■	■
Regulation	(AIR) Common Rules on Compensation	■				■	■
Regulation	(Air) Carrier Liability for Accidents	■				■	■
Regulation	(Air) Common Rules for Operation	■				■	■
Regulation	(Air) Community List of Banned Carriers	■				■	■
Regulation	(Air) Code of Conduct for Res Systs	■				■	■
Regulation	Rail Passengers' Rights	■				■	■
Regulation	Bus and Coach Passengers' Rights	■				■	■
Regulation	Waterborne Passengers' Rights	■				■	■
Regulation	Liability of Carriers by sea for Accidents	■				■	■
Regulation	Multimodal Travel Information Svcs	■	■		■	■	■
Regulation	Air PRM	■				■	■
Regulation	Rail Passengers' Rights (PRM)	■				■	■
Regulation	Bus and Coach Passengers' Rights (PRM)	■				■	■
Regulation	Waterborne Passengers' Rights (PRM)	■				■	■
Regulation	GDPR	■				■	■
Regulation	ePrivacy Regulation	■				■	■
TSI	TAF-TSI	■	■	■	■	■	■
TSI	TAP-TSI	■	■	■	■	■	■
TSI	PRM	■	■	■	■	■	■

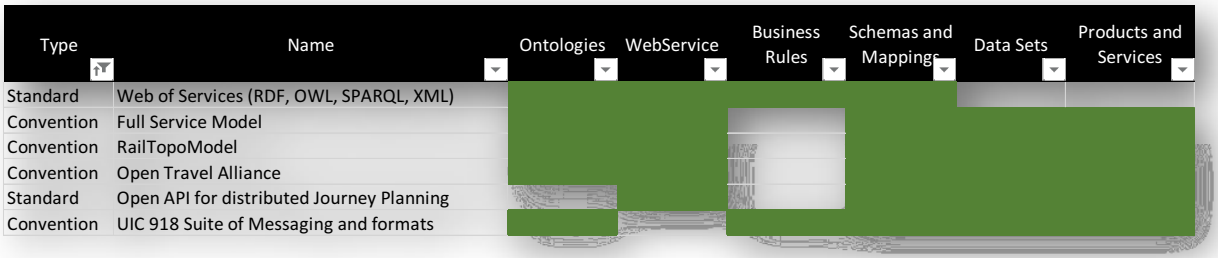
Figure 6 - Regulatory Impacts by Asset Category

As evidenced in the above analysis, most of the Regulatory framework will have a direct impact on the content and composition of the Semantic definitions as contained in the Reference Ontology(ies). This means that the Governance must consider the rules, processes and workflows necessary to add the Regulatory semantic content.

Also evidenced in the above analysis, most of the Regulatory framework specifically impacts the Datasets and Products and Services which fall mostly under the responsibility of the IF Asset Users.

As detailed in 2.1, IF assets aim to allow the diverse actors of the transport system and related services to share the semantics of their operations with a minimal impact on the underlying data. Since the ontology provides the terms and logical inferences that associate semantics with the underlying standards, the Governance structure must concentrate on the maintenance of the Ontology.

On the other hand, analysis showed that the body of Standards and Industry Conventions have a significant impact on most, if not all, of the IF Assets. As seen in the table below, the IF Assets must conform to the following Standards and Conventions if they are to be widely adopted in the marketplace by potential users.



Type	Name	Ontologies	WebService	Business Rules	Schemas and Mappings	Data Sets	Products and Services
Standard	Web of Services (RDF, OWL, SPARQL, XML)						
Convention	Full Service Model						
Convention	RailTopoModel						
Convention	Open Travel Alliance						
Standard	Open API for distributed Journey Planning						
Convention	UIC 918 Suite of Messaging and formats						

Figure 7 - Standards Impacts by Asset Category

It is important that the Governance considers not only the Standard/Convention (Format, metadata definitions, semantics, etc.); Governance must also consider how to apply version control and change management aspects to the pertinent Asset.

As stated in the Executive Summary, further analysis and recommendation to the Asset Users will be developed in Deliverable 3.2 concerning impact and application of the Regulatory Environment on Products and Services to be developed.