TAF TSI Executive Summary

Introduction.

The aim of this document is to give an overview to OTIF about the TAF TSI functions, which are:

- *described in the TAF regulation and*
- *implemented now by the European rail sector*

4.2.1. Consignment Note data

The Consignment Note has to be sent by the Customer to the Lead RU. It must show all the information needed to carry a consignment from the consignor to the consignee according to 'Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (CIM)', 'Uniform Rules concerning Contracts of Use of Vehicles in International Rail Traffic (CUV) and valid national rules'. The LRU must supplement additional information. A subset of the consignment note data including the additional ones, are described in Appendix I, TAF TSI — ANNEX D.2: APPENDIX A (WAGON/ILU TRIP PLANNING) and Appendix I, TAF TSI — Annex D.2: Appendix F — TAF TSI Data and Message Model)) listed in the table in Appendix I of this Regulation.

Requirements diagram in package '4.2.1. Consignment Note data '

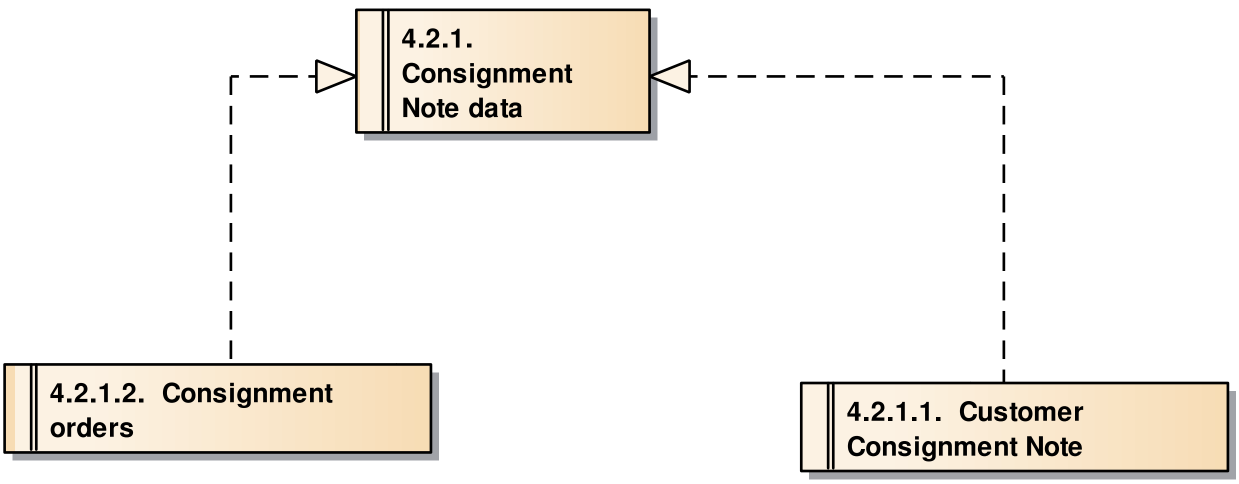


Figure 1: 4.2.1. Consignment Note data

4.2.2. Path Request

The Path defines the requested, accepted and actual data to be stored concerning the path and the characteris tics of the train for each segment of that path. This information must be updated whenever a change occurs. The information of the annual path therefore needs to allow the retrieval of the data for short term amendments. In particular, the Customer, in case he is impacted, must be informed by LRU *(Lead Railway Undertaking: Responsible RU, which organises and manages the transport line according to the customer's commitment. It is the single point of contact for the customer. If more than one Railway Undertaking is involved in the transport chain, the LRU is responsible for the co-ordination of the various Railway Undertakings. A customer may be especially for Intermodal transport an Intermodal service integrator.)*

Path Request on short notice

Due to exceptions during the train running or due to transport demands on a short time basis, a railway undertaking must have the possibility to get an ad hoc path on the network.

In the first case, immediate actions have to be started, whereby the actual train composition based on the train composition list is known.

In the second case, 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.

The basic parameter 'Short notice Path Requests' should be handled between the RU and the infrastructure manager (IM). In this basic parameter the term IM can refer to IMs and if applicable to Allocation Bodies (see Directive 2012/34/EU). These requirements are valid for all Short Notice Path Requests. This Basic Parameter (BP) does not include Traffic Management issues. The time limit between Short Term paths and Traffic Management path changes is subject to Local Agreements.

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.2. Path Request '

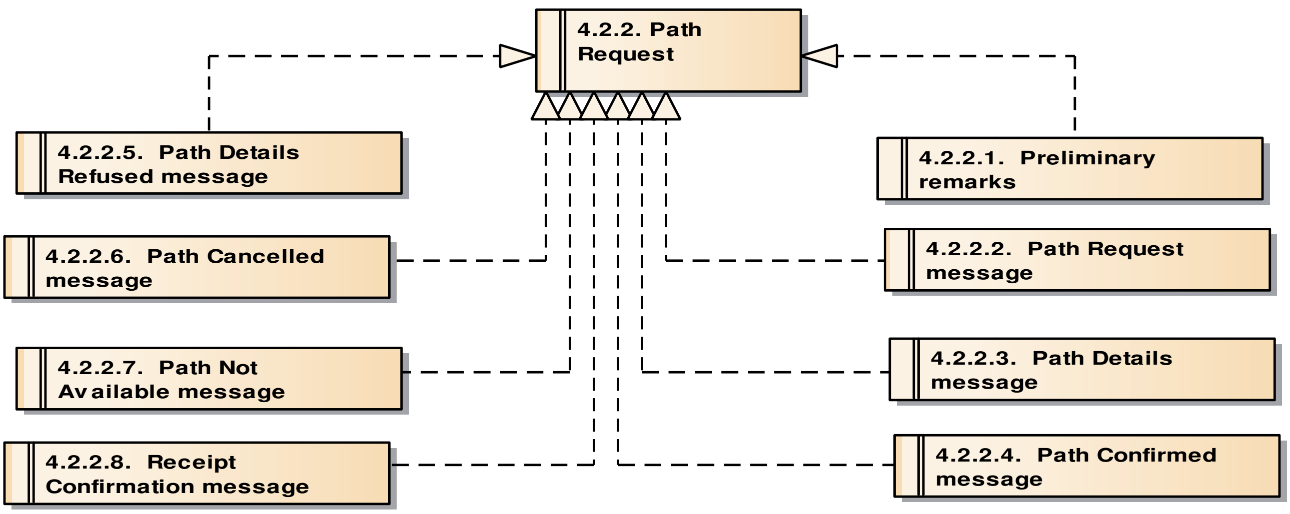


Figure 2: 4.2.2. Path Request

4.2.3. Train Preparation diagram

This basic parameter describes the messages which must be exchanged during the train preparation phase until the start of the train. Train preparation includes compatibility check between the train and the route. The RU does this check on basis of information provided by concerned IMs on infrastructure description and infrastructure restrictions.

During train preparation the RU must send the train composition to the next RUs. According to contractual agreements this message must also be sent from the RU to the IM(s) with whom it has contracted a path section.
If the train composition is changed at a location, this message must be exchanged once more with information updated by the RU responsible.

For the preparation of the train, the RU must have access to the infrastructure restriction notices, to the technical wagon data (Rolling Stock Reference Databases, Chapter 4.2.10.2: The Rolling Stock Reference Databases), to the information on dangerous goods and to the current, updated information status on the wagons (Chapter 4.2.11.2: Other Databases: The Wagon and Intermodal Unit Operational Database). This applies to all wagons on the train. At the end the RU must send the train composition to the next RUs. 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).

If the train composition is changed at a location, this message must be exchanged once more with information updated by the RU responsible. 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.

Further details about path request are available in the sequence diagram in the new Annex II.

Custom diagram in package '4.2.3. Train Preparation '

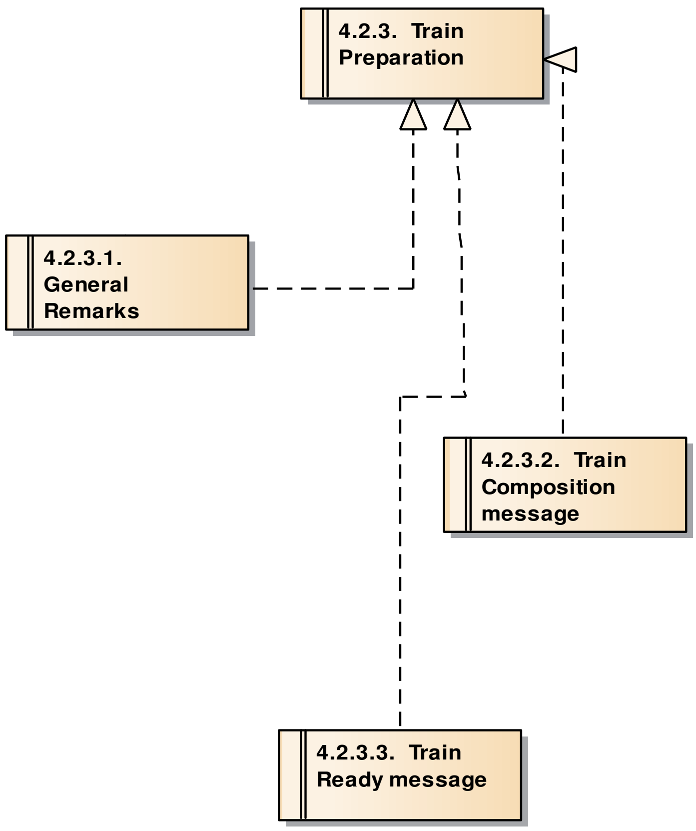


Figure 3: 4.2.3. Train Preparation

4.2.4. Train Running Forecast diagram

This basic parameter lays down the train running information and train-running forecast. It must prescribe how the dialogue between infrastructure manager and railway undertaking, are to be maintained in order to exchange train running information and train running forecasts.

This basic parameter lays down how the infrastructure manager must, at the appropriate time, send train-running information to the railway undertaking and the subsequent neighbouring infrastructure manager involved in the operation of the train. The train running information serves to provide details of the current status of the train at contractually agreed reporting points.

The train-running forecast is used to provide information about the estimated time at contractually agreed forecast points. This message shall be sent from the infrastructure manager to the railway undertaking and the neighbouring infrastructure manager involved in the run.

Contractual agreements shall specify Reporting Points for the train's movement. This information exchange between RUs and IMs always takes place between the IM in charge and the RU, who has booked the path on which the train is actually running.
Under contractual agreement the LRU will provide Customer the Train Running Forecast and Train Running Information. The reporting points will be agreed by both parties within the contract.

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.4. Train Running Forecast '

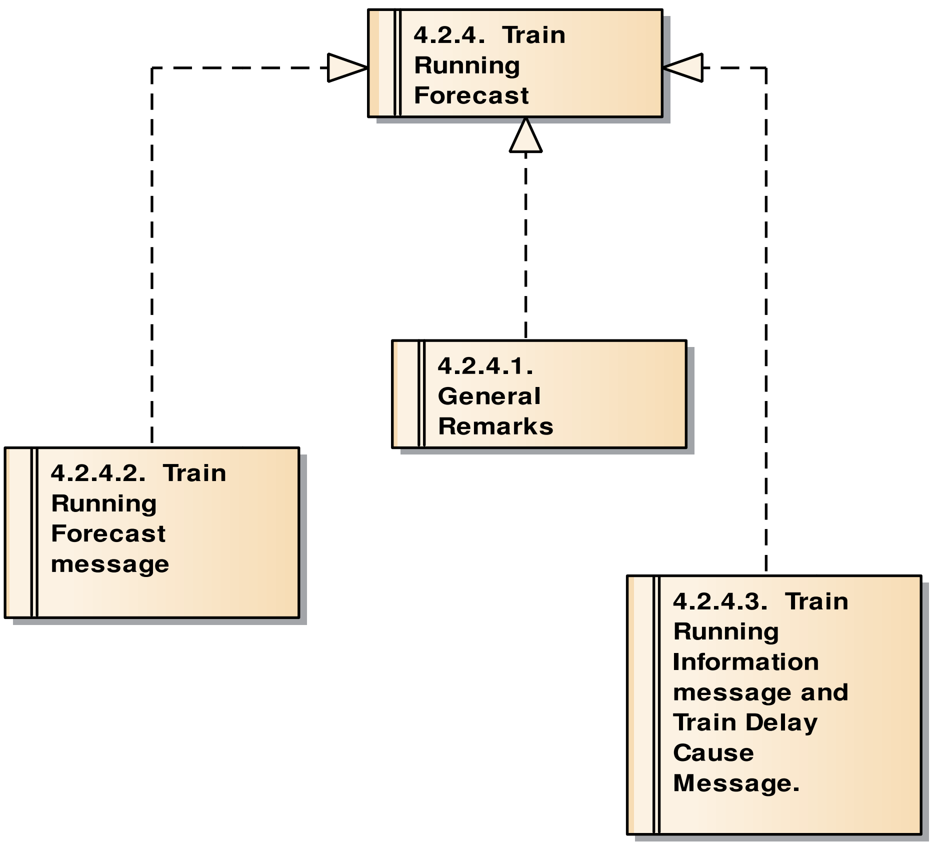


Figure 4: 4.2.4. Train Running Forecast

4.2.5. Service Disruption Information diagram

This basic parameter lays down how service disruption information is handled between the railway undertaking and the infrastructure manager.

When the RU learns about a service disruption during the train running operation for which it is responsible, it must immediately inform the IM concerned (this may be done orally by the RU). If train running is interrupted, the infrastructure manager shall send a 'train running interrupted' message to the contracted RU and the next neighbouring IM involved in the train run.

If the length of the delay is known, the infrastructure manager must send a train running forecast message instead.

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.5. Service Disruption Information '

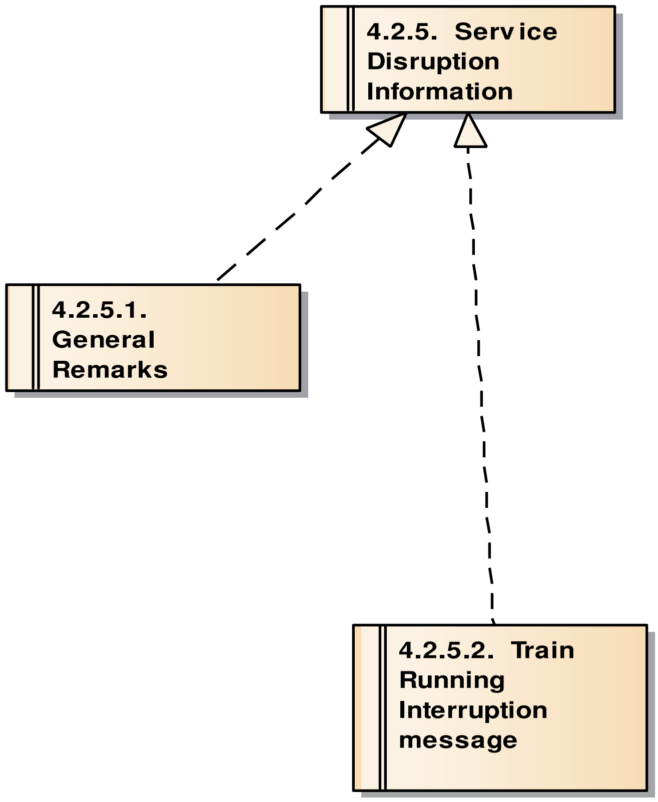


Figure 5: 4.2.5. Service Disruption Information

4.2.6. Shipment ETI/ETA diagram

"The ETI/ETA calculation is based on the information from the infrastructure manager (IM) in charge, which sends, within the Train Running Forecast message, the Train Estimated Time of Arrival (TETA) for defined reporting points (in any case for handover, interchange, or arrival points including Intermodal terminals) on the agreed train path e.g. for the handover point from one IM to the next IM ."

Then, ETA is for wagons and TETA is for Trains , therefore the first one is obtained from the Train Running Forecast (TETA sent from IM to RU and neighboring IMs) for contractually agreed forecast points split by the Railway Undertakings (RUs) into wagons composing the train, because the RU knows the Train Composition (TAF - Train Composition Message).

Concerning the information about ETA (Estimated Time of Arrival) , within TAF TSI it is prescribed on section 4.2.6 Shipment ETI/ETA: *"The wagon related ETA as well as the ETI is also the basic information in the communication between LRU and RU. This information is the main instrument for the LRU to monitor the physical transport of a shipment and to check it against the commitment to the customer."*

"Under contractual agreement the LRU will provide Customer the estimated time of arrival (ETA) and estimated time of interchange (ETI) at shipment level. The level of detail will be agreed by both parties within the contract."

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.6. Shipment ETI/ETA '

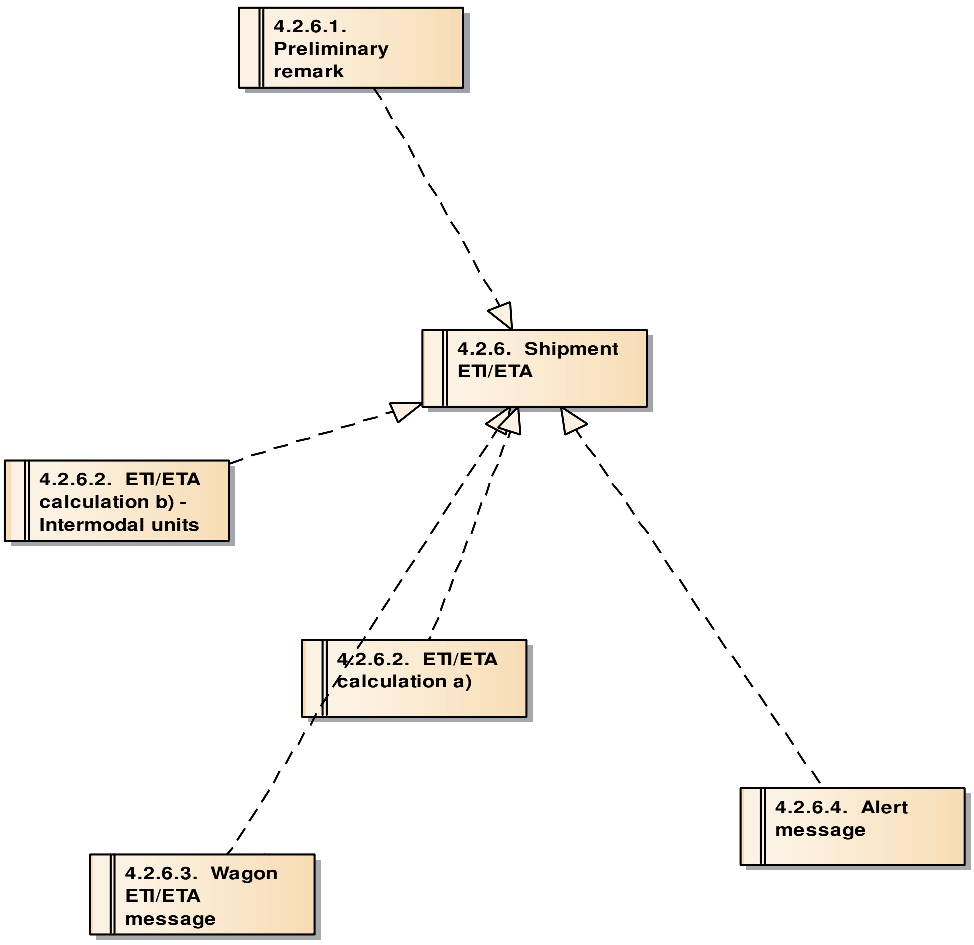


Figure 6: 4.2.6. Shipment ETI/ETA

4.2.7. Wagon Movement diagram

For the reporting of the movement of a wagon, data included in these messages must be stored and electronically accessible. They must be also exchanged within message on contractual base to authorised parties:

- Wagon Release notice
- Wagon Departure notice
- Wagon Yard arrival
- Wagon Yard departure
- Wagon Exceptions message
- Wagon Arrival notice
- Wagon Delivery notice
- Wagon Interchange reporting

Under contractual agreement the LRU must provide to the Customer the wagon movement information using the messages above described.

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.7. Wagon Movement '

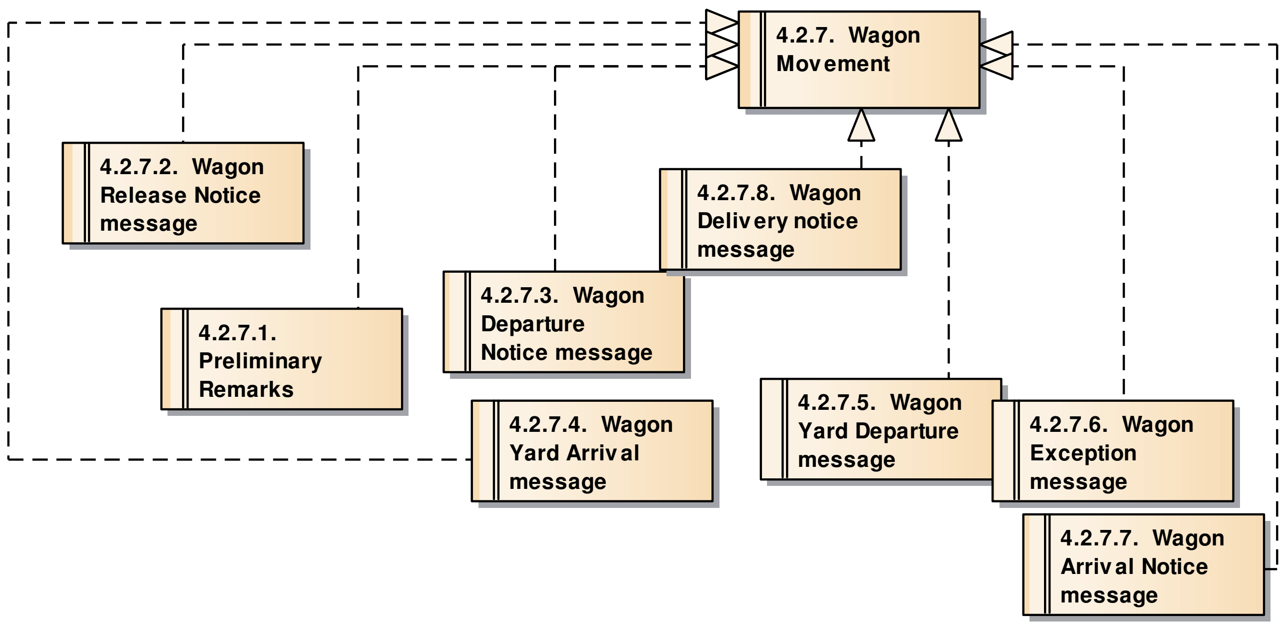


Figure 7: 4.2.7. Wagon Movement

4.2.8. Interchange Reporting diagram

The interchange reporting describes the messages attached to the transfer of responsibility for a wagon between two railway undertakings, which occurs at interchange points. It also commands the new RU to make an ETI calculation and to follow the process as described in Chapter 4.2.6 (Shipment ETI/ETA).

The following messages must be exchanged:

— Wagon Interchange Notice,
— Wagon Interchange Sub Notice,
— Wagon Received At Interchange,
— Wagon Refused At Interchange.

The information data of these messages must be stored in the Wagon and Intermodal Unit Operational Database. In case of any deviation a new ETI/ETA must be generated and communicated according to the process described in Chapter 4.2.6: Shipment ETI/ETA. The sequence diagram for these messages is shown in connection with the wagon movement messages in the document TAF TSI — Annex A.5:Figures and Sequence Diagrams of the TAF TSI messages' listed in Appendix I.

Further details about path request are available in the sequence diagram in the new Annex II.

Requirements diagram in package '4.2.8. Interchange Reporting '

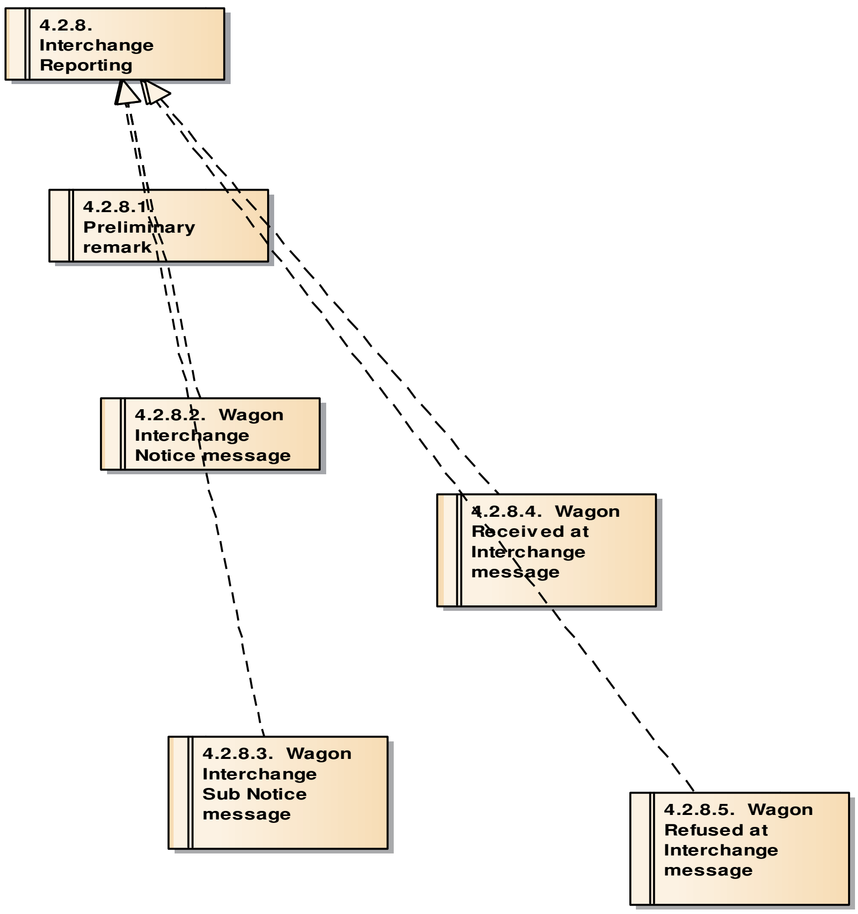


Figure 8: 4.2.8. Interchange Reporting

4.2.9. Data Exchange for Quality Improvement diagram

To be competitive the European Railway Industry must deliver higher service quality to its customers (see also Annex III, Article 2.7.1 to the Directive 2008/57/EC). A measurement process is an essential post trip process to support quality improvements. 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. The process involves the IMs and the RUs (especially if they are Lead RUs) selecting an individual quality parameter, a route or location and a measurement period in which actual results are to be measured against predetermined criteria and which normally have been set out in a contract. The results of the measurement process must clearly show the achievement level against the target which has been agreed upon between the contracting parties.

Requirements diagram in package '4.2.9. Data Exchange for Quality Improvement '

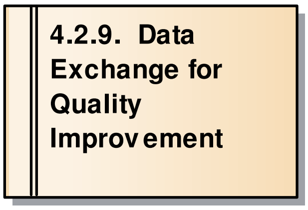


Figure 9: 4.2.9. Data Exchange for Quality Improvement

4.2.10. The Main Reference Data diagram

The Infrastructure Data (the Network Statements and the infrastructure restriction notices) and 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. Both types of data together allow an assessment of the compatibility of the rolling stock with the infrastructure, help to avoid multiple data input, which increase especially the data quality, and they give a clear picture on all available installations and equipment at any time for fast decisions during the operation.

Requirements diagram in package '4.2.10. The Main Reference Data '

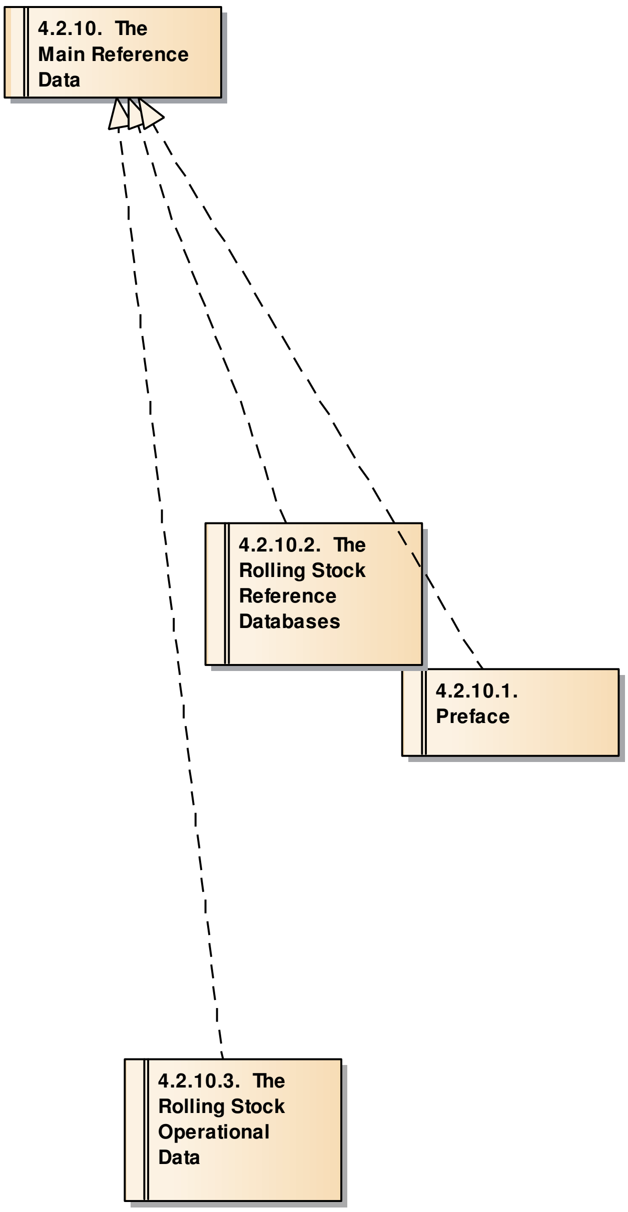


Figure 10: 4.2.10. The Main Reference Data

4.2.11. Various Reference Files and Databases

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. Where a reference file is in common use with the TAP TSI , the development and changes must be in line with TAP TSI , in order to achieve optimum synergies.

a. Reference File of the emergency services, correlated to type of hazardous goods.
b. Centrally stored and administrated:
c. Reference File of the Coding for all IMs, RUs, Service provider companies;
d. Reference File of the Coding for Freight Transport Customers;
e. Reference File of the Coding of Locations (Primary and subsidiary),
f. Wagon and Intermodal Unit Operational Database,
g. Trip plan for wagon/Intermodal unit.

4.2.12. Networking & Communication diagram

This subsystem will see, over time, the growth and interaction of a large and complex Telematics rail interoperability community with hundreds of participating players (RUs, IMs, etc.), which will compete and/or cooperate in serving the market's needs. The Network & Communication infrastructure supporting such rail interoperability community will be based on a common Information Exchange Architecture, known and adopted by all participating players.

The Information Exchange Architecture **as implemented:**:

— is designed to reconcile heterogeneous information models by semantically transforming the data that is exchanged between the systems and by reconciling the business process and application-level protocol differences,
— has minimum impact on the existing IT architectures implemented by every actor,
— safeguards IT investments made already.

The Information Exchange Architectures favours a mostly Peer-to-Peer type of interaction between all players, while it guarantees the overall integrity and consistency of the rail interoperability community by providing a set of centralised services.

A Peer-to-Peer interaction model allows the best cost distribution between the different players, based on actual usage and it will present, in general, lesser scalability problems. A pictorial representation on the general architecture is given in the document ' TAF TSI — Annex A.5 Figures and Sequence Diagrams of the TAF TSI messages', Chapter 1.5, listed in Appendix I.

Requirements diagram in package '4.2.12. Networking & Communication'

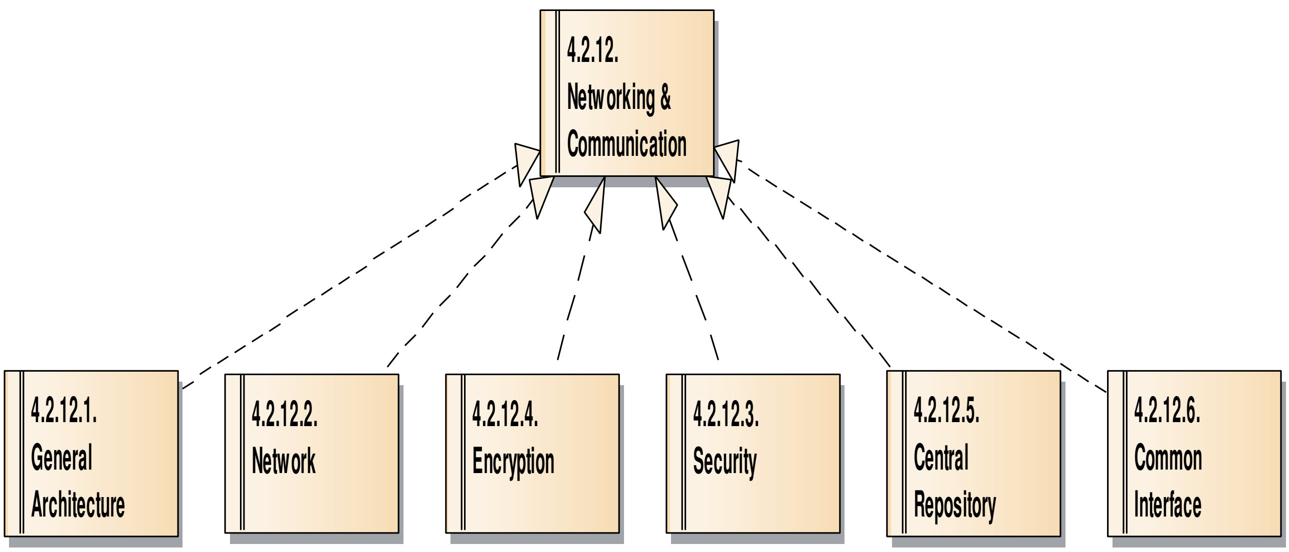


Figure 11: 4.2.12. Networking & Communication

4.2.12.6. Common Interface

A Common Interface is mandatory for each actor in order to join the rail interoperability community. A Common Interface has to be able to handle:

- 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.

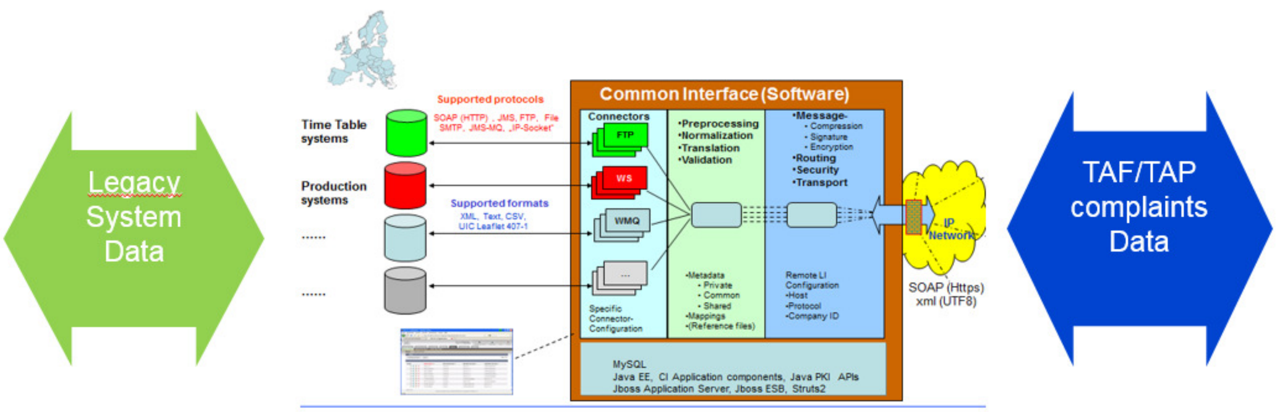
Each instance of a Common Interface will have access to all the data required according the TSI within each Wagon keeper, LRU, RU, IM, etc., whether the relevant Databases are central or individual (see also document ' TAF TSI — Annex A.5: Figures and Sequence Diagrams of the TAF TSI messages', Chapter 1.6, listed in Appendix I).

Where a Common Interface is in common use with the TAP TSI (2), the development and changes must be in line with TAP TSI (2), in order to achieve optimum synergies. Based on the results of authenticity verification of incoming messages, a minimum level of message acknowledgement can be implemented:

- positive send ACK;
- negative send NACK.

A common interface uses the information in the central repository in order to manage the above tasks. An actor may implement a local 'mirror' of the central repository to shorten response times.

Common Interface Functionality '4.2.12.6. Common Interface'



ANNEX I – TAF TSI Implementation progress

0.1. Evolution of TAF functions at Country level

In line with the timeline defined in the TAF TSI Master Plan and the request of the TAF TSI Implementation Co-operation Group members, the reporting of this second report is limited to the TAF TSI functions which could be achieved by 1st half 2015:

- Reference Files Function:
  - Company Codes
  - Primary Location Codes
- Common Interface Function
- Rolling Stock Reference Database.
- Train Running Information Function
- Wagon and Intermodal Unit Operational Database (WIMO) Function

The data was collected by the JSG tool in July 2015 and transferred to the ERA TAF TSI Implementation Co-operation Group IT tool.

Concerning the criteria adopted to estimate the level of implementation per country, it has been agreed within the context of the TAF TSI Implementation Co-operation Group to apply a weighting factor per company to those functions where the market share of RUs , Wagon keepers and Infrastructure Managers is relevant to have a better view of the degree of implementation per country. Thereby, the weighting factor per company has been applied for the following functions:

- Rolling Stock Reference Database.
- Train Running Information Function
- Wagon and Intermodal Unit Operational Database (WIMO) Function

More details about the particular weighting factor applied is provided in every section for every function. Indeed, it depends on different paramters as track kilometers for Infrastructure Managers, tonne kilometres for Railway Undertakings and number of wagons for Wagon Keepers.

For the remaning fuctions an average calculation for the values supplied by all the companies reporting that they have started freight transport activities or intent to develop it in the near future is applied. Thereby, the average without any weighting factor is applied to the following functions:

- Reference Files Function:
  - Company Codes
  - Primary Location Codes
- Common Interface Function

0.1.1. Implementation status in the 1st half 2015 for Company Codes function

In every country, the **Average Degree of Implemntation (DI)** for the **Company Codes function** is calculated from the data provided by the companies responding the JSG survey in every country without applying any weighting factor. It means that an arithmetic mean of a series of degree of implementation for this fuction supplied by the companies that they have started freight transport activities or intent to develop it in the near future is calculated. It results the value per country and therefore the colour attributed to a particular country.

Average DI = $(\sum_{i=1}^{n} DI(i)) / n$ **;**
Where DI(i) = Degree of Implementation declared by the company (i) starting freight transport activities or intending to develop it in the near future,
and n = number of companies reporting in a country.

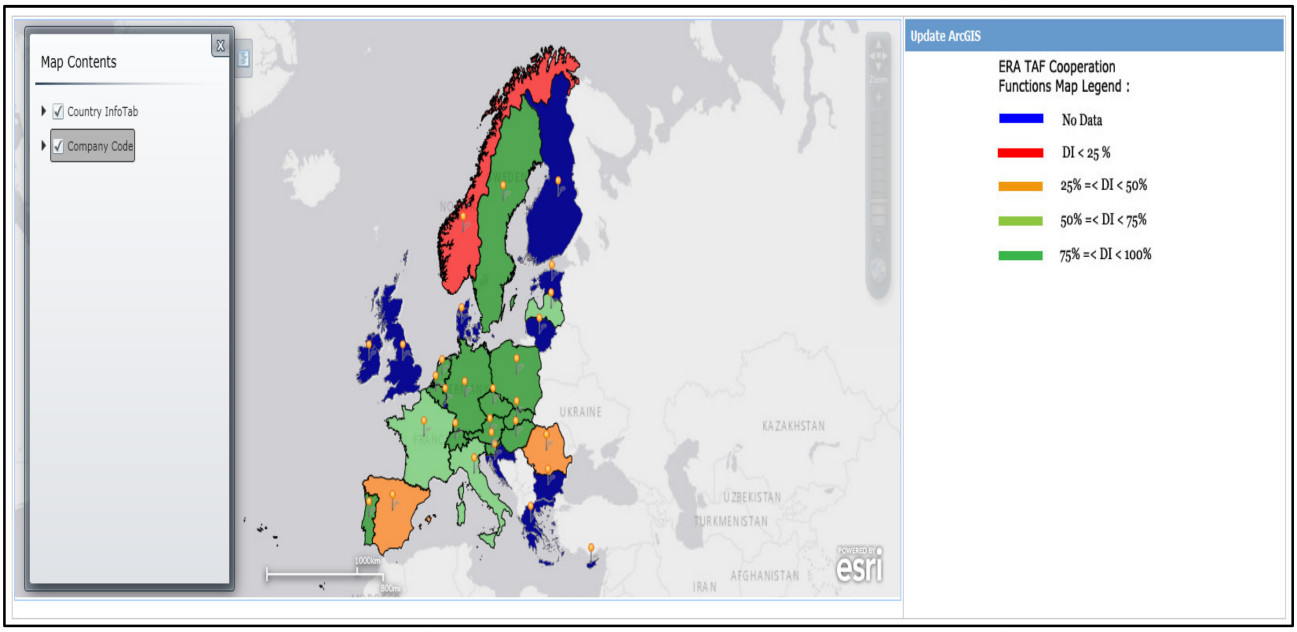


Figure 1: Company Codes function implementation in January 2015.

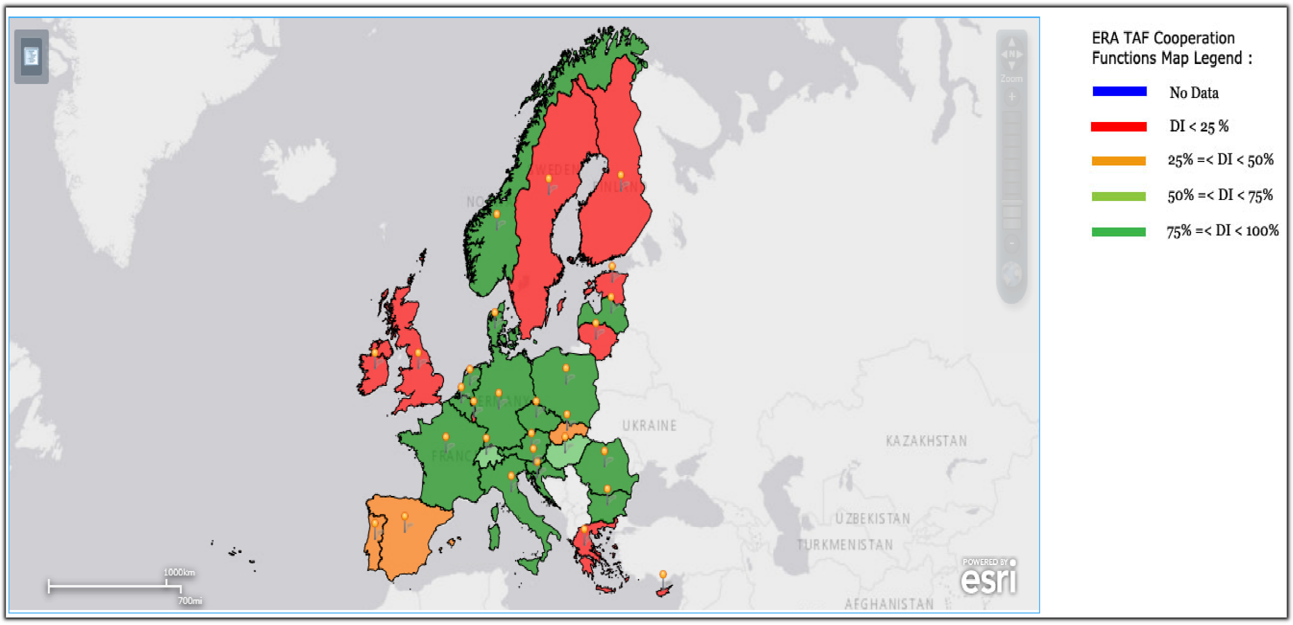


Figure 2: Company Codes function implementation in July 2015.

We can draw from the map the conclusion that in the 1st half of 2015 almost half Infrastructure Managers and Railway Undertakings have already performed the implementation of the **Company Codes function**. Indeed, the data stored in the **Annex 1** indicates an average level of **61% degree of implementation at European level for all companies having reported**.

Whether these results are compared with the data of the 1st Status Report , are the new values of the implementation for this particular function lower?

Indeed, it can be observed that the complete level of fulfilment for Company Codes function has only increased by 2 IMs and by 10 RUs compared to January this year. Thus, it means that with more than double participation in this query, the completion rate has **dropped to 61 % compared with the 88%** level of fulfilment obtained in the 1st release of the Status Report . In particular, it can be remarked that the level of Implementation among RUs is much lower than for IMs. This means that at European level the deployment of this function is still at the Planning Phase in an "optional" reference implementation; therefore, most of the countries are either in orange coloured or in light green coloured on the map.

In every country, the average level of deployment is calculated from the data provided by the companies responding the JSG survey in that country, thus this average defines the colour attributed to a particular country. Within this raw data provided by the companies, we have collected some observations from the companies. In most of the cases the company codes were already in use before the delivery of the TAF TSI Implementation Master Plan (January 2013). Indeed, it means an advantage in terms of TAF TSI implementation for those companies having the codes already included in UIC RICS code list and inherited by the TAF TSI CRD company codes repository. Other companies reported that they are not yet using the company codes to exchange TAF TSI messages at national level, while most of the companies just use such codes for international traffic and IT tools implementing TAF TSI functionality as Train Information System (TIS) tool hosted by Rail Net Europe (RNE).

In addition, compared to the previous report, some small companies joining at this stage the implementation of TAF TSI, have reported that they are in the process to get the company code applying the procedure described in the ERA-TD-103: TAF TSI - Annex D.2 : Appendix C - Reference Files. Therefore, a new code for these companies will be assigned into the UIC – RICS database and replicated into the CRD hosted by RNE.

0.1.2. Implementation status in 1st half of 2015 for Primary Location Codes function

In every country, the **Average Degree of Implemntation (DI)** for the **Primary Location Codes function** is calculated from the data provided by the companies responding the JSG survey in every country without applying any weighting factor. It means that an arithmetic mean of a series of degree of implementation for this fuction supplied by the companies that they have started freight transport activities or intend to develop it in the near future is calculated. It results the value per country and therefore the colour attributed to a particular country.

Average DI = $\left(\sum_{i=1}^{n} DI(i) \right) / n$;
Where DI(i) = Degree of Implementation declared by the company (i) starting freight transport activities or intending to develop it in the near future,
and n = number of companies reporting in a country.

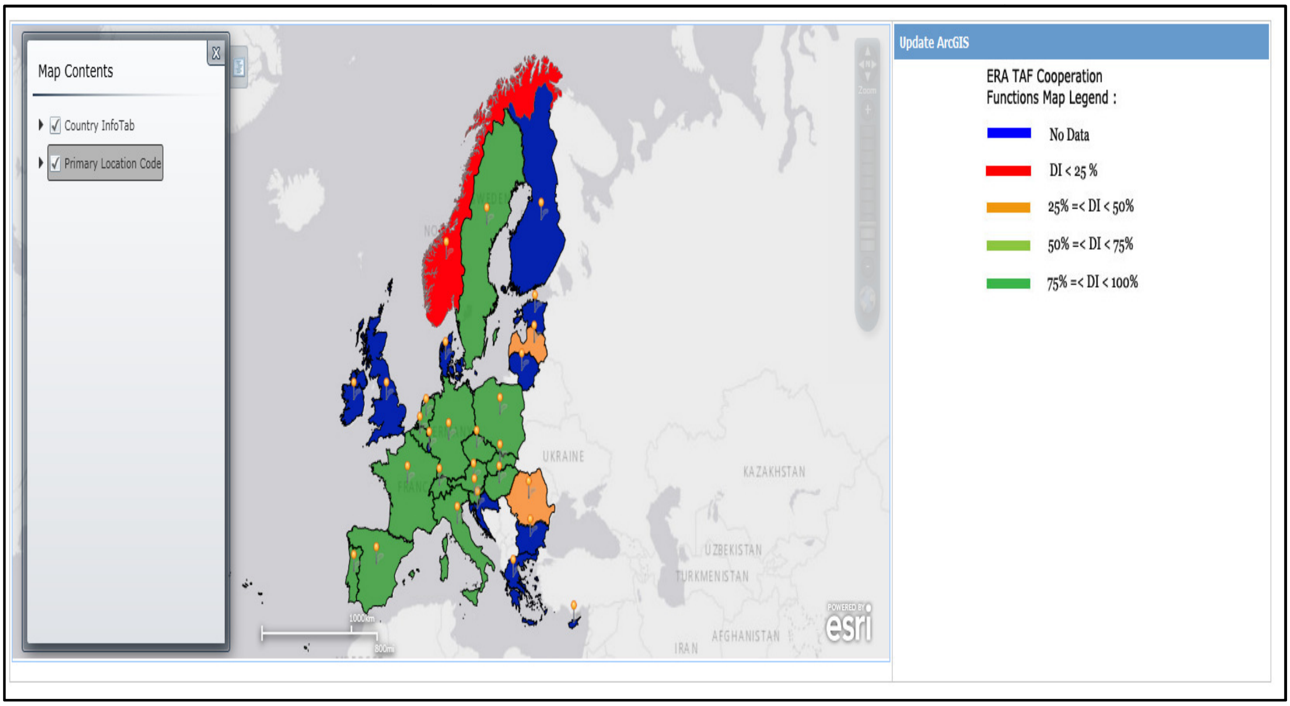


Figure 3: Primary Location Codes function implementation in January 2015.

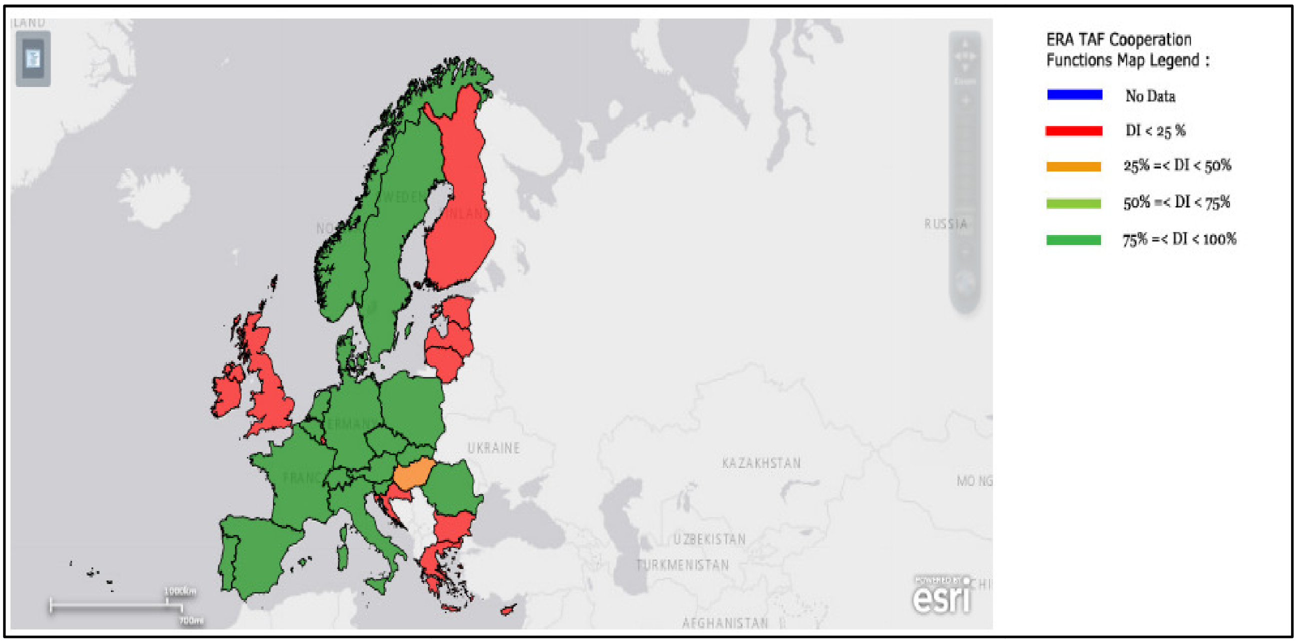


Figure 4: Primary Location Codes function implementation in July 2015.

The map shows that in the 1st half of 2015 most of the Infrastructure Managers have already performed the implementation of the **Primary Location Codes function**, as it can be drawn from the average level of **93% degree of implementation at European level of all Infrastructure Managers having reported**. This means that at European level this function is ready to be in production for the exchange of TAF TSI compliant messages. This data has been delivered in almost all the countries by the Infrastructure Managers as entities driving the implementation of the above mentioned function. Moreover, in most of the EU Members States and Switzerland the incumbent Infrastructure Managers have completed the deployment of this function and the have reached the "In Production & Monitor & Control Phase". Nevertheless, it cannot be neglected the effort made by the Railway Undertakings the EU member states to cooperate with the Infrastructure Managers to improve the data quality.

Whether it is compared the **level of fulfilment reported in July 2015 with the data reported by the European rail sector in January 2015**, we can observe a **limited evolution of the implementation, from 86% to 93%**, due to the high degree of implementation already obtained at European level at the beginning of this year.

In every country, the average level of deployment is calculated from the data provided by the companies responding the JSG survey in that country, thus this average defines the colour attributed to a particular country.

Within the raw data provided by the companies, we have collected some observations from the companies. Therefore, whether we consider the raw data and the observations submitted, we can draw the conclusions that in most of the cases the primary location codes are already in use for international trains and in some cases for domestic trains as well. Although the Railway Undertakings stated in their report that the publication of the **Primary Location Codes** is an obligation for the Infrastructure Managers, and thereby, it has to be reported only by the IMs (decision adopted in the Telematics Cluster TAF on the 20th of January 2015 in Vienna), the Railway Undertakings are as well working together with the Infrastructure Managers to improve the quality data. Furthermore, some Railway Undertakings pointed out that the treatment of border points is still subject to discussion. Finally, some companies pointed out that the development of the reference files for some Infrastructure Managers is strongly linked to the set-up of the Rail Freight Corridors across Europe.

0.1.3. Implementation status in 1st half of 2015 for Common Interface function

In every country, the **Average Degree of Implemntation (DI)** for the **Common Interface function** is calculated from the data provided by the companies responding the JSG survey in every country without applying any weighting factor. It means that an arithmetic mean of a series of degree of implementation for this fuction supplied by the companies that they have started freight transport activities or intent to develop it in the near future is calculated. It results the value per country and therefore the colour attributed to a particular country.

Average DI = $\left(\sum_{i=1}^{n} \boldsymbol{DI(i)} \right) / \boldsymbol{n}$ **;**
Where DI(i) = Degree of Implementation declared by the company (i) starting freight transport activities or intending to develop it in the near future,
and n = number of companies reporting in a country.

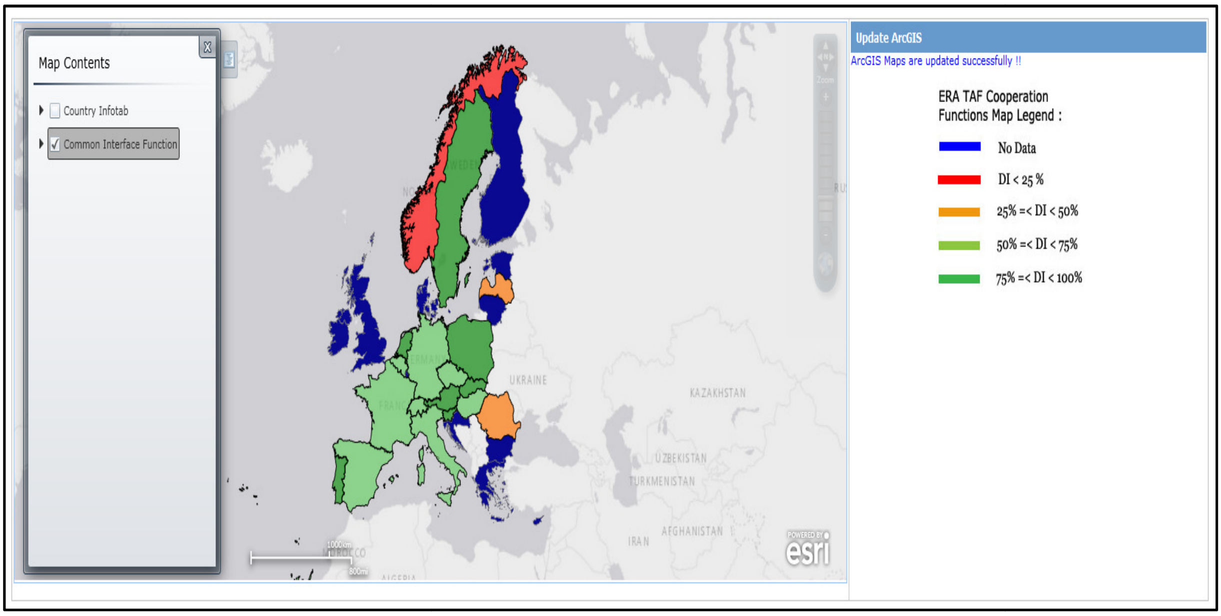


Figure 5: Common Interface function implementation in January 2015.

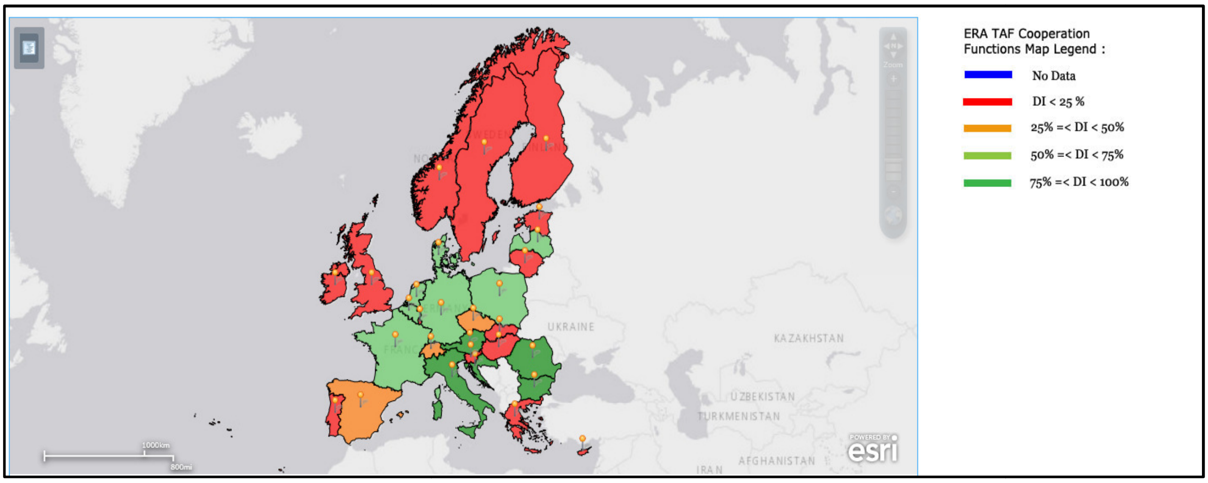


Figure 6: Common Interface function implementation for Railway Undertakings in July 2015.

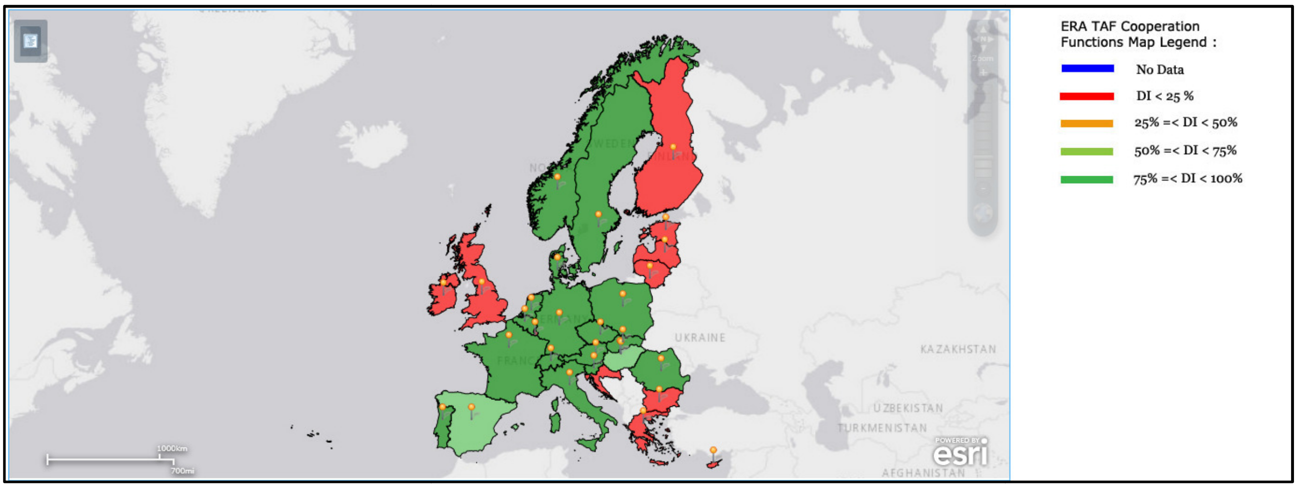


Figure 7: Common Interface function implementation for Infrastructure Managers in July 2015.

The map published above shows that in in the 1st half of 2015 the majority of RUs is still deploying this fuction, while about 50 % of IMs have already finished the implementation of the Common Interface. The level of fulfilment reaches the value of **83% for the Infrastructure Managers**, whereas for **the Railway Undertakings the level of accomplishment is 44 %**. The average level for the whole rail sector is **56% degree of implementation at European level for all companies having responded to the survey performed by JSG**. This means that at European level the deployment of this function is starting the "Executing Phase" , therefore, behind scheduled compared with the committed schedule by the rail sector in the **TAF TSI Master Plan**, **95% degree of implementation for the Railway Undertakings and 98% for the Infrastructure Managers**.

Whether it is compared the level of fulfilment reported in July 2015 with the data reported by the European rail sector in January 2015, we can observe a slight decline of the level of implementation, **from 63% to 56%**. This decline in the degree of implementation is due on the fact that the number of responders has doubled and many of the the new Railway Undertakings joining the TAF TSI implementation are not aware of the existance of Common Interface Function to exchange TAF TSI Compliant messages.

Within this raw data provided by the companies, we have collected some observations from the companies. Some companies outlined that they don't envisage the use of **Common Interface Function** for domestic trains, because they will continue using proprietary interfaces for this traffic. Other Railway Undertakings stated that the implementation of the **Common Interface function** for International traffic depends on the deployment to be done by the Infrastructure Managers. Moreover, some companies have reported as well that they are testing the use of the Common Interface to exchange messages with TIS system hosted by RNE for international trains and the exchange train running messages for international traffic. It has been reported as well that those companies that they are members of the "Common Components Group –UIC", they have already available a reference implementation the Common Interface to be used, but not in operation.

0.1.4. Implementation status in 1st half of 2015 for Rolling Stock Reference Database function

In order to reflect the real progress of the implementation of the **Rolling Stock Reference Database function**, an overview at European Level showing the information concerning the deployment per country is considered as the most appropriate. Moreover, the value which reflects the real implementation of this function is the number of wagons stored in the Rolling stock Reference Databases set-up across Europe to fulfil the requirements quoted in the TAF TSI Regulation.

Therefore, it was agreed in the 1st TAF TSI Implementation Cooperation Group meeting on 26 February 2015 to use as reference the number of wagons composing the complete fleet of wagons in Europe split down per country. In line with these assumptions, the data has been sorted in the following table estimating the percentage of wagons stored in a **Rolling Stock Reference Database**:

Country	Valid registrations VVR / Eurostat	Wagons In RSRD (Data provided by RSRD2 - UIP)	Percentage
Austria	19706	3104	16%
Belgium	40375	411	1%
BosniaHerzegovina	-		0%
Bulgaria	-		0%
Croatia			0%
Czech Republic	53885	1267	2%
Denmark	2305		0%
Estonia	-		0%
Finland	-		0%
Montenegro			0%
Norway			0%

Country	Valid registrations VVR / Eurostat	Wagons In RSRD (Data provided by RSRD2 - UIP)	Percentage
France	113261	25162	22%
Germany	102778	63214	62%
Greece	4094	5	0%
Hungary	12918	17	0%
Ireland	-		0%
Italy	44482	9	0%
Latvia	11210		0%
Lithuania	-		0%
Luxembourg	4216	1	0%
Netherlands	21957	9035	41%
Poland	109165	3635	3%
Portugal	5168	6	0%
Romania	24076		0%
Slovakia	33359	237	1%
Slovenia	3767		0%
Spain	12760	4887	38%
Switzerland	27398	3036	11%
Sweden	12760	2676	21%
United Kingdom	-	28	0%

Moreover, due to the need of having a visualization of this data and applying the same process that it has been applied for the above functions, this information has been uploaded in a Geographical Information System (GIS) obtaining the following map of Europe representing the implementation of this function at European level:

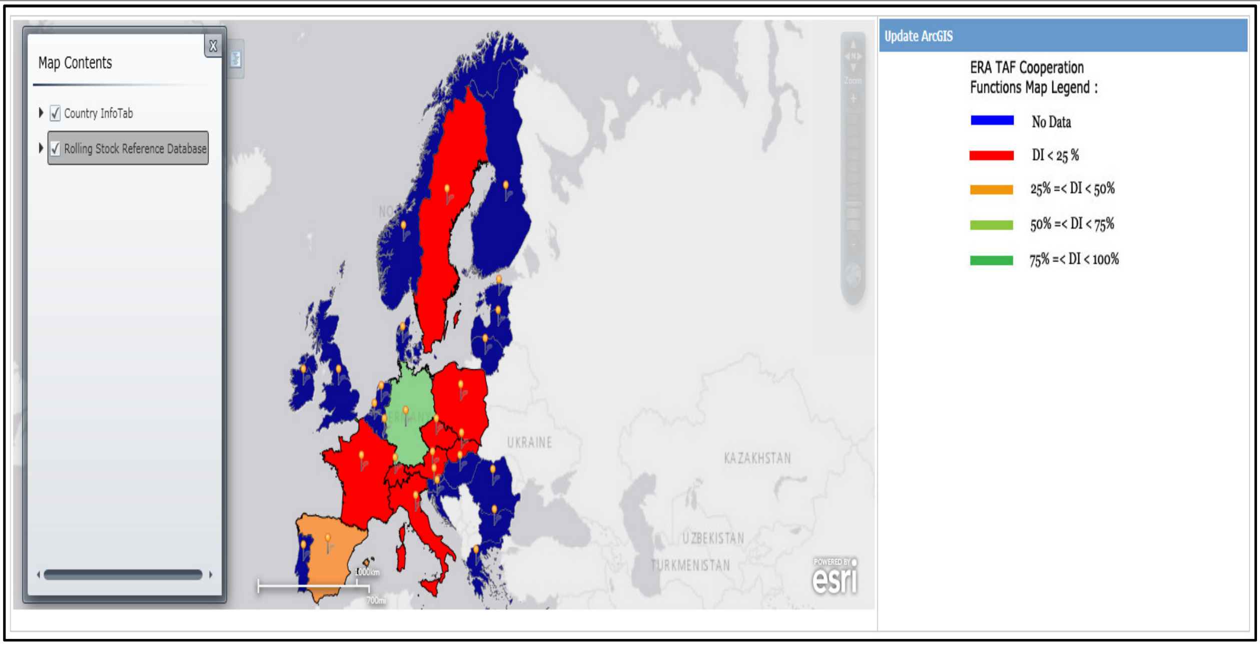


Figure 8: Rolling Stock Reference Database function implementation in January 2015.

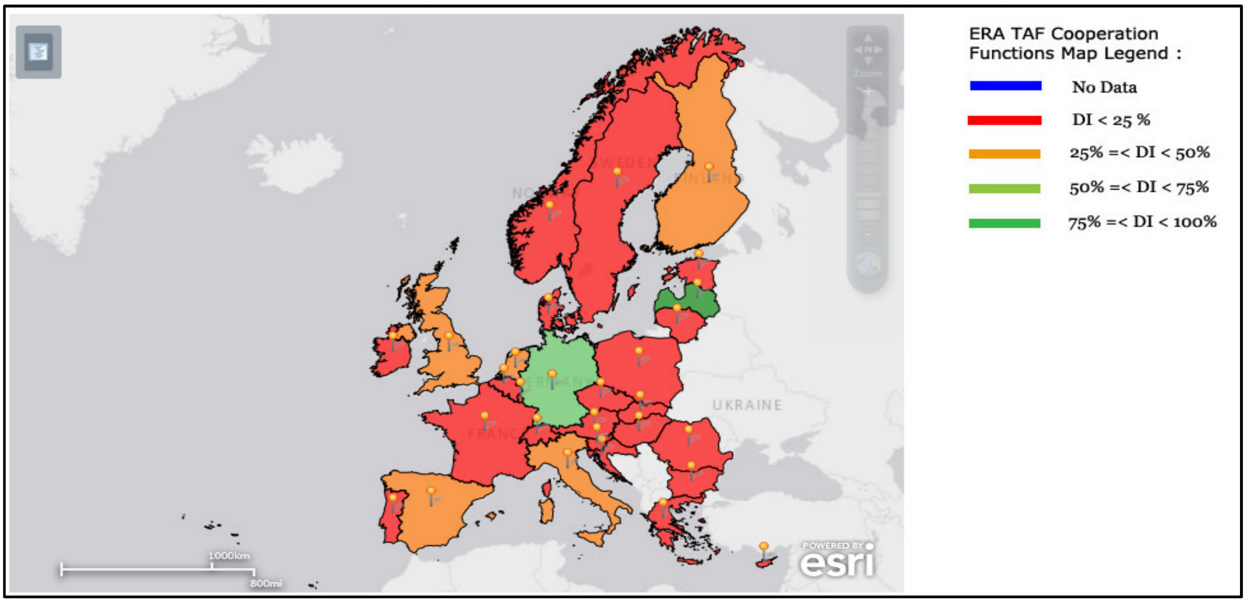


Figure 9: Rolling Stock Reference Database function implementation in July 2015.

The map shows that in the 1st half of 2015 some Wagon Keepers and Railway Undertakings have already completed the implementation of the **Rolling Stock Reference Database function**. Indeed, the average **degree of implementation at European level** is **17,28%**. This means that at European level the deployment of this function has reached, in average, the "**Initiating Phase**" (Feasibility Study, Business Case or Gathering of Technical and Functional Requirements). Thus, most of the countries are displayed in average on red or orange colour on the map with some exceptions where the level of implementation is more advanced. In particular, the green colour in Latvia, means that in this country most of the companies have already "**in production**" a database implementing this functionality. Morever, in Germany most of the companies are already facing the "**Executing Phase**", displayed on light green colour on the map, while, Finland, Italy, Spain, The Netherlands and United Kingdom are shown on orange colour, meaning that the companies in these countries are mostly in the “**Planning Phase**”.

In every country, the average level of deployment is calculated from the data provided by the companies responding the JSG-UIP survey for Rolling Stock Reference Database function. Thereby, this average defines the colour attributed to a particular country.

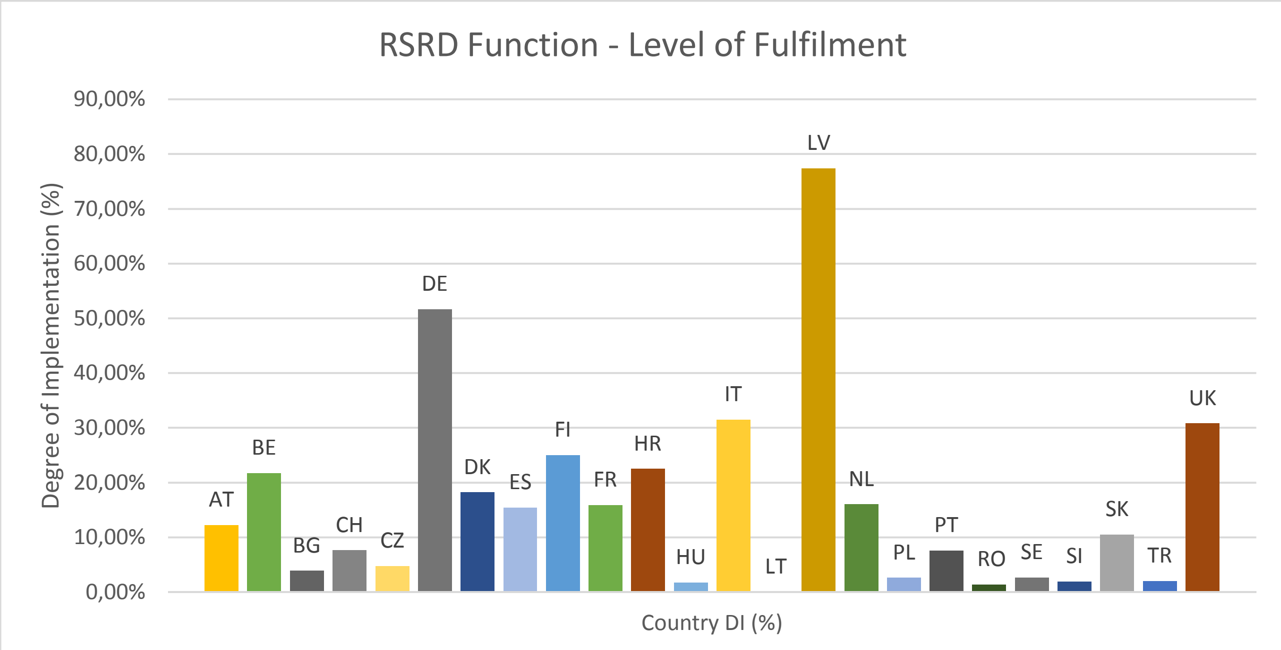


Figure 10: Chart bar to show Rolling Stock Reference Database function implementation in July 2015.

The data has been supplied by JSG and the European association of private wagon keepers, UIP. In particular the data concerning the deployment of the RSRD² database to fulfil the requirements of the **Rolling Stock Reference Database function** are provided by UIP. For these companies using this tool, the data stored in RSRD² is complete wagon data sets (mandatory data) therefore, data completeness is 100% ensured for recorded wagons. These figures do not cover keepers having indicated that they will use RSRD² but which are currently in a stage of collecting required wagon data or preparing the interface to RSRD².

The degree of implementation shows a slight growth compared to the 7% quoted in the previous report issued in April 2015 (1st Status Implementation report) and a delay in comparison with the **target Implementation Milestone for realisation of the RSRD function** according to the TAF TSI Master Plan , **2015**. However, this does not mean that no company has implemented this function, since only the average data is displayed on the map. Indeed, more than 34 European companies have already in place this functionality through the RSRD² tool.

0.1.5. Implementation status in 1st half of 2015 for Train Running Information Function

In order to have a better view of the real situation about the implementation of the **Train Running Information Function** the 1st half of 2015, the implementation data will be shown in different maps for Railway Undertakings and Infrastructure Managers:

- One map to show the evolution of the implementation of the **Train Running Information Function** at network level by the Infrastructure Managers (IMs). This information corresponds to the data provided by 23 Infrastructure Managers (almost 90% of the market in terms of track-kms) and the results can be represented at corridor level.
- A second map to show the deployment of the **Train Running Information Function** by the Railway Undertakings (RUs) at country level. The values provided by the Railway Undertakings have been weighted to reflect the market share of these companies in their national rail market. This data is based on the response provided, by 56 Railway Undertakings, representing approximately 80% of the market share for RUs in terms of tonne-kms.

To establish the status regarding the implementation the information provided by the rail companies is compared in both cases with the milestones prescribed in the TAF TSI Master Plan . The weighting factor used for the RUs is based on the figures stated in the report "**Fourth report on monitoring development in the rail market**" issued by the European Commission in June 2014, where **Annex 19** provides the figures concerning "Market shares of railway undertakings (2011-2012)".

In every country, the **Average Degree of Implemntation (DI)** for the **Train Running Information Function** is calculated from the data provided by the companies responding the JSG survey in every country applying the above mentioned weighting factor (WF). It means that an arithmetic mean of a series of degree of implementation for this fuction supplied by the companies that they have started freight transport activities or intent to develop it in the near future is calculated. It results the value per country and therefore the colour attributed to a particular country.

Average DI = $\sum_{i=1}^{n} DI(i) x\, WF(i)$ **;**

Where DI(i) = Degree of Implementation declared by the company (i) starting freight transport activities or intending to develop it in the near future,

WF(i) = Weighting Factor for company (i) based on "**Fourth report on monitoring development in the rail market**" issued by the European Commission in June 2014

and n = number of companies reporting in a country.

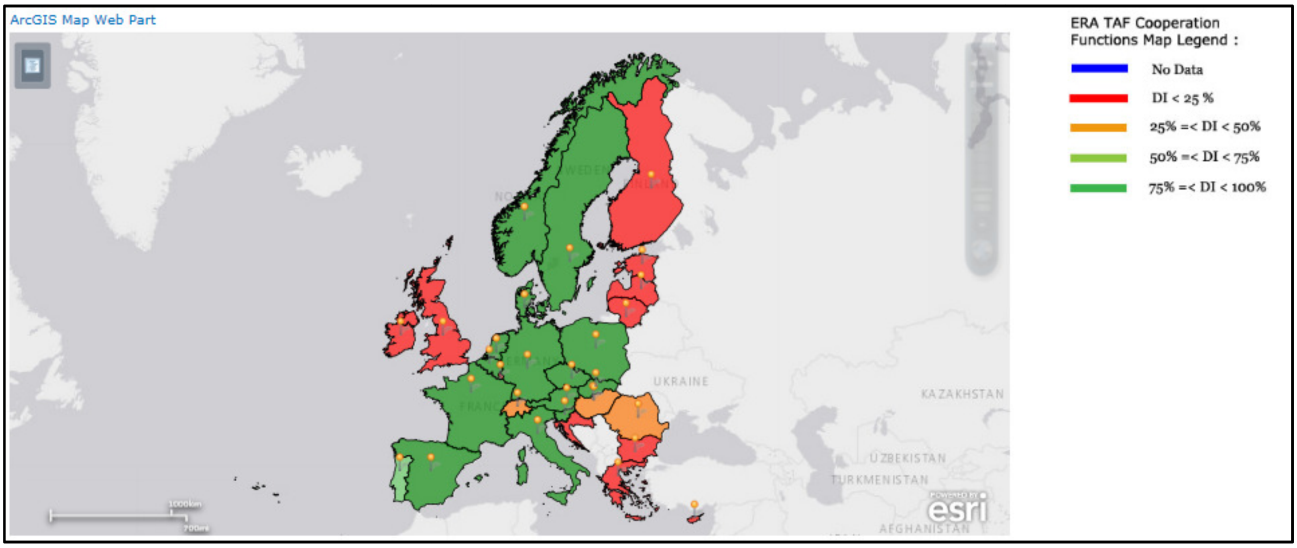


Figure 11: Train Running Information Function implementation for Infrastructure Managers in July 2015.

The map published above shows that in in the 1st half of 2015 the majority of the **Infrastructure Managers** have already stared the deployment of this function having reached a degree of implementation of **59,07%.** Therefore, the IMs are quite advanced in the deployment of this key function to deploy TAF TSI because they are already in the Executing Phase.

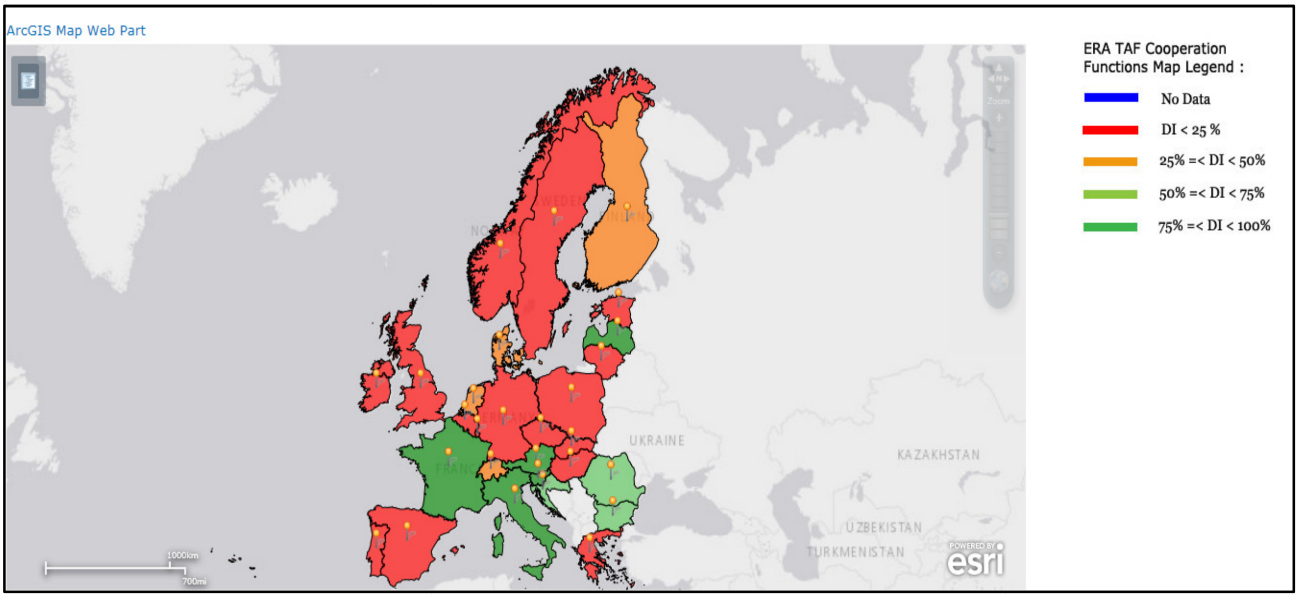


Figure 12: Train Running Information Function implementation for Railway Undertakings in July 2015.

For **Railway Undertakings** , the level of implementation is lower compared to the IMs, in particular the degree of implementation of the companies responding the online JSG questionnaire is **24,20%**.

The average weighted level for the whole rail sector is 36% degree of implementation at European level for all companies having reported. This means that at European level the deployment of this function is reaching in still at the "Planning Phase".

In every country, the average level of deployment is calculated from the data provided by the companies responding the JSG survey in that country, thus this average defines the colour attributed to a particular country.

Within this raw data provided by the companies, we have collected some observations from the companies. In most of the cases the companies are testing **Train Running function** with pilot projects. Moreover, the companies agreed in the context of the Telematics Cluster TAF on the 1st of July 2015 in Vienna that the stakeholder IM & RU only reported the Train Running Information Message.

Nevertheless, the results are quite positive due to the fact the target Implementation milestone according to the TAF TSI Master Plan is 2017.

0.1.6. Implementation status in 1st half of 2015 for Wagon and Intermodal Unit Operational Database (WIMO) Function

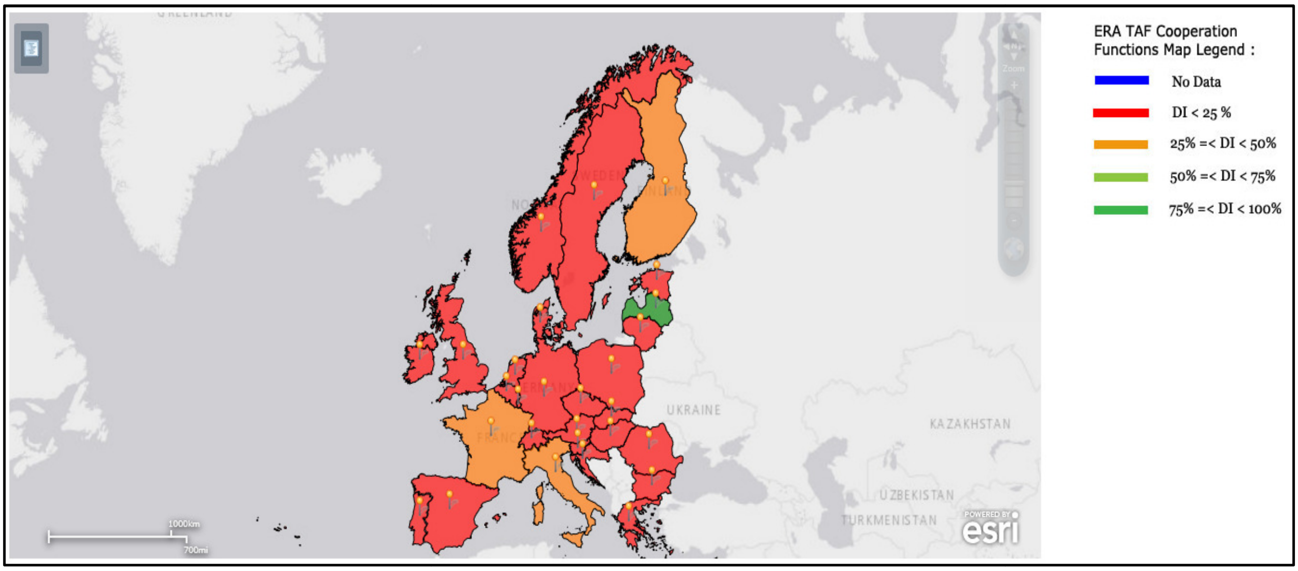


Figure 13: Wagon and Intermodal Unit Operational Database (WIMO) Function implementation for Railway Undertakings in July 2015.

The **Wagon and Intermodal Unit Operational Database (WIMO) Function** is a function to be implemented **only by Railway Undertakings**. Therefore, the map shows that in in the 1st half of

2015 the Railway Undertakings have already started the implementation of the **Wagon and Intermodal Unit Operational Database (WIMO) Function**, reaching a **degree of implementation of 11,28%** for the companies having answered to the survey performed by the JSG. This means that at European level the deployment of function is in the "Initiating Phase" and in line with the target implementation milestone for realisation of the WIMO function according to the TAF TSI Master Plan is 2016.

To establish the status regarding the implementation the information provided by the rail companies is compared in both cases with the milestones prescribed in the TAF TSI Master Plan . The weighting factor used for the RUs is based on the figures stated in the report "**Fourth report on monitoring development in the rail market**" issued by the European Commission in June 2014, where **Annex 19** provides the figures concerning "Market shares of railway undertakings (2011-2012)".

In every country, the **Average Degree of Implemntation (DI)** for the **Wagon and Intermodal Unit Operational Database (WIMO) Function** is calculated from the data provided by the companies responding the JSG survey in every country applying the above-mentioned weighting factor (WF). It means that an arithmetic mean of a series of degree of implementation for this fuction supplied by the companies that they have started freight transport activities or intent to develop it in the near future is calculated. It results the value per country and therefore the colour attributed to a particular country.

Average DI = $\sum_{i=1}^{n} DI(i) x\ WF(i)$ **;**

Where DI(i) = Degree of Implementation declared by the company (i) starting freight transport activities or intending to develop it in the near future,

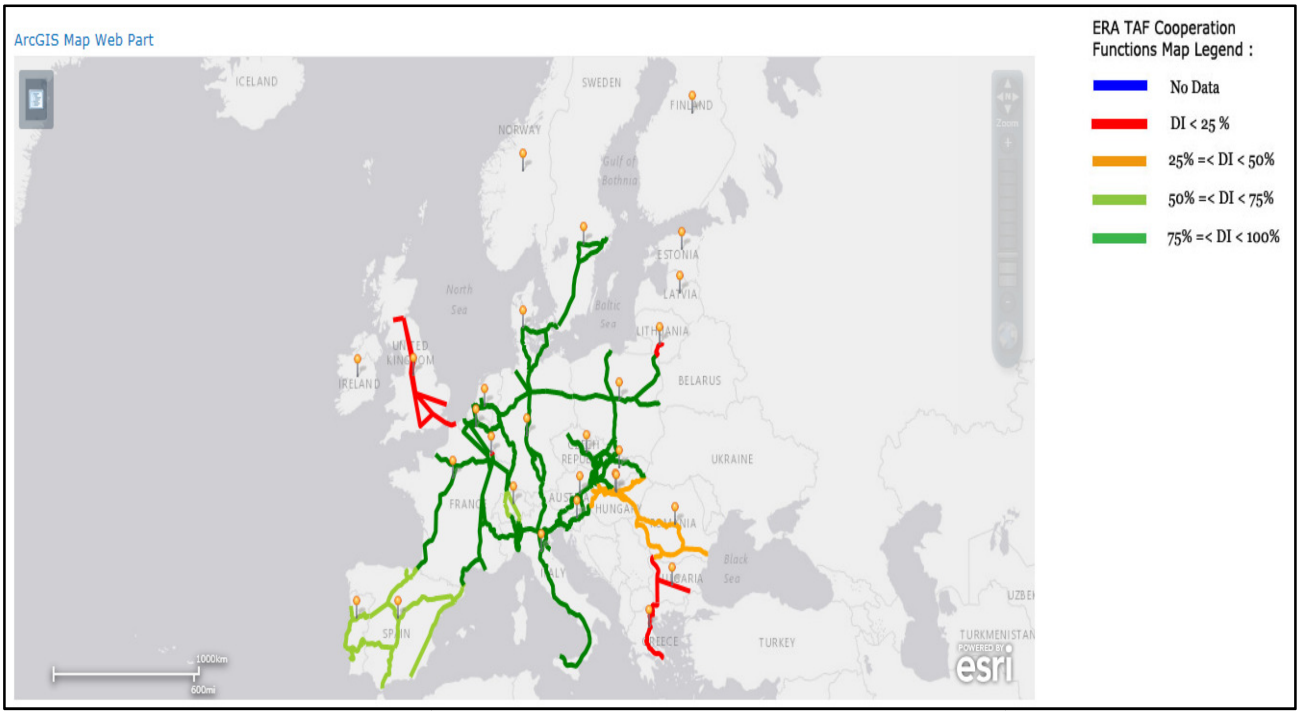
WF(i) = Weighting Factor for company (i) based on "**Fourth report on monitoring development in the rail market**" issued by the European Commission in June 2014

and n = number of companies reporting in a country.

0.2. Evolution of RU-IM functions per corridor

In line with the agreements reached in the Kick-Off meeting of the TAF TSI Implementation Co-operation Group, this report comprises information concerning the implementation of RU-IM Communication functions per corridor. In particular, this report contains the degree of implementation per corridor for the Train Running Information Function. The data displayed on the map for the corridors is obtained from the treatment of data regarding the implementation of Train Running Information Function submitted by the Infrastructure Managers.

The level of implementation for every corridor is the same as the level of deployment in the country where the corridor is located. That means that the degree of implementation corresponds to the same level shown in the map summarising the outcomes of the implementation for this particular function, Train Running Information Function, by 1st half 2015.

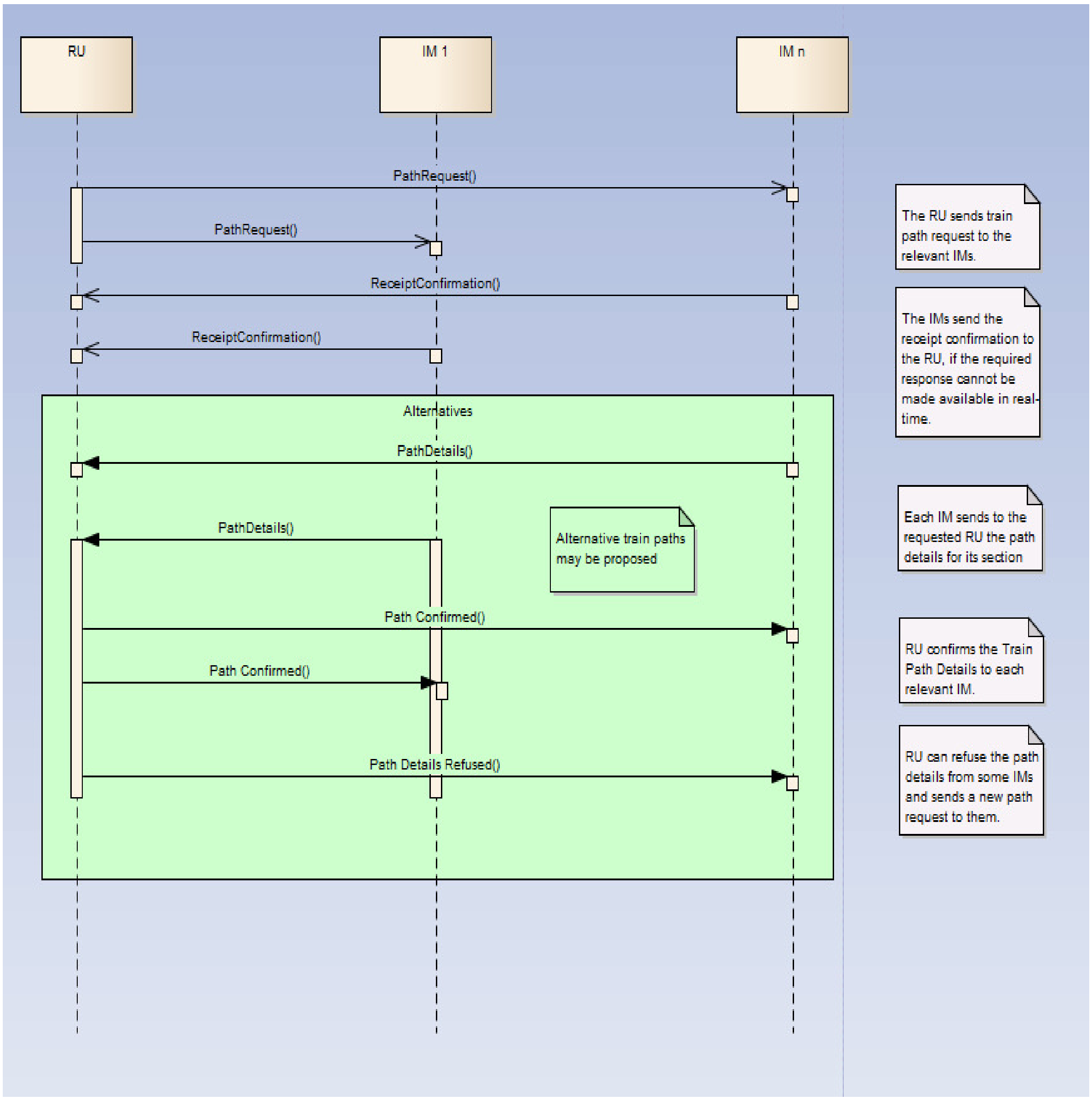


ANNEX II: Sequence Diagram

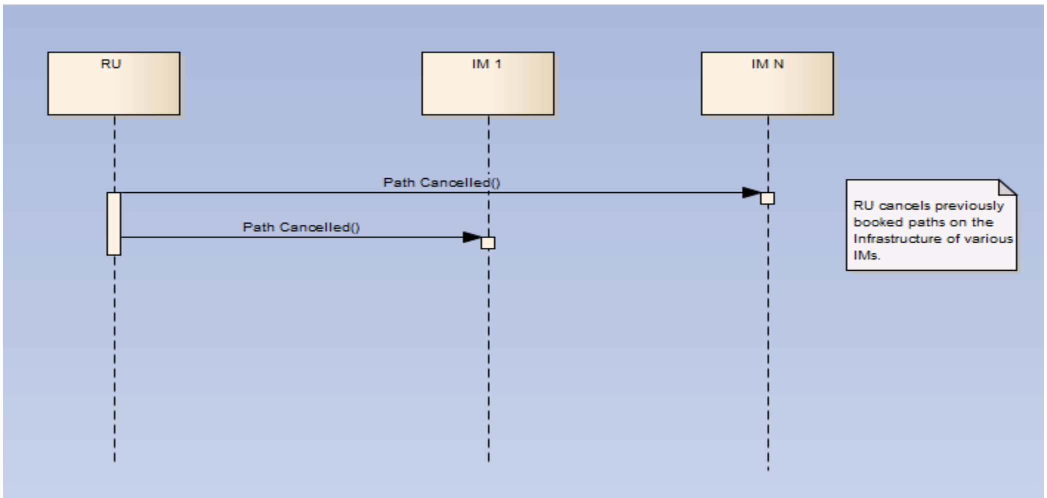
Sequence Diagram: Path request

Sequence diagram path request

This Diagram is also valid for Open Access (RU is LRU) and OSS with IM 1 as OSS



Sequence diagram RU cancels a booked path



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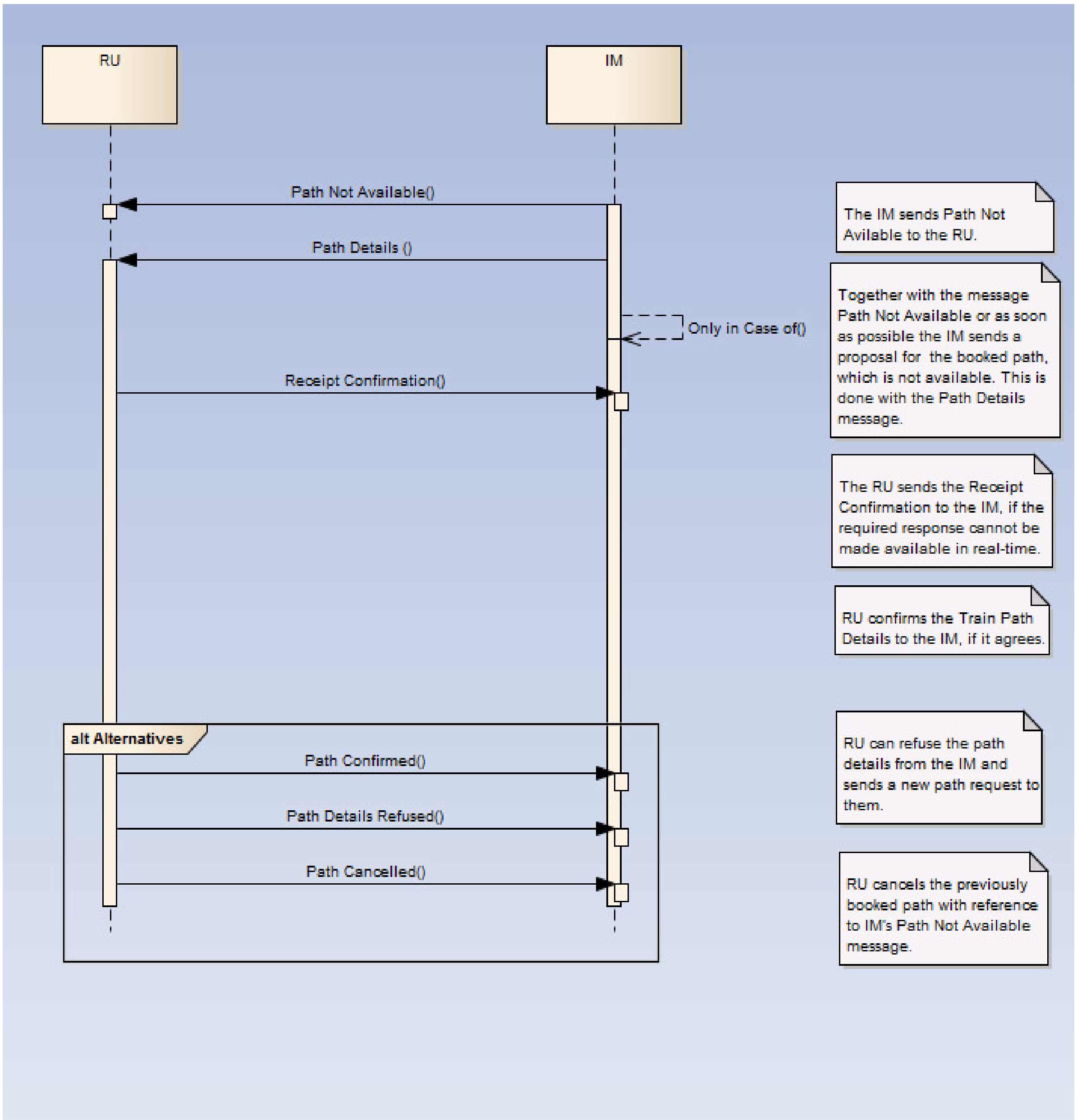
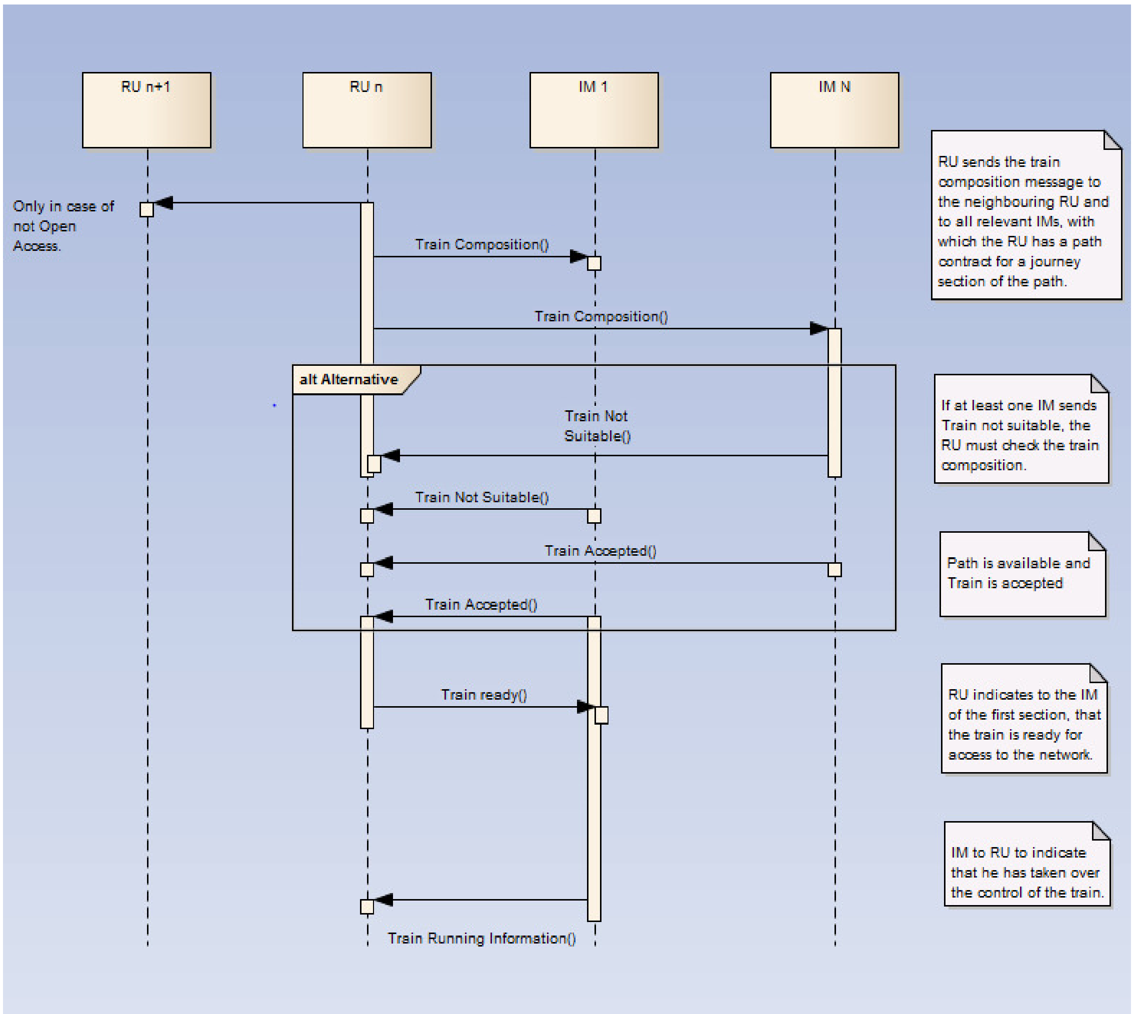
Sequence Diagram: Path Not Available

This Diagram is also valid for Open Access (RU is LRU) and OSS with IM as OSS:



Sequence Diagram: Train Preparation

This Diagram is also valid for Open Access (RU n is LRU) and OSS with IM 1 as OSS



Remark: During the train preparation also a Train Path Not Available message can occur, since this message can be send at any time between the moment the train path is contracted and the departure of the train. This is not included in this diagram.

Sequence diagram: Train running forecast

Process Description.

For Train Running Forecast and Train Running Information different scenarios are considered, taking into account the various communication relations between RUs and IMs according to the path booking scenarios for chapter 4.2.2.1 (Path Request, Preliminary remarks) of the TAF TSI coretext:

- **Train Approaching a Handover Point between IM n1 and his neighbour IM n2**
  It is supposed that the handover point is not also an interchange (only scenario B) nor a handling Point. Thus, the handover point is a point on the booked paths of one RU and the RU has already sent the train composition to IM n2, whilst simultaneously sending this message to IM n1.
  IM n1, after departure from the departure point, must send a train running forecast message to IM n2 with the estimated handover time (ETH). This message is simultaneously sent to the RU.
  When the train leaves the infrastructure of IM n1 at the handover point this IM sends a Train running information with the actual handover time at this point to its path contracted RU.
  When the train arrives on the infrastructure of IM n2 at the handover point this IM sends a Train running information with the actual handover time from this point to its path contracted RU.

- **Train Approaching an Interchange Point between RU 1 and the next RU 2 (only scenario B)**
  In the path contract an interchange point must always be defined as a reporting point. (TETAs at reporting points will be generated by the IMs as specified in their contracts with the RUs.)
  For this point the IM in charge sends, once the train left the previous reporting point, a train running forecast message with the TETA for this interchange point to the RU which has contracted the path with him (e.g. RU 1). RU 1 transfers this message to the next RU (e.g. RU 2) supposed to take over the train. Additionally, this message is also sent to the Lead RU (LRU) for the transport if there is one and if this is defined in the co-operation contract between both RUs.
  If the interchange point is also a handover point between e.g. IM n1 and IM n2, IM n1 sends the train running forecast message already after departure from the departure point or from the previous interchange point to IM n2 with the estimated handover time (ETH). This message is also sent to the RU having contracted the path e.g. RU 1. For the RU the ETH is equal to the TETA at the interchange point. RU 1 transfers this message to its neighbour RU 2 and to the Lead RU or the transport if there is one and if this is defined in the co-operation contract between both RUs.
  When the train arrives at an interchange point, the IM must send a Train running information to his path contracted RU, for example RU 1, with the actual time of the arrival at that point.
  Before the train leaves the interchange point, RU 2 must send a new train composition message to the IM having allocated the path and follow the departure procedure as defined in chapter 4.2.3 (Train Preparation).

- **Train Approaching a Handling Point of an RU (scenario A)**

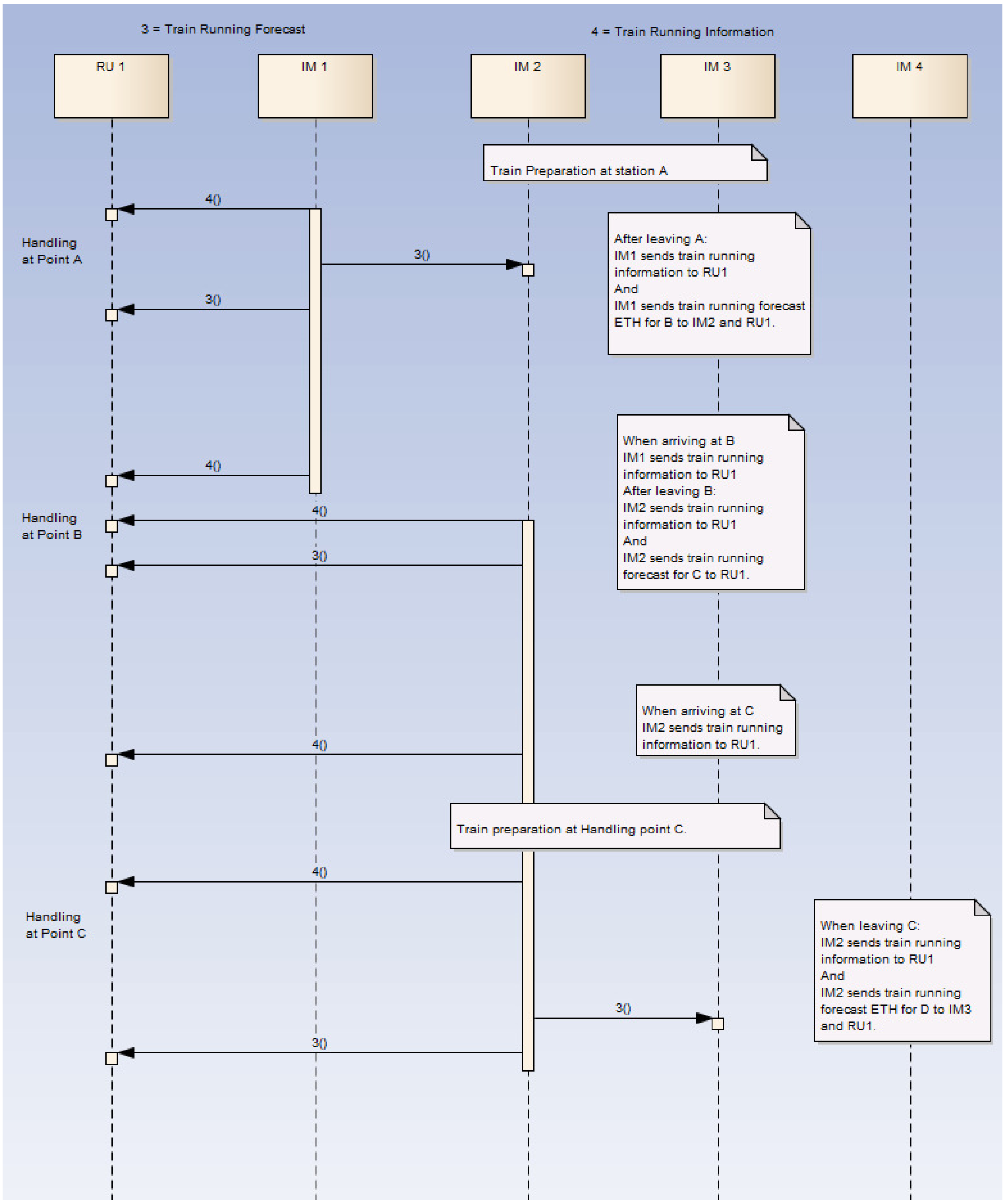
A Handling Point must always be defined in the path contract as a reporting point.
For this point the IM in charge must send a train running forecast message with a TETA only if this is specified in contract between IM and RU.
But if the Handling Point is also a handover point between, for example, IM n1 and IM n2, IM n1 must send the train running forecast message after departure from the departure point or from the previous interchange to IM n2 with the estimated handover time (ETH). This message is also sent to the RU. For the RU the ETH is equal to the TETA at the Handling Point.
When the train arrives at the Handling Point, the IM must send a Train running information with the actual time of arrival at this point to the RU.
Before the train leaves the Handling Point the RU and IM must follow the departure procedure as defined in chapter 4.2.3 (Train Preparation).

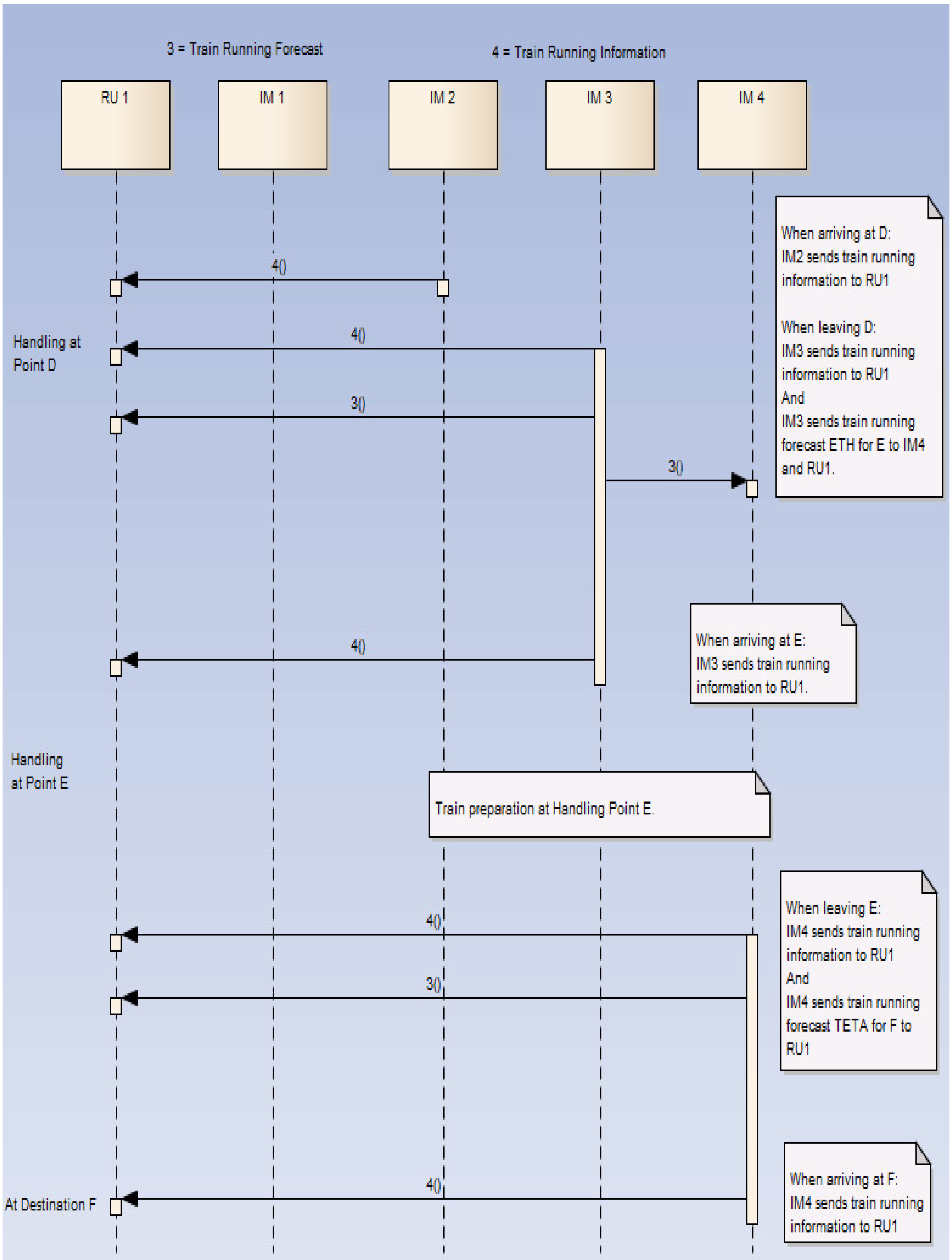
- **Train arrival at Destination**

When the train arrives at its destination the IM responsible sends a Train running information message with the actual arrival time to the RU which contracted the path.
Remark: In the path contract other locations may also be defined for which a train running forecast with TETA and train running information messages with the actual time are requested. For these points the IM in charge sends these messages as specified in the contract. The further evaluation and processing of the delivered ETHs and TETAs is described in the chapters 4.2.6 (Shipment ETI / ETA) to 4.2.8 (Interchange Reporting).
In the following examples the logical sequence message exchange of the “Train Running Forecast” and “Train Running Information” messages relating to the different communication scenarios are shown with the remark, that regarding the communication relation between RU and IMs for train running, the two path request scenarios A(case A) and A(case B) (chapter 4.2.2.1: Path Request, Preliminary remarks) are identical, because in both cases the IMs know only one RU e.g. RU1 which operates the complete path and is also responsible for new train composition at the handling pointsare The detailed formats of the messages are defined in Annex II, Annex A index 1. .

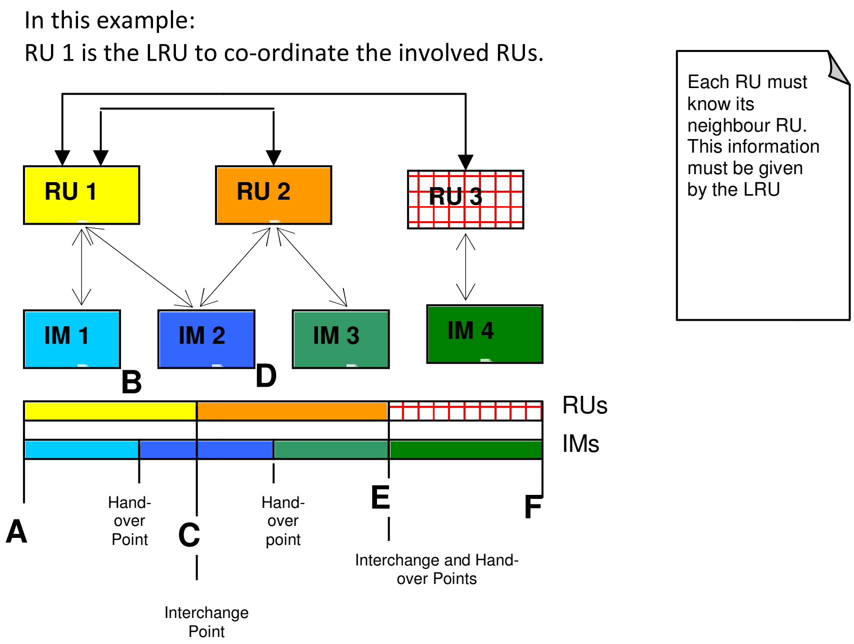
Examples.

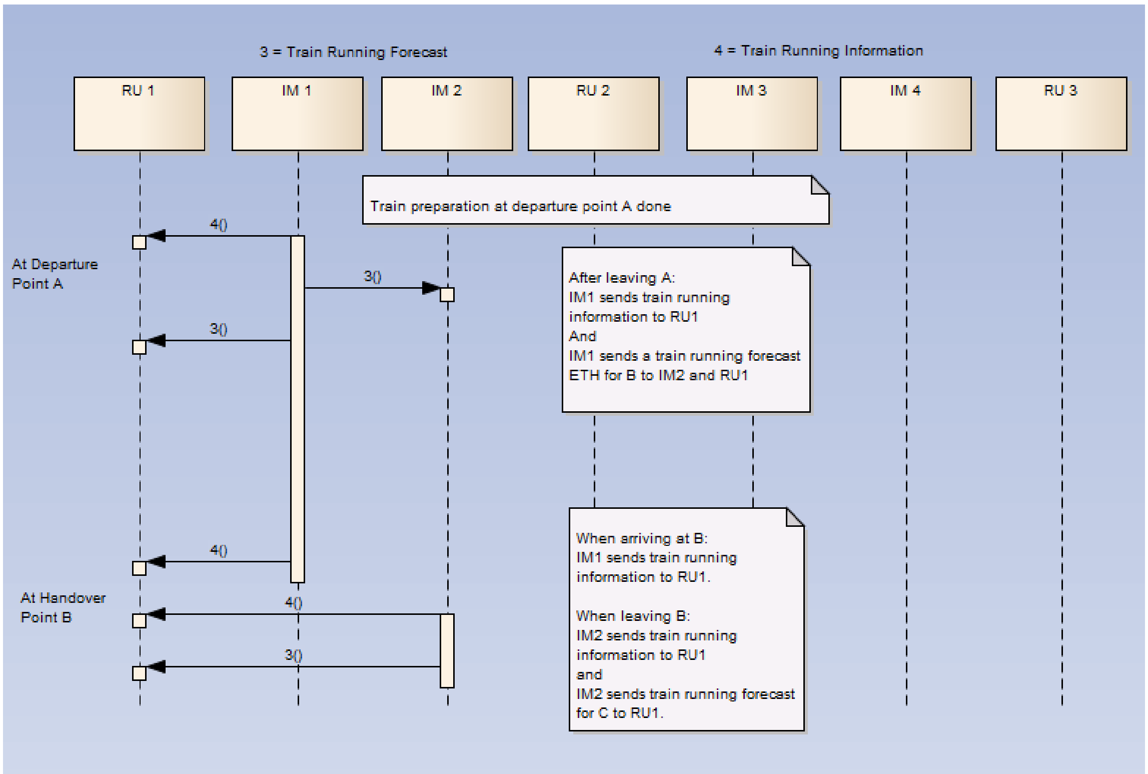
- **Example A** according Path request scenario A(a) and A(b) (see chapter 1.3):

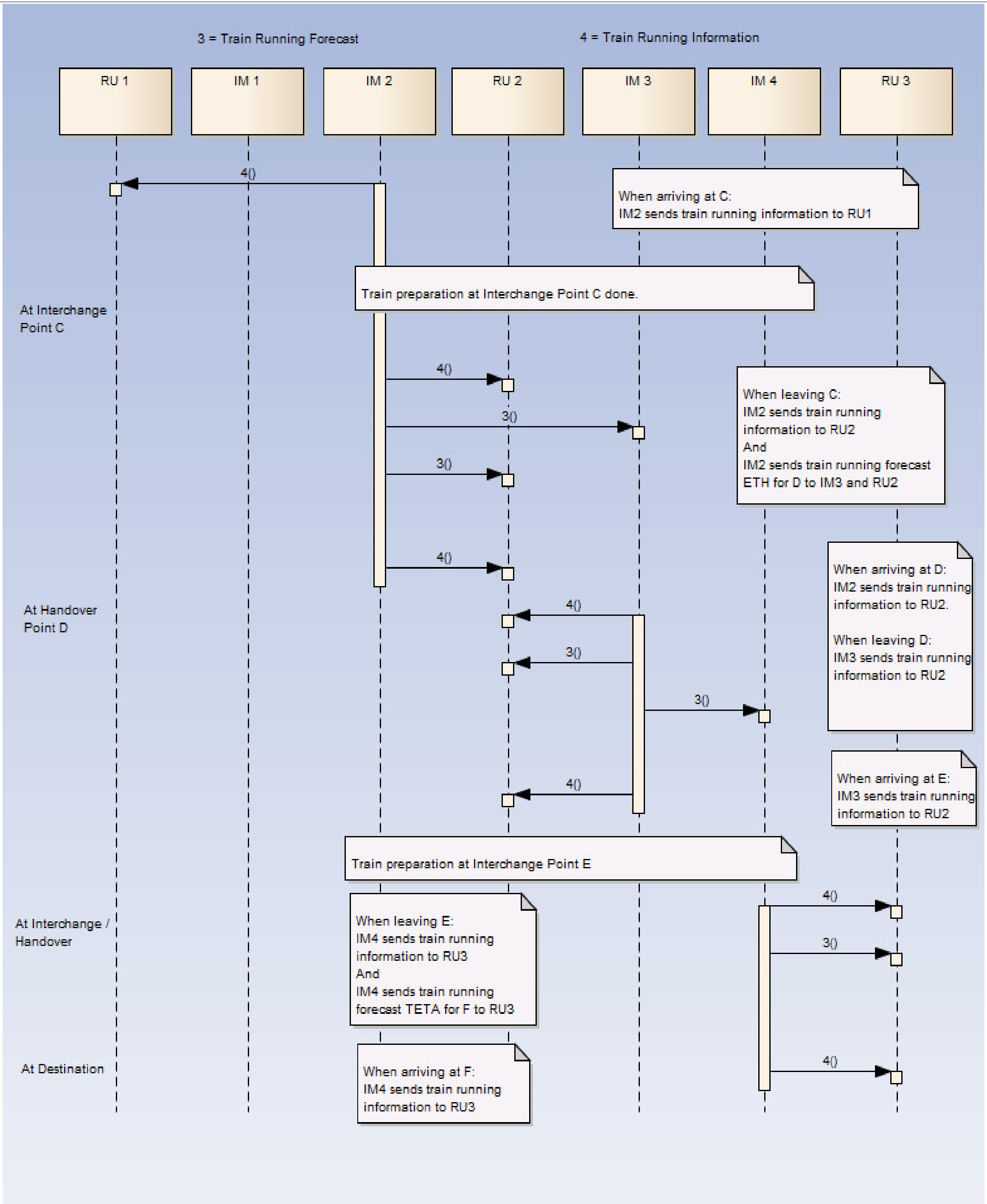



3 = Train Running Forecast
4 = Train Running Information
RU 1
IM 1
IM 2
IM 3
IM 4
When arriving at D:
IM2 sends train running information to RU1
When leaving D:
IM3 sends train running information to RU1
And
IM3 sends train running forecast ETH for E to IM4 and RU1.
4()
Handling at Point D
4()
3()
3()
When arriving at E:
IM3 sends train running information to RU1.
4()
Handling at Point E
Train preparation at Handling Point E.
When leaving E:
IM4 sends train running information to RU1
And
IM4 sends train running forecast TETA for F to RU1
4()
3()
When arriving at F:
IM4 sends train running information to RU1
At Destination F
4()

- **<u>Example B</u>** according Path request scenario B (see chapter 1.3):






3 = Train Running Forecast
4 = Train Running Information
RU 1
IM 1
IM 2
RU 2
IM 3
IM 4
RU 3
When arriving at C:
IM2 sends train running information to RU1
Train preparation at Interchange Point C done.
At Interchange Point C
When leaving C:
IM2 sends train running information to RU2
And
IM2 sends train running forecast ETH for D to IM3 and RU2
When arriving at D:
IM2 sends train running information to RU2.
When leaving D:
IM3 sends train running information to RU2
At Handover Point D
When arriving at E:
IM3 sends train running information to RU2
Train preparation at Interchange Point E
At Interchange / Handover
When leaving E:
IM4 sends train running information to RU3
And
IM4 sends train running forecast TETA for F to RU3
At Destination
When arriving at F:
IM4 sends train running information to RU3

Sequence Shipment ETI / ETA

Process Description

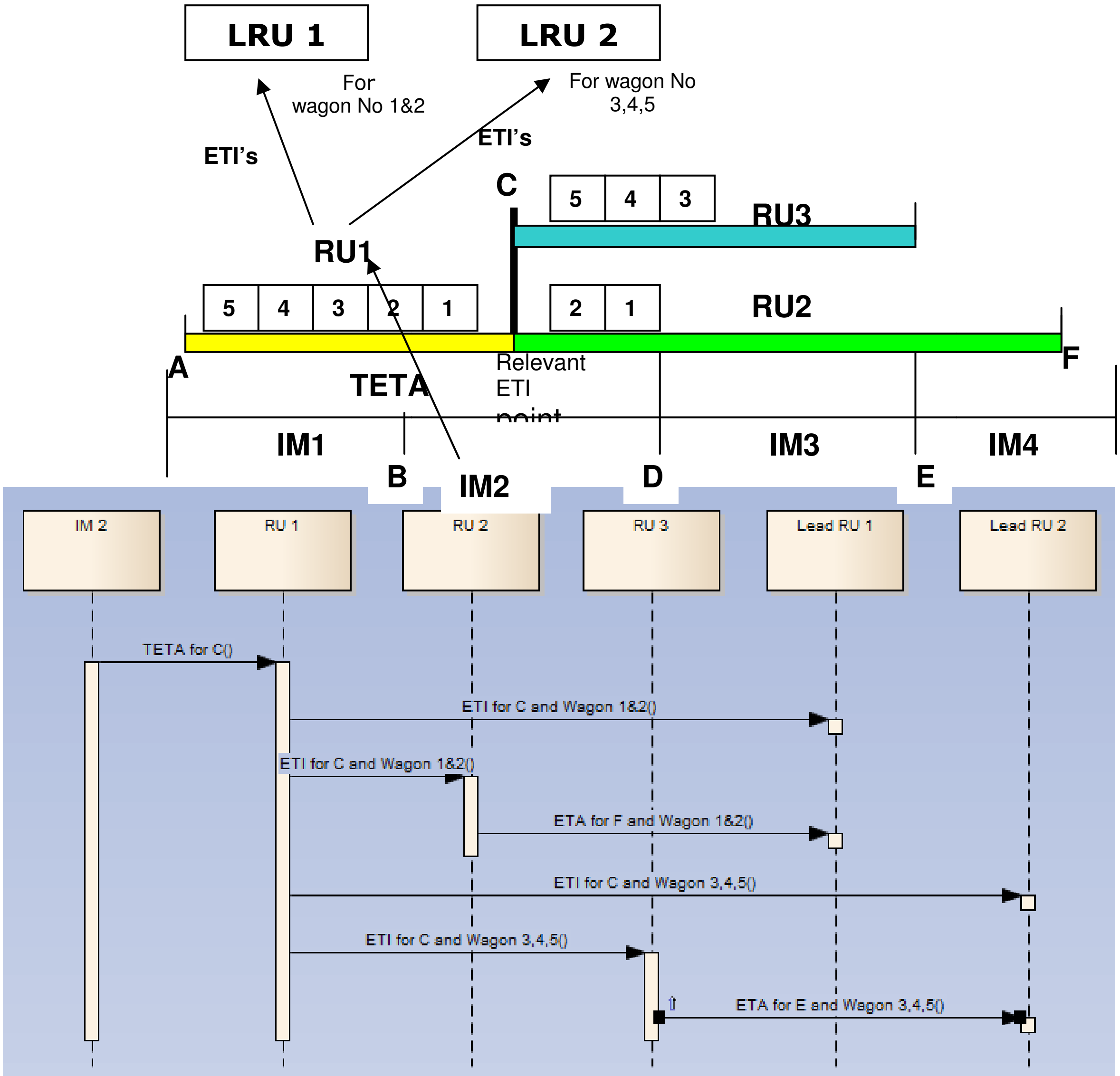
The description of the sequence of exchange of information for Shipment ETI/ETA is explaining through two examples about different scenarios:

- **Example 1**: RU1 has wagon no. 1 and 2 from LRU LRU1 and wagon no. 3 to 5 from LRULRU2 within the same train. At the interchange point C the further transport of the wagon 1 and 2 will be done by RU2 and for the wagon 3 to 5 by RU3. In this case RU1 must calculate related to the interchange point C the ETI for the wagon 1 and 2 and must send these values to LRULRU 1. RU1 must also calculate related to the same interchange point C the ETI for the wagon 3 to 5 and send these values to LRU LRU 2.

- **Example 2**: RU1 has wagon no. 1 and 2 from LRU LRU1 and wagon no. 3 to 5 from LRU LRU2 within the same train. At the interchange point C the further transport of the wagon 3to 5 will be done by RU3 whereas the wagon 1 and 2 remain in the train of RU1 until the interchange point E, where the responsibility for these wagons will be changed to RU2. In this case RU1 must calculate related to the interchange point C only the ETI for the wagon 3 to 5 and must send these values to LRU LRU 2. For the wagons 1 and 2 the interchange point C is not relevant. The next relevant interchange point for these wagons is E and related to this point the RU1 must calculate the ETI and send these values to LRU LRU1.

1.

This Sequence is based on the above example 1 for the interchange point C.



Remark: ETA for the wagons 1&2 is the ETI at F plus the time for delivery at customer siding according to commitment.
ETA for the wagons 3,4,5 is the ETI at E plus the time for delivery at customer siding according to commitment.

Sequence Diagram: Wagon Movement/Interchange Reporting

The following Sequence diagram refers to figure 14 (Example 1, ETI Calculation) and considers the handling for the wagon Numbers 1 and 2.