

STRATEGIC EUROPEAN DEPLOYMENT PLAN FOR THE EUROPEAN-WIDE IMPLEMENTATION OF THE TECHNICAL SPECIFICATION FOR INTEROPERABILITY TELEMATIC APPLICATIONS FOR FREIGHT (TAF TSI)



PROJECT No: 2005-EU-93008-S

Deliverable 2 - Definition of the functional and performance requirements and of the associated data necessary to deliver the TAF system.



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1 Introduction

This deliverable “Definition of the functional and performance requirements and of the associated data necessary to deliver the TAF system” was developed using the intellectual capital of the European Rail Industry to create Functional Requirements Specifications (FRS), which will identify the functional, data and performance requirements needed to implement the TAF TSI vision and the high-level requirements stated in the Regulation.

The FRS documents aim at providing an implementation guidance for the content of the Regulation and represent a consensus view of the scope and implementation of the necessary functionality. Of primordial importance in this context will be the correlation of the spectrum of information to be managed set against their impact in supporting the relevant rail freight business processes.

The set of documents produced are as follows:

1. Specification 1 – Wagon/ILU Trip Planning.
2. Specification 2 – Wagon & Intermodal Unit Operating Data
3. Specification 3 – Reference Files
4. Specification 4 – Infrastructure Restriction Notice Data
5. Specification 5 – Common Interface
6. Global Architecture Document (body of Deliverable 2)
7. TAF TSI Data & Message Model

This Global Architecture Document describes the functional set of specifications, delivered as separate documents. This set of documents will eventually constitute a full suite of functional, performance, system and technical specifications for the procurement of the TAF system.



2 TAF TSI Regulation

On the 18th of January 2006, the Technical Specification for Interoperability regarding Telematic Applications for Freight (TAF TSI regulation) has entered into force.

- This European regulation requires that the European railway industry develops and implements common standards to increase the interoperability of information, i.e. to facilitate the exchange of information between companies regarding rail freight services, notably as far as cross-border services are concerned. The regulation does NOT require replacing the existing IT systems of IMs and RUs. It essentially requires that the interfaces between individual IT systems use a common language and follow certain specifications. The political intention behind the regulation is to boost the quality and productivity of rail freight (notably for cross-border services) in Europe, in the context of an increasing road competition.
- To achieve this, the regulation also requires that the “European Rail Representative Bodies” (mainly CER...) deliver a Strategic European Deployment Plan (SEDP) by 18 January 2007 to the European Commission. This plan must describe how the European rail freight undertakings and infrastructure managers plan to organize the migration from the existing situation to the situation where a common language and uniform standards can be applied. In practical terms, this means that each rail freight undertaking and each infrastructure manager is required to have its own migration plan ready by 18 January 2007 and that all the plans must be coordinated and synchronized together in a way that saves time and cost for the industry as a whole.

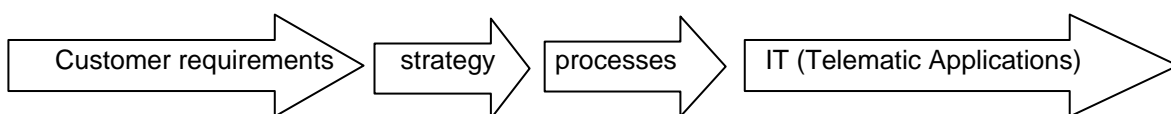
This is the reason why the SEDP project has been set up by the European political associations (with CER in a leading role) and entrusted to UIC for its practical realisation. The SEDP project is unfolding as scheduled under the leadership of its Chairman, Hans-Jürg Spillmann and of its Director, Jeremy Acklam. The project is monitored politically by CER.

Important note: TAF TSI mainly deals with rail freight operational aspects. It is therefore aimed at improving the following interfaces:

- the RU-RU interface, i.e. between Railway Undertakings (RUs) themselves,
- the IM-IM interface, i.e. between Infrastructure Managers (IMs).
- the RU-IM interface, between railway undertakings and infrastructure managers),

Technically, TAF TSI has little to do with the “RU-customer” interface. As far as RUs are concerned, the interest of implementing TAF TSI will therefore be best assessed by those destined to use it, i.e. the operations departments. Operation managers (responsible for Single Wagonload, Block Train and Intermodal Services) should therefore primarily be consulted. Being indirectly concerned, commercial managers should however not be excluded from the reflection (quality aspects). Nevertheless the TAF TSI ensures that the data required by RUs to interface with customers is available and is of high quality.

The technical scope of TAF TSI covers the information flow required for interoperability within the European rail industry. The basic philosophy of the TAF TSI is "IT follows business strategy".



Based on rail business strategy, the TAF TSI takes business processes and defines the required information exchange to improve rail industry market share by increasing efficiency, service quality and reducing freight handling costs.

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Common planning and post trip processes are not covered by the TAF TSI, but the interfaces to these and other IM and RU joint initiatives have been taken into account during the drafting of the TAF TSI and are in the scope of the SEDP.

The successful implementation of the TAF TSI will depend on the synchronisation by RUs and IMs of existing and future systems and processes. This integration will be facilitated by the TAF TSI Common Interface.



3 Global Architecture

3.1 Executive Summary

This Global Architecture describes how the functional components required to achieve interoperable information technology between the independent stakeholders of the European rail freight industry fit together within the context of the TAF TSI Regulation.

The many reasons why European rail freight transport has failed to evolve at the rate seen in the road sector are headed by the prime requirements of rail customers - the need for improved service quality and value in a changing economic landscape.

The rail system in Europe has become excessively complex in recent years and this has resulted in difficulties in setting common priorities and targets. Politicians have increasingly stepped-in to oblige stakeholders to operate with transparent rules and the intention of the Telematics Application for Freight TSI is to create improved, but open, conditions of operation as part of this political initiative. The planning for its introduction has ultimately to be a balance between the substantial barriers to entry that continue to exist in the market and the challenge faced by incumbent operators to provide top-class competitive services to customers due to legacy systems and processes.

Planning the pan-European implementation (the “how to” of the Regulation’s “what”) is a complex task which is being delivered as a Strategic European Deployment Plan (SEDP) project, managed by a small Project Team mandated by the Rail industry working together through UIC, CER & EIM and involving relevant experts from RUs and IMs.

Consensus is always at risk where competitive forces exist without a common unifying vision. This Global Architecture, with its components, is presented not as a compromise but as a “best value” approach for the implementation of the TAF TSI Regulation. It incorporates the ability to continue to utilise existing systems by choice whilst offering the opportunity to emulate the best of other European industries, where independent partners are contractually bound for service delivery with the whole “system” being bound together by advanced information technologies.

Speed of adoption, and therefore of benefit delivery, is dependent on two aspects. The first is the timescale to realise the technical messaging and small central data capability, which will be addressed in the next steps of the SEDP project. The second aspect dictating the adoption speed is the determination by individual stakeholders to link their systems and processes into a pan-industry integrated approach to rail freight logistics.

3.2 Overview

The deployment of TAF TSI is about halting and reversing the loss in rail freight market share in Europe (as measured by ton-km), which has declined from 21% in 1970 to the current level of 8%. In the same period, the road market share has grown on average from 31% to 45%. This has occurred as the city-to-city freight market has expanded at approximately 3% per year.

The impact of this market shift is enormous in that 1% market share loss by Rail results in more than 6 million additional lorry trips per annum and an annual reduction of revenue to the European Railway of over 1 billion Euros. The social cost in terms of congestion, additional highway construction, loss of usable land, reduced safety and reduction in air quality is difficult to quantify.



The primary reason for this loss in rail market share is the inability of the European rail freight Industry to individually and collectively meet the needs of Customers, primarily in the areas of transit time reliability and shipment information. Implementing TAF TSI is primarily focussed on the functional requirements enabling local systems to communicate data between rail freight industry stakeholders to improve transit time reliability and shipment information.

This Global Architecture describes how all the component functional parts fit together to meet the high-level requirements of the Regulation. It is therefore necessary to address the complete set of documentation as a single pack, with the TAF TSI Regulation as the primary document.

3.3 Changes to the Interpretation of the TAF TSI

The question of applicability of the TAF TSI and parts of the SEDP Functional Requirements Specifications to different RU business segments is an important topic that influences the implementation plans. The following mapping of the TAF TSI functionality has been made against the freight business requirements. This will mean that the implementation of the TAF TSI Requirements should be more business oriented to avoid wasting money. Only TAF TSI requirements will be implemented which are strictly necessary for the interoperability of the network.

This approach does not change the TSI, but better supports the RUs implementing the requirements of the TSI by interpreting the TAF TSI implementation to match the real business needs.

The RU Business Groups are as follows :

For RU Business Group 1:

Railway Undertakings which

- use only their own fleet,
- don't co-operate with other RUs
- operate only on their "own" infrastructure and
- have the contract for transport with the customer (they are the Lead RU).

One of the goals of RUs in Business Group 1 according to the TAF TSI should be to increase the quality of transport, but as they have no communication with third parties, they can stay with their legacy system(s) without any upgrade to the TAF TSI requirements as long as their infrastructure manager agrees.

But if on the same infrastructure, other Railway Undertakings are also operating, the infrastructure manager is obliged to fulfil the requirements according to the TAF TSI, which may require the RU in question to adapt its legacy system also to the TAF TSI requirements regarding the data exchange with the IM. The requirements below define the TAF TSI Requirements that might have to be fulfilled for this RU Business Group :



Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

If the IM implemented the following requirements, the RU may also want make use of them:

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

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It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

For RU Business Group 2:

Railway Undertakings which

- use not only their own fleet,
- don't co-operate with other RUs
- operate only on the "own" infrastructure and
- have the contract for transport with the customer (they are the Lead RU).

This Business Group of RUs has to fulfil the TAF TSI requirements as follows :

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement



Functional Package 4:

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery
4.2.12	Reference Files and Databases
	Wagon technical status data
4.2.11	The Main Reference Data
	Rolling Stock Reference Database

If the IM implemented the following requirements, the RU may also want make use of them:

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation



For RU Business Group 3:

Railway Undertakings which

- use only their own fleet,
- don't co-operate with other RUs
- operates only on the "own" infrastructure but
- have not the contract for transport with the customer (they are not the Lead RU),

In this case an RU must at least communicate with the Lead RU and shall therefore implement the relevant TAF TSI requirements, which are:

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery

Functional Package 6

TAF Ref	Description
4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation

Regarding the communication with the Infrastructure Manager, the RU can stay with their legacy system without any upgrade to the TAF TSI requirements as long as their infrastructure manager agrees.

But if on the same infrastructure, other Railway Undertakings are also operating, the infrastructure



manager is obliged to fulfil the requirements according the TAF TSI, which may require the RU in question to adapt its legacy system also to the TAF TSI requirements regarding the data exchange with the IM, the following functionality is required :

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

If the IM implemented the following requirements, the RU may also want make use of them:

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

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It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation



For RU Business Group 4:

Railway Undertakings which

- use not only their own fleet,
- don't co-operate with other RUs
- operates only on the "own" infrastructure but
- have not the contract for transport with the customer (they are not the Lead RU),

This Business Group of RUs has to fulfil the TAF TSI requirements follows :

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

Functional Package 7:

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.12	Reference Files and Databases
	Wagon technical status data
4.2.11	The Main Reference Data
	Rolling Stock Reference Database

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery



Functional Package 6

TAF Ref	Description
4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation

If the IM implemented the following requirements, the RU may also want make use of them:

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation



For RU Business Group 5:

Railway Undertakings which

- use only their own fleet,
- don't co-operate with other RUs
- operate also on various infrastructure and
- have the contract for transport with the customer (they are the Lead RU),

RUs in this Business Group can stay with their legacy system without any upgrade to the TAF TSI requirements as long as their infrastructure managers agree.

But if on the same infrastructure, other Railway Undertakings are also operating, the infrastructure manager is obliged to fulfil the requirements according the TAF TSI, which may require the RU in question to adapt its legacy system also to the TAF TSI requirements regarding the data exchange with the IM :

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location



Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

For RU Business Group 6:

Railway Undertakings which

- use not only their own fleet,
- don't co-operation with other RUs
- operate also on various infrastructure and
- have the contract for transport with the customer (they are the Lead RU),

This Business Group of RUs has to fulfil the TAF TSI requirements follows :

Functional Package 4:

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery
4.2.12	Reference Files and Databases
	Wagon technical status data
4.2.11	The Main Reference Data
	Rolling Stock Reference Database



Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

RUs in this Business Group should also extend their quality measurement system to the IM / RU communication aspects.



For RU Business Group 7:

Railway Undertakings which

- use only their own fleet,
- don't co-operation with other RUs
- operate on various infrastructure but
- have not the contract for transport with the customer (they are not the Lead RU),

This Business Group of RUs has to fulfil the TAF TSI requirements follows :

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery

Functional Package 6

TAF Ref	Description
4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement



Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

RUs in this Business Group should also extend their quality measurement system to the IM / RU communication aspects.

For RU Business Group 8:

Railway Undertakings which

- use not only their own fleet,
- don't co-operation with other RUs
- operate on various infrastructure but
- have not the contract for transport with the customer (they are not the Lead RU),



This Business Group of RUs has to fulfil the TAF TSI requirements follows :

Functional Package 7:

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.12	Reference Files and Databases
	Wagon technical status data
4.2.11	The Main Reference Data
	Rolling Stock Reference Database

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery

Functional Package 6

TAF Ref	Description
4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation



Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

RUs in this Business Group should also extend their quality measurement system to the IM / RU communication aspects.



For RU Business Group 9:

Railway Undertakings which

- use their own fleet or / and not own wagons,
- operate also in co-operation with other RUs
- operate only on the own infrastructure
- may have the contract for transport with the customer (they may or may not be the Lead RU).

In this case the RUs have to communicate with the partners and shall therefore implement the following TAF TSI requirements:

Functional Package 8

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.10	Quality Improvement
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
	Wagon technical status data
4.2.9	Interchange Reporting
4.2.9.2	Wagon interchange notice
4.2.9.3	Wagon interchange sub-notice
4.2.9.4	Wagon received at interchange
4.2.9.5	Wagon refused at interchange
4.2.11	The Main Reference Data
	Rolling Stock Reference Database

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery

Functional Package 6

TAF Ref	Description
4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation

Deliverable 2

PROJECT No: 2005-EU-93008-S



Regarding the communication with the Infrastructure Manager, the RU can stay with their legacy system without any upgrade to the TAF TSI requirements as long as their infrastructure manager agrees.

But if on the same infrastructure, other Railway Undertakings are also operating, the infrastructure manager is obliged to fulfil the requirements according the TAF TSI, which may require the RU in question to adapt its legacy system also to the TAF TSI requirements regarding the data exchange with the IM :

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement

If the IM implemented the following requirements, the RU may also want make use of them:

Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location



It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

For RU Business Group 10:

Railway Undertakings which

- use their own fleet or / and not own wagons,
- operate also **in co-operation** with other RUs
- operate **on various** infrastructure
- may have the contract for transport with the customer (they may or may not be the Lead RU).

This Business Group of RUs has to fulfil the TAF TSI requirements follows :

Functional Package 5

TAF Ref	Description
4.2.1	Consignment Data
4.2.1.2	Wagon orders
4.2.8	Wagon Movement
4.2.8.2	Wagon release notice
4.2.8.3	Wagon departure notice
4.2.8.6	Wagon exception
4.2.8.7	Wagon exception reason
4.2.8.8	Wagon arrival
4.2.8.9	Wagon delivery

Functional Package 6

4.2.7	Shipment ETI/ETA
4.2.7.2	ETI/ETA calculation
4.2.7.3	ETI/ETA message
4.2.7.4	Alert message
4.2.7.5	Enquiry Wagon deviation
	Response wagon deviation



Functional Package 8 :

TAF Ref	Description
4.2.8	Wagon Movement
4.2.8.4.	Wagon yard arrival
4.2.8.5	Wagon yard departure
4.2.10	Quality Improvement
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
	Wagon technical status data
4.2.9	Interchange Reporting
4.2.9.2	Wagon interchange notice
4.2.9.3	Wagon interchange sub-notice
4.2.9.4	Wagon received at interchange
4.2.9.5	Wagon refused at interchange
4.2.11	The Main Reference Data
	Rolling Stock Reference Database

Functional Package 1:

TAF Ref	Description
4.2.3	Train Preparation
4.2.3.2	Train composition, only if requested by the IM
4.2.3.3	Train accepted
4.2.3.4	Train not suitable
4.2.3.5	Train ready
4.2.5	Service Disruption
4.2.5.2	Train running interruption
4.2.4.3	Train running information
4.2.4.2	Train running forecast
4.2.14	Common Interface
4.2.12	Reference Files and Databases
	Reference Data (Location, company...)
4.2.10	Quality Improvement



Functional Package 2:

TAF Ref	Description
4.2.11	The Main Reference Data
	IRN Databases
4.2.6	Train Location
4.2.6.2	Enquiry Train running information
	Response Train running information
4.2.6.4	Enquiry Train delay performance
	Response Train delay performance
4.2.6.4	Enquiry Train identifier
	Response Train identifier
4.2.6.5	Enquiry Train forecast
	Response Train forecast
4.2.6.6	Enquiry Train at reporting location
	Response Train at reporting location

It is up to the Infrastructure manager to decide whether his 'local' RU shall also follow the requirements of the TAF TSI regarding ad hoc path request. If the RU has to follow, then it must also realise the Path request dialogue:

Functional Package 3:

TAF Ref	Description
4.2.2	Path Request
4.2.2.2	Path request
4.2.2.3	Path details
4.2.2.4	Path confirmed
4.2.2.5	Path details refused
4.2.2.6	Path cancelled
4.2.2.7	Path not available
4.2.2.8	Receipt confirmation

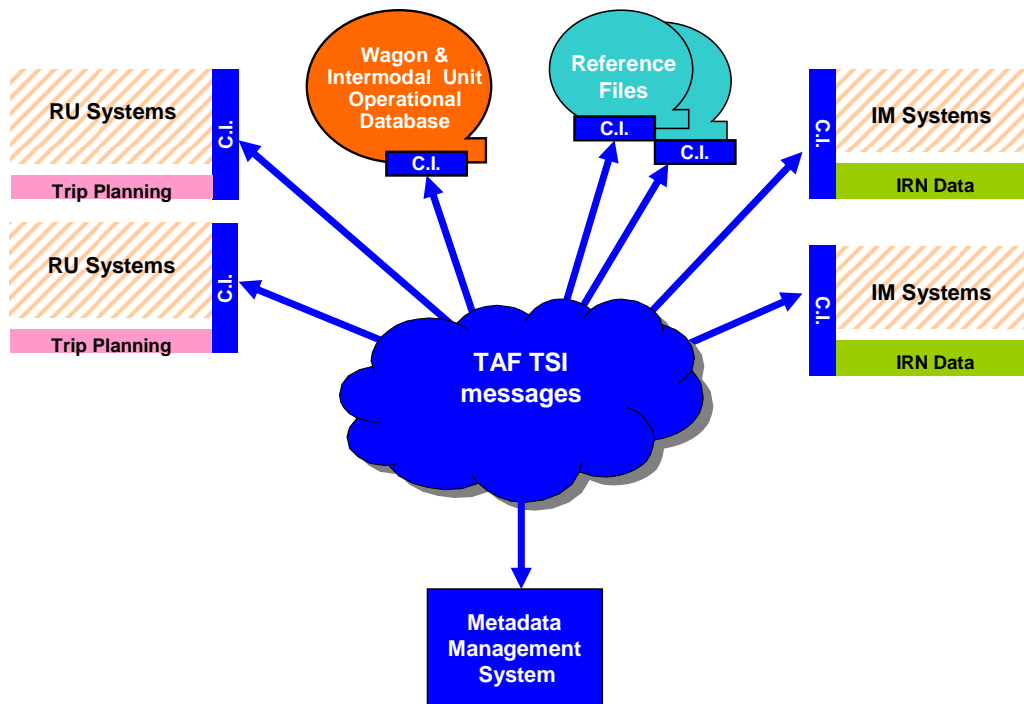
RUs in this Business Group should extend their quality measurement system to the IM / RU communication aspects.









3.4 Core Architecture

It is recommended that this core architecture page is printed separately and referred to / drawn on etc, as each document is read.

TAF TSI Global Architecture



Key

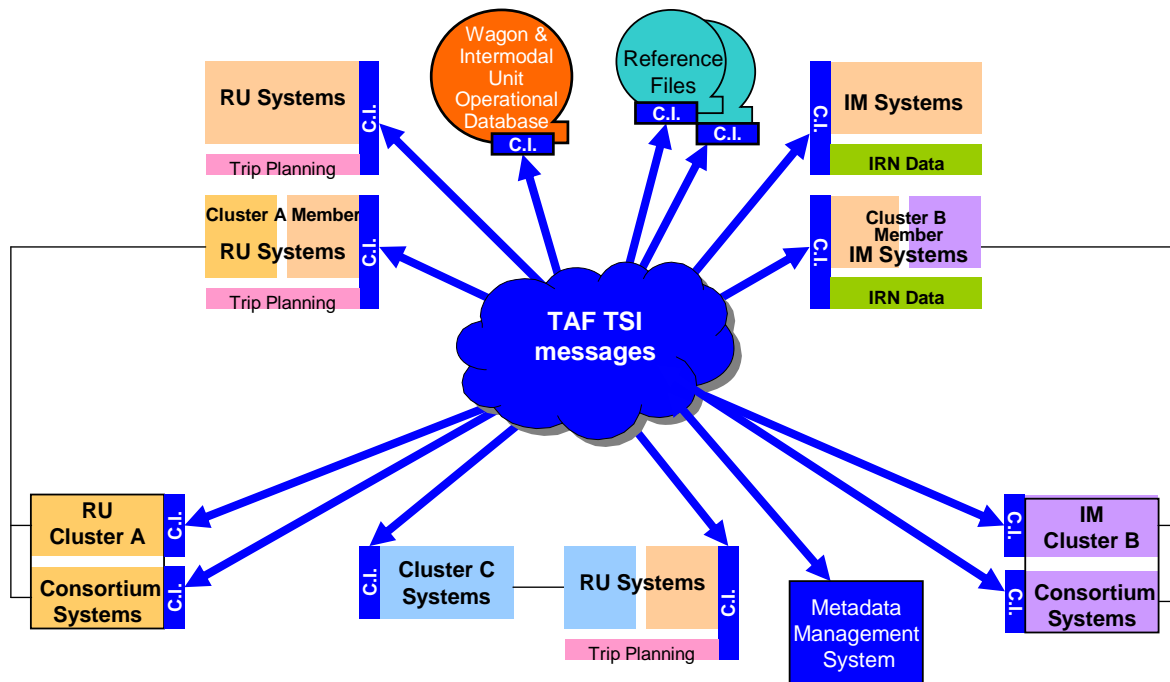
-  SEDP Functional Requirement Specification (FRS) – WIMO
-  SEDP FRS – Reference Files
-  SEDP FRS – Infrastructure Restriction Notice (IRN) Data
-  SEDP FRS – Common Interface (C.I.)
-  SEDP Guidance Document – Trip Planning
-  RU & IM Systems



3.5 Extended Architecture in relation to key existing systems

In order to provide context with existing systems, the following logical architecture is presented.

TAF TSI Logical Architecture



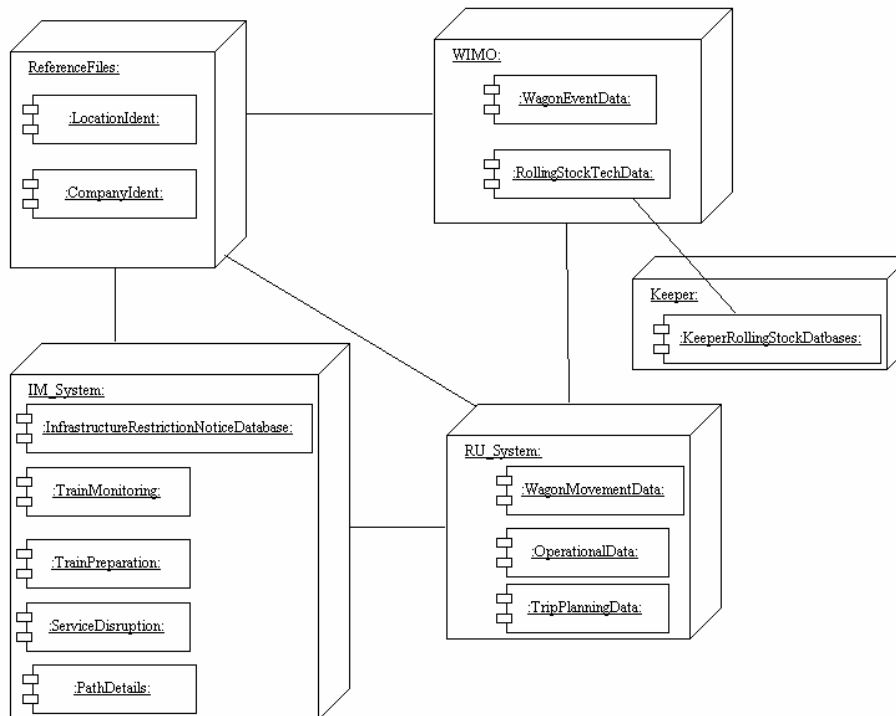
Key

- SEDP Functional Requirement Specification (FRS) – WIMO Instances
- SEDP FRS – Reference Files
- SEDP FRS – Infrastructure Restriction Notice (IRN) Data
- SEDP FRS – Common Interface (C.I.)
- SEDP Guidance Document – Trip Planning
- Integration with Cluster A
- Integration with Cluster B
- Integration with Cluster C
- Integration with RU & IM Systems



3.6 TAF System Deployment and Key Function Diagram

The following diagram illustrates the interaction of the system components. The reference files are used by all systems. The packages will use the Common Interface for interaction.



3.7 Global Architecture component cross reference

Each element of detail in the TAF TSI which requires common meaning will be found in the Component Functional Requirement Documents. Functional issues where common meaning is not strictly required (but would be advisable) are presented as guidance notes.

The common meaning for implementation is required in order that the entire TAF TSI is :

- open (in terms of open market capability for systems, open data-sharing platform, the capability for operational cost-transparency) and;
- capable of operating in practice

The second point is often not addressed early enough in such complex projects with the result that insufficient commonality results in significant operating difficulties, extended modifications and testing programmes. Typically these outcomes bring commensurate delay to the delivery of benefits. The SEDP team has taken considerable experience into account from the development and operation of railway and non-railways systems in addressing the question of where to draw the line for common meaning - and the document pack represents the approach required to meet the objectives of openness and capability to operate in practice.



If you have not read the TAF TSI main document before, you should do so before proceeding any further.

TAF TSI Element	TSI Reference	Global Architecture Component
<ul style="list-style-type: none"> Reference File of the emergency services, correlated to type of hazardous goods. 	4.2.12.1	Locally defined – not part of Global Architecture Component Documents
<ul style="list-style-type: none"> Reference File of the Coding for all IMs, RUs, & Service provider companies Reference File of the Coding for Transport Customers Reference File of the Coding of Locations (Primary, subsidiary and zone-track-spot), Reference File of the Coding for customer locations, Reference File of all existing train control systems, Reference File of Hazardous goods, UN and RID numbers, Reference File of all different locomotive types, Reference File of all CN and HS codes for goods, Reference File of all European maintenance workshops, Reference File of all European audit bodies, Reference File of all European licensed operators including respective list of national safety certificates granted. 	<p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p> <p>4.2.12.1</p>	<p>Component 3 – FRS: Central Reference Files</p> <p>Component 3 – FRS: Central Reference Files</p> <p>Component 3 – FRS: Central Reference Files</p> <p>Component 3 – FRS: Central Reference Files</p> <p>Existing code list</p> <p>Existing code list</p> <p>Existing code list</p> <p>Existing code list</p> <p>Awaiting ERA</p> <p>Awaiting ERA</p> <p>Awaiting ERA</p>
<p><u>Wagon and Intermodal unit Operational Database</u></p> <p>An RU, which communicates with the IMs at train level, must break down this information into wagon and Intermodal unit related one.</p> <p>This wagon and Intermodal unit related information must be stored in the Wagon and Intermodal Unit Operational Database.</p>	<p>4.2.12.2</p> <p>4.2.12.2</p>	<p>Local process. Not part of Global Architecture Component Documents</p> <p>Component 2 – FRS: Wagon & Intermodal Op. Database</p>



<p>The information on train movement leads to new entries / updates in the Wagon and Intermodal Unit Operational Database for customer information.</p> <p>This database must be accessible via the Common Interface</p> <p>This database shows the movement of a wagon and of an Intermodal unit from departure through to final delivery at customer sidings with ETIs and actual times at different locations until the final delivery time ETA.</p>	<p>4.2.12.2</p> <p>4.2.12.2</p> <p>4.2.12.2</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database</p> <p>Component 4 – FRS: Common interface</p> <p>Component 2 – FRS: Wagon & Intermodal Op. Database</p>
<p><u>Wagon Trip Plan Databases</u></p> <p>The Wagon Trip Plans must be stored by each LRU in a database.</p> <p>These databases must be accessible via the Common Interface</p>	<p>4.2.12.2</p> <p>4.2.12.2</p>	<p>Component 6 – Guidance Document - RU Trip Planning</p> <p>Component 4 – FRS: Common interface</p>
<p>The requirements regarding the rolling stock reference data</p>	<p>2.3.3</p> <p>4.2.11</p>	<p>Component 3 – FRS: Central Reference Files</p>
<p>The specified Rolling Stock Reference Databases must allow easy access to the technical data.</p> <p>The contents of the databases must be accessible, based on structured access rights depending on privilege, to all IMs, RUs and Fleet managers, in particular for purposes of fleet management and rolling stock maintenance.</p> <p>They must contain all transport critical technical data such as....</p>	<p>2.3.3</p>	<p>Component 3 – FRS: Central Reference Files</p>
<p>As a consequence it is not sufficient to work with only a trip plan for wagons and therefore a trip plan for the Intermodal units must also be drawn up</p>	<p>2.3.3</p>	<p>Component 6 – Guidance Document - RU Trip Planning</p>
<p>Data Exchange for Quality Improvement,</p> <p>In addition to measuring the service quality delivered to the customer, LRUs, RUs and IMs must measure the quality of the service components that in total make up the product delivered to the customer</p> <p>The measurement reports must be able to access sufficient detail to allow an analysis to indicate the location and apparent cause of reductions in quality e.g.</p>	<p>4.2.10</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database And Component 4 – FRS: Common interface And Component 5 –</p>



delays		FRS: Data Model & Messages And Component 3 – FRS: Central Reference Files
Functional and technical specifications of the interfaces	4.3	Not part of Global Architecture
The Main Reference Data, 3.7.1.1.1 The Infrastructure Data (the Network Statements and the stored data in the Infrastructure Restriction Notice Database) and 3.7.1.1.1.2 3.7.1.1.1.3 Rolling Stock Data (in the Rolling Stock Reference Databases and in the Wagon and Intermodal Unit Operational Database) are the most important data for the operation of freight trains on the European network.	4.2.11 4.2.11.1	Component 7 – FRS - IM Element, IRNDB Component 2 – FRS: Wagon & Intermodal Op. Database
Various Reference Files and Databases,	4.2.12	Component 3 – FRS: Central Reference Files
Electronic Transmission of Documents,	4.2.13	Component 4 – FRS: Common interface
Networking & Communication.	4.2.14	Component 4 – FRS: Common interface
Path Request The following description presents the information which must be available to the infrastructure manager The Path agreement for a train movement at short notice is based on a dialogue between RUs and IMs: <ul style="list-style-type: none"> - Path Request - Path Cancellation by RU - Path cancellation by IM - Receipt confirmation 	4.2.2 4.2.2.1	Component 4 – FRS: Common interface And Component 5 – FRS: Data Model & Messages Component 5 – FRS: Data Model & Messages Component 5 – FRS: Data Model & Messages Component 5 – FRS: Data Model & Messages
Operating rules	4.4	Not part of Global



		Architecture Component Documents
<p>Reference Files</p> <p>For the operation of freight trains on the European network the following reference files must be available and accessible to all Service Providers (IMs, RUs, Logistic providers and Fleet managers). The data must represent the actual status at all times.</p>	4.2.12.1	<p>Component 3 – FRS: Central Reference Files And</p> <p>Component 4 – FRS: Common interface</p>
<p>General Architecture</p> <p>Network</p> <p>Protocols</p> <p>Security</p> <p>Encryption</p> <p>Central Metadata</p> <p>Common Interface</p>	<p>4.2.14.1</p> <p>4.2.14.2</p> <p>4.2.14.3</p> <p>4.2.14.4</p> <p>4.2.14.5</p> <p>4.2.14.6</p> <p>4.2.14.7</p>	<p>This document And</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p> <p>Component 4 – FRS: Common interface</p>
<p>Consignment Note data, Wagon orders</p> <p>The content of the Wagon Order must show the relevant information which is needed for an RU to effect transportation during its responsibility until handover to next RU</p> <p>Selected data of the consignment note data must also be accessible for all partners (e.g. IM, Keeper...) in the transport chain including customers, These are especially per wagon:</p> <ul style="list-style-type: none"> • Load weight (Gross weight of the load), • CN/HS Number, • Dangerous goods information, • Transportation unit. <p>Before the running of a train, the journey section must be updated and completed with actual values</p> <p>A railway undertaking must have the possibility to get an ad hoc path on the network</p>	4.2.1.2	<p>Component 2 – FRS: Wagon & Intermodal Op. Database And</p> <p>Component 4 – FRS: Common interface</p> <p>Component 5 – FRS: Data Model & Messages</p>



<p>The railway undertaking must provide the infrastructure manager with all necessary data concerning when and where the train is required to run together with the physical characteristics in so far as they interact with the infrastructure.</p> <p>Wagon order ORU message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage <p>Wagon Order TRU message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage <p>Wagon Order DRU message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 		<p>Component 5 – FRS: Data Model & Messages</p> <p>Component 5 – FRS: Data Model & Messages</p> <p>Component 5 – FRS: Data Model & Messages</p> <p>Component 5 – FRS: Data Model & Messages</p>
<p>Train Preparation</p> <p>For the preparation of the train, the RU must have access</p> <ul style="list-style-type: none"> - to the infrastructure restriction notices, - to the technical wagon data - to the dangerous goods reference file - to the current, updated information status on the wagons <p>This applies to all wagons on the train.</p> <p>At the end the RU must send the train composition to the next RUs.</p> <p>This message must also be sent from the RU to the IM(s) with whom it has booked a path section, when requested by the Conventional Rail TSI Operation and Traffic Management or by the contract(s) between RU and IM(s).</p> <p>If the train composition is changed at a location, this message must be exchanged once more with information updated by the RU responsible.</p> <p>At each point e.g. origin and interchange point, where the responsibility changes on the RU side, the start procedure dialogue between IM and RU “Train ready – Train Running Information” is obligatory.</p>	<p>4.2.3.1</p>	<p>Component 4 – FRS: Common interface</p>



<p>Data quality</p> <ul style="list-style-type: none"> • Accuracy, • Completeness, • Consistency, • Timeliness. 	<p>4.4.1</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database And Component 3 – FRS: Central Reference Files And Component 4 – FRS: Common interface</p>
<p>The Infrastructure Restriction Notice Databases</p> <p>For this the IMs must install and fill-in Infrastructure Restriction Notice Databases.</p> <p>These databases must be accessible via the Common Interface</p>	<p>4.2.11.2</p>	<p>Component 7 – FRS – IM Element, IRNDB</p>
<p>Other Databases</p> <p>Authorised entities such as keepers and fleet managers must have access to the data relevant to fulfil their functions, according to contractual conditions.</p> <p>These databases must be accessible via the Common Interface</p>	<p>4.2.12.2</p>	<p>Component 4 – FRS: Common interface</p>
<p>The keepers of the wagons must give the RUs access to the technical wagon data.</p>	<p>4.2.2.2</p>	<p>Component 3 – FRS: Central Reference Files And Component 4 – FRS: Common interface</p>
<p>The RUs must themselves ensure access to the reference files e.g. to the dangerous goods reference file if required.</p> <p>Path request message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.2.2</p>	<p>Locally defined – not part of Global Architecture Component Documents And Component 4 – FRS: Common interface</p>
<p>Train Running Forecast,</p> <p>Handling description</p>	<p>4.2.4.1</p>	<p>Component 4 – FRS: Common interface</p>
<p>The Rolling Stock Reference Databases</p> <p>The keeper of a rolling stock is responsible for the</p>	<p>4.2.11.3</p>	<p>Component 3 – FRS: Central Reference Files</p>



<p>storage of the rolling stock data within a Rolling Stock Reference Database</p> <p>The Rolling Stock Reference Databases must allow easy access (a single common access provided via the common interface) to the technical data to minimise the volume of data transmitted for each operation.</p> <p>Contents of the Databases must be accessible, based on structured access rights depending on privilege to all Service Providers (IMs, RUs, Logistic providers and Fleet managers) in particular for purposes of fleet management and rolling stock maintenance.</p>		
<p>Additional Requirements on the Databases</p>	<p>4.2.12.3</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database And Component 3 – FRS: Central Reference Files And Component 7 – FRS – IM Element, IRNDB</p>
<p>Path details message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.2.3</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Train composition message</p> <p>The information, which must be transmitted and be accessible, is;.....</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.3.2</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Service Disruption Information,</p> <p>If necessary the RU updates the Wagon and Intermodal Unit Operational Database.</p> <p>If necessary the IM updates the infrastructure data in the Infrastructure Restriction Notice Database and / or the path, respectively the train database.</p>	<p>4.2.5</p> <p>4.2.5.1</p> <p>4.2.5.1</p>	<p>Component 4 – FRS: Common interface Component 4 – FRS: Common interface Component 4 – FRS: Common interface</p>
<p>Interfaces with the TSI operation and traffic management</p>	<p>4.3.4</p>	<p>Not part of Global Architecture</p>



<p>The subsystem Operation and Traffic Management specifies the procedures and related equipment enabling a coherent operation of the different structural subsystems, both during normal and degraded operation, including in particular train driving, traffic planning and management.</p> <p>The subsystem Telematic Applications for Freight mainly specifies applications for freight services including real-time monitoring of freight and trains and the management of connections with other modes of transport.</p> <p>In order to ensure consistency between both TSIs, the following procedure applies.</p> <p>When the specifications of the TSI Operation and Traffic Management related to the requirements of this TSI will be written and / or will become subject to amendments, then the body in charge of this TSI must be consulted.</p> <p>In the case that the specifications of this TSI related to operational requirements specified in the TSI Operation and Traffic Management should be subject to any amendment, the body in charge of the TSI Operation and Traffic Management must be consulted.</p>		<p>Component Documents</p>
<p>The Rolling Stock Operational Data</p> <p>This data shall include temporary data, such as</p> <ul style="list-style-type: none"> - restrictions, - current and projected maintenance actions, - km and fault counters, etc.; and - all data that could be considered as "status" (temporary speed restrictions, brake isolated, needs for repair and fault description, etc.). <p>For all three different parties (Railway Undertaking as Duty holder during its transport control, Keeper of rolling stock and User (Hirer) of rolling stock) the operational rolling stock data must be accessible by the authorised user, down to his predefined authorised level, using the single key given by the wagon id (wagon number).</p> <p>The operational rolling stock data is a part of the European wide Wagon and Intermodal Unit Operational Database</p>	<p>4.2.11.4</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database</p>
<p>Path confirmed message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.2.4</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Train accepted message</p> <ul style="list-style-type: none"> - Creation 	<p>4.2.3.3</p>	<p>Component 5 – FRS: Data Model</p>



<ul style="list-style-type: none"> - Data source - Format / Transmission - Storage - Data usage 		& Messages
<p>Train running forecast message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.4.2	Component 5 – FRS: Data Model & Messages
<p>Train Location,</p> <p>The access to this information must be independent from the communication relation RU / IM during the train running, which means that the RU must have a single access address to this information. (This means, that the access to this information must be independent from which IM has stored the information or part of it).</p>	<p>4.2.6</p> <p>4.2.6.1</p>	Component 5 – FRS: Data Model & Messages
<p>Path details refused message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.2.5	Component 5 – FRS: Data Model & Messages
<p>Train not suitable message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.3.4	Component 5 – FRS: Data Model & Messages
<p>Train running information message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.4.3	Component 5 – FRS: Data Model & Messages
<p>Train Running Interrupted message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.5.2	Component 5 – FRS: Data Model & Messages
Wagon / Intermodal unit ETI / ETA,	4.2.7	Component 6 – Guidance Document - RU Trip Planning
Path cancelled message	4.2.2.6	Component 5 –



<ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 		FRS: Data Model & Messages
<p>Train ready message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.3.5	Component 5 – FRS: Data Model & Messages
<p>Enquiry about train running messages</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission 	4.2.6.2	Component 5 – FRS: Data Model & Messages
<p>Wagon Movement</p> <p>For the reporting of the movement of a wagon, the following data must be stored and electronically accessible.</p>	4.2.8 4.2.8.1	Component 2 – FRS: Wagon & Intermodal Op. Database
<p>Path not available message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.2.7	Component 5 – FRS: Data Model & Messages
<p>Train Position message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	4.2.3.6	Component 5 – FRS: Data Model & Messages
<p>Enquiry about the train delay / performance messages</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission 	4.2.6.3	Component 5 – FRS: Data Model & Messages
<p>ETI / ETA calculation</p> <p>This is the ETA for the Wagon and must be sent to the LRU.</p> <p>It must be electronically stored along with wagon movement.</p> <p>The LRU must grant access to the customer for his relevant data, according to contractual conditions.</p>	4.2.7.2	Component 6 – Guidance Document - RU Trip Planning



<p>For the Intermodal units on a wagon, the wagon ETIs are also ETIs for the Intermodal units. Regarding the ETAs for Intermodal units it should be noticed, that the RU is not in the position to calculate such an ETA beyond the rail transportation part. Therefore the RU can only deliver ETIs related to the Intermodal terminal.</p> <p>The Lead RU is responsible for the comparison of the ETA with the commitment to the customer.</p> <p>As a basis for the Alert management process the LRU must have the possibility for a wagon related enquiry on deviations.</p>		
<p>Interchange Reporting,</p> <p>The information data of these messages must be stored in the Wagon and Intermodal Unit Operational Database.</p>	<p>4.2.9</p> <p>4.9.2.1</p>	<p>Component 2 – FRS: Wagon & Intermodal Op. Database</p>
<p>Receipt confirmation message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.2.8</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Train at start message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Data usage 	<p>4.2.3.7</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Enquiry about Train Identifier messages</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission 	<p>4.2.6.4</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon ETI / ETA message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Usage 	<p>4.2.7.3</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon Release Notice message</p> <p>This events must be stored in the Wagon and Intermodal Unit Operational Database</p> <p>The following data must be easy accessible to RU and LRU as stored data in databases:</p>	<p>4.2.8.2</p>	<p>Component 5 – FRS: Data Model & Messages</p>



<ul style="list-style-type: none"> - Transportation unit, identification, size and type, - Unit capacity used, - Total weight (Booked/actual total weight (mass) of goods, including packing and carrier's equipment), - Dangerous goods indication. 		
<p>Enquiry to IM about the Train Forecast messages</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission 	<p>4.2.6.5</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Alert message</p> <ul style="list-style-type: none"> - Creation - Data source - Format / Transmission - Storage - Usage 	<p>4.2.7.4</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon Departure Notice message</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>This events must be stored in the Wagon and Intermodal Unit Operational Database.</p>	<p>4.2.8.3</p>	<p>Component 5 – FRS: Data Model & Messages And Component 2 – FRS: Wagon & Intermodal Op. Database</p>
<p>Wagon Interchange Notice message</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>In addition the following data must be easily accessible as stored data in databases:</p> <ul style="list-style-type: none"> • Transportation unit identification (number, size, type), • Total weight (Booked/actual total weight (mass) of goods, including packing and carrier's equipment), • Unit capacity used, • Dangerous good details, ID. 	<p>4.2.9.2</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon Interchange Notice / Sub message</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>In addition the following data must be easily accessible as stored data in databases:</p> <ul style="list-style-type: none"> • Dangerous goods details, identification. 	<p>4.2.8.3</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Enquiry to IM about Trains at Reporting Location messages</p>	<p>4.2.6.6</p>	<p>Component 5 – FRS: Data Model</p>



<ul style="list-style-type: none"> - Creation - Data source - Format / Transmission 		& Messages
Enquiry about wagon deviation messages <ul style="list-style-type: none"> - Creation - Data source / creation - Format / Transmission - Storage - Usage 	4.2.7.5	Component 5 – FRS: Data Model & Messages
Wagon Yard Arrival message <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>This event must be stored in the Wagon and Intermodal Unit Operational Database.</p>	4.2.8.4	Component 5 – FRS: Data Model & Messages
Wagon Yard Departure message <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>This event must be stored in the Wagon and Intermodal Unit Operational Database.</p>	4.2.8.5	Component 5 – FRS: Data Model & Messages
Wagon Received At Interchange message <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage 	4.2.9.4	Component 5 – FRS: Data Model & Messages
Wagon Exception message <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>This information must be stored in the Wagon and Intermodal Unit Operational Database</p> <p>In addition the following data must be easily accessible as stored data in databases:</p> <ul style="list-style-type: none"> - Transportation unit identification, - Dangerous goods indication. 	4.2.8.6	Component 5 – FRS: Data Model & Messages
Wagon Refused At Interchange message <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage 	4.2.9.5	Component 5 – FRS: Data Model & Messages



<p>Wagon Exception message New ETI / ETA Request</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage <p>In addition the following data must be easy accessible as stored data in databases:</p> <ul style="list-style-type: none"> ▪ Transportation unit identification, ▪ Dangerous good indication. 	<p>4.2.8.7</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon Arrival Notice message</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage 	<p>4.2.8.8</p>	<p>Component 5 – FRS: Data Model & Messages</p>
<p>Wagon Delivery notice message</p> <ul style="list-style-type: none"> - Data source / creation - Format / Transmission - Storage - Data usage 	<p>4.2.8.9</p>	<p>Component 5 – FRS: Data Model & Messages</p>





4 The Specifications

Each specification as required by this deliverable is provided as a separate document as an Appendix under the appropriate headings as follows.

4.1 Specification 1 – Wagon/ILU Trip Planning

The requirements for RUs to generate ETIs and ETAs are specified in many locations in the TAF TSI however they are most clearly stated in § 4.2.7.3 “.....sending ETI or updated ETI from one RU to the next in the transport chain. The last RU in the transport chain of the wagon sends the ETA to the LRU.”

In § 4.2.12.2 (Other Databases) the TAF TSI states that “....This Database shows the movement of a wagon and of an intermodal unit from departure through to final delivery at customer siding with ETIs and actual times at different locations until the final delivery time ETA.”

In § 2.3.2 (Considered Processes) the TAF TSI states “... The LRU then prepares the preliminary wagon order (movement request) individually for each RU.....The addressed RUs check the availability of the train path. The responses from the RUs enable the LRU to ...until the trip plan finally fits the customer requirements.” Note: This requirement is covered in the Movement Planning Cycle defined in this guideline.

In § 4.3.4 (Interfaces with the ...) the TAF TSI states that “....The subsystem, Telematic Application for Freight specifies applications for freight services including real time monitoring of freight and trains and the management of connections with other modes.”

The descriptions listed above define what capability RUs must have. The purpose of this document is to provide a guideline or functional recommendations for RUs as to how these requirements can best be fulfilled. These guidelines are based upon experience gained from the operation and use of existing systems which are currently in operation in Europe and North America. (See Appendix A)

4.2 Specification 2 - Wagon & Intermodal Operating Data

The TAF TSI obliges to install a Wagon and Intermodal Unit Movement Data Base (WIMO) for the freight services in the complete freight rail network of the member States of the European Union.

The movement part for a wagon or Intermodal unit in the database is set up at the latest when receiving the release time for the wagons or Intermodal unit from the customer. This release time is the first movement entry for a wagon into the Wagon and Intermodal Unit Operational Database related to an actual transport journey.

The Wagon and Intermodal Unit Operational Database is the most important one for the tracking of wagons and therefore for the communication between the RUs involved and the Lead RU. This database shows the movement of a wagon and of an Intermodal unit from departure through to final delivery at customer sidings with ETIs and actual times at different locations until the final delivery time ETA. The database also shows the different status of the rolling stock such as:

- Status: loading of the rolling stock
This status is required for the information exchange between the RU and the IMs and to other railway undertakings involved in the transport journey.
- Status: loaded wagon on journey
This status is required for the information exchange between the IM and the RU, with other infrastructure managers and with other railway undertakings involved in the transport journey.
- Status: empty wagon on journey
This status is required for the information exchange between the IM and the RU, with other infrastructure managers and railway undertakings involved in the transport journey.
- Status: unloading of rolling stock
This status is required for the information exchange between the RU at destination and the Lead RU for the transport.



- Status: empty wagon under fleet management control

This status is required to get the information about availability of a vehicle of defined characteristics.

(See Appendix B)

4.3 Specification 3 - Reference Files

Normalised codes are needed to support data exchange as defined in the Technical Specification for Interoperability (TSI) relating to the subsystem Telematic Applications for Freight of the Trans-European Conventional Rail System referred to in Article 6(1) of Council Directive 2001/16/EC. To ensure data quality, the TSI for Telematic Applications for Freight (TAF) defines the need for centrally stored and administered reference files to be a repository for these codes. These codes and reference files ensure consistency of data interpretation across various application systems. (See Appendix C)

4.4 Specification 4 - Infrastructure Restriction Notice Data

Each IM is responsible for the suitability of a path on his infrastructure and the RU is obliged to check the train characteristics against the values given in the path details of its contracted path.

Without prejudice to the conditions for the usage of a path in the Network Statements or to the responsibilities in case of any restrictions in the infrastructure explained in the TSI Operation and Traffic Management, the RU must know before preparing the train, whether there are any restrictions on the line segments or stations (nodes) affecting its train composition described in the path contract.

For this the IMs must install and fill-in Infrastructure Restriction Notice Databases. The structure of such a database is outlined in Annex A index 2. The entries of these databases are based on segments in line with the relevant Network Statements with the addition of restriction information. These databases must be accessible via the Common Interface [...]

The RU is obliged to take into account all restrictions in the Infrastructure Restriction Notice Database affecting its train running until the pre-departure period. If nothing else is defined in a contract between the IM and RU, the pre-departure period starts one hour before the scheduled time of departure.”

In the pre-departure period the IM must notify directly the RU of any relevant changes arising in the Infrastructure Restriction Notice Database. (See Appendix D)

4.5 Specification 5 - Common Interface

In relation to the Common Interface, the Telematics Application for Freight Services Sub System (TAF TSI) documents the essential requirements for Telematics Applications (referring to 2.7.1 and 2.7.2 of Annex III to Directive 2001/16/EC):

The essential requirements for Telematic 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.

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.

Consequently, chapter 4.2.14.7 of the TAF TSI document that the Common Interface is mandatory for each actor in order to join the TAF TSI rail interoperability community and must have the following capabilities :



- message formatting of outgoing messages according to the metadata,
- signing and encryption of outgoing messages,
- addressing of the outgoing messages,
- authenticity verification of the incoming messages,
- decryption of incoming messages,
- conformity checks of incoming messages according to metadata,
- handling the single common access to various databases.

(See Appendix E)

4.6 TAF TSI Data and Message Model

The data formats of all TAF TSI messages are shown in this data catalogue and are also available as an XSD data model. These formats and data elements are to be used as a baseline for developing the message exchange as defined in the TAF TSI. However, during the technical definition and implementation phases, they may be subject to modification based on mutual consent according to approved change management procedures. (See Appendix F)



5 Actions required by RUs, IMs and other Stakeholders

The contents of this deliverable (including the Appendices) that are relevant to each stakeholder should be used to conclude planning for the implementation of the TAF TSI.

During 2006, decisions will be taken by the Rail industry working together through UIC, CER & EIM, regarding the delivery of the central components needed for the TAF TSI (Messaging, Wagon & Intermodal Database, Reference Files). The creation of these elements of the TAF TSI should not form part of individual stakeholder implementation planning.