TAP TSI and TAF TSI

Sector Handbook for the Communication between Railway Undertakings and Infrastructure Managers (RU/IM Telematics Sector Handbook)

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Readers attention required: This document is subject to pending changes in order to be aligned with the Commission Regulation (EU) No 2026/253 of 6 February 2026 (Telematics TSI).

Version:

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3.4.1.0	3.5	Updated Chapter 12.14.7 Timing at Location Updated Chapter 12.14.18 Reason of Reference	2024 04 17

3.5.0.0	3.6	New Chapter 15.2 Running Status Report Message added. New Chapter 17 Temporary Capacity Restriction Message (TCR Message) in Operations added.	2024 10 16
3.5.1.0 3.5.1.1	3.7	Updated Chapter 9.5.4 Reference Files Data Management in CRD New Chapter 9.6 Inclusion of Network Specific Parameters in CRD Updated Chapter 12.5.13.2 Path Request Process with a process description if a request contains at least one Pre-Arranged Path New Chapter 14.1.4 TractionMode Description of the element TractionMode TrainRunningForecast message update described	2025 01 29
3.5.2.0	3.8	Updated Chapter 12.15.7 Corrections of the existing typos and incorrect words throughout the Sector Handbook. New process type Path Optimisation described. Added description of TrainForecastedDelayCause message.	2025 12 15

3.5.2.1	3.9	New part B chapter 12: Temporary Capacity Restrictions Updated section 12.14.17: • New annex: code list of typeofinformationcode in PDF format – Annex 6.2 already exists Updated section 12.14.18 Updated section 12.15.2 Updated section 12.15.7 Updated section 8.2.3 New section 8.2.3.9 Updated section 8.2.3.10, iv Path request and allocation: message diagram update – Content of ReceiptConfirmationMessage and description. Several typos corrected Removed Annex 1 - TCR messages specification Removed Annex 12.3	2026 06 30

1. Document History

Document Location

This document is published on JSG website related to RU/IM Telematics. [https://taf-jsg.info/?page_id=280]

This Sector Handbook is available to all TAP and TAF actors.

Revision History

Date of last revision: 30 June 2026
Date of next review:

Revision date	Summary of Changes	Changes marked
V.0.01 26/11/2013	Draft version on basis of Implementation Guide v0.53 and outcomes of Telematic Groups TG1 (Planning), TG2 (Operation), TG3 (IT and Reference Files), TG4 (Train Identifiers) from September 2012 till December 2013	
V0.02 07/02/2014	Draft version 0.02 including some comments received from TGs experts	
V0.03 27/02/2014	Explanation on optional status of new identifiers (chapter 6)	
V0.04 06/05/2014	Aligned with Application Guide v0.06 approved by JSG on 06/05/2014	
V0.05	CW review and inclusion of all comments of TGs. Path Request_ part needs to be reworked	
V0.06	The path request chapter reedited	
2.1.1_v1.0	The results of the review from March 2015 included. Prepared for the final review for 12 November (JSG).	
2.1.2_v.1.1	The baseline. Error corrections from the TEG review integrated. Schema version incremented due to	

	approved error fix CRs	
2.1.3_v1.2	TrainID intro aligned with AG	Internal version – not published
2.1.7_v1.3	All changes to schema until 2.1.7 reflected. The content of CRs for Sector Handbook text added	Reviewed by sector
2.1.7_v1.4	Review results included	
2.2.3_v2.0	All changes to schema until 2.2.3 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
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3.1.0_v3.1	All schema changes until version 3.1.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.2.0_v3.2	All schema changes until version 3.2.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.3.0_v3.3	All schema changes until version 3.3.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.4.0_v3.4	All schema changes until version 3.4.0.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.4.1_v3.5	All schema changes until version 3.4.1.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.5.0_v3.6	All schema changes until version 3.5.0.0 reflected. The content of CRs for Sector Handbook text added.	Reviewed by sector
3.5.1_v3.7	All schema changes until versions 3.5.1.0 and 3.5.1.1 reflected. The content of CRs for the Sector Handbook text added.	Reviewed by sector
3.5.2_v3.8	All schema changes until version 3.5.2.0 reflected. The content of CRs for the Sector Handbook text added.	Reviewed by sector
3.5.2_v3.9	All schema changes until version 3.5.2.1 reflected. The content of CRs for the Sector Handbook text added.	Reviewed by sector

Approvals

This document was approved by the Joint Sector Group.

Reference

This document is created with reference to the following legal documents.

Abbreviation	Title	Remark	Date of Issue	Version
TAP TSI	Commission Regulation (EU) No 454/2011 on the technical specification for interoperability relating to the subsystem 'telematics applications for passenger services of the trans-European rail system and in particular the annexed ERA Technical Document B.30	For RU/IM functions only	05/05/2011	1
TAF TSI	Commission Regulation (EU) No 62/2006 on the technical specifications for interoperability – Telematic Applications for Freight __ for RU/IM Functions	For RU/IM functions only	23/12/2005	
Amendment to TAF TSI	Commission Regulation (EU) No 328/2012 amending Regulation (EC) No 62/2006 concerning the technical specification for interoperability relating to the Telematics applications for freight subsystem of the trans-European conventional rail system and in particular the annexed ERA Technical Document Appendix F	For RU/IM functions only	17/04/2012	
Amendment to TAF TSI	Commission Regulation (EU) No 280/2013 amending Regulation (EC) No 62/2006 concerning the technical specification for interoperability relating to the telematic applications for freight subsystem of the trans-European conventional rail system	For RU/IM functions only	22/03/2013	
Amendment to TAP TSI	Commission Regulation (EU) No 1273/2013 amending Regulation (EU) No 454/2011 on the technical specification for interoperability relating to the subsystem 'telematics applications for passenger services' of the trans-European rail system	For RU/IM functions only	06/12/2013	

Draft revised TAF TSI	Preliminary draft 1.0 of the Technical specifications of Interoperability relating Telematics Applications for Freight (TAF TSI) (Ref. ERA/CON/2013_03/INT		18/07/2013	

Distribution

This document is publicly available on the Joint Sector Group's web site http://taf-jsg.info/.

Document maintenance

This document will be maintained by the SMO (Sector Management Office).

In the meantime, any actor detecting errors, needing clarifications or proposing additions or updates can contact the SMO via JSG web site contact form.

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- Rail Freight Corridor (RFC): a Corridor organised and set up in accordance with EU Regulation 913/2010 92
- Pre-arranged Path (PaP): a pre-constructed path on a Rail Freight Corridor according to the Regulation 913/2010. A PaP may be offered either on a whole RFC or on sections of the RFC forming an international path request crossing one or more international borders. 92

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3. Management Summary

The Sector Handbook describes messages and elements used by the sector for RU/IM communications for planning and operation in freight and passenger traffic.

Some of these messages are basic parameters described in TAF and TAP regulation. Others are out of the scope of the regulation, designed by the sector for the sector and implementation by the actors under agreement.

The “legal” messages, described in TAF and TAP TSI, will be presented in a separate document called Application Guide. This application Guide is foreseen to replace the document B.56 quoted in the TAP revision text approved by RISC in June 2013 (and corresponding to the Implementation Guide delivered during TAP Phase 1 in May 2012). The decision of replacement will be taken by the Steering Committee co-chaired by the Commission and the Sector. In practice, the Application Guide is the subset of the Sector Handbook relevant for TAF and TAP regulation.

The Sector Handbook is targeted to those people within railway companies and their suppliers, who are in charge of organizing, supervising and/or carrying out the implementation of the TAP and/or TAF RU/IM Communication within their company.

This document explains the TAP and TAF messages derived from both regulations[1], giving a hint on their legal status, explains their usage the overall architecture, the establishment and use of the reference data and relevant code list.

The document covers the RU/IM communication of both TAF[2] and TAP. Some parts are specific to one of the TSIs only and are marked accordingly. The relevant TSI for passenger Railway Undertakings (RU), Infrastructure Managers (IM) and Station Managers (SM) is TAP TSI. The relevant TSI for freight RUs and Ims is TAF TSI.

The messages described in the regulation are completed by optional messages out of the regulations that can be used after agreement by the RUs and Ims (and SMs if relevant) for information exchange. These messages are maintained by the Sector Management Office under the authority of the Joint Sector Group.

Messages described in the Sector Handbook are:

Message	Relevant article in **draft revised TAF TSI**	Relevant article in **TAP TSI (454/2011)**	**Out of regulation** (by the sector for the sector)	
			Freight	**Passenger**
Consignment Note data				
Consignment Order message	4.2.1.2			

[1] Based in particular on TAP ERA Technical Document B.30 and TAF ERA Technical Document Appendix F.
[2] Messages specific to RU/RU communication (relevant only to TAF TSI, e.g. wagon order, wagon movement etc.) are consequently not covered in this document.

Path Request				
Path Request message	4.2.2.2	4.2.17.1		
Path Details message	4.2.2.3	4.2.17.2 (including 4.2.17.3)		
Path Confirmed message	4.2.2.4	4.2.17.4		
Path Details Refused message	4.2.2.5	4.2.17.5		
Path Cancelled message	4.2.2.6	4.2.17.6		
Path Not Available message	4.2.2.7	4.2.17.8 (Booked Path No Longer Available)		
Receipt Confirmation message	4.2.2.8	4.2.17.7		
Path Coordination message (Dossier 1)			X	X
Path Section Notification message (Dossier 2)			X	X
Error message	The message is accepted at ERA CCM Working Party for Common Metadata.	The message is accepted at ERA CCM Working Party for Common Metadata.		
Utilisation Notification message			Replaced by the generic message Path Section Notification	Replaced by the generic message Path Section Notification
Train Preparation				
(Freight) Train Composition message	4.2.3.2			
Passenger Train Composition Process message				X
Train Ready message	4.2.3.3	4.2.14.1		
Rolling Stock Restriction message				X
Train Running Forecast				
Train Running Forecast message	4.2.4.2	4.2.15.2		
Train Running Information message	4.2.4.3	4.2.15.1		
Train Delay Cause Message	4.2.4.3.	4.2.15.1 4.2.15.2 4.2.16.2		

Change of track/platform message				X
Service Disruption Information				
Train Running Interruption message	4.2.5.2	4.2.16.2		
Shipment ETI / ETA				
Wagon ETI / ETA message	4.2.6.3			
Alert message	4.2.6.4			
Wagon Movement				
Wagon Release Notice message	4.2.7.2			
Wagon Departure Notice message	4.2.7.3			
Wagon Yard Arrival message	4.2.7.4			
Wagon Yard Departure message	4.2.7.5			
Wagon Exception message	4.2.7.6			
Wagon Arrival Notice message	4.2.7.7			
Wagon Delivery notice message	4.2.7.8			
Interchange Reporting				
Wagon Interchange Notice message	4.2.8.2			
Wagon Interchange Sub Notice message	4.2.8.3			
Wagon Received At Interchange message	4.2.8.4			
Wagon Refused At Interchange message	4.2.8.5.			
Identifiers management				
Update Link message			X	X
Object info message			X	X
Error management				
Error message	ERA_TD_104: 3.2.4	ERA_TD_104: 3.2.4		

Each relevant chapter describes if the message is required by TAP, TAF, both or if it is a supporting proposal outside the legal requirements.

Related reference data on locations and companies as well as code lists are explained as well.

This document does not cover any requirement on how company internal applications have to be designed or how communication within companies is done. This is up to every company itself.

The document does not cover any Retail specifications derived from TAP TSI.

Apart from the central reference files, this document is not describing specific applications, as neither TAF nor TAP require the use of a specific commercial product.

4. Who should read what

This chapter provides a nonlegal binding guideline to the reader of which parts to read.

	Readers charged with the task of implementing…			
… should read Chapters…	**Train Preparation** relevant for RUs, Ims and SMs	**Train Running**[3] (covering real time data exchange) relevant for RUs, Ims and SMs	**Path requests** (requesting and attributing paths) relevant for RUs and Ims	**Reference data** relevant for RUs, Ims and SMs
Part A				
5	X	X	X	X
6	X	X	X	X
7	X	X	X	X
8	X	X	X	
9	X	X	X	X
10		X	X	X
11	X	X	X	X
Part B				*to facilitate the use of reference data, reading one of these chapters is recommended as well*
12			X	
Part C				
13	X			
14		X		
15		X		
16		X (TAP only)		
17		X (TAP only)		
18	X	X		
19		X (TAP only)		
20		X (TAF only)		
Part D				
21	X	X	X	X
22	X	X	X	X
23	X	X	X	X
24	X	X	X	X
25	X	X	X	X

[3] Train Running covers the running information, forecast, service disruption, change of track, journey modified, delay cause, information in station and vehicles and train location

This document covers the implementation of the RU/IM Communication of TAP TSI and TAF TSI. Normally, explanations given are valid for both TSIs (and hence the passenger and freight sector).

- TAP TSI is relevant for passenger Railway Undertakings (RU), Infrastructure Managers (IM) on whose networks passenger train services can be performed and Station Managers (SM). Companies dealing with the implementation of TAP should read all common parts valid for both TSIs and the specific TAP only sections.
- TAF TSI is relevant for freight RUs and Ims on whose networks freight train services can be performed. Companies dealing with the implementation of TAF should read all common parts valid for both TSIs and the specific TAF only sections.

The following applies in this document to distinguish between common information and content valid for one TSI only.

This sentence is valid for both TSIs.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	**TAF TSI only** **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
This sentence is valid for the implementation of TAP only.	**This sentence is valid for the implementation of TAF only.**

By extension, optional messages out of regulation, designed by the sector to be used by the sector after agreement, are allocated to TAP TSI (resp. TAF TSI) column if they concern passengers (resp. freight) traffic.

Part A Prerequisites

5. Background & Purpose of this Sector Handbook

The TAP and TAF TSI operational part describes the communication between Railway Undertaking (RU), Station Manager (SM) and Infrastructure Manager (IM). In addition to data exchange, the TAF TSI describes business processes for operational interoperability.

The purpose of these standards is to allow railway companies _ in the same way for domestic and interoperable[4] services – to

- order paths for trains
- control and manage their train services (and indirectly staff and fleet)
- Improve customer information provided by RUs and SMs[5]

The implementation of TAF and TAP TSI is one step towards interoperability. Full interoperability requires further steps besides TAF and TAP, as e.g. different operational rules and organisational set ups are valid in the different Member States, requiring different use of these messages. Gradually, these rules should be aligned.

Various requirements in the Passenger Rights Regulation (PRR) and TAP TSI are the basis for these RU/IM communications. For example, Annex II Part II of PRR requires passenger RUs to inform their customers about delays and main connecting services during their train ride. Basic Parameter (BP) 4.2.12 of TAP TSI requires SMs to inform passengers about material delays, change of track or platforms, full or partial cancellation of trains and train rerouting. In order to give this information, data exchange between Ims, RUs and SMs is needed, covered by B.30 of TAP TSI. The supporting processes of ordering train paths and informing the IM about the readiness of a train are covered as well, facilitating the interoperable train run for RUs.

There are common functions for planning and operations that are cited in both regulations and are common or similar to both TAP and TAF actors. These functions are:

Common System Components:

- Common Interface (TAP BP 4.2.21₀ TAF BP 4.2.14)
- Reference Files (TAP BP 4.2.19₀ TAF BP 4.2.12)

Common/similar messages (or groups of messages):

- Train Running Information (TAP BP 4.2.15₀ TAF BP 4.2.4)
- Train Running Forecast (TAP BP 4.2.15₀ TAF BP 4.2.4)
- Service Disruption (TAP BP 4.2.16₀ TAF BP 4.2.5)
- Train Preparation (TAP BP 4.2.14₀ TAF BP 4.2.3)
- Path Request[6] (TAP BP 4.2.17₀ TAF BP 4.2.2)

[4] For RU/IM an “interoperable” train service is understood as a train that involves more than one IM and/or more than one RU.
[5] And Ims, in case they provide services as a station manager or in direct communication to passengers.

Specific to TAF are certain parts of train preparation[7]. Specific to TAP are messages intended for customer information.

The application of the Common System Components should be used by both TAF and TAP communities for the operational RU/IM communications. Therefore, the related standards and specifications are being aligned.

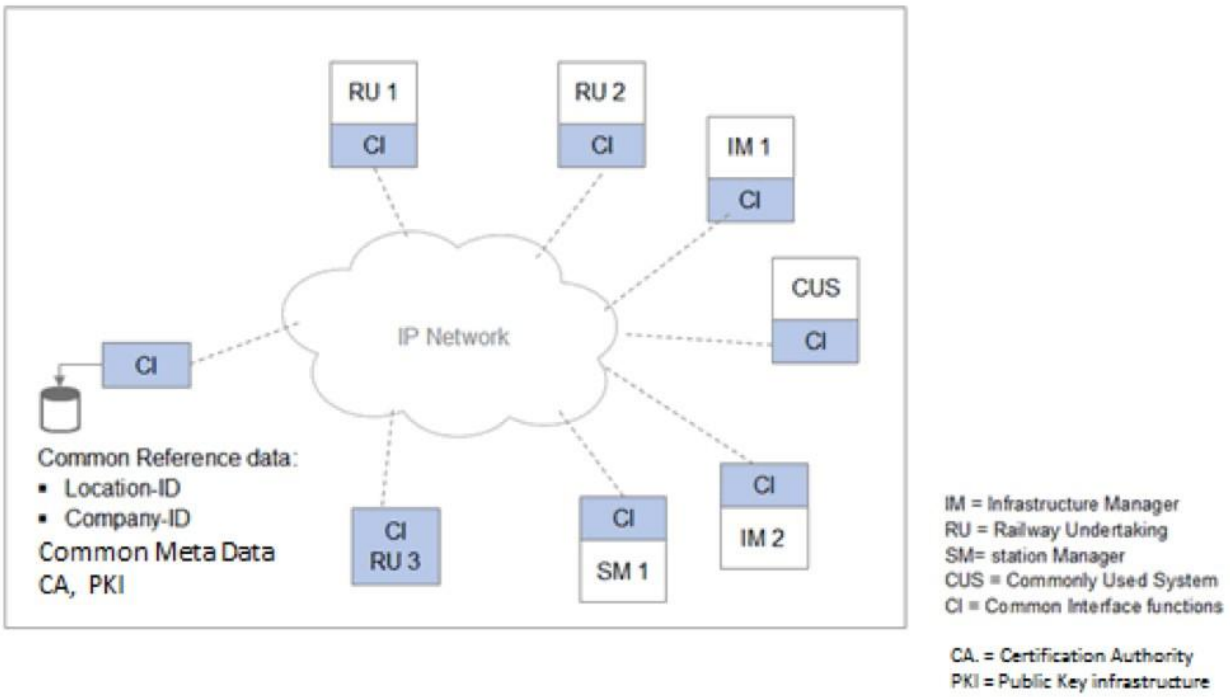
The Common Messages are based on operational business communications that are also common to the TAF and TAP communities. These operational messages are contained in the message catalogue and have been aligned between TAF and TAP working groups so that they include certain functionality needed in the Passenger and Freight domains.

This implementation guide provides the necessary information to actors of both TAF and TAP to assist in the implementation of the RU/IM functions of both TSIs. The document integrates all parts relevant from the RU/IM part of both regulations in one single guide. It covers prerequisites, such as reference data, the planning part, the operational part and general requirements, e.g. on data quality. Where necessary the document refers to further specifications relevant for the use of the message exchange and described elsewhere. It has to be assured that these referenced documents relevant for implementation are accessible to all actors in a fair and transparent manner.
This document also shows the remaining differences between freight and passenger specific processes and/or data according to business needs.

[6] In TAF TAP regulation, Short Term Path Request (STPR) is covered. However, it is a general agreement within the Sector to use TAF TAP messages framework for the Path Request process (including annual timetable)
[7] The Infrastructure Restriction Notice database is specific to TAF and not covered in this document

6. RU/IM Architecture

The following graph shows the general architecture of the RU/IM communication.



Companies' legacy systems will be linked via an open network[8] (the use of private networks is possible, too), using a common interface (CI). The Common Interface describes a set of functions that are legally required in order to take part in the RU/IM communication.

According to TAP TSI these are:

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

This list is not exhaustive.

[8] Any application commonly used by some parties can also be linked (marked CUS in the image). A CUS can be a system that is used on agreement by more than one party to commonly address data exchange according to or additional to TAP and TAF TSI. CUS are not a requirement from TAF nor TAP TSI.

The solution to cover the functions of the common interface used by a company can be either a commonly built CI[9] or another development with the required functions. In case a company (in the picture: RU 3) develops and builds new applications, the message exchange can directly be according to TAP and TAF TSI, with no additional application (separate interface) needed. The required functions of the Common Interface (as described above) will have to be covered by this application directly. (In case the new application does not support TAP and TAF messages and/or the functions of a CI, a common interface is still needed.)
A company's CI will have to be in accordance with the external interface specification, describing the communication between Cis. That external interface specification of the reference implementation can be found on the website of the European Commission (ERA_TD_104): http://www.era.europa.eu/Document_Register/Documents/ERA_Technical_Document_TAF_D_2_Appendix_E_v2_0.pdf

Common reference data (as described in chapter 9) including location codes, company codes and country codes are stored centrally, with different possibilities to access them (e.g. messages, bulk data load, web interface). RUs and Ims will need to have a current subscription to the TAP/TAF governance entity to be given access rights to the reference data service.
Common code lists are enumerated values that are available to be used within the RU/IM messages. These codes are to be used unless a bilateral agreement exists between partners to use other codes. These common Code Lists are published centrally by ERA for the codes messages required by the regulation and by Joint Sector Group _ sector RU/IM Telematic governance entity for the codes used out of the legal TAP/TAF requirements.

Reference data and code lists are mirrored in the companies' systems (see chapter 9.3 for ways to access the data), i.e. each actor holds a copy of the reference data in its own system environment.
The exchange of bilateral and multilateral agreed messages remains possible as well. This covers the use of both messages and codes in the TAP and TAF messages.
In the further document, the references and excerpts of the XSD schema (the metadata definition for TAF TSI messages) are used, and often in the form of graphic models. The syntax of the model used in the pictures through the document which reflect the message or element structure is described in the Annex 6.1. The full export of the XSD model in the "readable form" including diagrams and cross-references is given in the Annex 6.2. The code lists are exported in the readable form in the Annex 6.3.

[9] e.g. the CI developed initially under the supervision of the Common Components Groups ("CCG CI"). Update 2017: It is now called "Common Components System (CCS)" under the umbrella of RailNetEurope

7. End to End Processes

This chapter provides an overview on the main end-to-end process covering planning and operations. The details or any other associated processes (e.g. path cancellation) can be found in the individual chapters (see section 12.5).

7.1 Definition of the roles

Lead RU (Railway Undertaking)

The Lead RU is responsible for coordination of an interoperable traffic service and train journey. It is not necessarily the first RU at the origin of the planned journey of the train. The Lead RU undertakes the harmonization and coordination in the pre-planning phases and the whole communication between involved RUs. For freight traffic, the Lead RU may be the single point of contact of the customer.
Among the tasks of the Lead RU are: the creation of the object train, the definition of TrainID and assurance of its uniqueness. The Lead RU may be RA (responsible applicant) and/or a RRU (responsible RU) as well. If that is not the case, the Lead RU has to inform that both other roles if they are taken by other RUs. In principal, in such a case the communication exchange takes place primarily between Lead RU and RA. Communication exchange between Lead RU and infrastructure manager (IM) is optional; no special rights and obligations to the IM.

Legal reference:
EU Regulation No 1305/2014 (TAF), p10, §2.3.1 *Involved Entities*

Responsible Applicant (RA)

Applicant means a railway undertaking or an international grouping of railway undertakings or other persons or legal entities, such as competent authorities under Regulation (EC) No 1370/2007 and shippers, freight forwarders and combined transport operators, with a public-service or commercial interest in procuring infrastructure capacity (Directive 2012/34/EU (3)).

The RA is the applicant/customer and contractor as well as the single point of contact for respective IM in the whole planning process phase. The main task of the role RA is to request the booking of capacity to an IM. The RA does not need to be a RU, it can also be another entity, which is able and permitted to book capacity.
The RA (if it is an RU) may take the roles Lead RU and/or RRU as well. If that is not the case, RA has to inform the both other roles if they are taken in by other RUs. The RA has to create a Path Request and a PathRequestID to request for a desired path in network of a particular IM. If it is not an interoperable train managed by a planning Lead RU, the RA also creates the object train, the TrainID and assures the uniqueness and takes the Lead RU role too. Furthermore, the RA is allowed to confirm or to refuse a path offer, to book a path (sign the contract), to change or to cancel the booked path.

Legal reference:
EU Regulation No 1305/2014 (TAF), p10, §2.3.1 *Involved Entities* & Appendix II, Glossary
EU Regulation No 454/2011 (TAP), §8 Glossary: mentioned as “Access Party”

Responsible RU (RRU)

Railway Undertaking (Directive 2004/49/EC (9)) means railway undertaking as defined in Directive 2001/14/EC, and any other public or private undertaking, the activity of which is to provide transport of goods and/or passengers by rail on the basis that the undertaking must ensure traction; this also includes undertakings which provide traction only;

Based on this definition, this TSI regards the RU as the service provider for operating trains.

The RRU is responsible for the run of the train in operation phase, for the whole journey or a section of the journey. It is the service provider for operating trains, i.e. which task is to provide transport of goods and/or passengers by rail.
If more than one RRU is involved in the operation of the train, the responsibility is transferred from one RRU to the next RRU at the interchange point.
In this context the RRU is the primary contact for the IM in operation phase, for all exchange of information related to the running of the train (e.g. train running information forecast, change of track, etc.) as well as the tasks required for incident management (e.g. coordination with the IM in case of a line closure, technical malfunction). If required by the necessity of the service and depending on specific network statement, it is for the operations phase also allowed to perform tasks like confirming a path offer for an alteration of a booked path by IM, to change or to cancel the booked path (depending on specific network statement or agreement with RA).
Based on an agreement with RA, it can also ask a subcontractor with running the train, the RRU will nevertheless remain the primary point of contact for the IM in operations phase.
If there is a need to communicate a subcontractor, this can be done outside TAF/TAP TSI communication. If bilaterally agreed, the update of the element RRU is also possible. In principle, the RRU may be the same RU as for roles Lead RU and RA. If that is not the case, RRU has to inform the both other roles if they are taken in by other RUs.

Responsible IM (RIM), Planning IM (PIM)

The RIM is the IM who is the owner of the respective network and responsible for all operational handling of the traffic. The PIM is the IM who is responsible for elaboration and allocation of a path. The responsibility area of PIM is defined by handover points, e.g. used as first/last journey location in PathInformation of PathRequestMessage or of an offered/booked path.

In most cases, the RIM will be the same entity as the PIM. However, for some locations and /or some trains, traffic monitoring in operations may also be delegated to another IM. For this purpose, special agreements must be concluded between Ims. If they are different, the RIM is always defined by the PIM when the path is allocated.

Summary of the roles

	Lead RU	**Responsible Applicant** (Contractor)	**Responsible RU** (responsible for train run)	**Planning IM** (Planner and owner of the path)	**Responsible IM** (responsible for monitoring operations)
Harmonisation/Coordination	R	I			
Path request	I	R		R	
Path allocation/confirmation/ booking	I	R		R	
Path cancellation	I	R		R	
Path modification in planning	I	R		R	
Path alteration in planning	I	R		R	
Path modification in operations ([1])	I	I	R	I	R
Path alteration in operations	I	I	R	I	R
Operations messages RU > IM	I	I	R	I	R
Operations messages IM > RU	I	I	R	I	R

Commercial issues ([2])	I	R		R	

(1) If IM allows modification in operations phase
(2) No TAF-TAP message exchange

R =	responsible for process step and RU/IM message exchange
I =	involved. To be informed by responsible actor („R"), particular based on respective network statement or bilateral agreements
Sender may send messages to more than one recipient but „R" is mandatory and responsible.	

7.2 High level overview of the processes

Main flow (planning)
Lead RU find demand for a train services (same for passenger and freight), or customer makes requests for a service.
If partner RUs have to be involved for this service, Lead RU contacts and coordinates the work with them.
The Lead RU prepares a draft planning for this service. If needed, the Lead RU aligns this planning with partner RUs ("RU harmonization").
For each involved network, a licensed RA makes a request for a path for either overall journey or a section of the journey to the respective IM.
The possibility exists for Ims to coordinate the different sections of the journey ("IM harmonization").
IM offers path(s) based on the PathRequest back to the RA.
RA confirms or negotiates with the IM if changes are required until an agreement is reached between RA and IM (this could be for the whole journey or just a section).
Upon agreement the IM confirms the path in its system (booked train).

The booked train is confirmed in the Ras system for production and also in the RAs' and Lead RU's system for commercial information.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
This might involve publishing the train in the commercial timetable, making the service available for e.g. booking, Reservations, publishing the timetable in	This might involve publishing the train in the timetable and offers for freight forwarders.

stations etc. Related processes and standards are related to the Retail part of TAP TSI and can be found in the dedicated retail Implementation Guides. Subject to contractual agreements between RU, SM, affected Ras and IM or according to national rules, the Lead RU shall transmit relevant technical characteristics (train composition, etc.) and commercial information (offered services, etc.) to the SM and/or IM and/or affected Ras necessary to operate the train and provide passenger information. This information is out of TAP obligations. An optional message can be used. [See §	

The data and identifiers agreed in planning have to be transferred into operations.

Main flow (operations)

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
Subject to the contractual arrangements between Lead RU, SM, Ras, and IM RRUs, Ims and according to national rules. The RRU shall be required to send the composition to IM and/or to SM and/or to Ras at the time of train operation. This information is out TAP obligations. An optional message can be used. [See § 13.1]	In TAF, the process of sending the train composition from RRU to IM and its validation by IM may be required (depending on contractual agreements between IM and RRU or according to national rules). The RRU in operation must send composition to the

Before the train accesses a network, the Responsible RU informs the affected IM on the readiness of the train to run the booked path on that network..

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**

Subject to the contractual arrangements between Lead RU, SM, RRUs and IM and according to national rules. - The RRU shall inform the IM (and when relevant the involved Ras or the SM) prior to departure and during the journey of any rolling stock restriction affecting the ability to accommodate the allocated path. - Subject to the contractual arrangements between RU, SM, involved RUs and IM and according to national rules. The RU shall inform RAU(s) or SM(s) of any modification or anomaly affecting the services provided to the passengers. This information is out of TAP obligations. An optional message can be used. The optional Passengers Train Composition message can also be used.	Not concerned

The train starts running and train running information is sent from IM to RRU at agreed reporting points. Forecasts are sent from IM to RRU and also to neighboring IM involved for agreed forecast points, which could also be before the train starts running.

Depending on contractual arrangements, the IM may also send running information to Ras and Lead RU.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
For TAP, the train running information and forecast are also forwarded to Station Managers. In case a train will not arrive on the scheduled track/platform to allow passengers to alight or leave the train, the information of change of track is issued to the SM (to inform the passengers in the station). Note that the message Change Of Track/Platform is optional and out of TAP regulation	

In case the train running is interrupted with no forecast possible, the IM informs the RRU on the train running interruption. Communication (not TAP/TAF message supported) between RRU and IM takes place to agree on the continuation of the train.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
If the agreed continuation of the train involves a re-routing, cancellation, partial cancellation, stop cancellation or adding stops, train journey modification information is issued by IM or RRU to the SM. National rules specify if and how the messages are transmitted between IM, RRU and SM.	[Not applicable.]

Delay cause messages are used to identify the cause of every single delay affecting the train run.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
The train running information and delay causes are used for passenger information, passenger rights handling and performance regimes.	The delay causes are used to inform the customer and for performance analysis.

8. Objects Identifiers

8.1 Introduction

The aim is to have a unique ID for all objects over their complete lifecycle. The lifecycle starts with the planning phase until the phase of accounting.

Identifiers in the messages for TAF as set out in Regulation (EC) No 62/2006 replaced by the Regulation (EU) 1305/2014 in 2014 and amended by the Regulation (EU) 2021/541 in 2021 and TAP as set out in Commission Regulation (EU) No 454/2011 (as amended by Commission Regulation (EU) No 1273/2013) as well as further industry needs have been analysed and are specified hereafter.

The problems of the identification of trains have been an issue since the early days of the railways. This can be borne out by the considerable amount of time it has taken to complete.

During the analysis of the message exchange in TAF/TSI and the existing international systems it became apparent that identifiers for almost all of the elements involved in the transport process are needed. Today's identifiers (and also the operational train number, in the further text the abbreviation is used: OTN) are not able to cope with the new business processes. More precisely, all Ims and RUs use some form of train number or train description to identify their trains to operational staff. Depending on the country this code can be used to perform a number of different tasks. This can include information such as a speed of train, priority, route, direction, running order, timetable and some special needs (such as exceptional loads or hazardous goods). If this information changes the train's number (OTN) must also be changed. While the majority of trains will keep the same number for their entire journey this can often make it worse for the occasion where the number is changed as the company procedures for handling the changes are "ad hoc". That's why the train could be lost.

8.2 Solution guideline for the industry

The intentions of the industry are:

1. To create and develop the recommendations and specifications for the coding of Train ID and the other TSI identifiers

2. To find a solution for medium and long term

8.2.1 Business environment (background)

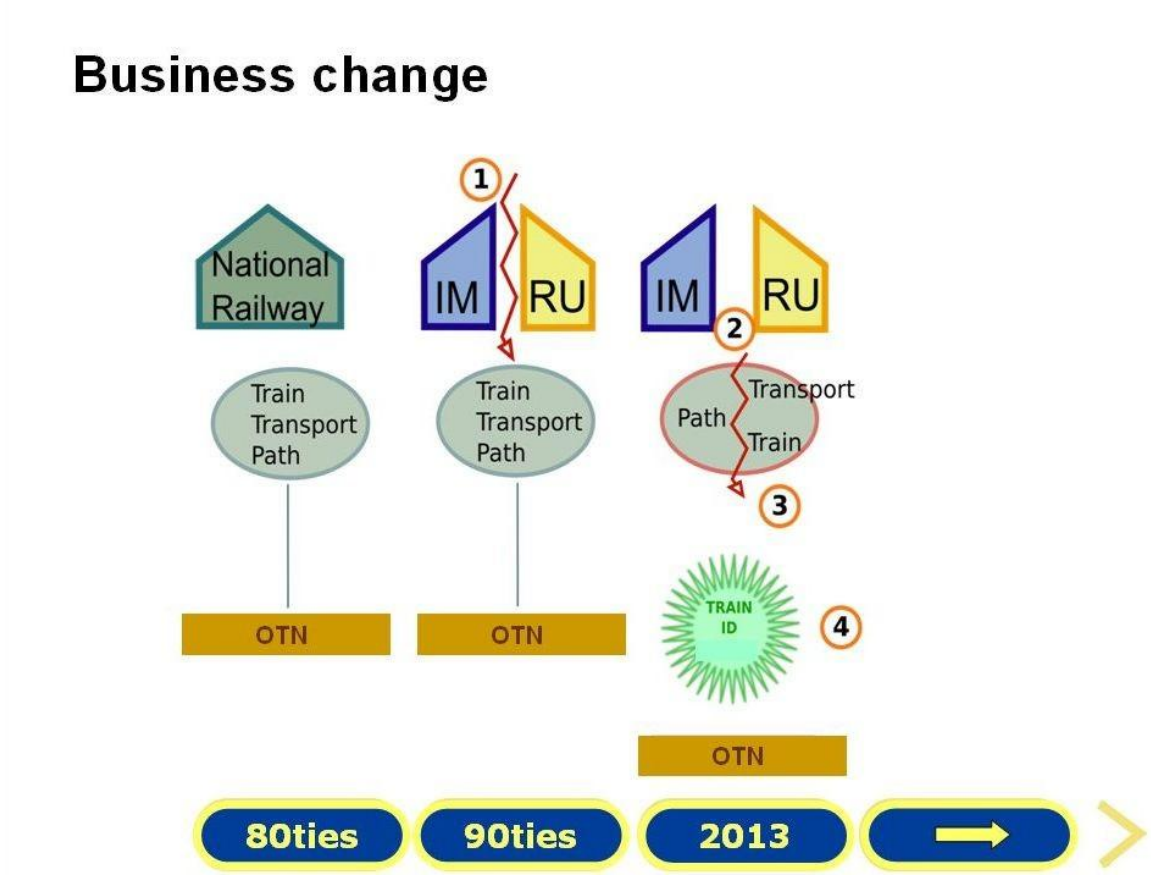
The solution is based on the available documents from TAF/TSI regulation 62/2006 replaced by regulation 1305/2014 amended by regulation 2021/541, TAP/TSI regulation 454/2011, and the results of the other TAF/TSI working groups showing that one of the key elements required for the majority of the message types is a "Unique Identifier" that relates to the train from the business perspective and the link to the path can be managed in a standardized way.

It does not take into account any newer developments of regulations, e.g. the regulation (EU) 913/2010.

In principal the solutions have been designed to be flexible to allow it to be used to meet new regulations as well.

Identifiers in the messages for TAF/TAP and further industry needs have been analysed and are represented in this chapter.

Important note: Both ERTMS/ETCS and GSM-R remain untouched by the proposed solution.



• Fig. 1 Background: the change of business

It is important to mention that the split of the Railway business, according to the directive 2012/34 had as a consequence the split of the Ims from the RUs. The business focus of each separate company changed. The actual situation is the result of several previous steps over the last years. Driven from the split of the national railway companies (see number 1 in Fig. 1) in the 1990ties a consequence is that the existing IT systems (number 2 in Fig. 1) were distributed to the two or more new companies (Infrastructure Managers and Railway Undertakings).

The scope of the companies differs:

- A RU supplies a service (train) for a customers'/applicants' need (transport).
- An IM responsibility is to manage the capacity of its network (path).

Together with the split of the companies and the separation of the systems new processes have been developed to cope with the new situation. These processes are based on new (separated) data objects “Path” and “Train” (number 3 in Fig. 1). In former times a data object “Trainpath” has been used in the systems. The consequence was the need to separate into two objects: “Train” and “Path”. In the communication between RUs, RU and IM, Ims these separated data objects must be uniquely identified (number 4 in Fig. 1). A new data model has been developed to deal with the changed situation described in TAF/TAP regulation and the results of the other working groups.

The new model needs (new) identifiers. Those identifiers are described in this chapter of the Sector Handbook.

8.2.2 Requirements

When establishing this concept, the following high-level requirements have been taken into account:

1. Need for identification:

   A new model for identifiers is needed for some of the existing objects in the railway business.

2. Coverage of the whole business process

   The future solution must support all existing railway business processes starting with the end customer request for transportation until the accounting phase

3. Compliance with the results of the other working groups

   The solution must be in compliance with TAF TSI and TAP TSI (for RU/IM exchanges) regulations and the changes coming out from the TAF TSI and TAP TSI working groups or telematics expert groups.

4. Existing identifiers remain

   Given the need to maintain compatibility with existing systems and infrastructure it was concluded that the usage of the operational train number must be kept “as is”. Each IM would set it in accordance with its national rules and safety standards.

   International trains could continue to follow UIC leaflets 419-1&2.

The detailed requirements analysis had as a consequence the following demands:

i. The identifier must be unique for the planning phase.
ii. The identifier must be unique for the operational phase.
iii. The identifier must work for both domestic and international trains.
iv. The identifier must support splitting and joining of trains.
v. The identifier of the train must remain the same when a train is diverted, delayed or disrupted in any way.
vi. The operational train number should be retained as used today, e.g. in operations within both Ims and RUs. (In the Annex 8.1 (OTN Framework), there is an explanation of the usage of OTN in TAF/TAP messages, related to the TAF/TAP objects and identifiers).

vii. The identifier (in combination with the new business rules for the implementation of the Train ID) must allow operational train number to be changed in transit and guarantee traceability.

viii. There must be a separate path identity, controlled by the IM.

ix. The identifier must be unique on its own. It doesn't rely on data to meet this requirement.

x. The format of the core part of the reference is decided by its creator (subject to the rules set out in this document).

xi. There should be as few rules as possible about format for not constraining the future use of the reference.

xii. The identifier has to cover the whole lifecycle of the referenced object.

8.2.3 Objects

It has been agreed on the level of the working groups which produced this result to use the data analysis techniques developed by the IT industry for designing databases.

Computer systems can be made to do very difficult things but only if they are designed correctly. Computer systems often have to deal with complex pieces of information. The analysis process involves understanding the data in its simplest forms and the relationships between the different bits of information. In this process the "Data" is normally information about something. This something is called an "Object". In the IT industry this may also be called an "Entity", a "Class" or a "Class Object". In databases it may be called a table. For consistency in this document it will always be called an "Object". In order to keep track of objects, an identity (ID) has to be defined for them. The ID needs to be a name or code for each time an object occurs which "uniquely" identifies each instance of an object.

The main "Objects" identified in this chapter are:

a. Train (including Reference TRID with Reference Calendar)
b. Route
c. Path
d. Path Request
e. Case Reference
f. Capacity Model
g. Capacity Needs Announcements
h. Catalogue Path
i. Temporary Capacity Restriction

The Path is defined according to TAF TSI (regulation 1305/2014 as amended by regulation 2021/541) or TAP TSI (regulation 454/2011) : path means the infrastructure capacity needed to run a train between two places over a given period (route defined in time and space).

The Train is a more complex object to define with its different faces (physical set of vehicles, entity moving on track that can change the composition during the journey or be rerouted, seamless journey from one point to another, term used by RU to define a traffic/Transport service etc.).

In this document focused on RU/IM communications, the Train is defined according to OPE TSI (regulation 2019/773) : a train is defined as (a) traction unit(s) with or without coupled railway vehicles with train data available operating between two or more defined points.

The LRU/RA/RRUs inside their own IT systems should also consider the 'Commercial Train" that could be defined as a seamless offer of transport for the passengers or freight loads between origin and destination of the 'commercial train', including intermediate stops, meaning a traffic/Transport service. This concept and the link with the '~~operation~~ production train' are not developed in this document.

The objects are used in the chain of processes from train creation and harmonization via path request and path allocation (yearly timetable to short term path request) until the end of operation, and even for post operation tasks (e.g. statistics, accounting) :

- The LRU/RA decides to offer a 'train service' ensured by a 'family of trains' with similar (but not necessary identical) characteristics (train technical data, timings, commercial data if relevant, etc.) :
  - Significant number of trains have same characteristics (running on the same line and in the same direction)
  - Some trains can slightly differ (composition, stops, timings, etc.)
  - On a given day of the Reference Calendar only one train of the same family will run
  - Same LRU, cooperating RA/RRUs could be different
  - It's up to the LRU to define if it uses the concept of train family and the trains belonging to the same family
- The LRU/RA defines the 'family of trains' during the RU harmonization phase and describes the 'family of trains' in its own IT system with the useful characteristics, usually :
  - Information for Path Allocation and Train Operation ('RU/IM information') ;
  - Customer-oriented information ;
  - Commercial and retail information ;
  - Etc.
- At the end of the RU harmonization phase, each LRU/RA sends for the first time to the concerned IM the Path Request which contains :
  - An identifier, called 'Reference TRID', unique and unchanged during the entire lifecycle of the Train, used also to trace the objects (Route, Path Request, Path, Case Reference) and messages attached to the Train during its entire lifecycle ;
  - The direct identifiers that are mandatory (ROID, PRID),
  - Other related identifiers are optional (CRID and PAID as related identifier) ;
  - The relevant information to allow the Ims to design the path and coordinate between them, namely the Route (for an overview of entire train's journey) and details for requested Path in a given network as part of the train's journey.

- When coordinated , each IM sends the path offer(s) as answer to the requesting RA. There can be more than one Path as answer to a Path Request.
- At the end of the path allocation process, if necessary after a dialogue between Ras and Ims for adjustment, the path is confirmed by the RU and booked by the IM.
- The Train, which characteristics are if relevant updated in the LRU/RA/RRU IT system according to the booked paths and considered as reliable, can then be used by the LRU/RA/RRU for further duties :
  - Rostering of ressources ;
  - Client information ;
  - Retail ;
  - Etc.
- The ReferenceTRID, completed by the Reference Day, identifies the Train in daily operation and permits the tracing with the daily objects Route and (booked) Path.

8.2.3.1 Train

The train object first comes into existence at the earliest planning phase when the RA starts to develop plans to run a train in order to offer a ‘train service’. This ‘train service’ is ensured by a ‘family of trains’ with similar (but not necessary identical) characteristics .

The Lead RU creates the identification TRID (see 8.2.4) for the train at this stage:

- The variant 00 of the TRID (called Reference TRID, see 8.2.3.6) identifies the family of trains and will be exchanged with the IM;
- The variants 01 to ZZ identify the sub-sets of the family of trains with identical characteristics and are used inside the LRU/RA/RRU world; ‘identical’ is meant according to LRU/RA/RRU rules.

The object Train with its identifier is modelled in the LRU/RA/RRU own IT system according to the duties to be performed by the LRU/RA/RRU.

The object Train is used inside the LRU/RA/RRU world and has not to be exchanged with the IM which needs only :

- the Reference TRID variant v00 (see 8.2.3.6);
- the (planned) objects Route (see 8.2.3.2) and Path Request (see 8.2.3.4) in the path allocation phase;
- the (daily) objects Route and Path (see 8.2.3.3) in the preparation and operation phases linked to a (daily) ReferenceTRID (with variant v00 and Reference day).

The Lead RU will then go through a harmonization process with all Ras involved in the particular business case. The aim of the harmonization is to permit all involved Ras to apply for paths to run the trains.

Regarding the aim of path request which follows the train harmonization, the attributes of the object Train in the LRU/RA/RRU own IT system are at least those which will be incorporated in the Path Request message sent to the Ims:

- Train routing (geography, journey sections / locations, timing, indication of responsible RU and IM)
- To fulfill the Path Request message sent to each IM, the locations to be defined for the train routing shall be at least:
    - origin of the train route
    - border points (Handover points, Interchange points, network border points)
    - destination of train route
- Train parameters (weight, length)
- Train calendar
- Start location of path elaboration defined in element PathPlanningReferenceLocation.

To fulfill easily the Path Request message sent to each IM, it is recommended to the LRU/RA/RRU to use in the Train modelling inside the own IT system at least the element TrainInformation which contains the relevant information on the entire journey (see the current TAF/TAP XSD Schema / data catalogue – see JSG web site http://taf_jsg.info/).

Nota :

- If agreed between LRU/RA/RRU and IM, the object Train or the Full Assembled Path (FAP) can be shared with the IM for defined use cases. Same with other stakeholders e.g. Station Manager. That concerns usually the object Train consolidated after path booking.
- In theory the LRU/RA/RRU can use another ID (different core element) for the Train inside its own IT system so long the Reference TRID and the RU/IM messages are correctly exchanged with the IM. It is nevertheless recommended to use the TRID with same core element as in ReferenceTRID in the internal IT system of LRU/RA/RRU.

8.2.3.2 Route

The Route is the minimum set of information on the entire journey of a planned train that the IM needs to perform its duties (Path Coordination/Harmonisation, Path Allocation, Path Publication, Traffic Management).

Composed by origin, handover, destination, calendar, the Route is attached to one Train. Indeed the Route follows the lifecycle of the Train and is updated in case of modification of origin, handover, destination or calendar. Until end of the preparation phase, the route update is performed. When operation has started the update follows bilateral agreement.

Created by the LRU it is exchanged for the first time between LRU/RA and IM when the Path Request message is sent from each LRU/RA to the concerned IM, via the element TrainInformation limited to the elements origin, handover, destination and calendar (see the current TAF/TAP XSD Schema / data catalogue).

8.2.3.3 Path

In response to Path Request(s) issued by RA, the IM will offer Path(s) or answer that no capacity is available (see Path Request process). The IM will need to create an ID for this Path. It may also offer a number of paths each with their own IDs.

The attributes of the Path object are:

- Geography – Journey(path) sections / locations, timing, indication of the responsible IM
- Path parameters
- OTN for each section of path (journey)
- Calendar

Shown here is the minimum requirement from the technical point of view. The technical details of the object Path can be found in the XSD structure (see the current TAF/TAP XSD Schema / data catalogue) within the element PathInformation.

8.2.3.4 Path Request

In order to get a Path for a Train, the path request has to be issued. Therefore, the Path Request is an object in its own right with a separate ID. The technical attributes of the Path Request object are contained in the Path Request Message in the current TAF/TAP XSD Schema / data catalogue (the message header elements which are used for all messages in TAF/TAP are excluded from the model).

8.2.3.5 Case Reference

This object heavily depends on the agreements between the partners that exchange the information with the means of TAF/TAP messages in the industry. The object is here mentioned for the purpose of:

- Umbrella for the business case: The cases where the partners want to provide an identifier as an umbrella for the whole business case which is handled in the process of organizing the Train, sending the Path Requests for it_ and constructing, offering and keeping the track on Path for it.
- Transaction scope: this identifier is used in a sequence of actions that have to be started, processed and ended as a whole.
- Differentiation of parallel applications: All the (re-)planning activities to be processed in parallel have to be differentiated by using this identifier.

Therefore, the structure of this object is not further defined in this document, As mentioned before, it rests on the agreements between the partners in the industry.

8.2.3.6 Capacity Model

The usage of this object is still under further development. The following description provide a general baseline.

The Capacity Model object (CM) is used during the early stages of the infrastructure capacity planning as part of the Advance Planning and contains information about forecasted traffic volumes per traffic type (market segment). The CM is defined by a minimum set of information (e.g., origin, destination, calendar) and does not have to contain detailed train parameters. The object is created, owned, and maintained by an IM and may be defined based on various sources of information (e.g., historical data, capacity needs published by applicants, market needs forecasts).

The main attributes of the Capacity Model Object are the following (non-exhaustive list):

- Title
- Train type (examples: passenger train, freight train)
- Category
- Model parameters
- Calendar
- Geography (locations to which the traffic volume refers to)

On international lines, harmonization between the CM objects with neighboring IM(s) is essential and preliminary optional discussions can be also conducted with applicants to collect additional information on market needs.

The technical details and structure of the Capacity Model object can be found in the XSD structure (please refer to the CapacityModelMessage).

8.2.3.7 Capacity Needs Announcements

The usage of this object is still under further development. The following description provide a general baseline.

The Capacity Needs Announcements object (CN) is used during the early stages of the infrastructure capacity planning as part of the Advance Planning and contains information about forecasted traffic needs. The object is created, owned, and maintained by an applicant (a valid RU license, nor a legal entity located in the country in which the network concerned by the CN is located are not mandatory) and the announced needs are non-binding.

IMs are obliged to handle all submitted CNAs and any connected communication strictly confidential.
The main attributes of the Capacity Model Object are the following (non-exhaustive list):

- Title
- Train type (examples: passenger train, freight train)
- Category
- Model parameters
- Calendar
- Geography (locations to which the traffic volume refers to)

The technical details and structure of the Capacity Needs Annoucemenets object can be found in the XSD structure (please refer to the CapacityModelMessage).

8.2.3.8 Catalogue Path

The usage of this object is still under further development. The following description provide a general baseline.

The Catalogue Path object (CP) contains information about an available planned infrastructure capacity that can be requested by an applicant either in full or partially and which is, at the time of its creation, not affected by temporary capacity restrictions. The object is created based on one of the following:

- The latest version of a CM object: the reference to this object is included as Related Planned Transport Identifier
- A Catalogue Path defined by an IM at national level in a national system

8.2.3.9 Temporary Capacity Restriction

The Temporary Capacity Restriction (TC) object refers to a restriction with a geographical and temporal scope and characterized by operational consequences. The object represents a negative capacity on the infrastructure.

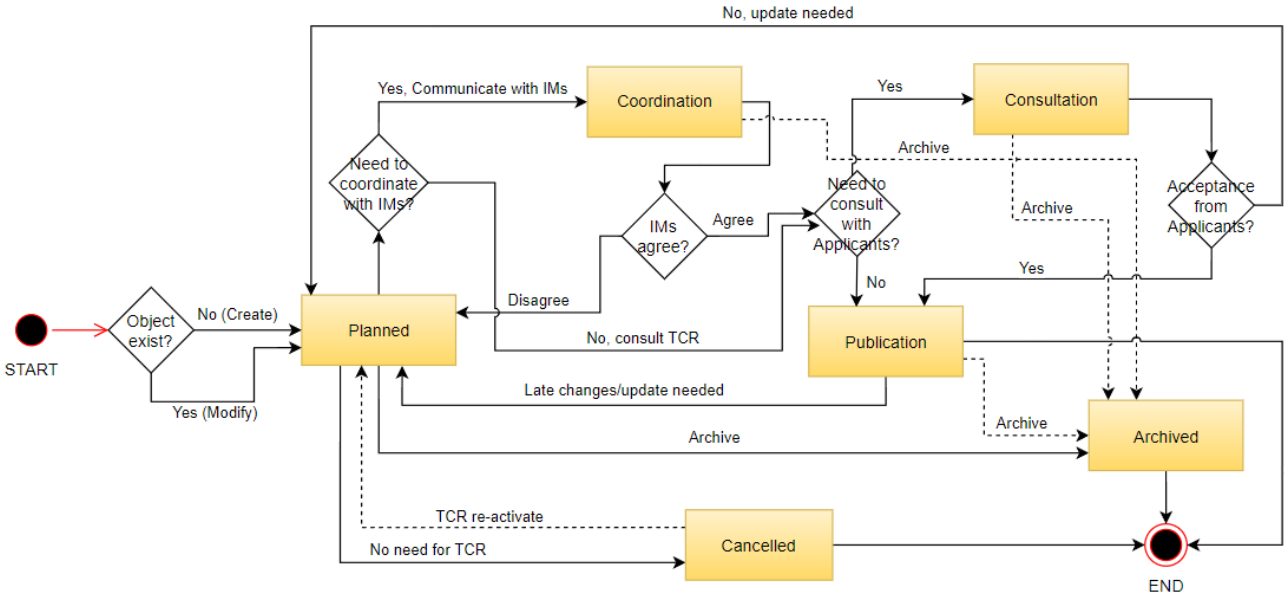


Figure 1 - Object status diagram

Planned

The planning of Temporary Capacity Restrictions (TCRs) begins with their creation. Initially, the TCR is given the status of “Planned”, meaning the Infrastructure Manager (IM) started with the preparation of the object and has not yet completed its preparation.

Once the TCR is fully prepared, other IMs can be involved in the coordination process, especially if the TCR affects a line of international importance.

If the TCR does not have an international impact, the owner IM does not need to coordinate with others and can publish the TCR at any time, making it visible to other IMs, applicants, and the public.

Coordination
When Infrastructure Managers (IMs) are involved, the Temporary Capacity Restriction (TCR) status changes to “Coordination” because the TCR needs to be harmonized.

The affected IMs can either agree or disagree with the TCR. If an IM disagrees, he does not change the TCR status but instead provides the owner with a request for the necessary changes and the reasons behind them. IMs base their agreement on the TCR according to their plans and infrastructure availability. If possible, the owner IM adjusts the TCR based on the feedback and then resubmits it for coordination.

Consultation
Once the TCR is agreed upon by the involved Infrastructure Managers (IMs), it should be consulted (discussed) with the Applicants. Applicants review the planned TCR and, based on their business needs, either accept it or request an update from the owner IM. If an update is requested, the TCR should be turned back to Planned status and modified, then returned to the coordination phase if necessary. Otherwise, it proceeds directly to consultation with the Applicants.

In some cases, the IM may receive feedback from Applicants through other communication channels, such as email or meetings. In such instances, the TCR may not need to go through the formal consultation process again.

Publication
Once accepted by the Applicants, the TCR is advanced to the “Publication” status by the owner IM, making it publicly visible to all stakeholders in accordance with the deadlines defined by the process. TCR lifecycle ends when its validity period (defined by Start and End dates) past.

Archived and Cancelled
If the circumstances change with the TCRs and the IM owner realizes that carrying out the TCR isn’t possible anymore, they have a couple of options:

- Cancel the TCR by marking its status as "Cancelled", or
- Archive it along with other TCRs by setting its status to "Archived."

It is important to distinguish the use of these two statuses because they are used for different purposes.

If a TCR is marked as "Cancelled," it is no longer active and is not treated as a restriction. This status may arise due to budget unavailability, a need to prioritize other tasks, or similar reasons. However, a TCR with this status can be reactivated if circumstances change on the IM side, and they determine that work on the TCR should resume.

On the other hand, if the TCR is "Archived," it is not considered as restriction anymore, but also cannot be re-activated later. In most cases, it is replaced by a new TCR or multiple TCRs that better align with the current circumstances. The "Archived" status is primarily used to support IM's tools for long-term and short-term TCR planning. For instance, IM might initially plan a TCR for the long term but later, during short-term planning, identify the need to divide it into multiple TCRs to better accommodate the planned work. If necessary, TCRs can be archived from any process status.
Under normal procedure, the TCR status is transitioned to "Archived" from the "Planned"

status. However, the IM (TCR owner) may also perform this transition from other statuses where appropriate.

8.2.3.10 Reference TRID – Reference Calendar

9) <u>Reference TRID</u>

- The Reference TRID is the unique and stable identifier that ensures the link between all objects (Train, Route, Path Request, Path) and related messages during the entire lifecycle of these objects.
- The Reference TRID is always the variant v00 of the TRID of the family of trains.
- Consequently it is defined by the LRU.

<u>ii) Reference Calendar</u>

- In Preparation and Operation phase the Reference TRID is completed by a Reference Day to ensure uniqueness : TRIDv00 + Reference Day.
- The set of Reference Days defined for the same Reference TRID constitutes the Reference Calendar.
- Each day of the Reference Calendar is associated with one and only one train of the ‘family of trains’ to ensure uniqueness of the daily TRIDv00 + Reference Day.
- The Reference Calendar is defined by the LRU.

<u>iii) Offset To Reference (OTR)</u>

- The Reference Day is commonly the Start Date of the Train. To belong to the same family, the Reference day of a large part of the trains of the same family commonly corresponds to the ‘requested/expected’ Start Date.
- Nevertheless it could happen that, due to slight midnight shifting, the same start date of the (real) train corresponds to two (Reference) trains with the same Reference TRID. E.g. all trains of the family of trains normally start at 00h10 each day, but on Monday one train starts at 00h10 and another at 23h50 due to slight shifting of the train of Tuesday to Monday before midnight. If using the actual start date instead of the initial start date of Reference Train, this situation would lead to a double TRID for the same date (Monday), which is not possible.The problem is avoided if the original Reference Day is always kept : the train on Monday 23h50 (actual date) keeps its Reference start date on Tuesday i.e. the Reference Day remains compliant with the day of the referenced train of train’s family.
- The gap/shift between the Reference Day (to be added to TRIDv00 to ensure uniqueness in operation for daily objects and in mind for calendar objects) and the ‘requested/expected’ or actual Start Date of train/route/path request/path defines the Offset To Reference (OTR).
- The OTR indicates more widely the gap between the Reference Calendar and the Planned Calendar of an object Train, Route, Path Request, Path (we consider not

the complete Reference Calendar, but only the subset related to the respective Planned Calendar).

- In other words, considering the Planned Calendar with its OTR of any object Train, Route, Path Request and Path, the (subset of) Reference Calendar can immediately be determined.
- The same rule applies for the daily object : considering the start date in daily identifier of any object Train, Route, Path request and Path, with the OTR of the object, the corresponding start date of the Reference Train can immediately be determined. Vice versa, when receiving a message with a daily Reference Train ID, the corresponding daily objects for each stakeholders can be unambiguously determined.
- The very common case is OTR = 0 (Reference Calendar = Planned Calendar) :
  - PlannedCalendar = 10/02 to 20/02 and OTR = 0 means that corresponding Reference Calendar = 10/02 to 20/02
- It can be negative (Planned Calendar earlier than Reference Calendar as in the example), the only expected negative value is -1 :
  - PlannedCalendar = 10/02 to 20/02 and OTR = -1 means that corresponding Reference Calendar = 11/02 to 21/02
- It can be positive (Planned Calendar later than Reference Calendar), especially for the last paths of long journey train :
  - PlannedCalendar = 10/02 to 20/02 and OTR = 1 means that corresponding Reference Calendar = 09/02 to 19/02
- The OTR is part of the element PlannedCalendar which is used in the element TrainInformation and PathInformation.
- The Reference Calendar is shared indirectly with the IM via the Planned Calendar and the OTR of the object Route (TrainInformation), Path Request and Path (PathInformation). Usually the Reference Calendar is sum of Planned Calendars inclusive its OTR of currently booked paths linked to Reference TRID (without intermediate path cancellations). But a partial match can happen as well if path requests or paths don’t exist for all Reference days.

iv) Reference TRID Sub-Calendar

- To allow consistency check the subset of the Reference Calendar related to the PlannedCalendar and OTR in PathInformation is also exchanged between RUs and Ims in the element ReferenceTRIDSubCalendar.
- In other words, the days given by PlannedCalendar and OTR in PathInformation are equivalent to those given by the ReferenceTRIDSubCalendar, as shown in the examples above in section iii), using the formula: ReferenceTRIDSubCalendar + OTR = PlannedCalendar
- The element ReferenceTRIDSubCalendar is present in following messages and corresponds to the PlannedCalendar+OTR in the element PathInformation :
  - PathRequestMessage – at message level,
  - PathDetailsMessage – at message level,

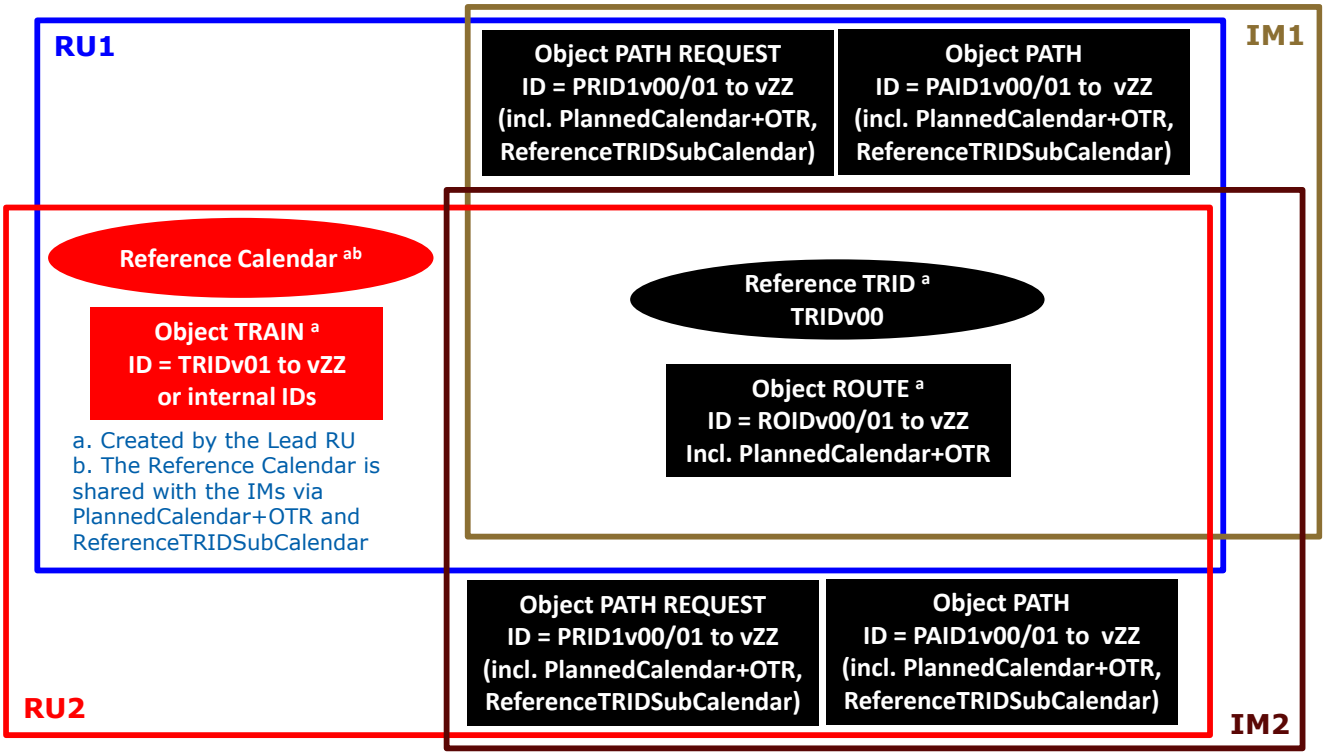
- PathCoordinationMessage – at message level,
- ObjectInfoMessage – at message level for the concerned object,
- UpdateLinkMessage – in element Operation.

- The element ReferenceTRIDSubCalendar is present in following messages and corresponds to the PlannedCalendar+OTR in the element AffectedSection :
  - PathConfirmedMessage – at message level,
  - PathCanceledMessage – at message level,
  - PathDetailsRefusedMessage – at message level,
  - ReceiptConfirmationMessage – at message level.

8.2.3.11 The objects in the RU's or IM's IT systems

i) Overview of the objects

The picture hereafter shows the objects (except Case Reference) in the IT systems of LRU/RA/RRU and of IM. Note the LRU/RA/RRU self-standing sub-IT system.



ii) Cardinalities

Cardinality Train/Route/PathRequest/Path towards Reference TRIDv00

The most important rule is that each daily object Route, Path Request and Path is linked to one and only one day of Reference Calendar of one Reference TRIDv00 during the complete lifecycle of the objects. Or otherwise said, the corresponding ReferenceTRIDSubCalendars for the objects in Planning have no overlap.

It is the same for the objects Trains toward Reference TRIDv00 in the RU system.

Cardinality PathRequest towards Route

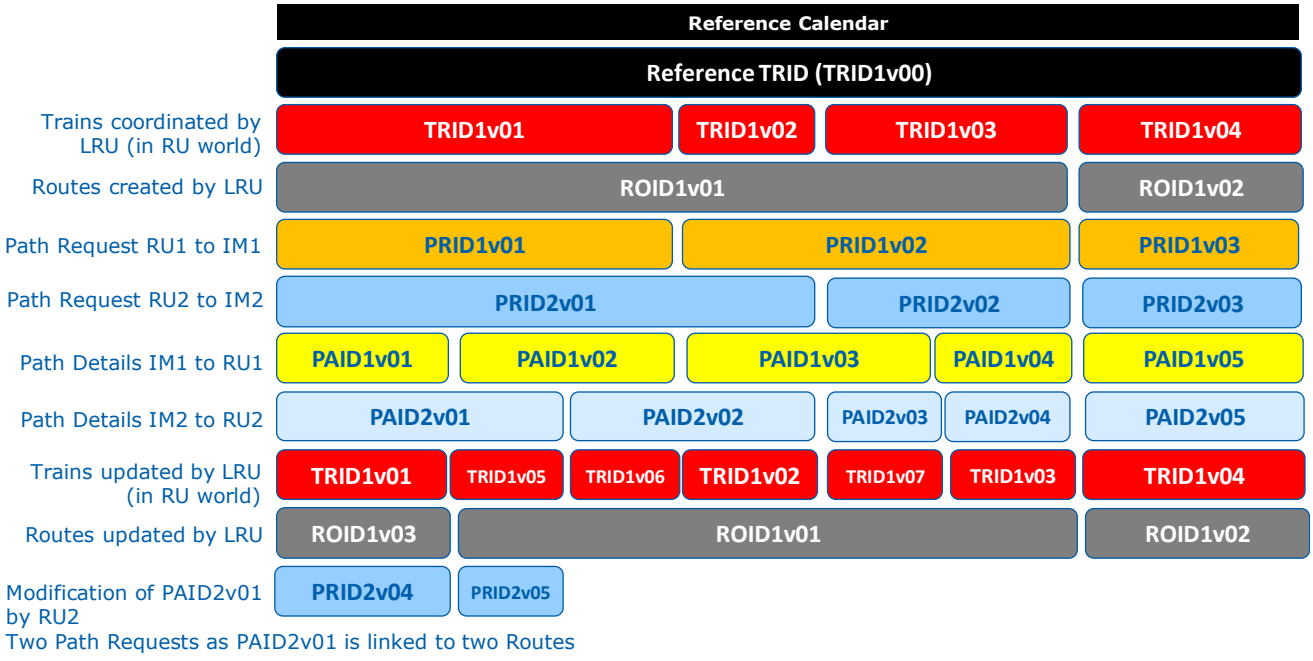
The object Path Request is linked to one and only one Route, it has a limited lifecycle that ends usually when the Path is booked.

Cardinality Path towards Route <INDICATIVE TEXT, WORK IN PROGRESS>

Each object Path is always linked to only one object Route when confirmed/booked at the end of the path allocation process.

Nevertheless, when the LRU checks the Route according to the booked paths, a new Route may be created and a Path (outside the network triggering the change of Route) may then be linked to two Routes via disjoint sub-calendars according to the Route Update process (see section 12.8.9).

On a network level and according to the Network Statement or according to an agreement between the parties, the path can be split in two sub-paths linked to the initial Route with shortened calendar and the new Route.



Picture with cardinality : one Path (here PAID2v01) may be linked to several Routes after Paths confirmed/booked

8.2.3.12 The difference of IDs for objects in planning and operational phase

When a RU creates a train or a route and an IM a path it may be for a single day or a number of days. In the planning phase the object (train, route, path request and path) will have a calendar as an attribute to indicate which days it operates that means the object is valid. However, when the object is used in operation each object (train, route and path) on each day needs a unique ID for only one day.

For this reason, the objects and the format of their IDs come in two forms:

- The Planning object (with the ID of the planning object without the element StartDate). The Planning object (calendar object) train, route, path request or path with its PlannedCalendar inclusive OTR must be consistent and unique to the Reference calendar of ReferenceTRID in compliance with the rules and requirements mentioned above.

  And

- The Daily (operational) object (with the ID of the planned object enlarged and made unique with the element StartDate indicating the Reference Day).

The Daily Reference TRID is composed by the Reference TRID (TRIDv00) completed by the Reference Day (as described in 8.2.3.6).

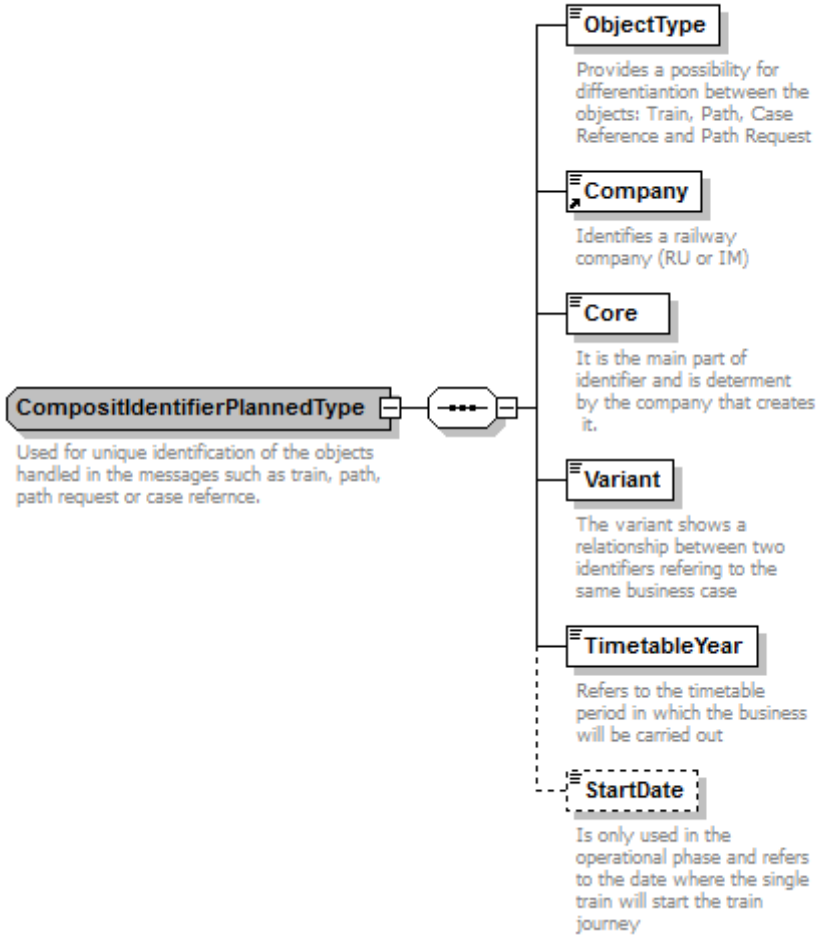
9.5.6 I D s

In order to standardize the structure of IDs for the TAF/TAP the following format has been chosen with a specific field for the object type.

8.2.4.1 Standardized Structure

Basically, the structure is made in a generic manner, and the identifier is constructed as a “composite” of several elements.

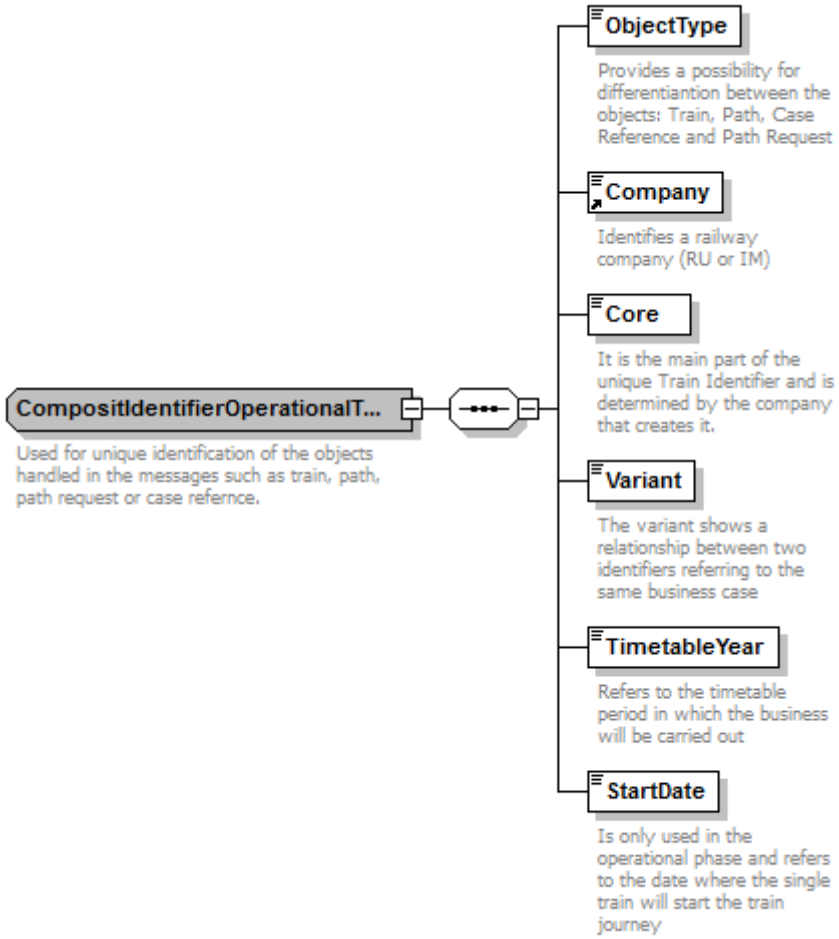
1. Planning:



- Figure 1 Composite Type for Planning objects

In the figure above, the elements of the composite identifier for the objects in the planning phase are shown. The details about the elements are provided below.

2. Operation:



• Figure 2 Composite Type for identifying of “daily” (Operational) objects

In the figure above, the composite identifier type which should be used in the operational phase is shown. The elements for building of the composite are described below.

For the Daily Reference TRID the Start Date is replaced by the Reference Day (see 8.2.3.6). Very commonly Start Date and Reference Day are the same (OTR = 0), it can happen that there is a gap/shifting (OTR positive or negative).

Elements of the composite structure

9.5.6.8 Object type

A two-character element indicating the type of object this ID is for. This object is necessary to ensure that the IDs for different objects are unique between them. It also allows a person or system to easily recognize the type of object the ID is for.

The object type is a fixed length of 2 alphanumeric characters: It can use any digit from 0 to 9 and any upper-case character from A to Z. It cannot be shortened to 1 character and cannot use any punctuation or spaces.

Enumeration:

- TR for Train
- RO for Route
- PA for Path
- PR for Path Request
- CR for Case Reference

The object types are managed by the SMO to ensure their correct application.
In the XSD schema, it looks as follows:

```
<xs:element name="ObjectType">
        <xs:annotation>
    <xs:documentation>Provides a possibility for differentiation between the objects: Train (TR), Route (RO), Path (PA), Case Reference (CR) and Path Request (PR)</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
            <xs:restriction base="xs:string">
                <xs:minLength value="2"/>
                <xs:maxLength value="2"/>
                <xs:pattern value="[0-9A-Z]{2}"/>
                <xs:enumeration value="TR"/>
                <xs:enumeration value="RO"/>
                <xs:enumeration value="PA"/>
                <xs:enumeration value="CR"/>
                <xs:enumeration value="PR"/>
            </xs:restriction>
        </xs:simpleType>
    </xs:element>
```

9.5.6.8 Company

A four-character element is indicating the company who created the object. By prefixing all IDs with the company ID, it allows the company to use its own code and still ensure the ID is unique. The company codes to be used will be the current standard set down by the TAF/TAP. These codes are made up of only numbers at the moment. From 01/01/2026 the allocated CompanyCodes could contain figures and/or letters. The transitional period for TAF and TAP stakeholders to adapt their IT system to handle Company Codes on alphanumerical format lasts until 31/12/2025.

In the XSD schema, it looks as follows:

```
<xs:simpleType name="CompanyCode">
        <xs:annotation>
            <xs:documentation>Identifies the RU, IM or other company involved in the Rail Transport Chain</xs:documentation>
        </xs:annotation>
        <xs:restriction base="String4-4">
            <xs:pattern value="[0-9A-Z]{4}"/>
```

```
            </xs:restriction>
        </xs:simpleType>
```

8.2.4.4 Core element

The Core element is the main part of the ID and has a free format and is determined by the company that creates it. It can use any digit from 0 to 9 and any upper-case character from A to Z , dashes (short horizontal dash “-” (UTF8-Codepoint 0x2d)) and asterisks (“*”) and has a It is fixedlength of 12 characters.

In the XSD it looks as follows:

```
<xs:element name="Core">
            <xs:annotation>
                <xs:documentation>It is the main part of identifier and is determined by the company that creates  it.</xs:documentation>
            </xs:annotation>
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:minLength value="12"/>
                    <xs:whiteSpace value="replace"/>
                    <xs:maxLength value="12"/>
                    <xs:pattern value="[\-\*0-9A-Z]{12}"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
```

Rules:

From the technical point of view the content of the core element can be freely constructed by each company involved, by respecting the rule given in the regular expression in the XSD model.

Even though the use of various combinations of dashes and asterisks are technically allowed, the recommendation is to provide “human-readable” value for the core element. Examples of human-readable core elements:

- ******123456
- ---667896321
- 123456AP9123

8.2.4.5 Variant

The variant field is a fixed length of 2 characters. It can use any digit from 0 to 9 and any upper-case character from A to Z. It cannot be shortened to 1 character and cannot use any punctuation or spaces.

If identifier is Reference TRID the variant has always to be “00”.

This is how does the structure look like in XSD:

```
<xs:element name=”Variant”>
        <xs:annotation>
            <xs:documentation>The variant shows a relationship between two identifiers referring to the same business case</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
            <xs:restriction base=”xs:string”>
                <xs:minLength value=”2”/>
                <xs:maxLength value=”2”/>
                <xs:pattern value=”[0-9A-Z]{2}”/>
            </xs:restriction>
        </xs:simpleType>
    </xs:element>
```

Utilization:

See chapter 8.2.4.8 “Uniqueness of the code”.

8.2.4.6 Timetable Year

In order to allow the core element to be reused for different timetable periods the year is included to indicate which year it applies to.

Please note the following example. If a Train, or a Path crosses 2 timetable periods (due to midnight crossing): the year should refer to the timetable period of the departure of the Train or Path.

If a Train starts in timetable period 1 (TTP1) in country A, but crosses the border after midnight (in TTP2) in country B, the following logic should be applied:

- Train object with TTP1
- Path in the Path Request message in country A with TTP1
- Path in the Path Details message in country A with TTP1
- Path in the Path Request message in country B with TTP2
- Path in the Path Details message in country B with TTP2

The IT system should consider this requirement (related train and path belonging to different timetable periods).

In XSD, it looks as follows:

```
<xs:element name=”TimetableYear”>
        <xs:annotation>
            <xs:documentation>Refers to the timetable period in which the business will be carried out</xs:documentation>
        </xs:annotation>
```

```
            <xs:simpleType>
                <xs:restriction base=”xs:integer”>
                    <xs:minInclusive value=”2012”/>
                    <xs:maxInclusive value=”2097”/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
```

8.2.4.7 Start-Date:

The start_date is the day of planned departure from the origin station of the object. The field is only present in the daily object.

For the Reference TRID the start_date is the Reference Day as described in 8.2.3.6.

In XSD it looks as follows:

```
<xs:element name=”StartDate” type=”xs:date”>
            <xs:annotation>
                <xs:documentation>The start of the date/time in effect</xs:documentation>
            </xs:annotation>
        </xs:element>
```

8.2.4.8 Uniqueness of the code

It is the responsibility of the company that creates the code to ensure its uniqueness. For the lifecycle of an ID only the entity which has created it, is allowed to change it. Because a code is prefixed with the type and company codes a company only needs to ensure the “core element” is unique in each timetable period. If there is any change to the object in the timetable period and there is a need to hold two or more records – this is allowed providing each one uses a different variant

Indeed, during the planning phase several train/path/other objects will be created. They may differ slightly in their information (e.g. a train running Monday to Friday has a different timetable than the same train on Saturday). To relate those similar objects easily, the variant can be used. Each object has the same core (~ family) and the other fields for the identifier but they differ in the variant (~ individual).

The variant v00 is mandatory allocated to the Reference TRID.

For the objects Route, Path Request, Path, Case Reference, the variant v00 shall not be used.

The objects are identified by the variant v01 to vZZ.

More details about the usage of the Variant can be found in the Annex 8.2.

In case of path request withdrawal, the PR ID cannot be used in another path request, the Reference TR ID and RO ID can be used and included in another PathRequestMessage.

8.2.5 Relationship to existing identifiers Operational Train Number (OTN)

All railway operations today identify trains using OTN (except for railways in Great Britain that uses 4 character alphanumeric). This OTN consists of up to eight characters (example: 5 digits in UIC Leaflets 419-1&2) which identifies the train. In addition, in most countries it is also used to describe the category of the train. This can include information such as a train's speed, priority, route, direction, running order, timetable and some special needs (such as exceptional loads or hazardous goods).

- The rules for the uses of the number are complex and each country has different information included in the makeup of the train number.
- In all countries the train number is used by the signaling system to route and track the train across the rail network.
- The existing operational train number (OTN) must be retained as a reference to existing systems. It would no longer serve as the actual "identifier" of the train (as this creates the problems to be solved) but would be used as a way of identifying the train as part of the existing operational procedures.
- In addition, it was agreed that each IM (in conjunction with its national authorities) should be free to determine the rules for how it is used in accordance with its operational and safety standards.
- The numbering scheme described in UIC leaflet 419-1&2 regarding a decision of the RUs could continue to be used as the basis for the train numbering of international trains.

In the operational environment the operational train number (OTN) can be changed if national rules allow or require it. IMPORTANT: This is subject to the new rule that the IM must update the OTN in the **Path object** and inform all other affected Ims and RUs involved in the train run. In all these cases they would be required to do so electronically and include in the message the Train ID and the Path ID.

8.2.6 Communication with Identifiers

Both RU and IM must be able to receive and act on all types of identifiers. When exchanging messages and using the identifiers a RU or IM must be able to receive and process the message on occurrence. Consequently, Reference TrainID, Route ID, Path Request ID and Path ID and the corresponding objects they identify must be recorded in systems of both RU and IM as well as the links between the objects (that concerns also the object Train if it is exchanged after agreement between LRU/RA/RRU and IM). The responsible entity changing an ID shall inform all actors concerned about such a change, which results in an update of links between the corresponding objects. The entity which has received an update of a link notification shall introduce this update in its own systems. Changes of the Path ID and/or OTN without **update of the links** between the corresponding objects Path and Train can be described as irregular link destruction (i.e. inconsistent state in the databases of the partners/actors), a situation which leads into losing the possibility of tracking the train with all negative consequences.

Note: The details about the framework for updating the links between the objects can be

found in the document “Update Link Framework” (#reference to be added) which is attached to the Sector Handbook.

8.2.7 Benefits of the Proposed Solution

8.2.7.1 Benefits to the Industry

The working group had to consider a large number of problems and constraints to be resolved in the identification of train. The benefits of resolving the problem of not being able to identify trains uniquely are widespread and not limited to those described here.

8.2.7.2 Full Life cycle

The Reference TRID is created at the earliest possible time in the creation of a train by an RU (mostly in role LeadRU) and retained throughout its existence. This allows it to be used throughout all the steps of the business process of railway operation.

8.2.7.3 Reduction in the cost of resolving errors

By having clear identifiers, it will simplify the process of resolving incorrect data. All companies will have to check the data before it is exchanged with another company. Data can be checked as messages are received. All identifiers will contain their creators ID so may be traced back to who created them. By having the Reference TRID, the 2 IDs (RouteID and Path ID) and the operational Train number (OTN) it will be possible to cross check one ID against the others so simplifying the checking process.

8.2.7.4 Flexibility by separation of IDs

In the past the ID of trains has had to be used for many different purposes. Each one has constrained its use for the other purpose. By splitting the IDs for Train and Path, creating the Route and using the Reference TRID (TRIDv00) as stable identifier while retaining the operational train number (OTN) will allow each one to be used for the respective purpose and set for that purpose. E.g. the Train ID may be set by the (lead) RU as a commercial reference inside the RU world that would be understood by its customers. In addition, this will help to reduce the cost of implementation, as it will be possible to include the IDs from legacy systems in the core element of the IDs.

8.2.7.5 Customer

An end customer in the future can follow its product throughout the entire lifecycle. It gives more reliability of information for the customer and allows tracking and traceability (ETA/ETI).

8.2.8 Summary

- The solution will give a separate identity to the Train, the Route and the Path. All these IDs will be new and different from the existing train number.
- The splitting into the Reference TRID (as 'key identifier') and the object Train in itself permits updates of the TrainID inside the LRU/RA/RRU world while ensuring the 100% stability of the Reference TRID.
- During the transitional phase until new identifiers are implemented, the legacy identifier (such as operational train number OTN) is used as train identifier. After implementation, the legacy identifier will continue to be used for compatibility with signaling and other systems.
- A standard ID structure is created which might be used for all objects for which data is exchanged between companies in TAF and TAP messages within RU/IM communication (TAP messages are also related to the commercial area that is not influenced at the moment by this IDs structure). Therefore, the information about other objects may be exchanged between IM and RU when they agree to do so. They could use the standardized generic ID structure too.

8.3 How to reach the aim (migration procedure)

8.3.1 Overview of the migration procedure

In order to reach the aim of using the new identifiers in the industry, the following has to be taken into account.

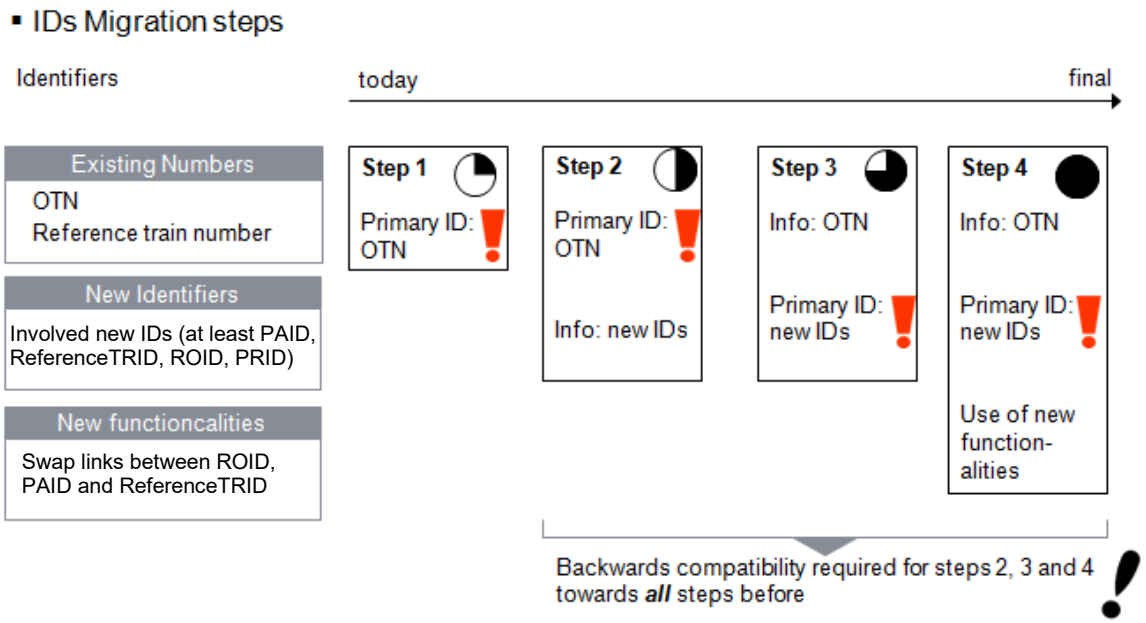
- The use of messages between the partners depends on implementation status.
- The use of optional messages depends on local needs and rules.
- Use of optional elements depends on local needs and rules.
- The use of identifiers depends on implementation status of each partner

There are some basic rules to be considered:

It is up to every company itself to investigate and be responsible for its own internal migration. Due to different implementation steps of each of the involved partners and due to the different local use of optional messages and elements, each pair of partners needs to agree on the details of RU/IM message exchange prior to sending.

During the migration, the companies that use legacy identifiers have to agree with those that use the new identifiers about the content of the messages. Consequently, the companies that use new identifiers will additionally have to transfer the legacy identifiers to those companies that have still not adopted the new approach.

The proposed migration plan looks roughly as follows:



• Figure 3 Migration strategy

- Basically, in the first step of the implementation of TAF/TAP, the legacy identifiers such as OTN have to be used. During the implementation, there will be the need for testing the correctness of the new identifiers and methodologies of their use.
- Therefore, in the second step, the identification will still be made with “old” legacy identifiers such as OTN, but those companies that are implementing new identifiers and are mature to use them additionally in the messages can send the new identifiers, as an additional information regarding the objects.
- In the third step, the new identifiers will be used as the primary IDs, and the legacy IDs should be sent as an information. There is a mandatory requirement for all partners in the industry: there has to be backwards compatibility guaranteed between the steps two and three, since the various actors will have different speed in the implementing of TAF/TAP especially regarding the new identifiers. Therefore, the partners that are already using the new identifiers for the primary identification, have to be able to decode and exchange the messages by using “old” legacy identifiers with those partners that are still not mature with the new identifiers.
- In the fourth step, the new identifiers will be exchanged between all the partners as primary identifiers. As the end stage of the implementation, as the approval of the benefit of implementing the new identifiers concept, it should be possible that the links (relations) between the objects Train and Path can easily be changed (shifting of one Train its Path to another Path, swapping of 2 Trains and 2 Paths etc.) by every actor.
- This is a subject of change, according to the situation in the industry.
- After the finalization of the migration to the new identifiers, the new identifiers have to be mandatory in the message exchange.

- This section can then be deleted !

8.3.2 Foreseen implementation calendar

Besides few RUs and Ims applying already on national or bilateral level, the implementation and the use of the objects identifiers is expected to start by forerunners RUs and Ims from the yearly timetable 2024 (that means for the path requests introduced beginning 2023 and the operation from end 2023).

The implementation and the use will be extended for yearly timetables 2025 and 2026 when the implementation is expected complete in the Single European Railway Area.

References for further reading (mandatory for implementation of the new identifiers!)

The following documents are necessary to be used:

- TrainID – OTN Framework (Annex 8.1)
- TrainID – Variant Framework (Annex 8.2)
- TrainID – Update Link Framework (Annex 8.3)
- TrainID – Case Reference Framework (Annex 8.4)
- TrainID – Object Info Framework (Annex 8.5)

With these documents, the details about the procedures of handling of the new identifiers and their relationship with legacy identifiers (such as OTN) is provided.

9. Reference Data

9.1 Reference Files Sector Handbook

This chapter describes the Sector Handbook for TAF and TAP TSI Reference Files for Countries, Companies/Organisations and Primary Locations and Subsidiary Locations.

The Reference files comprise:

- Countries
- Companies/Organisations
- Locations
  - Primary
  - Subsidiary

The legal requirements for the reference files are derived from TAF 4.2.1.2 and TAP 4.2.19.1.

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
For the operation of passenger trains on the European network, the following reference files must be available and accessible to all service providers (infrastructure managers, railway undertakings, authorised third parties and station managers). The data must represent the actual status at all times.	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.

- reference file of the coding for all infrastructure managers, terminal operators (act as IM or RU), railway undertakings, station managers, service provider companies,
- reference file of the coding of locations,
- […]

Other reference files, e.g. for Retail, and the use of location reference data for TAP Retail are not in scope of this document.

9.2 Document Objectives

This Implementation Guideline describes how to deal with various reference files that are shared between TAP and TAF TSI and could be used with legacy systems or other purposes (e.g. RINF…). This guideline set out:

- Definition of the reference files and their content
- The initial load of the reference file data base by the national location allocation entity
- The options for processes to maintain the reference files
- The maintenance of the reference files (responsible entities, companies)
- Exchange of Reference files using the Common Interface

This document describes the Sector Handbook and the governance for the development and implementation of reference files.

Although the Sector Handbook does not have the legal force the Sector Handbook for TAF and TAP TSI Reference Files is an essential document to ensure the use of Location descriptions within the TAF and TAP TSI framework is well defined and processes for regular operation are available to populate and maintain the data.

Finally, the document includes some technical appendices which describe the data being held.

These reference files include the codes 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 and Telematic Applications for Passenger referred to in Directive (EU) 2016/797. To ensure data quality, the TSI for Telematic Applications for Freight and for Passenger (TAF and TAP) 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 IT application systems.

The scope of the document describes:

- the content of the Reference files,
- actors,
- suggested maintenance scenarios for Reference files,
- the data access policy for the Reference files within the TAF and TAP framework.

It is out of scope of the document to describe:

- a detailed timetable for implementation,
- national processes,
- company hardware or software solutions.

9.3 Reference Data

9.3.1 Country description

This element indicates the type of a field containing the coded identification for a State/Country as defined by ISO 3166 – 2 position alpha code (2A).

Country Code	A1	A2
	x	x
Code Example	D	E

More details are to be found in Annex 9.1 of this Implementation Guide.

9.3.2 Company Description

The present document describes a coding structure to identify unambiguously and uniquely:

- Railway Companies as defined in the Technical Specification for Interoperability Telematics Applications Freight Services (TAF TSI) and TAP derived from the Directives 2012/34/EC and (EU) 2016/797.
- Other transport bodies

- Any other company involved in the rail transport chain.

The defined coding structure of CompanyIdent meets the requirements and vision of the TAF and TAP TSI[1]. It can be used in various applications and for different purposes (documents, messages, marking, etc.).
The coding structure has sufficient flexibility to satisfy the expected demand for codes requested in the forthcoming decades in the current EU single market, its possible expansion and operation with non-EU member States.

The definition of Company comprehends the following as defined in the TAF and TAP TSI.

- IMPartner
- NextResponsibleIM
- NextResponsibleRU
- Recipient
- ResponsibleIM
- ResponsibleRU
- PreviousResponsibleRU
- RUPartner
- StationManager
- Sender
- Receiver

Further on only CompanyIdent is used[2]. As defined, the 4-digit numeric codes shall be reserved for TAF/TAP actors until the 1 January 2026. Afterwards a 4 (AN) alphanumeric code can be allocated.

Coding for TAF/TAP stakeholders until 1st January 2026.

Company Code	N1	N2	N3	N4
0001 - 9999	x	x	x	x
Code Example	3	3	4	5

Coding for TAF/TAP stakeholders after 1st January 2026.

Company Code	**AN1**	**AN2**	**AN3**	**AN4**
0001-ZZZZ	x	x	x	x
Code Example	0	0	8	1
Code Example	C	8	H	5
Code Example	2	A	7	G

More details are to be found in Annex 9.1 of this Sector Handbook.

These codes are unique worldwide.

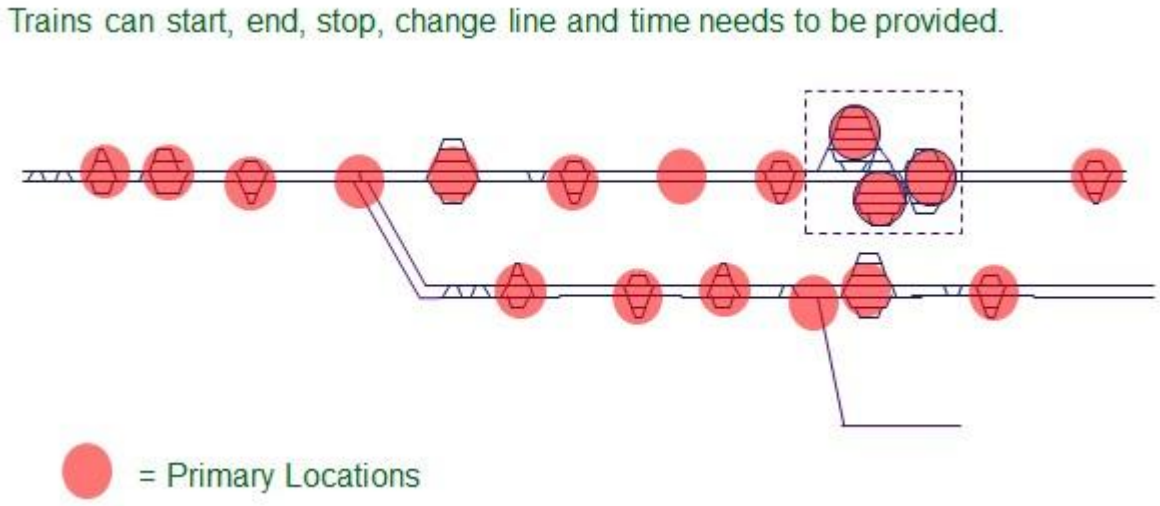
Currently the code uses numeric only, but from 2026 the code should be implemented in company applications as alphanumeric to be flexible enough if more than 9999 is needed. ERA currently issues alphanumeric Organisation Codes for non-TAF/TAP purpose.

[1] ERA Technical Documents for TAF TSI _ ANNEX D.2 : APPENDIX C _ REFERENCE FILES and TAP_TSI technical document B.8
[2] TAF described a PartnerIdent which is similar to CompanyIdent and consequently is no longer used independently.

9.3.3 Location Description

Location is a place, a geographic point, inside or outside the rail network, which is needed to be identified for operational, technical, administrative, or statistical purposes.

This can be either a Railway or location of RU Customer location. Locations can be logical or physical place, for example: Stations, Yards, Halts, Terminals or Loading Points, Warehouses, Maintenance Workshops, Transit Points, Handover points and Interchange points, Customer Sidings, Travel Agencies, Sales Points, Tracks X and so on. It can also represent a part or section of them.



Definition of Primary Location

Primary Location is a place used by IM to define a path for a train in TAF/TAP TSI framework/messages. This location is a rail point inside the rail network where train starts, ends, stops, or runs through or change line. This location must be managed by an Infrastructure Manager (IM) identified by company code.
Primary locations are for example: stations, yards, halts, handover points, border points, open access terminals.
Primary locations are identified by single and unique Primary Location codes. Primary location code is allocated based on processes defined by national entity. Primary location codes are used in any kind of TAF/TAP communication.

Description	Primary Location Code							Validity Start Date	Validity End Date	Name	Company Code			
	Country ISO Code		Numeric Code											
Type	A1	A2	N1	N2	N3	N4	N5	Date	Date	Text max 255	AN1	AN2	AN3	AN4
Example	S	E	1	0	0	0	1	2013-04-30		Aleholm	0	0	7	4
	A	T	0	1	0	0	1	2013-01-01		Wien Westbf (in Ws)	0	0	8	1

Only the main elements are shown here. More details are to be found in Annex 9.1.

- The first two characters (2 Alpha) contain the ISO 3166 Country Code defining the country where the location is (e.g. DE = Germany)
- The next five digit (1N – 5N) contain a non-significant LocationPrimaryCode to identify the location. Leading zero is not used. The LocationPrimaryCode has to be unique per country and each physical location shall have only one LocationPrimaryCode

Country Code and LocationPrimaryCode are used in messages to identify a (primary) location. Within the Central Reference File, Primary Location key consists of the Country

Code, Primary Location Code and the Start Validity Date as well. A Primary Location Code can occur, therefore, more than ones in the CRD, but not with overlapping validity dates.

Definition of primary location attributes in CRD

- **Country [mandatory]:** ISO Code of Country
- **Location Code [mandatory]:** Code of Primary Location
- **Location Name (ASCII) [mandatory]:** Primary location name provided in ASCII character set.
- **Location Name [mandatory]:** Primary location name in an official language of the country using the ISO Unicode alphabet
- **Responsible IM [mandatory]:** Company Code of IM responsible for primary location.
- **Description:** Additional information about the primary location.
- **(Validity) Start Date [mandatory]:** First date when the location is open for running a train.
- **(Validity) End Date:** Last date when the location is open for running a train.
- **Latitude:** Latitude of point representing Position of Location. It is strongly recommended to populate this element. It is possible to use up to 6 decimals.
- **Longitude:** Longitude of point representing Position of Location. It is strongly recommended to populate this element. It is possible to use up to 6 decimals.
- **Freight Possible:** Information, that Freight train can make freight commercial activity at primary location.
- **Start Date Freight Activity[3]:** Start date of use Location for Freight train. StartDate is mandatory if Freight possible is selected.
- **End Date Freight Activity[4]:** End date of use Location for Freight train
- **Passenger Possible:** Information, that Passenger train can make passenger commercial activity at primary location.
- **Start Date Passenger Activity[5]:** Start of use Location for Passenger train. StartDate is mandatory if Passenger possible is selected.
- **End Date Passenger Activity[6]:** End of use Location for Passenger train
- **Container Handling:** Location is suitable for handling of containers and loading or unloading of containers.
- **Handover Point:** Point where legal responsibility changes between the Ims. This can be but does not have to be in conjunction with a state border.
- **NUTS Code:** Code from the Nomenclature of Territorial Units for Statistics – geocode standard for referencing the subdivisions of countries for statistical purposes.

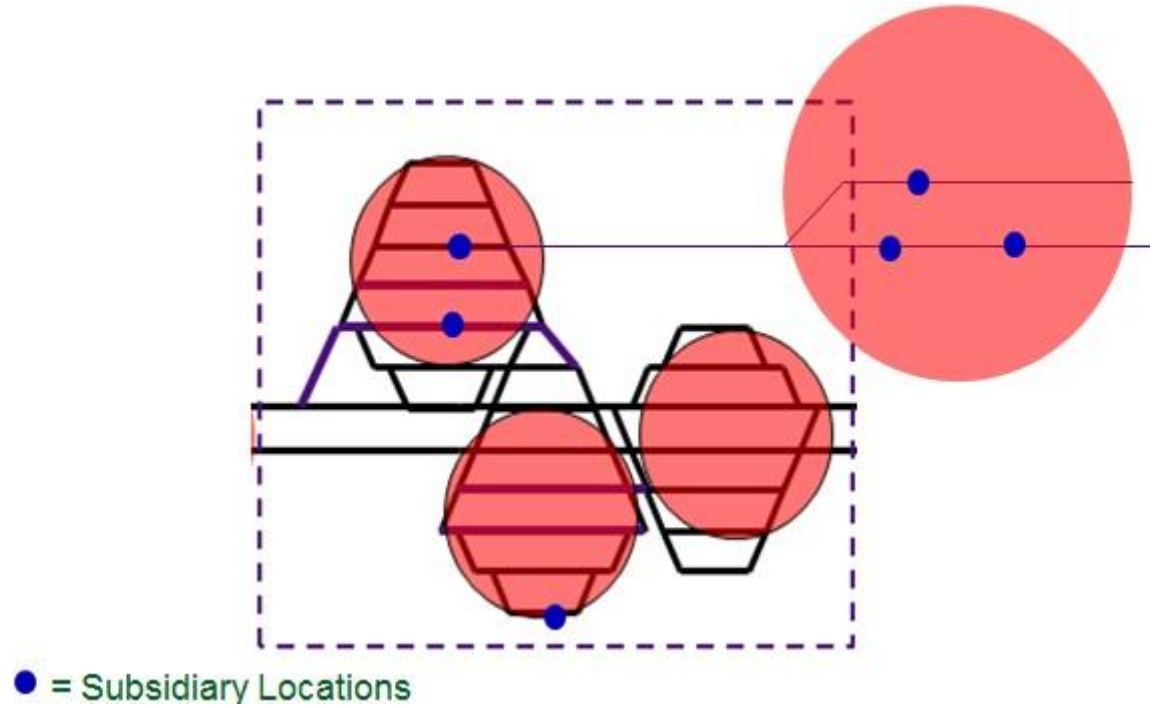
Definition of Subsidiary Location

Subsidiary location must be linked to a Primary Location and specifies in more detailed way part, attributes, or usage of Primary location. It may be also a non-rail point or a rail point that is not managed by an Infrastructure Manager (IM). It may be defined by entity having company code according to their needs. The Subsidiary location is optional and dependent upon business needs.

There are Subsidiary locations that are important for RU/IM communication as specifying part of Primary location e.g. from timetable construction point of view (like Track, Platform, Signal, etc.). These Subsidiary locations to be coded by responsible IM in order to ensure clarity. Additional Subsidiary locations are for example: Loading Points, Switches, Buildings, Border Point Codes, etc.

[3] Validity periods of the freight and passenger activities must be within the validity dates of primary location.
[4] Validity periods of the freight and passenger activities must be within the validity dates of primary location.
[5] Validity periods of the freight and passenger activities must be within the validity dates of primary location.
[6] Validity periods of the freight and passenger activities must be within the validity dates of primary location.

The Subsidiary location is identified by a subsidiary location code. Subsidiary location and subsidiary location codes can be used in data communication among involved parties based on company agreement or Network Statement. Each Subsidiary location is attributed to allocating company based on company code. It has to be used always in addition to the primary location code of the Primary location, in which the Subsidiary location is situated or which it refers to.



Coding of a Subsidiary Location

Description	Primary Location Code							Location Subsidiary Type Code		Location Subsidiary Code										Validity Start Date	Validity End Date	Name	Company Code			
	Country ISO Code		Numeric Code																							
Type	A1	A2	N1	N2	N3	N4	N5	N1	N1	AN1	AN2	AN3	AN4	AN5	AN6	AN7	AN8	AN9	AN10	Date	Date	Text max 255	AN1	AN2	AN3	AN4
Example	A	T	0	1	0	0	1	3	6	0	1	0	0	2	0	1	0	0	2	2013-01-01		Wien Westbahnhof Fbf	2	1	8	1

Here are only the main elements are shown. More details are to be found in Annex 9.1 Subsidiary location is always associated with a Primary location and is always comprised of a LocationSubsidiaryTypeCode, LocationSubsidiaryCode and AllocationCompany. All these elements make the subsidiary location code unique.

Country Code, LocationPrimaryCode, SubsidiaryTypeCode, LocationSubsidiaryCode and AllocationCompany are used in messages to identify a subsidiary location. Within the Central Reference File, the key consists of the Validity Start Date as part of the key.

- The two characters (2AN) comprise a pre-defined code, LocationSubsidiaryType Code. Code ‘00’ is undefined.
- The predefined codes are maintained by RNE. More details can be found in Annex 9.4.
- The next one to ten characters (1AN – 10AN and special characters (based on extended ASCII codes) comprises a non-significant LocationSubsidiaryCode to identify a “dependent” location defined together with the LocationPrimaryCode.
- The Allocation Company in the Subsidiary Location is a part of the primary key of the location subsidiary code.
- The validity of the Subsidiary Location is bound to the life span of the Primary Location. There can be no Subsidiary Location without a valid Primary Location.

General rules for establishing Subsidiary location type. At least one of the following must be covered.

3. The Subsidiary location type defines a physical part (signal, track, platform, siding, etc.) of the Primary location which is important for the exchange of information related to the path.
4. Subsidiary location type defines an attribute or logical point related to a Primary location which is important for communication between the partners IM, RU and their partners related to their business needs.
5. Subsidiary location types are not to be used to describe the technical details of a Primary location beside the above mentioned
6. New type codes should be fitting to the above described rules and their allocation must follow the TAF/TAP Change Control Management (CCM) process.

Subsidiary type codes

Locations are defined by a primary location and optionally by a subsidiary location.

Primary locations are used for stations and can be used for parts of stations. They will be usually maintained by the Infrastructure Manager or a National Allocation Entity.

Subsidiary locations are usually used between the Railway Undertakings where detailed information within a primary location is needed.
For specific reasons as specified in certain messages for the communication between IM and RU the primary location needs to be further detailed, e.g. to indicate a specific track in the station, a subsidiary location can also be used in messages between RU and IM.

A subsidiary location depends always on a primary location. Subsidiary locations are grouped by subsidiary types. Each Subsidiary Location is allocated by an Allocation Company. Bases on national rules Freight and Passenger Companies are allowed to maintain subsidiary locations for certain subsidiary types directly in the Common Reference Files Database.

This coding was established under the premise to support the coding of Subsidiary Locations

- in TAF and TAP TSI messages
- in the related business applications and
- other activities

Any entity can maintain subsidiary locations directly in CRD which is maintained at a country level by NAE.

The list and the description of the Subsidiary Location Type Codes is provided in Annex 9.4.

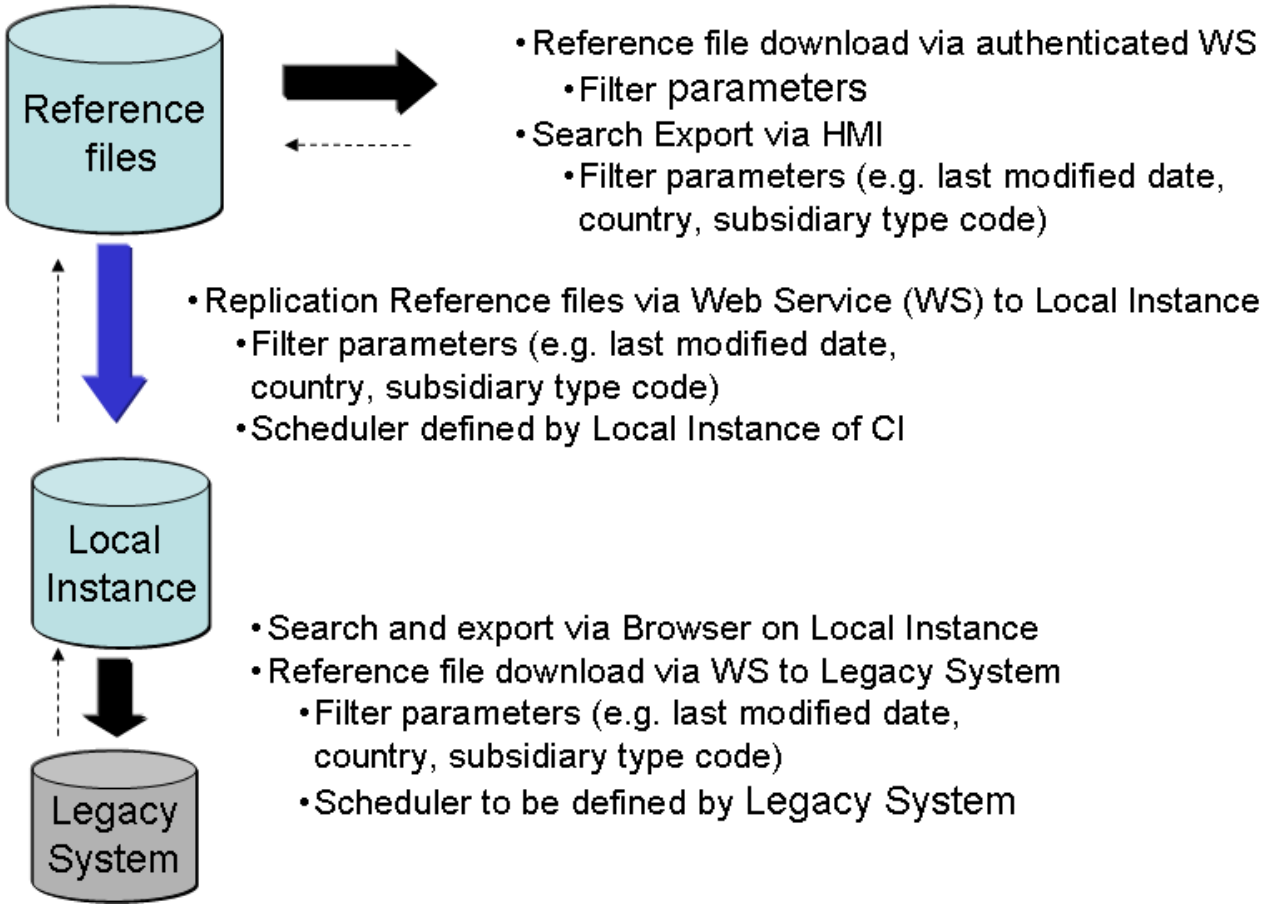
Description of the CRD data model

The data model is described in Annex 9.1 and the description of the update message is provided in the official document TAF TSI — ANNEX D.2: APPENDIX F — TAF TSI DATA AND MESSAGE MODEL.

9.4 CRD Reference Files Access

The precondition to access the CRD is to have a valid company code. For companies with a company code the web browser use should be free of charge. To access the reference files these are the following options:

- Individual users view, edit and delete data in the reference files via a web browser if necessary, rights defined for the user. For companies having a company code the usage of the web browser should be free of charge.
- Application access to the Common Reference Files Database (CRD) is provided by a secure web-service interface
- For an IM or RU with local Common Interface, there is a scheduled replication service from the CRD to a local Common Interface. The scheduler is configured on the local Common Interface
- The local IM or RU Common Interface then provides web-services for use by the internal IM or RU applications



9.4.1 Roles in Regular Operation

TAF and TAP TSI define a set of actors. This section lists which actor type is responsible for each activity:

Actor Type	Responsibility of activities
Administrator of the CRD	Maintains the centralised Reference file system. Maintains users and the technical interface for the maintenance of reference files based on the agreed governance.
International Reference File Entity	Maintains countries and companies reference file and/or common location definitions (e.g., types of subsidiary locations, border definition) independent of a country or company.
National Allocation Entity (NAE)	The National Allocation Entity role is defined in the TAF TSI. NAE maintains a unique list of location codes within a country. In many countries the largest IM has taken on this role. The National Allocation Entity delegates if subsidiary locations, based on the subsidiary location types, can be maintained directly (create/read/update/delete) by other stakeholders in the given country.
Infrastructure Managers (IM)	Infrastructure Managers are accountable for ensuring locations on their network are maintained within the CRD. IM may take the role of the National Allocation Entity.
Railway Undertakings	By agreement with NAE Railway Undertakings are able to maintain subsidiary locations for defined subsidiary type codes and are accountable that these are correctly coded in the CRD.
Station Managers	By agreement with NAE Station Managers are able to maintain subsidiary locations for defined subsidiary type codes and are accountable that these are correctly coded in the CRD
Allocation Company	By agreement the Allocation Company, such as a Railway Undertaking or Station Manager, is able to maintain Subsidiary Location Codes for specified subsidiary type codes. The National Allocation Entity defines the access rights based on the defined maintenance process for PLCs and SLCs for an Allocation Company.
Other Stakeholders (i.e., other actors under the TAF or TAP TSI)	May request the creation of primary locations by National Allocation Entity.

National Contact Point (NCP)	The NCP works with the Member State to ensure that National Allocation Entity is appointed and fulfils its roles of populating the Common Reference Files Database with primary location codes. NCP shares the identity of the National Allocation Entity to ERA for appropriate distribution.

9.4.2 Project Actors for Reference Data

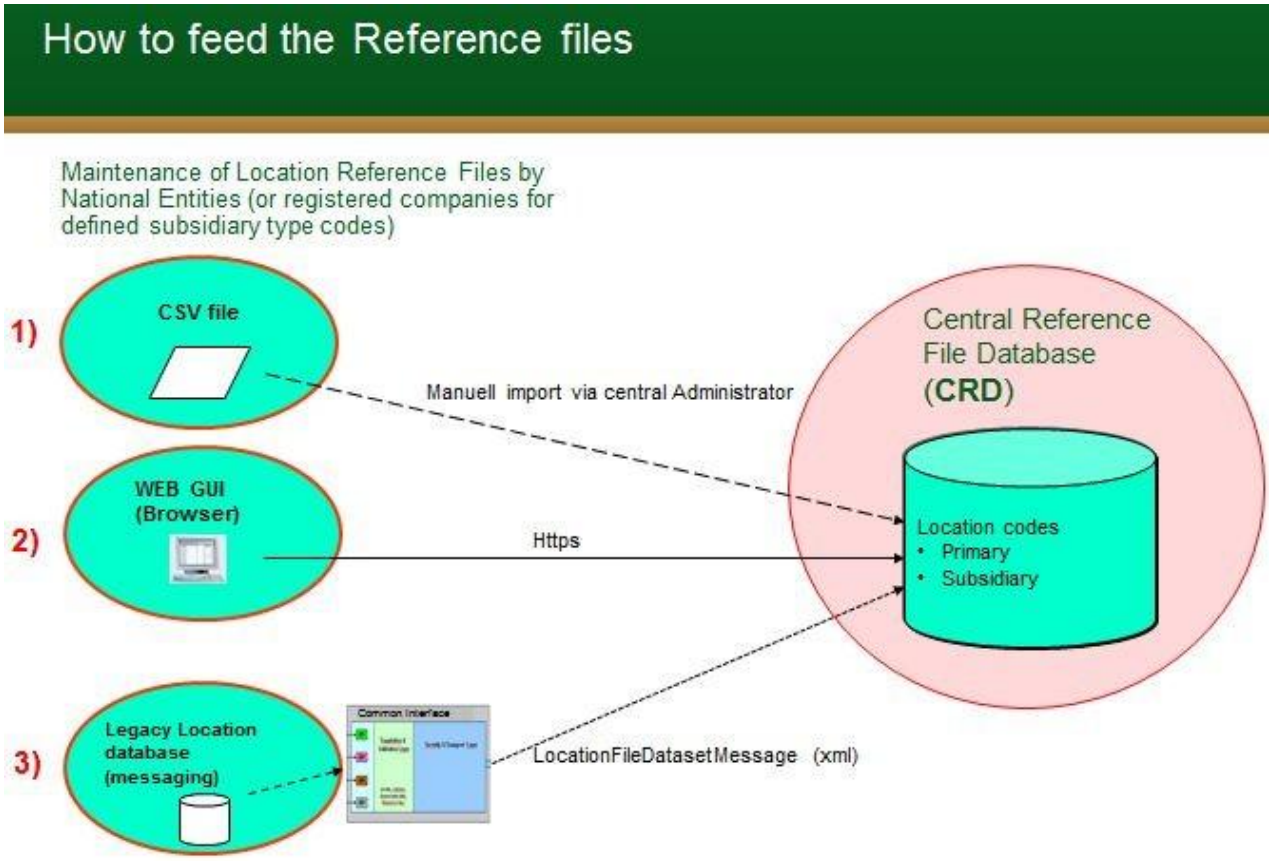
The role of actors is classified as one of:

- Administrator
- International Reference File Entity
- National Contact Point (TAF & TAP)
- National Allocation Entity
- Infrastructure Manger
- Railway Undertaking
- Other Stakeholders

Individual actors in this list may be assigned governance roles for extraordinary activities and executive power to take decisions by others, e.g., EU Commission, ERA, TAF and TAP Steering Boards, Provider of common elements or services.

9.5 Data Management

The figure below shows the different possibilities to maintain the location reference files.



9.5.1 Regular Maintenance

Within each EU country a “National Allocation Entity”, typically a large Infrastructure Manager within a member-state, is responsible for ensuring that the TAF/TAP TSI Location Reference files are maintained. In certain cases the NAE might delegate allocation of the subsidiary location codes (e.g. 03) to another organisation e.g. UIC. In this case the delegated organisation is responsible to maintain the data and ensure the data quality. . In appendix III of the Regulation “Tasks to be undertaken by the TAF/TAP National Contact Point (NCP)” it is stated in Article 6 “*Work with the Member State to ensure that an entity is appointed to be responsible for populating the Central Reference Files Database with primary location codes. The identity of the appointed entity shall be reported to DG MOVE for appropriate distribution.”*

The Process to update the location reference files is provided as figure in Chapter 9.4. Detailed maintenance processes are described in the Chapter 9.7.5.

Company/Organisation Codes are allocated and administered by:

- ERA for codes for companies covered by the European legal framework for railways
- UIC in cooperation with OSJD for any other company

The current registration entity is UIC (RICS) who maintains the four-digit RICS code. The

RICS code is then transferred to the TAP and TAF TSI Company Code reference file. A company code is required to participate in TAP and TAF TSI message communication and locations file maintenance and exchange. Currently Company Codes are requested using UIC WEB Page: https://uic.org/support-activities/it/rics.

ERA currently allocates 4 (AN) digit alphanumeric Company/Organisation Codes for RINF and other administrative purposes for entities who do not exchange TAF/TAP messages. ERA web page for Organisation Code allocation:

https://www.era.europa.eu/registers/evr_en.

From 1st January 2026 ERA will allocate also 4 (AN) alphanumeric Company/Organisation Codes to TAF/TAP actors.

Country Codes are maintained by the International Organization for Standardisation (ISO). If a change or new Country Code is required, the requester should follow the process as laid out by ISO and documented on their website. www.iso.org/iso/country_codes.htm

9.5.2 Maintenance Processes and Actors

(CRUD: Create, Read, Update, Delete)

1. Initial loading of locations (primary and/or subsidiary) in the form of a bulk import is performed by CRD Administrator.

The National Allocation Entity (or any other delegated actor) delivers a file to the CRD Administrator. At the time RailNetEurope (RNE) is acting as CRD Administrator. The file structure is available in Annex 9.5.

2. Countries Reference File and Companies Reference File CRUD is performed by International Reference File Entity

3. Primary Location Reference File CRUD can be performed by:

   a. Infrastructure Manager – Constraint:
      - Element “ResponsibleIM” (Company Code) must be the same as IM user’s Company Code.
      - Element “AllocationCompany” must be the same as IM user’s Company Code
   b. National Allocation Entity (NAE) – Constraint:
      - Country ISO Code of primary location must be the same as the NAE user company’s Country ISO Code.
   c. International Reference File Entity
   d. CRD Administrator

4. Subsidiary Location Reference File CRUD can be performed by:
   a. Infrastructure Manager – Constraint:
      - Element “ResponsibleIM” (Company Code) must be the same as IM user’s Company Code.
      - Element “AllocationCompany” must be the same as IM user’s Company Code
      - “Subsidiary Location Type” must be any subsidiary location type whose maintenance by IM companies is

allowed

b. Railway Undertaking – Constraint:
    - "Subsidiary Location Type" must be any subsidiary location type whose maintenance by Railway Undertaking company is allowed within each country
c. National Allocation Entity (NAE) – Constraint:
    - Country ISO Code of "Primary Location" must be the same as the NAE user company's Country ISO Code.
    - "Subsidiary Location Type" must be any subsidiary location type whose maintenance by National Allocation Entity is allowed
d. International Reference File Entity – Constraint:
    - "Subsidiary Location Type" must be any subsidiary location type whose maintenance by Central Entity is allowed
e. CRD Administrator

5. Subsidiary Location Type Reference File CRUD can be performed by:
    a. CRD Administrator

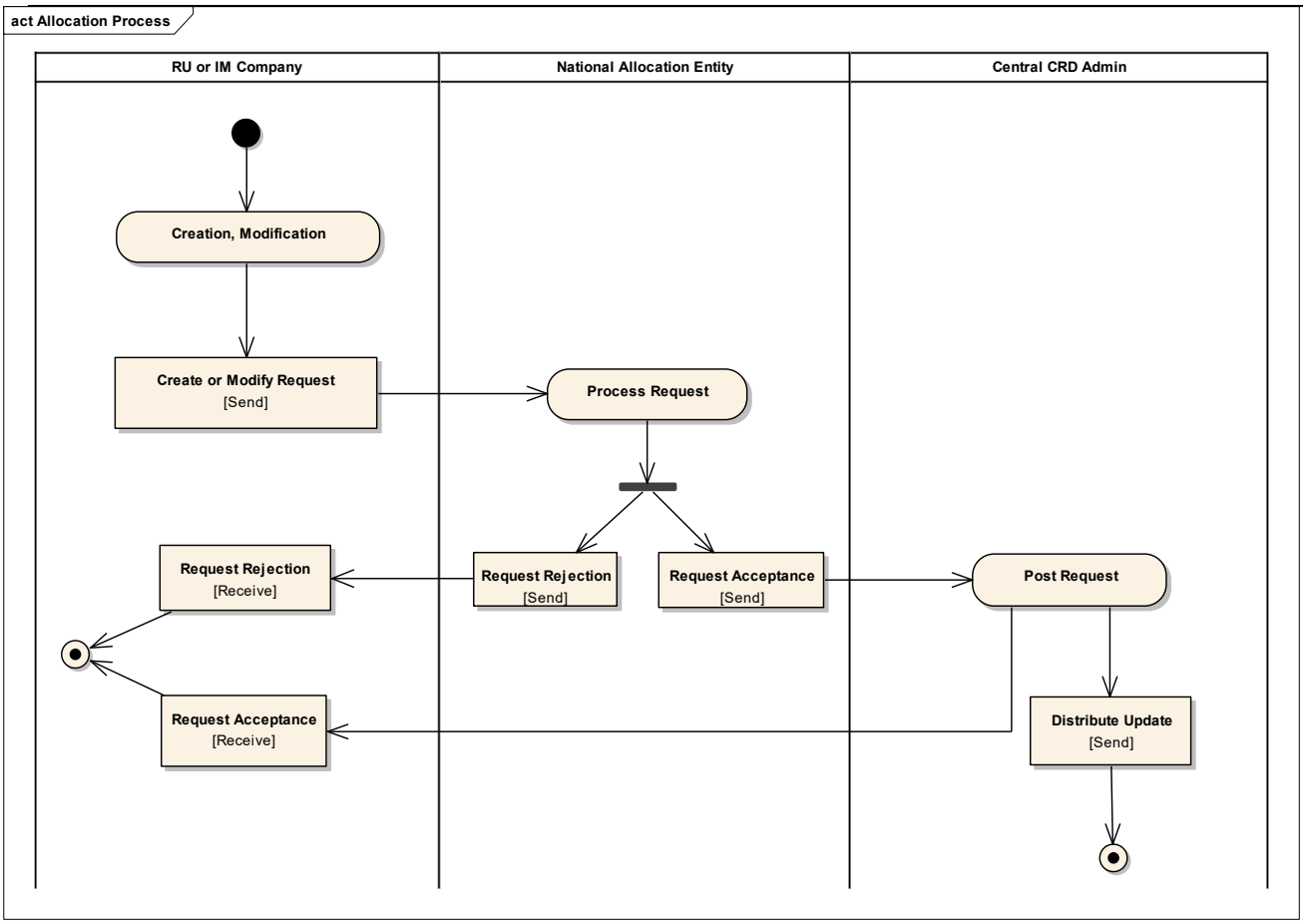
9.5.3 Availability of locations in CRD

General rule for the first availability of a location in CRD is defined below (X – start of a yearly timetable, range is in months):

- Before definition of Temporary Capacity restriction (TCR) – X-36
- before construction of Prearranged Path (PAP) – X-24
- before PAP publication – X-12
- before Network statement publication – X-11
- before date for accepting of path requests – X-8
- before first use of respective code in data Communication (e.g., New short-term validity point because of infra works)

9.5.4 Reference Files Data Management in CRD

The figure below shows the process to maintain Location Reference Files. For primary locations allocation process is described below:



The TAF and TAP TSI Location Reference Database is also known as the Common Reference File Database (CRD).

New Primary Location – Primary Location Code Request

With the current system (CRD), Ims have a problem when adding new primary locations: They have all location information except a PLC (Primary Location Code) – that code needs to be assigned by the NAE. The IM cannot add locations without PLC to CRD, so they have to manually send a PLC request to the NAE and enter the location after the NAE has assigned a code. This process is to ease and automate insertion of the new primary locations into CRD and its usage is optional in member states.

1. A new entity “Primary Location Code Request” (PLCR) will be added to CRD.
2. PLCRs have the same mandatory and optional properties as Primary Locations, expect for the PLC.
3. IM users can create and edit PLCRs.
4. PLCR permissions are restricted on IM basis: IM users can view and edit PLCRs of other users of the same IM but have no access to PLCRs of other Ims.
5. The initial status of PLCRs is “Draft”.
6. After providing the mandatory attributes of a PLCRs, IM users can submit the PLCR to the NAE of the location country.
7. If there is no NAE for the country, the IM user gets a message advising him/her to contact CRD Administrator.
8. Submitting a PLCR has the following effects:
    a. The status changes to “Submitted”.
    b. A notification email is sent to the NAE.
    c. The PLCR shows up in the CRD UI of the NAE.

   d. The PLCR becomes read-only for the IM user.
9. In status “Submitted”, the NAE user has two possible actions for the PLCR:
   a. Approving the request by assigning a PLC. The system aids the user by proposing the next logical PLC (current highest PLC of the country + 1) and validating that no PLC that is already in use is chosen.
   b. Rejecting the PLCR.
10. Approval of a PLCR has the following effects:
   a. The status changes to “Approved”.
   b. A Primary Location with the information of the PLCR and the assigned PLC is created.
11. Rejection of a PLCR changes its status to “Rejected” and the reason for rejection can be provided.
12. In statuses “Approved” and “Rejected”, no one can edit the information of the PLCR.
13. Every status change of PLCRs causes an email notification for users of the affected IM.
14. Every modification of a PLCR causes an audit log entry.
15. Internally, PLCRs are not bound to a specific NAE so that when the validity of one NAE ends and another user becomes the active NAE for a country, the new NAE has access to the PLCRs of his/her country.

New Subsidiary Location – Subsidiary Location Code Request

Similar to the Primary Location Code Request (PLCR) described earlier, there should also be process in CRD for requesting codes for Subsidiary Locations. This Subsidiary Location Code Request (SLCR) works the same as the PLCR, except:

1. SLCRs are based on Subsidiary Locations instead of Primary Locations.
2. Instead of IM users, any CRD user can initiate a SLCR.
3. Permissions and notifications are then restricted to the user company, instead of on IM basis.
4. NAEs can appoint one company of the same country or organisation based on agreement as the NAE per subsidiary type.
5. Users of the appointed company or organisation have the same permissions on SLCRs of the management of the subsidiary type as the NAE.
6. Users of the appointed company or organisation also receive email notifications for SLCRs with their subsidiary type.
7. Changing the country of an appointed company must cause a validation failure (except if an organisation are allowed to manage several countries), or remove the “appointed” status of the company. Otherwise, a company could be appointed to manage SLCRs outside of its country.

For the request and maintenance process by NAE or delegated organisation see Annex 9.4, section 9.4.2

Primary Location Proposal

With the current system, some users – typically Rus – have no formal way to request addition of a new primary location.

The goal is to support and automate this process in CRD where possible.

1. A new entity “Primary Location Proposal” (PLP) will be added to CRD.
2. PLPs have a subset of Primary Location properties: Name, Latitude, Longitude, Country, and Description.
3. All properties except Description are mandatory.

4. Any CRD user with permission “Create PLP” can create a new PLP. Via roles, CRD can be configured to grant this permission to all users.
5. PLP permissions are restricted on user basis: A user has only access to their own PLPs.
6. The initial status of PLPs is “Draft”.
7. After providing the mandatory properties of a PLP, the user can submit the PLP to the NAE of the location country.
8. If there is no NAE for the country, the user gets a message advising them to contact CRD Administrator.
9. Submitting a PLP has the following effects:
    a. The status changes to “Submitted”.
    b. A notification email is sent to the NAE.
    c. The PLP shows up in the CRD UI of the NAE.
    d. The PLP becomes NAE-only for the user.
10. In status “Submitted”, the NCP user has two possible actions for the PLP:
    a. Approving the request by assigning a responsible IM.
    b. Reject the PLP.
11. Approval of a PLP has the following effects:
    a. The status changes to “Approved”.
    b. The PLP shows up in the CRD UI of the users of the responsible IM.
    c. An email notification is sent to all users of the responsible IM.
12. Rejection of a PLP changes its status to “Rejected”.
13. In statuses “Approved” and “Rejected”, no one can edit the information of the PLP.
14. In status “Approved”, IM users have two possible actions for the PLP:
    a. Create a Primary Location Code Request based on the PLP
    b. Create a Primary Location based on the PLP
15. Every status change of PLPs causes an email notification for the user who created it.
16. Every modification of a PLP causes an audit log entry.
17. Internally, PLPs are not bound to a specific NAE so that when the validity of one NAE ends and another user becomes the active NAE for a country, the new NAE has access to the PLPs of his/her country.

Deleting Primary Location

To discontinue primary location (invalidate it for the future use – deactivate) End Date must be set to the day until this location is valid. End Date value must be greater or equal to Start Date value.

The discontinuation of a primary location will automatically result in the discontinuation of the subsidiary locations attached to it.
For any subsidiary location (SL) attached to some primary location (PL) the following rules apply for Start Date and End Date values:

(PL) Start Date ≤ (SL) Start Date ≤ (SL) End Date ≤ (PL) End Date

Primary location and subsidiary locations records deletion is not allowed. Validity end date should be provided to maintain integrity of the timeline.
Once primary location is deactivated with all its associated subsidiary locations, reactivation of this primary location requires manual reactivation of its associated subsidiary locations.

Updating Mandatory Data of Primary Location

Every Primary Location in CRD is uniquely identified by:

1. Location Code
2. Country
3. Start Date

Updating these fields is not possible for the existing primary location record. In case any of these values are changed, updated data set is considered as new primary location.

Updating primary location's name "Location Name" or "Location Name (ASCII)" is possible but should be avoided in case it is not done for error correction purposes. To rename the primary location, existing primary location must be discontinued and new one with the same Location Code and Country should be added having the Start Date value of a day since the new name is valid.

Updating Additional Data of Primary Location

"Freight Possible" flag and "Passenger Possible" flag values of a primary location can be updated any time without updating mandatory data.

When "Freight Possible" flag is set, its corresponding "Start Date Freight Activity" must be set, too. The value must be greater or equal to the primary location's Start Date value. When primary location's End Date is set, "End Date Freight Activity" must be set, too. Its value must be less or equal of the primary location's End Date value.

Start Date ≤ Start Date Freight Activity ≤ End Date Freight Activity ≤ End Date

When "Passenger Possible" flag is set, its corresponding "Start Date Passenger Activity" must be set, too. The value must be greater or equal to the primary location's Start Date value. When primary location's End Date is set, "End Date Passenger Activity" must be set, too. Its value must be less or equal of the primary location's End Date value.

Start Date ≤ Start Date Passenger Activity ≤ End Date Passenger Activity ≤ End Date

Other additional data can be updated anytime without any restrictions.

New Primary Location with Used Location Code

It may happen that the newly created primary location should have Location Code that has already been assigned to some other primary location. This happens if discontinued primary location's code is reused which is not recommended practice.
In that case, discontinued primary location must first be updated by setting the End Date value of a day until it was valid. Next, new primary location is inserted with the same Location Code and Start Date must be set to any value after the End Date of the discontinued primary location.

Deleting Subsidiary Location

To discontinue subsidiary location (invalidate it for the future use – deactivate) End Date must be set to the day until this location is valid. End Date value must be greater or equal to Start Date value.

Subsidiary location records deletion should be avoided. The only exception is deletion of new location created by technical mistake.

9.5.5 Quality Criteria indicators

This section explains the Quality criteria for the Reference Files, in particular the delivery of Reference Files by responsible actors and the successful validation of Reference Files.

IM must validate the completeness and uniqueness of all primary locations used in messages between IM and RU within its network. The IM must ensure all missing locations are added by the responsible National Allocation Entity.

A company using a primary code in messages has to make sure that this code is available in the Reference File.

The National Allocation Entity is responsible to ensure that the primary location for the same physical location is unique.

Subsidiary Locations will be regulated by the railway sector based on the business needs. The completeness of Subsidiary Locations will be ensured by the railway sector itself.

An actor using a subsidiary location code has to ensure the subsidiary location code is available in the Common reference files database.

When a company ceases to exist, the ownership of its subsidiary locations must be transferred to another entity or the associated subsidiary locations identified and the proper validity end date set. In case the action is not performed by the company itself the NAE shall manage this.

9.6 Network Specific Parameters

TEG Operations decided to establish a Core Group (CG14), as a working group appointed by TEG Operation, to collect the Network Specific Parameters (NSPs) from the IMs and propose a common solution for the TrainCompositionMessage (TCM).
CG14 collected all reported NSPs and after working with them came to the conclusions below.

9.6.1 Governance

Since there are plenty of NSPs available in Europe, a central reporting solution is needed to better provision them. The Central Reference Database (CRD) is the best place to create, read, update and delete (CRUD) all the NSPs on IM level. The required mandatory fields in the CRD to register an NSP are:

- IM Name
- IM Code
- Network Specific Parameter Name
- Applicable TAF/TAP TSI Messages
- Type of value (Format)
- Min - Max Length
- Code list (if exists)
    - Description of the codes
- Is Mandatory (Yes/No)

- Description of NSP
    - Text field to describe the NSP purpose and usage. Conditional rules to be described here
    - If TCM, select the level of NSP on the message (train, wagon, loco)
- Network Statement (Yes/No)

9.6.2 Regular Maintenance

The responsible IM, through CRD, will be responsible for the creation, update and deletion of these parameters registered under the network of their responsibility. All the stakeholders involved, performing Telematics TSI message exchange, should read the NSPs in the CRD and comply with the reported rules as they are bilaterally agreed or stated in the Network Statement. There are two ways to get this update:

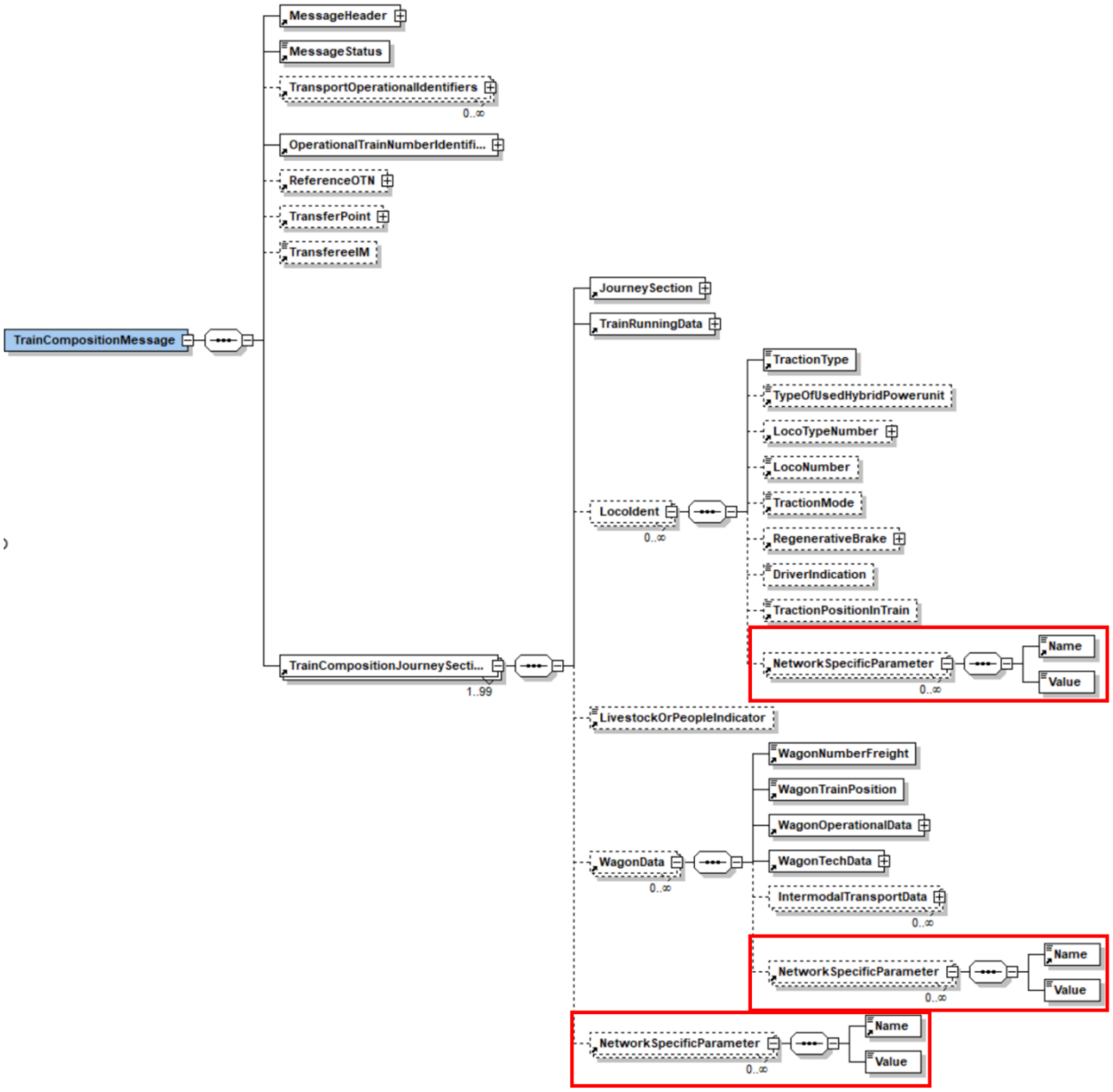
- Seen directly on the CRD user interface
- Activate the replication of the CRD

For the availability and the overall implementation plan of NSPs, the national Network Statement is the responsible document to determine the applied rules. The availability and the general provision of the NSPs is subject to change based on the description of the relevant Article of the Telematics TSI. Once an NSP is published, there will be no need for the TEG groups to discuss or approve it.

9.6.3 Technical Implementation

For the technical implementation, CG14 concluded that the existing NetworkSpecificParameter element can be used. The NetworkSpecificParameter element is an optional, unbounded complex type element with 2 child elements Name and Value which are free text fields allowing 255 characters.
In TCM, and to fulfil the sector’s needs, the NetworkSpecificParameter element introduced on Train, Wagon and Locomotive level:

Picture: NSPs in TrainCompositionMessage



An example of a TCM using NSP can be seen below:

```
<?xml version="1.0" encoding="UTF-8"?>
<ns3:TrainCompositionMessage>
	<ns3:MessageHeader>
		<ns3:MessageReference>
			<ns3:MessageType>3003</ns3:MessageType>
			<ns3:MessageTypeVersion>5.3</ns3:MessageTypeVersion>
			<ns3:MessageIdentifier>154270</ns3:MessageIdentifier>
			<ns3:MessageDateTime>2025-01-
14T04:13:58.000+01:00</ns3:MessageDateTime>
		</ns3:MessageReference>
		<ns3:SenderReference> </ns3:SenderReference>
		<ns3:Sender>0000</ns3:Sender>
		<ns3:Recipient>0054</ns3:Recipient>
	</ns3:MessageHeader>
	<ns3:MessageStatus>2</ns3:MessageStatus>
	<ns3:TransportOperationalIdentifiers>
		<ns3:ObjectType>TR</ns3:ObjectType>
```

```
            <ns3:Company>0000</ns3:Company>
            <ns3:Core>DISCO002655C</ns3:Core>
            <ns3:Variant>00</ns3:Variant>
            <ns3:TimetableYear>2025</ns3:TimetableYear>
            <ns3:StartDate>2025-01-13</ns3:StartDate>
        </ns3:TransportOperationalIdentifiers>
        <ns3:OperationalTrainNumberIdentifier>
            <ns3:OperationalTrainNumber>00000</ns3:OperationalTrainNumber>
        </ns3:OperationalTrainNumberIdentifier>
        <ns3:OperationalTrainNumber>00000</ns3:OperationalTrainNumber>
        <ns3:TrainCompositionJourneySection>
            <ns3:JourneySection>
                <ns3:JourneySectionOrigin>
                    <ns3:CountryCodeISO>CZ</ns3:CountryCodeISO>
                    <ns3:LocationPrimaryCode>78000</ns3:LocationPrimaryCode>
                </ns3:JourneySectionOrigin>
                <ns3:JourneySectionDestination>
                    <ns3:CountryCodeISO>CZ</ns3:CountryCodeISO>
                    <ns3:LocationPrimaryCode>76884</ns3:LocationPrimaryCode>
                </ns3:JourneySectionDestination>
                <ns3:ResponsibilityActualSection>
                    <ns3:ResponsibleRU>0000</ns3:ResponsibleRU>
                    <ns3:ResponsibleIM>54</ns3:ResponsibleIM>
                </ns3:ResponsibilityActualSection>
                <ns3:ResponsibilityNextSection>
                    <ns3:ResponsibleRU>0000</ns3:ResponsibleRU>
                    <ns3:ResponsibleIM>54</ns3:ResponsibleIM>
                </ns3:ResponsibilityNextSection>
            </ns3:JourneySection>
            <ns3:TrainRunningData>
                ….
            </ns3:TrainRunningData>
            <ns3:NetworkSpecificParameter>
                <ns3:Name>CZMilitaryTransport</ns3:Name>
                <ns3:Value>LTU1101CZE02CZE</ns3:Value>
            </ns3:NetworkSpecificParameter>
            <ns3:NetworkSpecificParameter>
                <ns3:Name>CZFreeTextField</ns3:Name>
                <ns3:Value>CZ-76884|ZSTC:54-768846-00</ns3:Value>
            </ns3:NetworkSpecificParameter>
        </ns3:TrainCompositionJourneySection>
</ns3:TrainCompositionMessage>
```

The Responsible IM for the reported network can be used to identify the network of the NSP. The NetworkSpecificParameter elements at the end of the message report the name and value of the NSP.

10. Code Lists

This chapter is just a reference to the Annexes where the codes used in the RU/IM message exchange are given. For the simplicity purpose, and easier maintenance of the f code list documentation, only the direct export from the most accurate XSD (schema) will always be provided. Since it is agreed within the sector, that every code list and the code should be documented in the annotation of the XSD, it is easier to keep the code list documentation centralized.

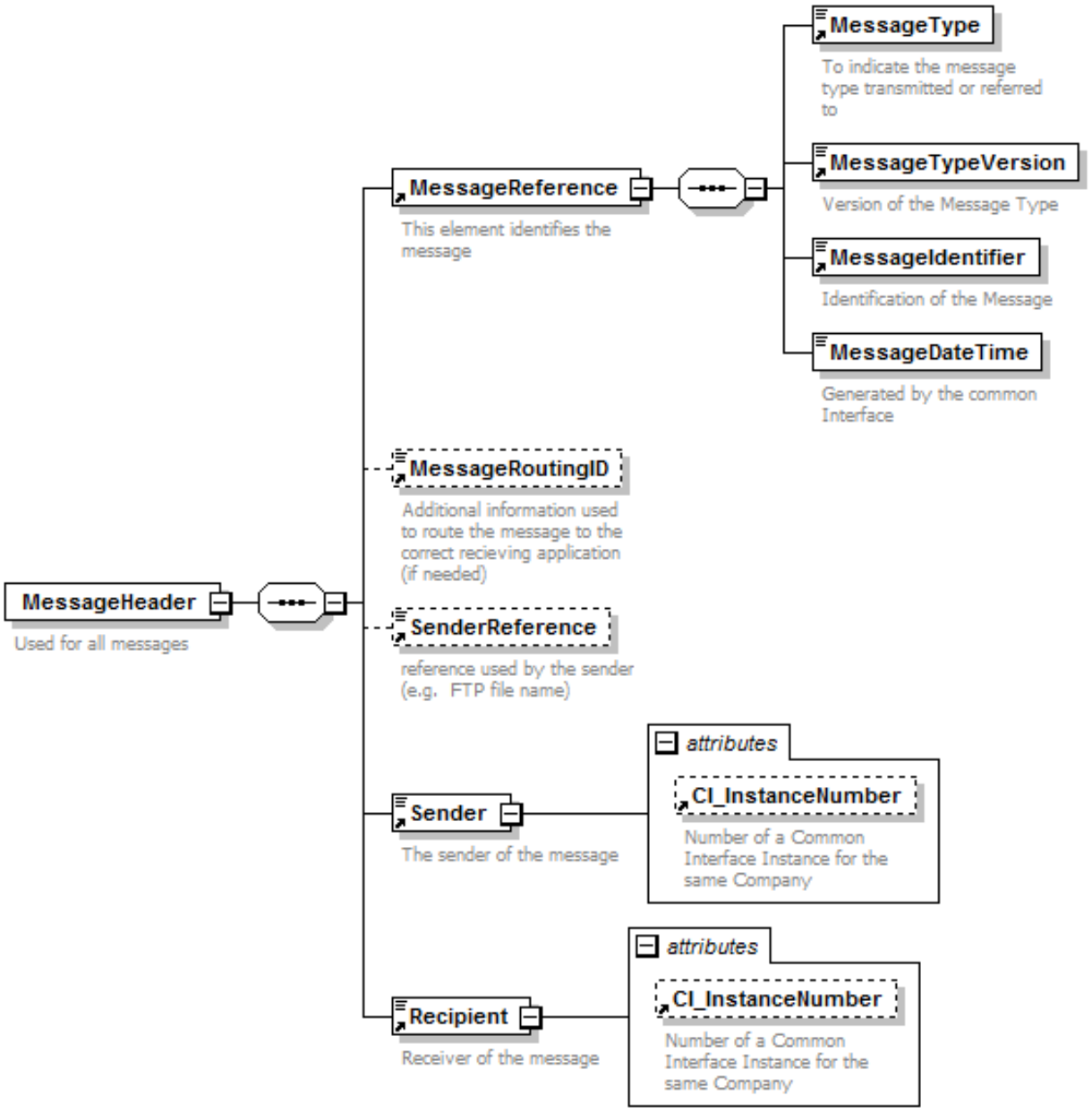
Some of the code lists are agreed by the sector to be only kept in the annotation of the element for the flexibility reasons:

- Message Type
- Error Code

The code lists can be found in Annex 6.3 (full code list document) and Annex 10.2 containing the important annotations for Message Type and Error Code.

11. Message Header for RU/IM communication

This chapter describes the message header that is common to all TAF and TAP RU/IM Messages.



11.1 Explanation of Message Header Elements

The Sender, Recipient and Message type fields are used to route the message to the right recipient based on configuration on the sending CI.

This Header also MUST be used for shared metadata messages exchanged between two partners. (Shared Metadata describes messages which could be exchanged between two or more partners.) The format can be locally defined and shared between partners. This also allows using the Common Interface for enhanced xml message exchange outside of the TAF and TAP defined metadata.

Element	Format	Description
Message Reference		
Message Type	4n	The message type defines the functional message by a number. The message types are defined in the annotation of the MessageType element. As an example, value 2006 is the Path Request Message, value 1000 is Consignment Order Message, and 8500 is the sector message Update Link. The Path Request related messages are starting with 2, Operations related messages with 3 and 4, the Wagon related messages with 5, Dataset messages with 6. The sector messages have the 5 as the second digit (e.g. 2500 Path Coordination Message, 8500 Update Link Message)
Message Type Version	string ..25	The message type version defines the version of the message. It will be the version of the schema. It is proposed to use for each Message a single schema. This will identify the version of the schema. For common metadata, this will be version of the metadata used, i.e. ‘5.3’ for the current version the metadata.
Message Identifier	String ..255	The message Identifier is assigned by the CI to secure the transactions are uniquely identified between the Cis for reliable messaging. It has to be unique. The Message ID is a sting of 36 bytes. For technical point of view the MessageIdentifier is a universally unique identifier (UUID) created using java.util.UUID class. It is 128-bit value. We

Element	Format	Description
		are using randomUUID() function of UUID class which generates UUID using a cryptographically strong pseudo random number generator. As string it is represented as 36 bytes (128 = 16 bytes, each byte is represented by a two-byte hex code. That makes it 32 bytes and there are 4 – separators) If Company is using its own CI it has to produce the Message ID accordingly.
Message Datetime	datetime	The date and time will be given by the CI to report the last time when the message was sent by the sender. It will contain the local time of the message sender. The convention is on local time with UTC offset.
Message Routing ID (optional)	2n	Normally the routing (configuration) on the Common Interface (CI) for incoming messages to the right legacy Application will be done based on the message type. There could be a need to have an additional routing code to identify a particular application on the receiver's end. (i.e. routing to a combined transport or wagonload system.) In this case the Routing ID (defined by the receiver and agreed by the sender) allows definition and configuration on the receiving CI. Routing ID is mutually agreed by trading partners.
Sender Reference	string 25	This optional element allows the sending application to transfer a reference ID taken from the legacy message (e.g. ftp file number if unique) to the receiving CI and possibly to the receiving application (if supported). It could be used to link a legacy message with a TAP / TAF TSI Message over the translation Layer of the Common interface.
Sender	Company code string 4	The Sender defines the sender of a Message by its company ID. It will be configurable through message processing on the sending CI if not contained in the legacy message.
CI_InstanceNumber	2n (Attribute of Sender)	In case that a company has more than one CI (which is possible) the instance number is present as an attribute to identify the correct instance within a company. It will be configurable on the sending CI as a constant and should

Element	Format	Description
		contain a default of “01”
Recipient	Company code string 4	The Recipient is the receiving Company defined by the Company ID. It could be defined by the sending application or done by the CI by configuration. Origin information must come from the sending application (either contained within the message or by message processing configuration)
CI_InstanceNumber	2n (Attribute of Recipient)	In case that a company has more than one CI (which is possible) the Instance number is present as an attribute to identify the correct instance within a company. It will be configurable on the sending CI as a constant and should contain a default of “01” For example, it would allow routing of operational messages to instance No 1 of Company A and timetable messages to instance No 2 of Company A.

Sender Recipient and Message type are used to route the message to the right recipient based on configuration on the sending CI.

11.2 Example XML message after processing by the Common Interface

```
<MessageHeader>
  <MessageReference>
      <MessageType>2002</MessageType>
      <MessageTypeVersion>5.1.8</MessageTypeVersion>
      <MessageIdentifier>1c05811f-0dfc-4554-b9e2-1d053353b2bd</MessageIdentifier>
      <MessageDateTime>2011-10-04T19:34:39.062+1:00</MessageDateTime>
  </MessageReference>
  <SenderReference>2102.txt</SenderReference>
      <Sender CI_InstanceNumber=”01”>0080</Sender>
      <Recipient CI_InstanceNumber=”01”>0016</Recipient>
</MessageHeader>
```

11.3 Further explanation on Message Identifiers

The message ID is created by the CI immediately as the messages arrives on the CI not knowing any message structure at this time. This is necessary to log the legacy message at earliest stage. At CI it is used in all logs and also included in the messages in the Header element.
Even if it is provided from Legacy system it will be replaced from CI within the messages processing, even if there is no translation.

Example of logging of message ID:

INFO OutBoundMessageProcessingConnectorTextLogger _ TS=2011_11_13 20:25:35,997 CET|MID=7142ac39_91a7_4b6d_93f6_0ecb542413c5|STS=RCVD|CT=IP Socket|CI=0080_0083_out_2002_IPS|ENC=UTF 8|SIZE=205|RM=20020[illegible]_18003000421732011111403504800802259 6NOBS Obersinn 20111113202334_004905008020178MKI Kiefersfelden 00810000000421732011111403504 8|

Part B Temporary Capacity Restrictions

12. Temporary Capacity Restrictions

Planning of TCRs is important to keep infrastructure and equipment in good condition and to allow infrastructure development in accordance with market needs. Since TCRs have a negative impact on the rail network (due to blocking capacity) they have to be carefully planned and coordinated among all the involved IMs.

Introduction

The purpose of implementing TAF/TAP TSI is to ensure TCR data exchange between IMs to have well-coordinated and up-to-date information about TCRs published and visible to Applicants and other service providers.

Section reference:

- *The revised Annex VII (recast in 2017) of Directive 2012/34/EU*
- *RNE's handbooks (*Procedures for Temporary Capacity Restriction Management, ver 2.0*;* Description of the Timetabling and Capacity Redesign Process, ver 3.0

12.1 Introduction

This chapter concisely describes the Temporary Capacity Restriction (TCR) and the messages used for data exchange between involved parties. It aims to provide the necessary information required for the implementation of the TCR messages.

12.1.1 Payload of the Messages

The following chapters 12 to 18 and 20 will describe the detailed message payloads for

12.1.2 Short Term Path Request
12.1.3 Operation of Trains
12.1.4 Train Preparation
12.1.5 Train Running Information and Forecast
12.1.6 Service Disruption/Train Running Interrupted
12.1.7 Change of Track/Platform
12.1.8 Train Journey Modified
12.1.9 Delay Cause
12.1.10 Train Location.

12.2 TCR process

Temporary capacity restrictions are necessary to keep the infrastructure and equipment in good condition and allow for infrastructure development per market needs. Hence, TCRs are in the best interest of all stakeholders. The main objective of IMs is to ensure smooth traffic flow, even while investing in rail infrastructure improvements that may temporarily reduce capacity, all while considering the specific interests of stakeholders. Proper handling of the whole TCR life cycle, including the involvement of all relevant stakeholders is necessary. Therefore, the IMs should set up joint procedures for the TCR processes to treat their planning and execution in a harmonized way, and to ensure TCRs alignment to allow maximum traffic flow.

12.2.1 TCR Process Steps

Each TCR has a certain life cycle from the definition of the initial need to its execution.
IM plans certain needs for TCR that are related to the mainland or lines with international impact. During the creation of TCRs, the IM owner must classify them by defining them as major, high, medium or minor impact TCRs, by considering the number of consecutive days (uninterrupted days of TCR) and its impact on the traffic.
TCRs created on the lines with the international impacts must be communicated to the affected IMs. With this communication, the coordination phase starts, and the aim is to find the best way to manage TCRs among involved IMs. Once the TCRs are accepted by all involved IMs, they go into the publication and are visible to all interested parties (other IMs, Applicants, Allocation Bodies, etc.).
According to this, TCRs that are defined on the mainland and do not affect other IMs can be published on the owner's IM needs and decisions.
However, all TCRs (created on the mainland or lines with international impact) follow the publication deadlines defined by Annex VII.
Each TCR has defined its validity when it starts and ends. After the end date, the lifecycle of the TCR finishes.
Owner IM can also decide to cancel TCR if the necessary factors (budget, working team, etc.) are not available or archive TCR in case the current one is going to be replaced with one or more new TCRs. With the archiving or cancellation of TCR, its lifecycle finishes.

12.2.2 Criteria for TCR Classification

One of the main parameters to define TCR is its classification, and each TCR must be classified according to the Annex VII of Directive 2012/34/EU (articles 11 and 12).

12.2.3 TCR plans/creation

Infrastructure managers (IMs) can begin planning their Temporary Capacity Restrictions (TCRs) up to 36 months ahead using their existing legacy systems. Each TCR should include all relevant details, such as the identifier, timeframe, TCR type, start and end locations, participating IMs, and any affected borders for cross-border TCRs. Additionally, the TCR needs to outline its impact on traffic, classification, necessary traffic measures, and the current status within the process. To ensure clarity about the route impacted by the TCR, IMs should also provide details for all sections directly affected, based on the start and end points of the TCR.

Data about TCR can be sent whenever IM has stable information about TCR and its realization, but the respective deadlines according to Annex VII for each TCR type must be

followed. Data is provided by sending the TCR message. The sequence of the messages is presented in the following diagram.

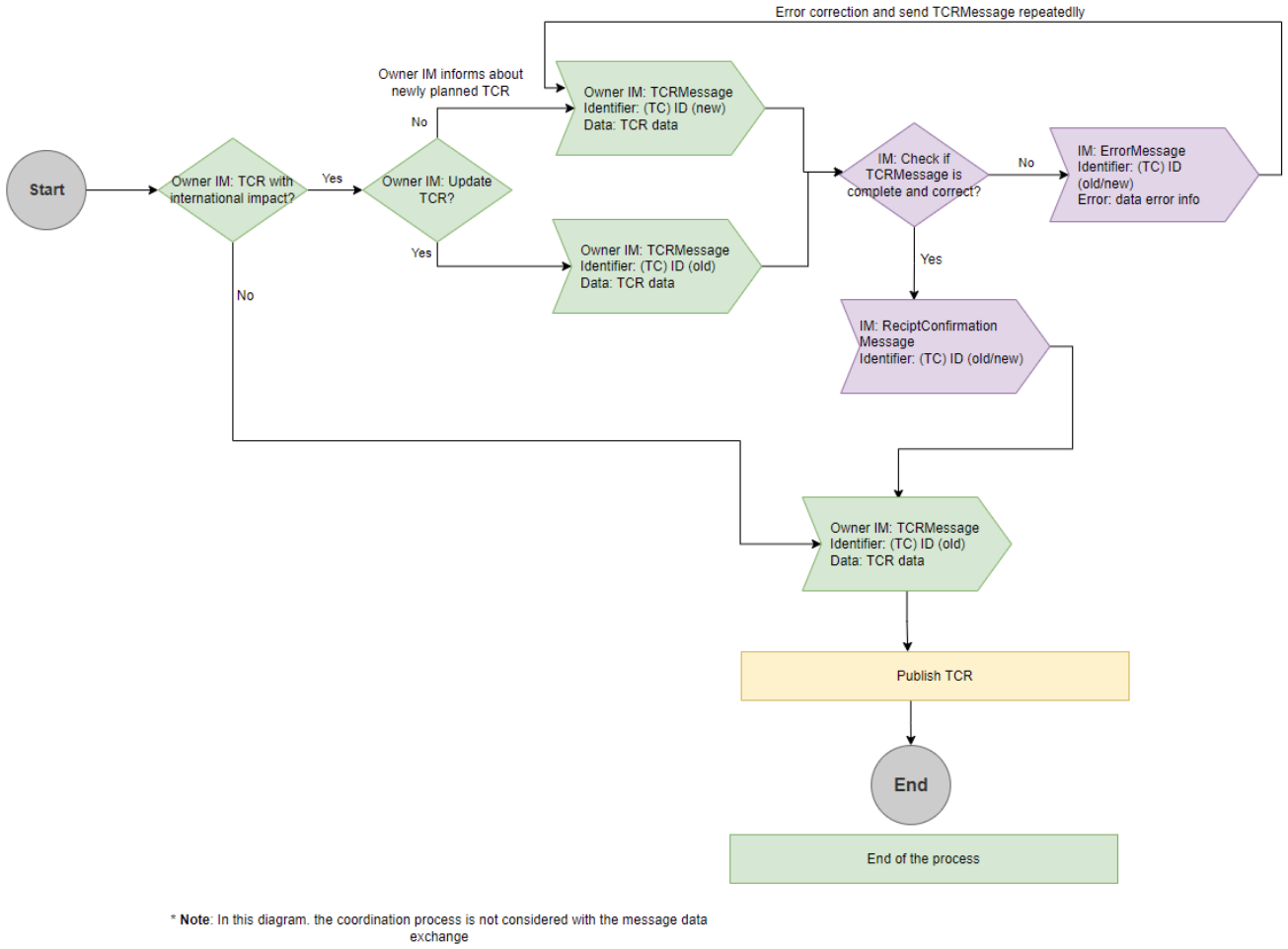


Figure 2 - TCR data exchange – sequence of messages

TCR data exchange or update happens regularly when IM has any new TCR or update of the existing (already shared) TCR.
In general, information about the TCRs must be exchanged before the defined deadlines (presented in Figure 6).

12.2.4 TCR Coordination

TCRs with a national impact should be coordinated among the involved IMs to decrease their negative impact on traffic. During coordination, IMs discuss their availabilities and align TCRs accordingly. A use case for aligning the TCRs is shown in Figure 5.
The coordination of TCRs shall ensure that planned capacity restrictions will consider the needs of both the IMs and the market by rationalizing and minimizing the gravity of the impact and duration of the capacity restrictions.

The coordination phase aims to guarantee the possibility for all IMs to carry out their respective TCRs, optimizing their mutual interferences and minimizing the impact on applicants.

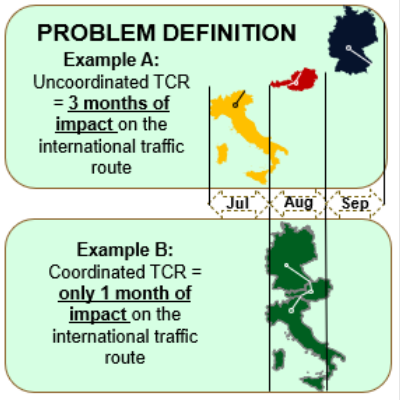


Figure 3: TCR Coordination logic

Coordination shall be facilitated through bilateral (or multilateral) meetings of IMs taking into account passenger and freight flows. All IMs shall coordinate TCRs in such a way that their impact on capacity and applicants is as low as possible and the use of infrastructure as efficient as possible (no parallel works on the same line, etc.).

For the time being, the coordination function is not considered nor defined in the TSI messages, and coordination cannot be made by using the TCRMessage. Depending on the coordination process definition and agreement by the members, the messages could be extended with the coordination parameters.

12.2.5 TCR publication

The Infrastructure Managers must publish all capacity restrictions according to the deadlines defined in the Annex VII of Directive 2012/34/EU. Published TCRs must include essential parameters as defined in the provided message structure, such as timing, location, type of restriction, and the expected impact on capacity.

12.3 Overview of the messages

The list of messages considered for TCR data exchange is the following:

- TCRMessage
- TCRCanceledMessage
- ErrorMessage
- ReceiptConfirmationMessage

12.3.1 TCRMessage

The message shall be used for the creation or update of data about the planned TCRs. By sending this message, the owner IM will inform affected IMs about the TCR that he plans, and which should be considered by their side by aligning them with those that they plan. The agreed changes among IMs or Applicants can be updated by using the TCRMessage.

One TCR object can be delivered with one TCRMessage. TCR must contain all the mandatory elements. Also, IMs can provide information about neighbouring IMs that are affected by the TCR.

12.3.2 TCRCanceledMessage

The message shall be used to cancel the particular TCR. To cancel a TCR, the owner IM has to

provide the respective identifier of the TCR that wants to cancel.

12.3.3 ErrorMessage

The error message shall be used by the recipient' system to provide information about an error when receiving the message. This error can be related to the wrong message structure, missing mandatory fields or providing the wrong data type, referencing not existing data (e.g., wrong PLC) and similar.

12.3.4 ReceiptConfirmationMessage

This message should be sent from the recipient of the message to the originator of the message in order to acknowledge that its legacy system has received the message.

12.3.5 Structure of the TCR message

This topic describes the main elements of the TCRMessage structure, that are specific to this message. A detailed description of all message elements can be found on the RNE website.

Identifiers
The element Identifiers is a global element used in other TAF TSI messages and for which the optional status of PlannedTransportIdentifiers is relevant.
For the TCR data exchange, the PlannedTransportIdentifiers is mandatory.
StartDate as part of the Identifiers is not used for the TCR data exchange.

Coordinating IM
This element is used to define which IM is responsible for the TCR and coordinates the process between IMs. It is important, especially in countries with more than one IM, where IMs can create TCRs for each other (e.g., in Switzerland). The value that should be entered is the company code of the responsible company. This element is optional.

Administrative Contact Information
Used to define the contact information of the person responsible for creation and coordination of TCR in the company. Initially, it will be a person who is TCR manager in the company or TCR manager for the specific region inside the country. Only the "Name" (name and surname of the person) element is mandatory.

Reason for Restriction
It gives an indication about the works regarding the TCR, like signal, switch, catenary, maintenance, etc. Possible values are defined in the XSD schema.

Description
It is an optional element to provide a brief description of the TCR.

Start and End Locations
In the planning, the part of the network that TCR impacts will be defined by using the Start and End locations.

The "StartLocation" defines the beginning while the "EndLocation" defines the end location of the TCR. Both fields are mandatory and only locations associated with the country of the issuing IM are allowed. The location is described with the Country Code (CountryCodeISO) and Location Primary Code.

The "WholeNetwork" element will be used for the operation only and it is not applicable for planning. This element will be used only for the operation, and in this case the Start and End locations' elements should not be provided. Alos, the "Direction" element must be set on

"both directions" (value 10).

Incident
This element is not applicable for planning.
It is an optional element which is used in operation only to give information that this is a special TCR related to incident. The type of this element is Boolean and the "true" value shall be provided in case that TCR is incident.

Sections
This is an optional structure to be used to provide information about the sections of the corridor that are affected by the TCR. It contains the "Section" element, that shall be used to provide information about one or more sections (defined by Start and End locations).
The mandatory element "StartLocation" shall be used for giving information about the starting location on the section but also can be used for providing information about affected track at the location (by using SLC codes). Providing information about the affected tracks at the location is applicable only with the "StartLocation" element in the "Section" structure.

The optional element "EndLocation" shall be used to provide the last location of the section or segment.

Optional element "Name" is used to provide information about the name of the section.

Optional element "Line" is used to provide information about the affected line and tracks on the line or part of the line by considering the StartLocation and EndLocation elements (not tracks at the location itself). It contains the following:

- A mandatory "LineName" attribute used to provide information about the line on which TCR is created
- Track – mandatory element used to provide name or code of the affected track that belongs to the affected line
- KilometricPoint – optional element to provide information about the kilometric points about the TCR. It contains mandatory information related to the Start and End points.

If a TCR is established on a longer route, each section should be clearly defined to ensure there is no ambiguity about which specific route is affected by the TCR.

TCR direction
Defines which direction of the section is affected by the TCR (bi-directional, direction towards starting point of the location, direction towards end point of the location).

Affected Borders
This is an optional element that IM can use to define which border/s are affected by the TCR. This is especially important for the coordination of TCRs.

Affected IMs
This is an optional element used to involve neighbouring IMs, that are affected by the TCR, in the harmonization process. One or more IMs "CompanyCode" could be provided.

Involved ICE
Optional element to define one or more internationally coordination entities (ICE) that are affected or should be involved in the capacity coordination

Temporal Expansion
This is a mandatory element used to define the dates and times of the TCR, and also temporal expansion type and duration of the TCR.
It contains an "Expansion Type" attribute that must be provided to indicate the type of TCR:

- Periodical - The characteristic of this event is described with a repeating pattern (e.g., work activities happen each Saturday and Sunday from 11:00 to 04:15). For periodical works,

specific working days should be set, where each value represents the beginning day of each work. In the case of the given example with works on Saturday and Sunday from 02:00 to 04:15, the values Sat and Sun need to be set (not Sat, Sun and Mon).
- Continuous - These events are characterized in a way that they occur non-stop during the TCR (e.g., complete closure of a track from 01.07.2025 10:00 to 01.09.2025 12:00).

Each TCR is defined by its validity period, by defining the start and end date. The validity period of TCR can be defined with the exact dates and times if it is known or rough dates if it is unknown.
If the precise dates and times of the TCR are known, the validity period should be defined using the "Planned Calendar" element. This includes specifying the exact start and end dates, which mark the beginning and conclusion of the TCR. Within this defined period, daily occurrences can be detailed using the "BitmapDays" element.
OffsetToReference element is not relevant for the TCR data exchange.

The "Weekly Pattern" element is used to indicate the specific days when TCRs occur, starting with Monday as the first day. This is particularly important for recurring TCRs, as it establishes the day pattern for these events.

Additionally, the weekly occurrence of the TCR can be specified using the "Weekly Interval" element. This allows you to indicate, for example, that TCRs will occur every second week (2), every third week (3), and so on.

Both, “Weekly Pattern” and “Weekly Interval” elements can be used in combination with the PlannedCalendar if the sender of the message does not support the calendar with the BitmapDays format and can therefore not include in the message.

In the case of not knowing the precise dates, the TCR validity is defined by year/week ranges that approximately define the TCR validity period. For this purpose, elements of the “RoughDates” structure shall be used to define the start and end year and week. By providing the information of the “RoughDates” structure, the “WeeklyPatern” must be provided, therefore it is defined together with the “RoughDates” element structure.
Later, when the exact dates will be known, this data should be updated, using the “Planned calendar” element.

The "TCRTimeAtLocation" can be utilized to provide details about the start and end times at specific locations, accounting for any potential deviations from the planned TCR date and time.

Operational Consequences

This includes the impact on traffic, classification of impact, traffic measures, necessary deviations and the incorporation of traffic measures in the yearly timetable.

The optional element "ReducedTrackAvailability" is used to indicate whether the line track (LT), the station track (ST), or both have reduced availability.

The optional element “DimensionalRestriction” is related to providing information on weight, length and profile restrictions. This type of element is boolean and just indicates that there are some restrictions related to dimensions.

The impact of a TCR on operations can result in a complete closure of the section defined by its start and end points. In some cases, however, traffic may still be able to pass through the TCR. Such instances should be categorized as "GoThrough" TCRs. Based on the nature of the TCR, Infrastructure Managers (IMs) must determine whether the TCR should be classified as "TotalClosure" (where no traffic is allowed throughout the planned period) or "GoThrough" (allowing limited traffic flow during the TCR).

The optional element “SpeedRestriction” indicates that TCR has imact on the speed which will be

reduced. It does not provide information about the exac reduced speed but gives information that the speed will be reduced (type of element is boolean).

The optional element “NoCatenary” provides information that there is no catenary (type of element is boolean).

With the optional element “AffectedTrafficVolume”, IMs can provide information on how much traffic is affected by TCR, in percetage.

The “TCRClassification” is a mandatory element which value should be calculated according to the criteria for TCR classification, explained above in this Annex.

The optional “TrafficMeasures” element structure can be used to provide information on the type of trains that are cancelled, rerouted or replaced and their estimated delays.

To minimize the operational impact of a TCR, alternative routes for train operations can be proposed. These alternative routes can be defined using the optional "Deviations" element structure, allowing Infrastructure Managers (IMs) to specify one or more routes along with their locations and any relevant comments. Similarly, if the TCR affects a border, IMs can provide information about alternative borders to be used during the TCR period.

The optional element "InternationalCoordination" can be used when the IM creating the TCR wishes to involve neighboring or additional IMs in the coordination process. This is applicable when the IM anticipates that the TCR will have a broader impact.

The “InYearlyTimetable” element actually refers to the running timetable period. If the TCR was included in thetimetablepublished for the running timetable period, “InYearlyTimetable” should be set to “true”; and if it was not, it should be set to “false” and the “IndicationOfTimetableAdaption” is then mandatory.

Project ID
Referencing to the project ID of the TCR issuing IM.

TCR Status
The values are the following: Planned, Coordination, Consultation, Published, Cancelled, and Archived.

Last updated
Optional element that can be used for providing date of creation and update of a TCR. The message sender can choose to include this information or not.

AutomaticProcess
This optional element can be used to provide information that the process workflow shall be automated or will be manually executed. In case of automatic process (bollean value “true”), the TCR shall be promoted to next status according to the Annex VII deadlines. For the manual process, the TCR status should be updated by IM by sending information within the TCRMessage structure.

Part C Planning of Trains

13 Path Request

In TAF TAP regulation, Short-Term Path Request (STPR) is covered. However, it is a general agreement within the Sector to use TAF TAP messages/framework for the Path Request process (including annual timetable).

Introduction

This chapter aims to provide with the necessary planning specific information that is required for the implementation of the messages by the various actors impacted as a result of complying with the TAF/TAP regulations.

The TAF and TAP TSIs are focused on the planning process for short term planning as the annual train services have short term amendments made to them e.g. cancellation of the service for the day, change of route for a week.

In addition to the diversity of processes there is also a need to identify a train service during the different phases of planning and into operation. The use of the TAF/TAP processes for Long-term Planning is a recommendation outside and in addition to both TSIs. It is therefore up to the involved parties to agree on using it.

Assumptions:

13.1.1 The term "Short Term Path Request" process denotes a number of different processes that range from Path Request, Path Cancellation, Path Modification/Alteration, Path Not Available and Path Utilisation.

13.1.2 The Network Statement defines on each network when the Short-Term Path Request period is applicable before the running of a train.

13.1.3 The application of Short-Term Path Request is mandatory according to TAP and TAF. The application of the same messages for Annual Timetable/Long Term Planning is optional.

13.1.4 It is assumed that all activities described within the processes that are carried out by each IM are done so in accordance with their Network Statement.

The purpose of implementing TAF/TAP TSIs is to ensure an efficient and concrete exchange of information between Ims, Allocation Bodies, Ras and other service providers. The exchange of information is done in relation to the processes during the planning stage.

This information exchange is essentially bilateral and takes place between the IM in charge of the Path Section and the RU that will operate over the Path Section. In the case of an Open Access Operator the RU will be dealing with several Infrastructure Managers.

The framework for the allocation processes are laid down in Directive 2012/34 EU and described in detail in National Network Statements of the Infrastructure Managers.

A list of the main content is shown in the following table. The content of these can be accessed in the referenced Annex.

Outputs Produced	Reference to Regulation / Comments
Business processes	**Specific Section**
PATH REQUESTs	TAF 4.2.2 / TAP 4.2.17
Path cancellation by RA "applicable to Cooperation and Open Access	TAF 4.2.2 / TAP 4.2.17
Path alteration by IM	TAF 4.2.2 / TAP 4.2.17
Path modification by RA	TAF 4.2.2 / TAP 4.2.17
Messages	**Reference or New**
Path Request	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Details	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Confirmed	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Details Refused	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Cancelled	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Not Available	TAF ANNEX D.2: APPENDIX F / TAP B.30
Receipt Confirmation	TAF ANNEX D.2: APPENDIX F / TAP B.30

13.1 Introduction

This complete chapter aims to provide the necessary planning specific information that is required for the implementation of the messages by the various actors impacted as a result of complying with the TAF/TAP regulations. Other information that is related to planning, e.g. Train Identification, Architecture, can be found in dedicated chapters of this overall Sector Handbook.

13.1.1 Long-term Planning linked with Ad hoc Planning

The TAF and TAP TSIs were initially focused on just the planning process for short term planning. As happens across virtually all networks in Europe annual train services have short term amendments made to them e.g. cancellation of the service for the day, change of route for a week. It therefore makes sense' to use the same standards for annual planning and ad hoc planning. The use of the term "ad hoc" is aligned with the Directive 2012/34/EU.

In addition to the diversity of processes there is also a fundamental need to identify a train service during the different phases of planning and into operation. A European Train Identifier whose main benefit is to have the same number across the various stages – that

includes moving from long term planning into short term planning is used in the messages. Extending the TAF/TAP processes to include long term activities as well as short term the problem of train identification for planning can be overcome.

The use of the TAF/TAP processes for Long-term Planning is a recommendation outside/in addition to both TSIs. It is therefore up to the involved parties to agree on using it.

13.1.2 The need for Harmonisation

At present, there is no mandate as such for the regulations to include harmonization[7] activities between:

- RAs when setting up a path request
- IMs when planning the path details

However, the handover point from one IM to the next IM, where the legal responsibility is changing, is often on a line section there the trains do not stop. This means, the RA interchange point is either in one of the journey locations before or after the handover point. Interchange point could be also on the Handover point. In this case, Ras could have the need to collaborate on these sections (e.g. who is requesting till where, which rolling stock is used). On the IM side, the times at the handover point are often just run through times. In any case, the times at handover provided by both of the IMs shall be the same. Therefore, some collaboration between the two involved IMs is required.

In order to have a fully joined up ‘Short-term Path Request’ process it could be considered that the harmonization phases between the respective parties (Applicant to Applicant under the leadership of the LeadRU, IM to IM) are included as relevant activities. These activities take place currently in planning and they are incorporated into the overall process. However, harmonization is not included in the regulations. Therefore, it has been made optional with a strong recommendation that RAs/IMs adopt them within their working practices.

13.1.3 Support Mechanism for Harmonization

A support mechanism that has the capability to support and maintain the Short-Term Path Request process as well as the information (messages) that the process produces helps in tracking and coordinating the different steps of a path request. Having such support not only helps to provide evidence of the message transactions that take place between the actors but also to provide benefits such as auditability, traceability and data recovery (in the case where information can be lost by sending/receiving systems). Having the planning information stored commonly will also help with management reporting and the ability to measure how the process is utilised by the different parties.

This common support mechanism is likely to be in the form of an IT system or tool, that is common to the usage of TAF/TAP and that will work in conjunction with the Actor systems. The tool will have to be fully compliant and could be adopted especially for the traffic

[7] However, Directive 2012/34 Article 40 requires IMs to cooperate which each other for the allocation of infrastructure capacity which refers to a harmonization process.

involving more than one network or being interoperable in any other kind. Interactions to this tool within the specific processes that make up Short Term Path Request process (e.g. Path Request, Path Alteration) is represented by the swim lanes “coordination” and “order tracking” within the process diagrams themselves, see Annex 12.1.

The technical analysis of such a tool has to be carried out by interested parties. This will involve working with different actors (RAs, IMs) in order to define the best way to interact.

The harmonization process also works when using a bilateral data exchange between two communicating parties[8] without a need of adopting the common support mechanism. The communication will use the same TAP and TAF standards.

13.2 Assumptions

13.2.1 The term “Short-Term Path Request” process denotes a number of different processes that range from Path Request, Path Cancellation, Path Modification/Alteration, Path Not Available and Path Utilisation Notification.

13.2.2 The Network Statement defines on each network when the Short-Term Path Request period is applicable before the running of a train.

13.2.3 As described Short Term Path Request processes, for ad hoc Planning, have been further extended to include Long-Term Planning processes for the Annual Timetable (working timetable). Where there is information in the Planning section that is applicable to both processes, only ad hoc Planning will be mentioned even though it could apply to Long-Term Planning as well. Where there is information that is only applicable to one process and not the other, it will be specifically mentioned which process it is applicable to.

13.2.4 The application of Short-Term Path Request is mandatory according to TAP and TAF. The application of the same messages for Annual Timetable/Long Term Planning is optional.

13.2.5 It is assumed that all activities described within the processes that are carried out by each IM are done so in accordance with their Network Statement.

13.2.6 Even if based on the fulfilment of TAF/TAP regulation, there might be the possibility that ‘Short-term Path Request’ processes will not be applied, and companies will be able to follow their national practices and regulations. This will be in the case of exceptional transport such as the planning of nuclear or military trains. This will have to be decided by the authorities that determine the national practices and regulations.

13.2.7 Activities of third parties (e.g. for shunting), acting on behalf of an RA or IM, have to be dealt by the responsible RA or IM who mandate the third party to handle the task(s). There will be no requirement for these third parties to be TAF/TAP compliant, this responsibility lies within the mandating company

13.2.8 Where there is a change of an RU in the operation, the responsible RA may use the resources (rolling stock/staff) of another company (e.g. RU). Responsibility and path ownership stay at the RA with the path contract. This

[8] The two communicating parties are sender and receiver of the messages. The bilateral exchange could involve all parties relevant for the harmonization. E.g. RU1 to IM1, IM2 to RU2 etc.

has no impact to the TAF and TAP apply both to interoperable traffic and domestic traffic.

13.2.9 In relation to this document the term IM refers to an IM or an Allocation Body (AB) that carries out the same function as an IM.

13.2.10 The term Path Section is used to describe a specific network section where there is an interoperable journey, however it also refers to a journey that is within one network.

13.2.11 If the IM is the owner of the transport (e.g. maintenance train) it will carry out the same role as an RA and all processes will then be applied as normal.

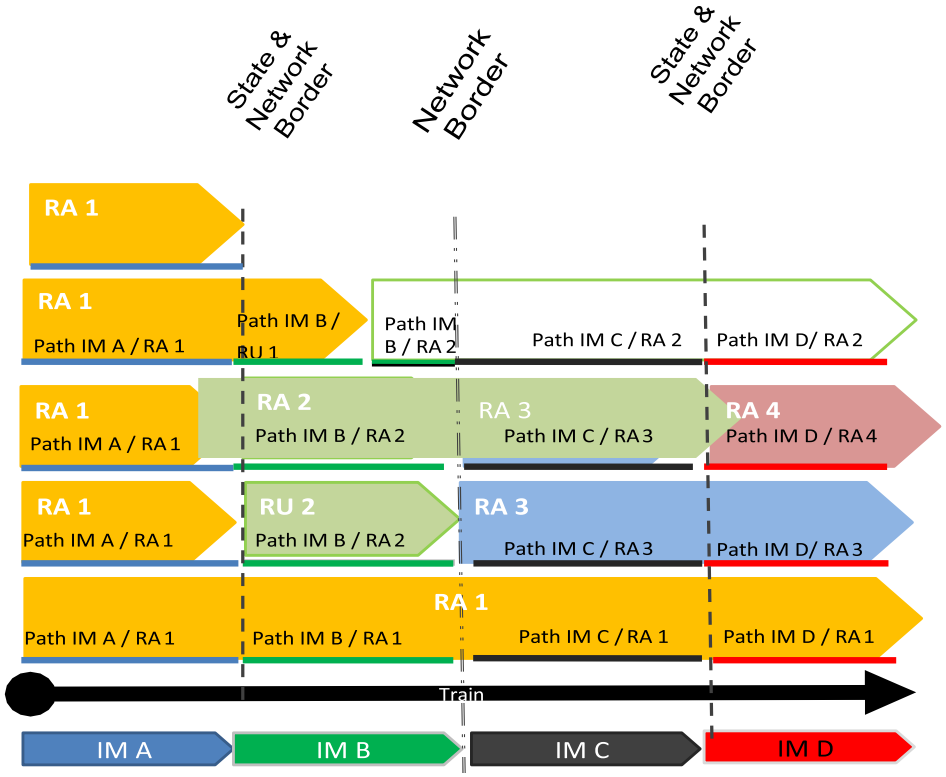
13.3 Explanation on the involvement of the RUs and IMs

The principle of TAP and TAF regulation are underpinned by the communication and collaborative relationship between an RA and the relevant IM. For interoperable business this usually involves more than one RA and/or IM involved during the different sections of the path request. However, for domestic business the relationship can be between one IM and one RA only as well.

The diagram demonstrates the different types of relationships that the processes will apply to.

13.4 Summary of the outputs

A list of the main content is shown in the following table.



Outputs Produced	Reference to Regulation / Comments
Business processes (diagrams and descriptions)	**Specific Section**
PATH REQUESTs	TAF 4.2.2 / TAP 4.2.17
Cooperation model "full harmonisation	Note that harmonization is not described in TAF
Cooperation model " partial harmonisation	
Open Access (single RU) "full harmonization by Ims	
Open Access (single RU) "partial harmonization by Ims	
Path requests via an OSS	
Path cancellation by RA "applicable to Cooperation and Open Access models	TAF 4.2.2 / TAP 4.2.17
Path alteration by IM	TAF 4.2.2 / TAP 4.2.17
Path Utilisation notification	Not enforced by the TSIs
Path modification by RA	TAF 4.2.2 / TAP 4.2.17
Annual timetable " Long Term Planning	Not enforced by the TSIs
Messages	**Reference or New**
Path Request	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Details	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Confirmed	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Details Refused	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Cancelled	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Not Available	TAF ANNEX D.2: APPENDIX F / TAP B.30
Receipt Confirmation	TAF ANNEX D.2: APPENDIX F / TAP B.30
Path Coordination	Not enforced by the TSIs
Path Section Notification	Not enforced by the TSIs: serves also for Path Utilization Notification
Error	TAF ANNEX D.2: APPENDIX F / TAP B.30

In addition to the messages and processes code lists have been developed to support the data exchange. See chapter 10.

13.5 Path Request processes

13.5.1 High Level Overview of the Process

The purpose of implementing TAF/TAP TSIs is to ensure an efficient and concrete exchange of information between IMs, Allocation Bodies, RAs and other service providers.

The information exchange is mainly bilateral between one RA and one IM and structured according to the processes presented in the following sections. The TAF/TAP messages sequence that needs to be produced overlays the process activities taking place.

The Path Request process (TAP BP 4.2.17, TAF 4.2.2) is composed of several different processes covering the different activities taking place during the planning phase. Key to the activities is the actual on time placement and the confirmation of the request itself (the offer back from the IM). However, once a path is booked other activities may take place such as the modification, alteration, cancellation and even the activation of the path (as applicable on some networks).

Process	Relevant for TAP and TAF	Outside of the TAF or TAP regulation (developed from best practices)
New Path Request and allocation process for annual timetable		X
Late Path Request and allocation process for annual timetable		X
Ad hoc path request and allocation process	X	
Rolling Planning path request and allocation process		X
Path Modification process (triggered by applicant)	X	
Path Cancellation by RA	X	
Path Alteration process (triggered by IM)	X	
Path Utilisation notification		X
Feasibility Study process		X
Pre-arranged Path publication by RFC		X
Catalogue Path publication by IM		X

The use of the TAF/TAP processes for Long-term Planning is a recommendation outside/in addition to both TSIs. It is a general agreement within the Sector to use TAF/TAP message/framework exchange for the Path Request processes for Long-term Planning.

TAF/TAP messages are used across different process types and the process type to which

these messages refer is valuable information for the recipients of the message. The following process types and corresponding code are available and shall be used:

- 0: New Path Request and allocation process for annual timetable
- 1: Late Path Request and allocation process for annual timetable
- 2: Ad hoc path request and allocation process
- 3: Rolling Planning path request and allocation process
- 4: Feasibility Study process
- 5: Path Modification process (triggered by applicant)
- 6: Path Alteration process (triggered by IM)
- 7: Pre-arranged Path published by RFC
- 8: Catalogue Path published by IM
- 10: Path Cancellation process
- 11: Path Utilisation notification process

The information about the applicable process type shall be included in the Process type element in the following planning messages:

- PathRequestMessage
- PathDetailsMessage
- PathCoordinationMessage
- PathConfirmedMessage
- PathDetailsRefusedMessage
- PathCanceledMessage
- PathNotAvailableMessage
- PathSectionNotificationMessage
- ObjectInfoMessage

In the following sections please find further explanation about the Path Request processes and the way they are intended to be used by IMs and RAs.

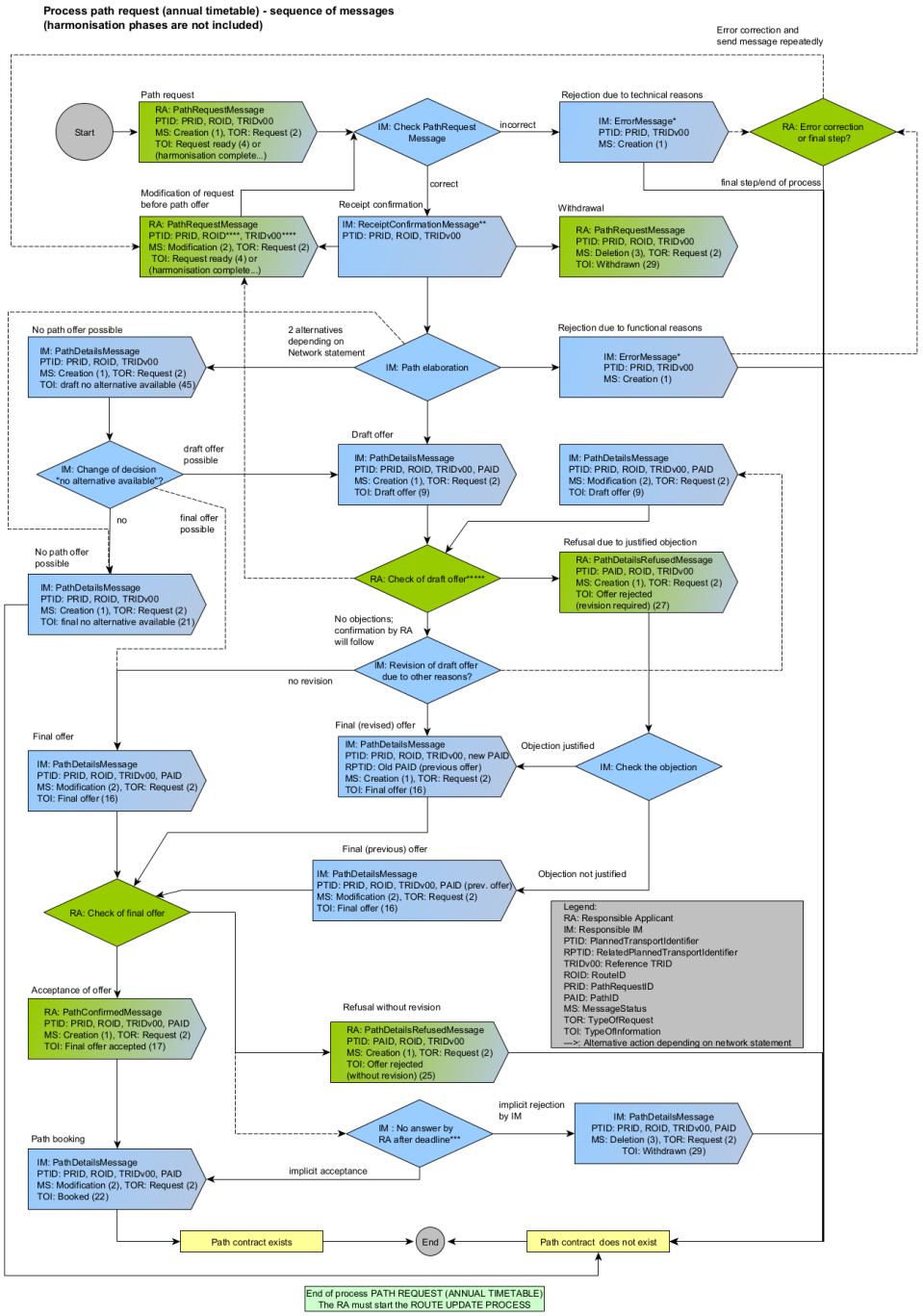
13.5.2 New Path Request and allocation process for annual timetable

The process is based on the steps and activities for the Long-term planning and starts with the RA placing a request for a Path Section representing either the entire journey of the train or only one section of its journey and the IM offers the corresponding path back. The RA accepts the offer and the path is booked by the IM. However, the RA may also withdraw the request, refuse the offer or the IM may not be able to answer the path request (e.g. due to technical or logical errors in the request).

When a full harmonization between RAs and/or IMs can be achieved, the harmonization shall be processed according to the process described in section 12.6 of this document. If a full harmonization cannot be achieved a partial harmonization shall be considered.

The different process activities and corresponding TAF/TAP TSI messages are described in the following sequence diagram. Messages part of this process shall contain “0” as value in the Process Type element and “2” as TypeOfRequestCode.

New Path Request and allocation process for annual timetable – Sequence of messages (harmonization phases are not included)



*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

***Note: Internal process step by IM; depending on network statement no message exchange with RA

****Note: In process type "request" It is allowed to change TRIDv00 or ROID in PathRequestMessage with MS = modification

*****Note: Depending on specific network statement it is allowed to send modification/deletion of PathRequestMessage by RA after receiving draft offer in observation phase.

13.5.3 Late Path Request and allocation process for annual timetable

The process is based on the steps and activities for the Long-term planning and starts with the RA placing a request after the path request submission deadline of the New Path Request process, for a Path Section representing either the entire journey of the train or only one section of its journey and the IM offers the path back. The RA can accept the offer and the path is booked by the IM. However, the RA may also withdraw the request, refuse the offer or the IM may not be able to answer the path request (e.g., due to technical or logical errors in the request).

When a full harmonization between RAs/IMs can be achieved, the harmonization shall process according to the process described in section 12.6 of this document. If a full harmonization cannot be achieved (e.g., due to a too short notice request), a partial harmonization shall be considered.

The different process activities and corresponding TAF/TAP TSI messages follow the same logic as for the New Path Request and allocation process for annual timetable and are described in the sequence diagram of section 12.5.1. Messages part of this process shall contain “1” as value in the Process type element and “2” as TypeOfRequestCode.

13.5.4 Ad hoc path request and allocation process

This subchapter also applies to the short-term ad hoc path request and allocation process. The distinction between an “Ad hoc path request” and a “Short-term ad hoc path request” is made based on the number of days between the reception of the path request by the IM and the first running day requested by the RA. If the first running day is less than 30 days from the path request submission, the path request shall be considered as an Ad hoc short-term path request.

The process is based on the steps and activities for Short Term planning and starts with the RA placing a request for a Path Section representing either the entire journey of the train or only one section of its journey and the IM offers the path back. The RA can accept the offer and the path is booked by the IM.

However, the RA may also withdraw the request, refuse the offer or the IM may not be able to answer the path request (e.g., due to technical or logical errors in the request).

When more than one RA or/and more than one IM are involved along the journey of the train, harmonisation between the involved RAs and/or IMs shall be targeted. If a full harmonisation can be achieved, the harmonisation shall process according to the process described in the following two paragraphs and in section 12.6 of this document. If a full harmonisation cannot be achieved (e.g., due to a too short notice request), a partial harmonisation may be selected by the Lead RA or offered by the IM.

The different process activities and corresponding TAF/TAP TSI messages are described in the following sequence diagram. Messages part of this process shall contain “2” as value in the Process type element and “2” as TypeOfRequestCode.

Ad hoc path request and allocation process – Full Harmonization

This process is based on the steps and activities for ad hoc planning.

All path sections must be harmonised and agreed between the involved RAs before placing the path request and between all involved IMs before submitting the offer back to the RAs.

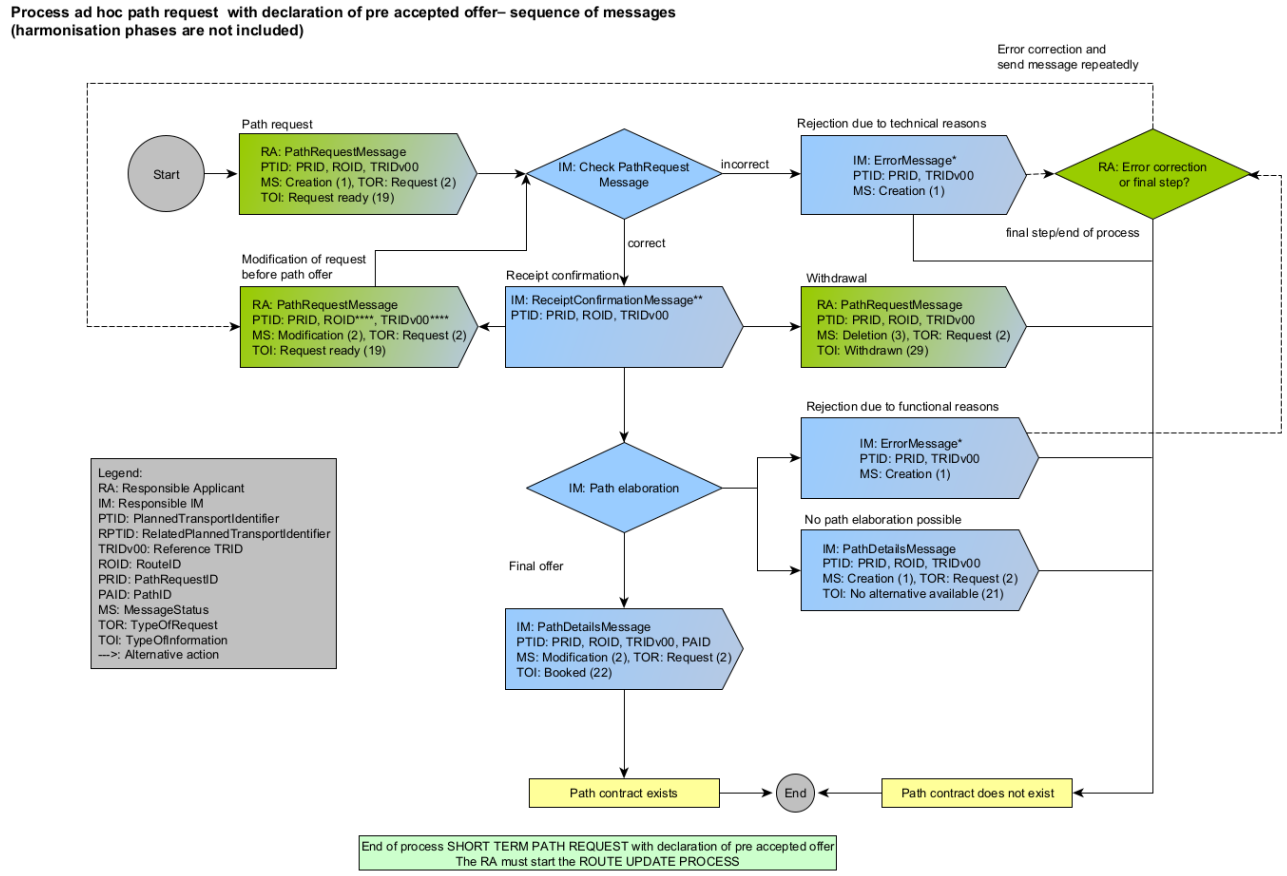
The process starts with the RA placing a request for a Path Section representing either the entire journey of the train or only one section of its journey and the IM offers the corresponding path. The RA can accept the offer and the path is booked by the IM. However, the RA may also withdraw the request, refuse the offer or the IM may not be able to answer the path request (e.g., due to technical or logical errors in the request).

Ad hoc path request and allocation process – Partial harmonisation

This process is based on the steps and activities for Short Term planning for Full Harmonisation and applicable when selected by the Lead RA, the Coordinating IM or by default the first IM in the train's journey if all path sections cannot be harmonised between the involved RAs or IMs.

A partial harmonisation may be required for short-term path requests where the time between the path request placement and the train departure is too short, and it is not possible to harmonise the path request and/or path details.

Ad hoc path request and allocation process with declaration of pre-accepted offer – Sequence of messages (harmonisation phases are not included)

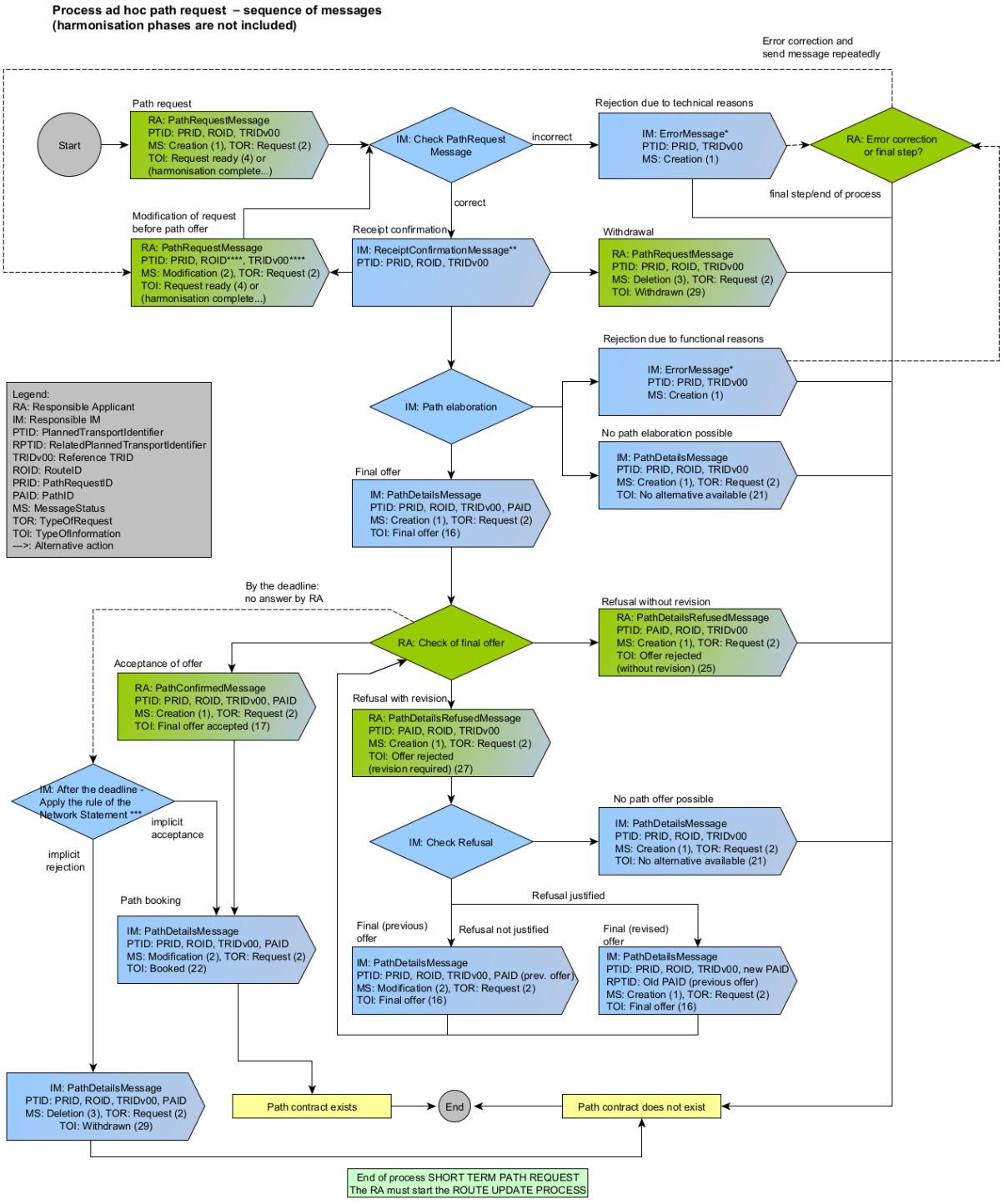


*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

****Note: In process type "request" it is allowed to change TRIDv00 or ROID in PathRequestMessage with MS = modification - Means the message replaces previous PRM

Ad hoc path request and allocation process - Sequence of messages (harmonisation phases are not included)



*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

***Note: Internal process step by IM; depending on network statement no message exchange with RA

****Note: In process type "request" it is allowed to change TRIDv00 or ROID in PathRequestMessage with MS = modification

13.5.5 Rolling Planning path request and allocation process

The process is based on the steps and activities for the Long-Term planning is identical to the New Path Request Process. It applies to requests with calendars over more than one timetable period. The process starts with the RA placing a request for a Path Section

representing either the entire journey of the train or only one section of its journey and the IM offers the path back. The RA accepts the offer and the path is booked by the IM. However, the RA may also withdraw the request, refuse the offer or the IM may not be able to answer the path request (e.g., due to technical or logical errors in the request).

When a full harmonisation between RAs and/or IMs can be achieved, the harmonisation shall process according to the process described in section 12.6 of this document. If a full harmonisation cannot be achieved (e.g., due to a too short notice request), a partial harmonisation shall be considered.

The different process activities and corresponding TAF/TAP TSI messages follow the same logic as for the New Path Request and allocation process for annual timetable and are described in the sequence diagram of section 12.5.3. Messages part of this process shall contain “3” as value in the Process type element and “2” as TypeOfRequestCode.

13.5.6 Feasibility Study process

This process applies to paths in the Long-term planning. The goal of the Feasibility Study Process is a support to the RA from the IMs while setting up a path request in anticipation of placing the actual request. It allows the RA to get timings for its intended train service to be used in its planning before placing a path request. The Feasibility Study Process makes make a significant contribution to the efficiency of the path allocation process for the annual timetable. These studies allow applicants’ service plans to be checked for feasibility and, as necessary, taken through into the next stages of the planning process. It is used mainly in the working timetable but can also be applied for the running timetable. No separate process description has been considered because the process is identical to the path request process, except that the path is not booked by the IM.

The IM answers a Feasibility Study request before the timetable starts and is never binding. If the Feasibility Study had been placed within the running timetable, the legal status of an IM’s answer depends on the company/national rules.

The Feasibility Study process comes in addition to TAF/TAP TSI. It follows best practice from the sector and can be used with the TAP/TAF TSI standards although it is not mandated by TAP/TAP TSI.

Messages part of this process shall contain “4” as value in the Process type element and “1” as TypeOfRequestCode.

13.5.7 Path Modification process (triggered by applicant)

The process applies to paths in the Long-term and ad hoc planning and based on an existing path agreement, the RA intends to change some elements of the train that could impact the path details after it has been booked. A modification can be done for one day, several or all remaining booked days and the modifications that need to be communicated are described in the Network Statement and could be for example be:

- Change of engine type with same performance
- Reduction in the train length/weight

- Operational stop changes to technical stop

If a Path Modification has a strong impact on the path, the IM can reject the modification. The RA needs to cancel the allocated path (fully or partially) and to place a new request. This will lead to a new path request where the IM will send first a draft offer after the path elaboration.

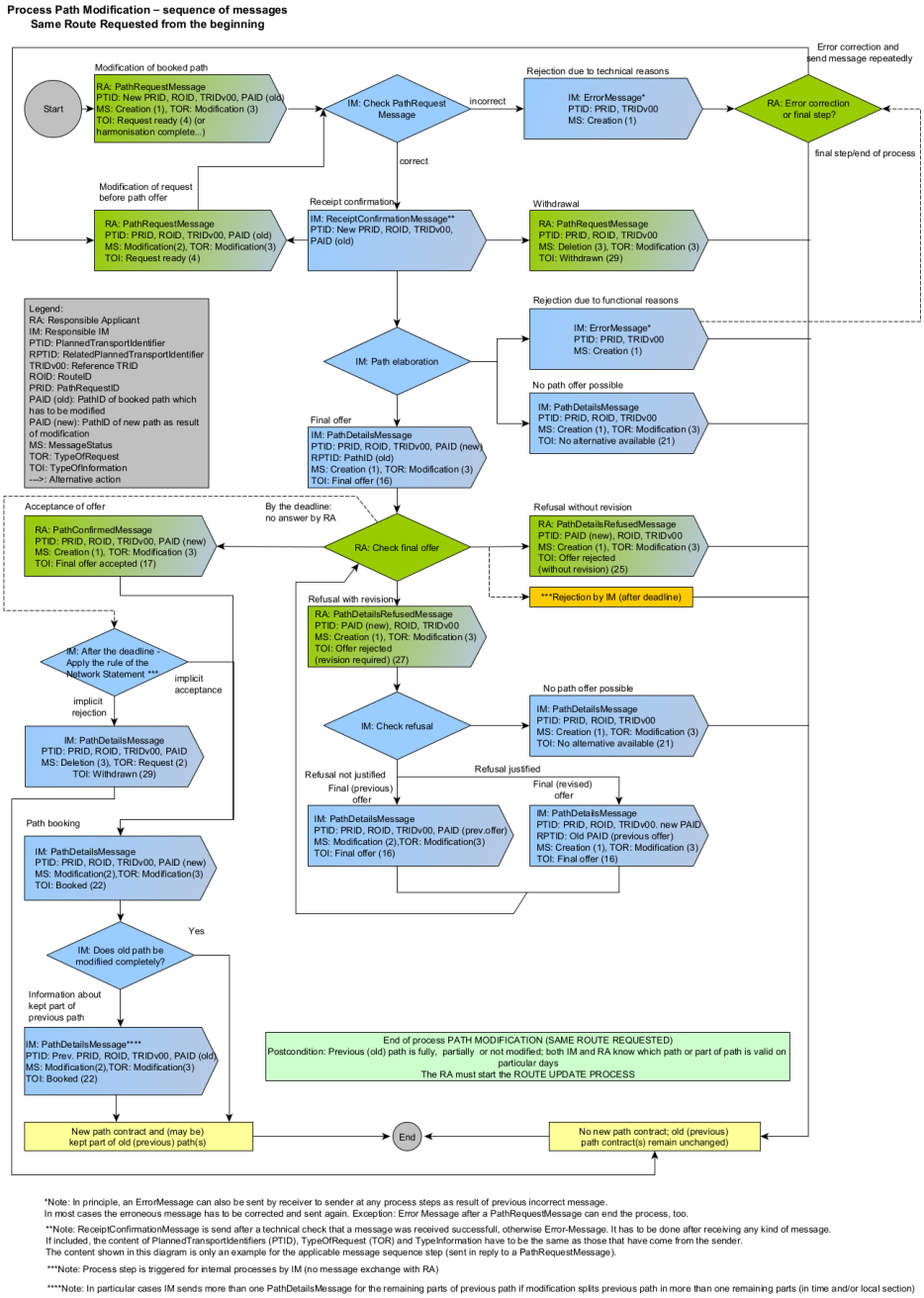
Two processes are available:

- If the requested path to modify a booked path after RU harmonisation (before sending the path request) keeps the same Route (same origin, handover, destination), ROID is unchanged.
- If the requested path to modify a booked path after RU harmonisation (before sending the path request) leads to a new Route (e.g., if origin is modified by RU), the Route must be modified with a new ROID (usually new variant) by Lead RU.

The different process activities and corresponding TAF/TAP TSI messages are described in the following sequence diagram.

Messages part of this process shall contain “5” as value in the Process type element and “3” as TypeOfRequestCode.

Path Modification process (triggered by applicant) – Sequence of messages (harmonisation phases are not included) – Same Route requested



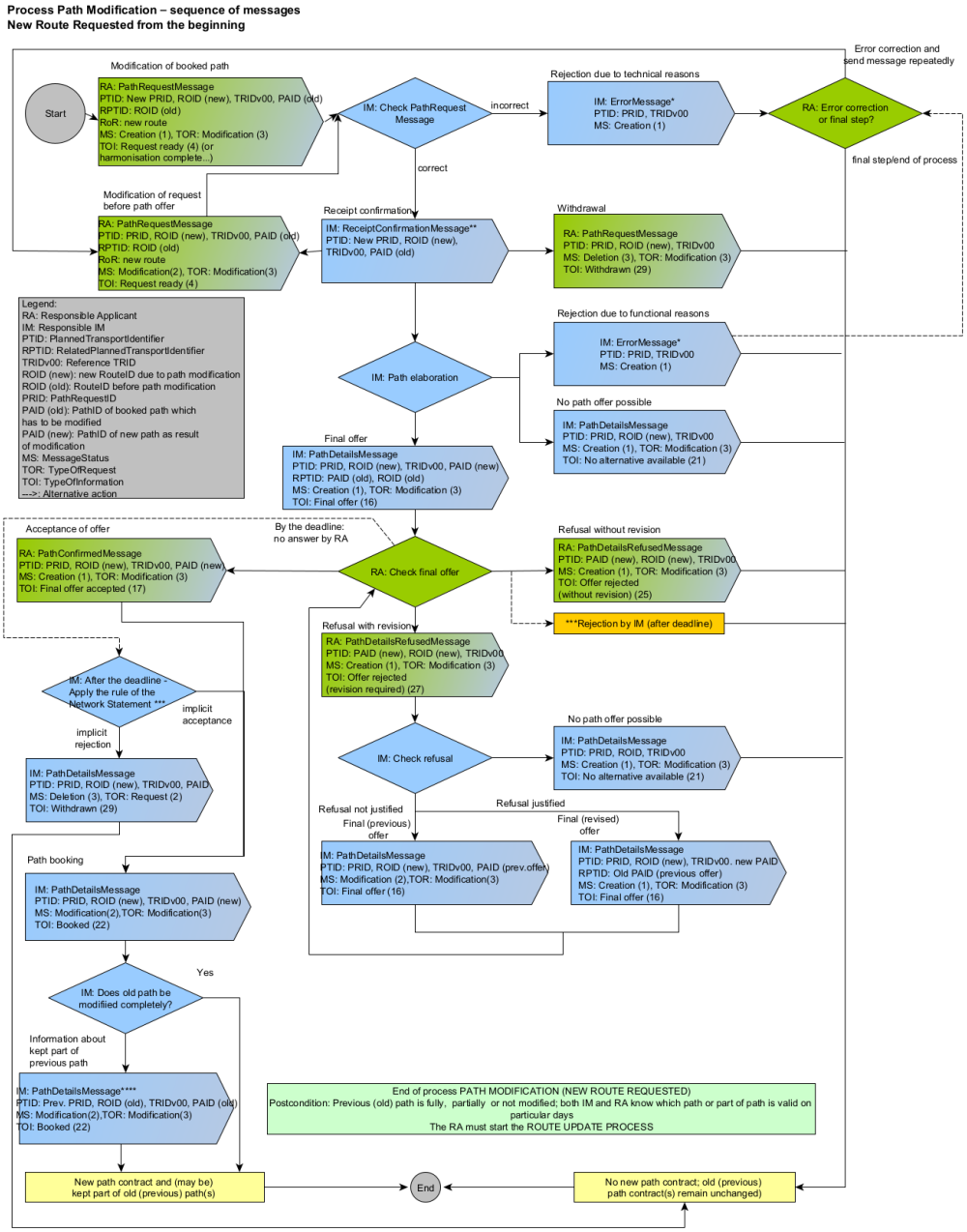
*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

***Note: Process step is triggered for internal processes by IM (no message exchange with RA)

****Note: In particular cases IM sends more than one PathDetailsMessage for the remaining parts of previous path if modification splits previous path in more than one remaining parts (in time and/or local section)

Path Modification process (triggered by applicant) – Sequence of messages (harmonisation phases are not included) – New Route requested



*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

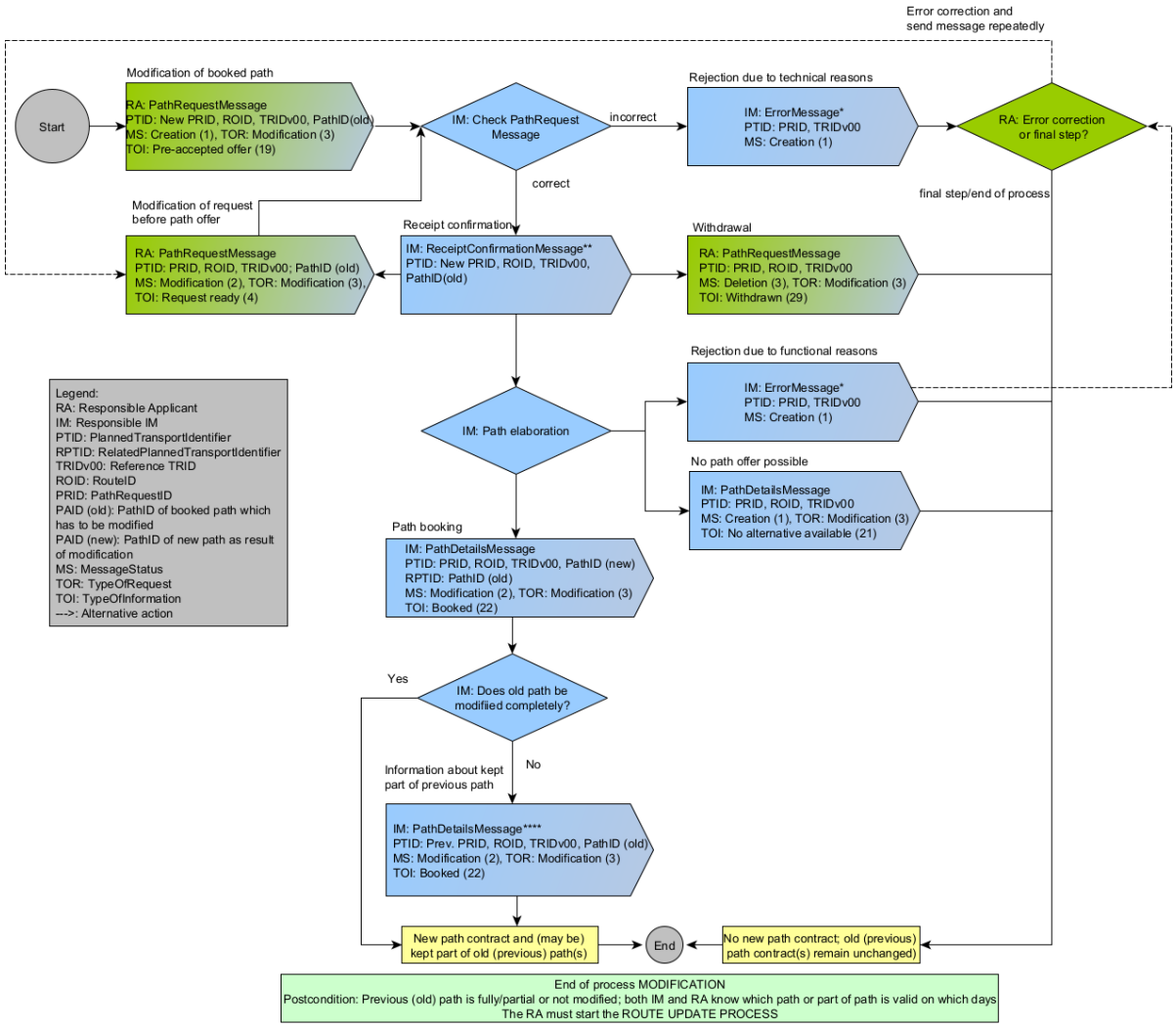
**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

***Note: Process step is triggered for internal processes by IM (no message exchange with RA)

****Note: In particular cases IM sends more than one PathDetailsMessage for the remaining parts of previous path if modification splits previous path in more than one remaining parts (in time and/or local section)

Path Modification process (triggered by applicant) with declaration of pre-accepted offer – Sequence of messages (harmonisation phases are not included) – Same Route requested

Process path modification with declaration of pre accepted offer (same route requested) – sequence of messages (harmonisation phases are not included)

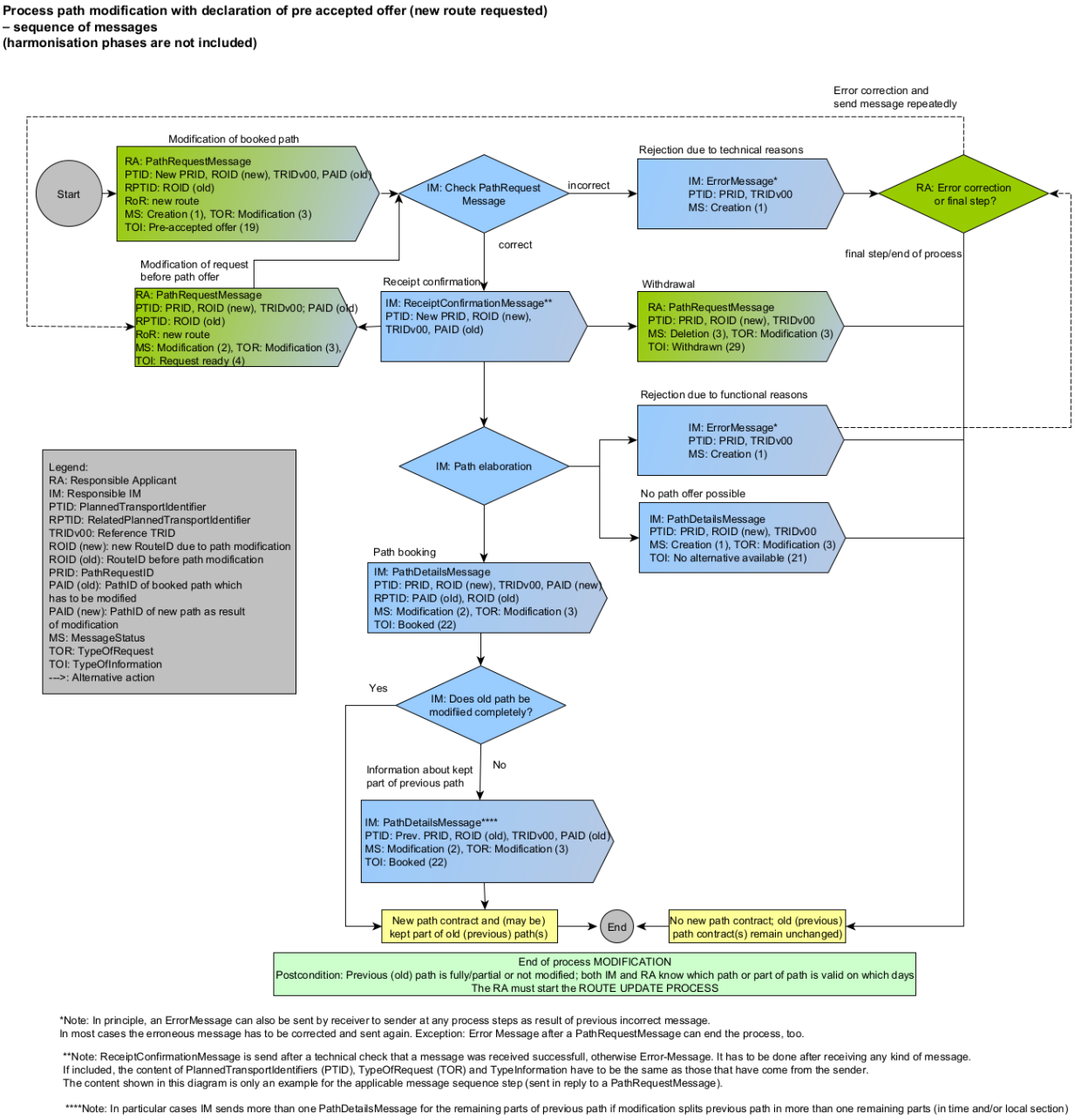


*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

****Note: In particular cases IM sends more than one PathDetailsMessage for the remaining parts of previous path if modification splits previous path in more than one remaining parts (in time and/or local section)

Path Modification process (triggered by applicant) with declaration of pre-accepted offer – Sequence of messages (harmonisation phases are not included) – New Route requested



*Note: In principle, an ErrorMessage can also be sent by receiver to sender at any process steps as result of previous incorrect message.
In most cases the erroneous message has to be corrected and sent again. Exception: Error Message after a PathRequestMessage can end the process, too.

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kind of message.
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

****Note: In particular cases IM sends more than one PathDetailsMessage for the remaining parts of previous path if modification splits previous path in more than one remaining parts (in time and/or local section)

13.5.8 Path alteration process (triggered by IM)

The process applies to paths in Long-term and ad hoc planning processes and based on an existing path agreement, the RA can expect that a booked path is available up to its operation. However, if an event occurs (e.g. disruption to the path) between the booking of the path and the train's departure and the booked path from either the long-term or ad hoc planning is no longer available, the IM must inform the RA as soon as the information about the disruption is available and provide the cause of the disruption (e.g., an interruption on the path). The IM is obliged to send an alternative proposal together with the indication that the booked path is no longer available. However, an alternative path is not always available, therefore prompt information to the RA is required.

Particular cases like the interruption of the path in the middle of the train's journey must be handled separately. The general rule agreed by the sector is, when possible, to avoid the situation of a path interruption in the middle of the train journey. If it cannot be avoided, the handling of such a case needs to be started immediately after the information about the disruption is available between the partners and the following possibilities need to be considered:

- An alternative is immediately provided by the IM on whose territory the interruption happens, all other paths (and/or path sections) remain booked No possibility to provide an alternative for the interrupted section: all other paths (and/or path sections) remain booked and used by RA (example of 3 IMs in 3 countries: the second IM has an interruption, but the RAs keep using the paths in IM1 and IM3 territories). In such a case, the "Train split" consequences for the RA (significant change on the train object) must be considered.
- The whole path is cancelled by the RA and a request of a new one is sent, depending on the commercial conditions between IMs and RA.

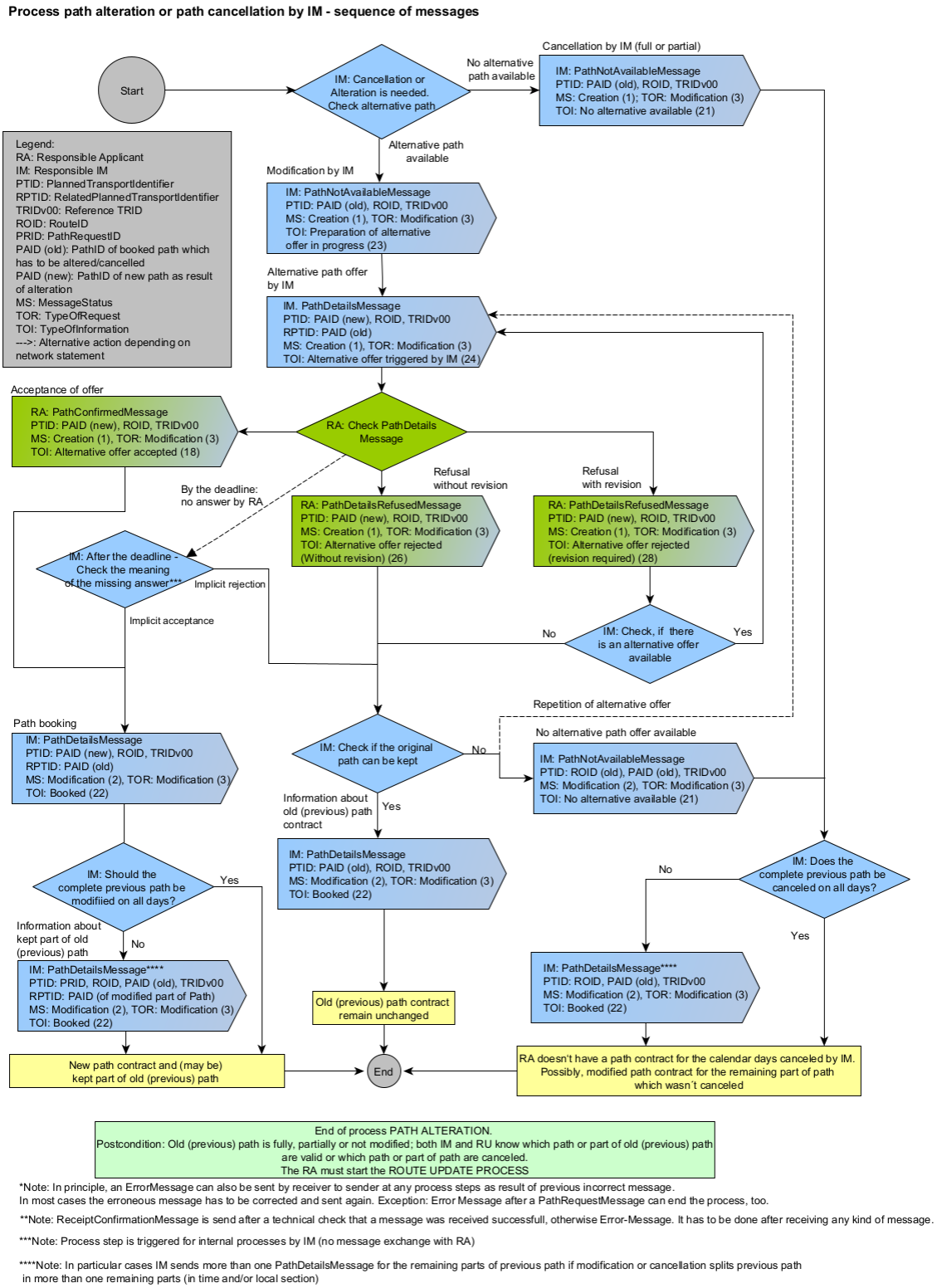
The non-availability is announced by the IMs for the whole path and a coordinated alternative is provided The path alteration may refer to one single day, several days or all remaining days. It is also possible to alter the whole path section or just a part of it.

The Path Alteration process is also used in a simplified manner for the Route Update process, see section 12.8.9.

Messages sent as part of the Path Modification process shall have "6" as code in the Process type element and "3" as TypeOfRequestCode.

The different process activities and corresponding TAF/TAP TSI messages are described in the following sequence diagram.

Path Alteration process (triggered by IM) – Sequence of messages



When no alternative is available, the Path Not Available message will carry the corresponding type of information (21) which should indicate that an alternative is not possible. In all other cases, the IM will send Path Not Available message with type of information 23 (preparation of alternative offer in progress) and then send the Path Details

message containing the alternative offer. After receiving and accepting the alternative offer LeadRU/RA must start the process for updating the route if needed.

13.5.9 Pre-arranged Path publication by RFC

The process concerns the publication of pre-arranged paths by RFCs (Rail Freight Corridors) for the Long-Term planning. The different process activities and corresponding TAF/TAP TSI messages are still to be defined.
Messages part this process shall contain “7” as value in the Process type element and “2” as TypeOfRequestCode.

13.5.10 Catalogue Path publication by IM

The process concerns the publication of catalogue paths by IMs for the Long-Term planning. The different process activities and corresponding TAF/TAP TSI messages are still to be defined.
Messages part this process shall contain “8” as value in the Process type element and “2” as TypeOfRequestCode.

13.5.11 Path cancellation by RA

The process applies to paths in the Long-term and ad hoc planning.

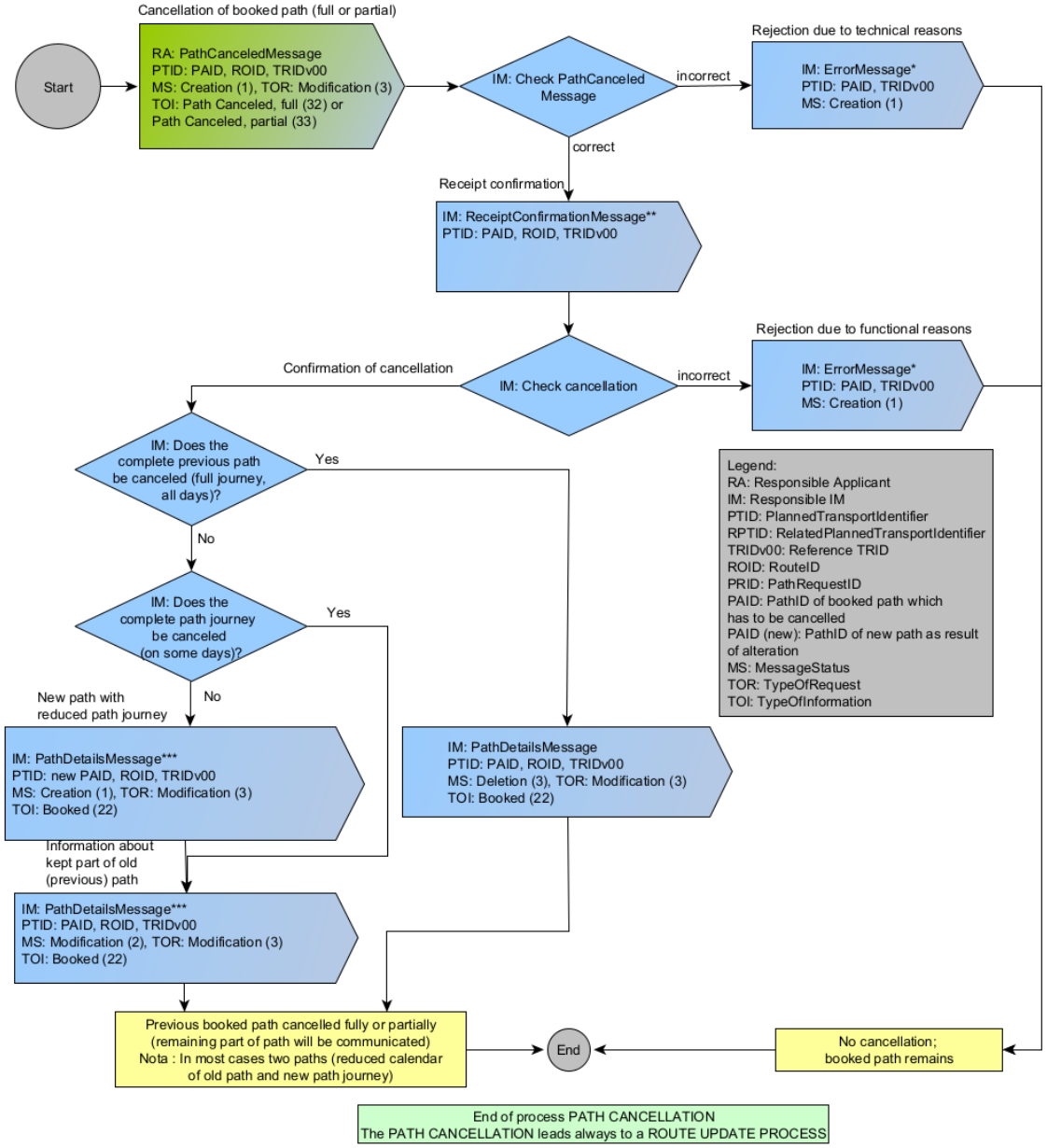
The RA must always have the possibility to cancel a booked path. This path cancellation may refer to one single day, several, or all remaining days. It is also possible to cancel the whole journey (all the path sections) or just one or more partial sections of the traffic (one path section).

However, in cases of several path sections with different involved RAs, it may even be possible that one of the involved RAs keeps its booked path section and reuse it for another train. By doing so, the path modification process shall be applied instead for the RA that still wishes to use the path section for other trains. Partial cancellation is not recommended without harmonization with partner RAs and IMs in order not to destroy the path.

Messages part this process shall contain “10” as value in the Process type element and “3” as TypeOfRequestCode.

Process path cancellation – sequence of messages (harmonisation phases are not included) – Case where there remains at least one (full or partly) path attached to the initial Route, that leads to create a new RouteID by LeadRU/RA after receiving PathDetailsMessage with new path with reduced journey.

Process path cancellation – sequence of messages
Case where there remains at least one (full or partly) path attached to the initial Route
(harmonisation phases are not included)



*Note: In principle, an ErrorMessage can also be sent at any process steps, as a result of incorrect message received before by receiver (RA or IM)

**Note: ReceiptConfirmationMessage is send after a technical check that a message was received successfull, otherwise Error-Message. It has to be done after receiving any kinc
If included, the content of PlannedTransportIdentifiers (PTID), TypeOfRequest (TOR) and TypeInformation have to be the same as those that have come from the sender.
The content shown in this diagram is only an example for the applicable message sequence step (sent in reply to a PathRequestMessage).

***Note: In particular cases IM sends more than one PathDetailsMessage for the remaining parts of previous path if cancellation splits previous path in more than one remaining parts (in time and/or local section)

13.5.12 Process Path Utilisation Notification by RA

This process applies to both paths in the Annual Timetable and those booked using the ad hoc planning process.

In some networks it is possible to pre-book a path and it is called an “on demand path”. The capacity has been allocated to an RA who has to inform the IM in due time and prior to the operation on the utilisation of this path, meaning that the train should then be run operationally. This type of practice between RA and IM is mainly used in cases where an RA has regular transport needs but does not know when to make the path request e.g. due to fluctuations in business. All of the path information (e.g. period, origin location, route etc..) is built up in the “on demand path” and is treated in exactly the same way by the IM whereby a path is offered and subsequently booked.

Messages part this process shall contain “11” as value in the Process type element and “2” as TypeOfRequestCode.

13.5.13 Handling of Pre-arranged Paths published by Rail Freight Corridors

13.5.13.1 Specific terms

- Corridor OSS (C-OSS): a joint body designated or set up by the RFC organisations for Applicants to request and to receive answers, in a single place and in a single operation, regarding infrastructure capacity for freight trains crossing at least one border along the freight Corridor (EU Regulation No 913/2010, Article 13).
- Rail Freight Corridor (RFC): a Corridor organised and set up in accordance with EU Regulation 913/2010
- Pre-arranged Path (PaP): a pre-constructed path on a Rail Freight Corridor according to the Regulation 913/2010. A PaP may be offered either on a whole RFC or on sections of the RFC forming an international path request crossing one or more international borders.

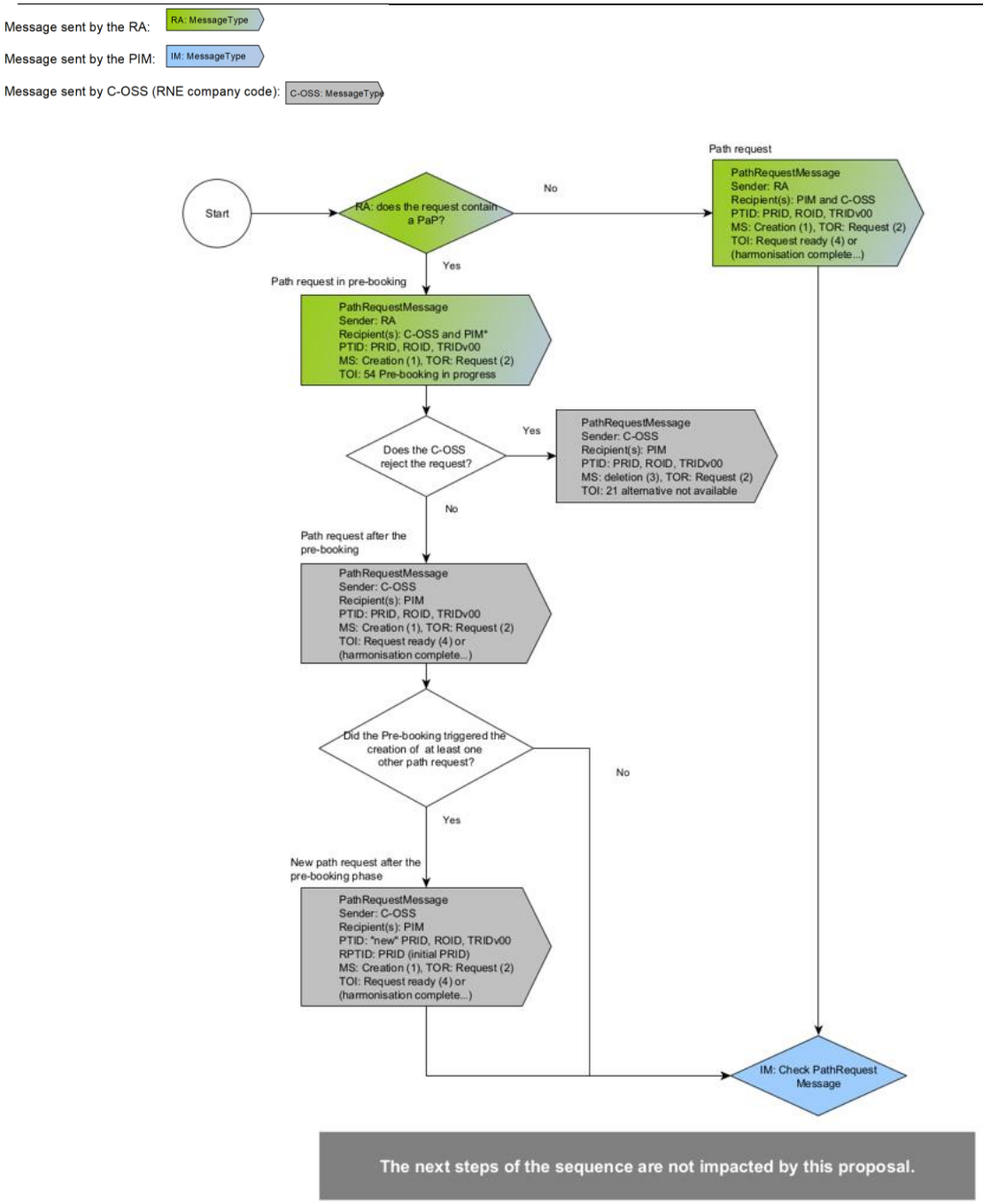
13.5.13.2 Path Request processes

The path requests containing planned journey locations part of a PaP are handled via one of the existing path request processes and not via a specific and separated process. The only difference is the additional process step “Pre-booking”. The RA submits the request to the C-OSS and the IM: the request arrives in the Pre-booking phase. The C-OSS checks it and either reserves the requested PaP, offers an alternative PaP, or if the offered alternative PaP is rejected or if there is no alternative available, the PaP locations are converted into tailor-made locations. The IM also receives the request, however, since it may be modified during the Pre-booking step, it is only for information.

At the end of the Pre-booking phase, the path request (updated if applicable) is forwarded to the IM and the path offer construction can start.

If a new path request is created as a result of the Pre-booking phase, the request is also forwarded by the C-OSS to the IM. Example: the requested PaP can be reserved but not for the entire requested calendar. Another path request with tailor-made locations with the calendar that cannot be reserved as part of the requested PaP is then created.

Additional path request process steps if a request contains at least one Pre-Arranged Path.



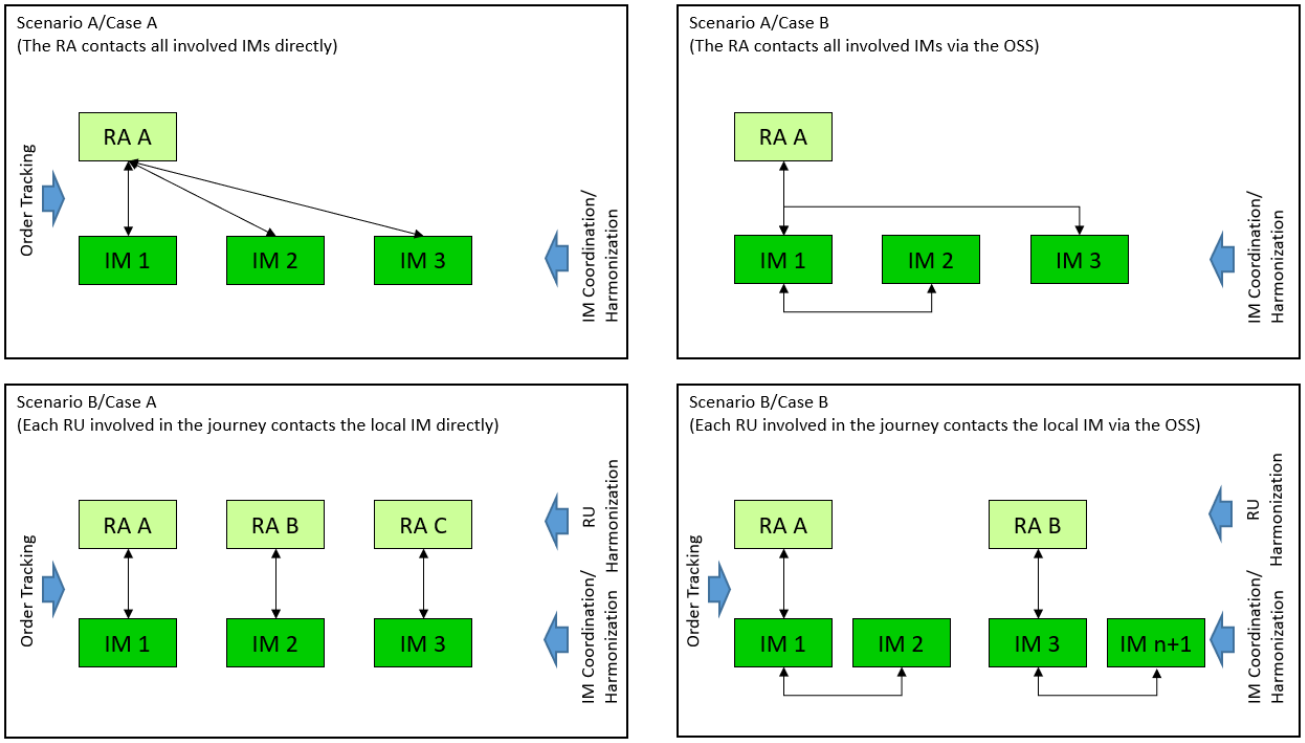
13.5.13.3 Information about locations part of a Pre-arranged Path published by a Rail Freight Corridor

The element RFCPaP at the planned journey location level contains the ID of the PaP to which the planned journey location belongs and based on which specific information (e.g., times modification)

about the location and the PaP can be retrieved.

13.6 Path Request Scenarios

Several path request scenarios between the RAs (s) and the IM(s) for interoperable passenger/freight traffic are available. Some of them are presented below:



Scenario A (case A and B) adheres to the Open Access business model whereby there is only one RA, but several IMs are involved throughout the journey. Scenario B (case A and B) adheres to the Cooperation business model whereby more than one RA and IM are involved throughout the journey. These models are documented in the TAF Regulation 4.2.2.1. The above-listed scenarios do not represent an exhaustive list and a combination of these scenarios is also possible.

The need for coordination and harmonization is also shown on the above diagram For domestic traffic (applicable to the TAP regulation) where only one RA and IM are involved,the scenario is very straightforward. A bilateral communication between the parties takes place which can be consideredas as a sub-scenario of scenario A case A. However, in other scenarios/cases coordination and harmonisation may be required:

- Scenario A covers the process where the RA contacts all the IMs involved. This can also be carried out without harmonization (e.g. via a central tool or in bilateral data exchange) between the different IMs. According to chapter 4.2.2.1 of TAF scenario A) defined in the following process, the RA contacts all involved IMs directly or via the OSS to organise the paths for the complete journey.
- Scenario B covers the process where each RA involved in the train's journey contact the local IM directly. Coordination and harmonisation between RAs and

IMs are required.

13.7 The need for Full and Partial Harmonization

13.7.1 Full Harmonization

When a short-term path request for trains (either passenger or freight) running across more than one network is placed in sufficient time ahead of the operation, the IMs will be able to deliver **full harmonisation** for the path details for all the sections that comprise the whole journey. Full harmonisation means the complete journey of the train, including all path sections, has been fully validated by the involved IMs and all times are confirmed, especially the times at handover locations where the train runs moves one territory to the next one.

13.7.2 Partial Harmonization

If RAs are not able to coordinate a path request, (e.g., due to insufficient resources for the request because of the short notice) the Lead RU or the RA at the beginning of the train's journey may place a partially harmonised path request. In this case, the first IM/RA pair can start working on the request and the next IM/RA pair(s) along the train's journey will follow as soon as the request is ready for their path section. The request is handled more sequentially, and it is not necessary that all the latter sections have confirmed before that train sets off across its journey. This is called **partial harmonisation**.

If a path request is placed at too short notice or if the complexity of the path request requires more time than anticipated (according to the deadlines set in national agreements or in their Network Statements), the IMs may not be able to coordinate all the sections for the whole journey. In this situation the RA(s) will receive Path Details from the IMs where the coordination with the previous/following IM is harmonized.

There are separate path request processes for the two types of harmonisations. By default, the aim of harmonisation is to achieve a full harmonisation of the journey (all path sections), as represented in the messages (Path Request and Path Details) with the elements "Type of RA Harmonisation" and "Type of IM Harmonisation". If this is the case the Lead RA or Coordinating IM sets the Type of Harmonisation to Full. However, in some cases, a path request starts with the aim of carrying out a fully harmonised process and it may be necessary, for any reason, to switch from a full to a partial harmonisation process:

- If the Lead RA realises that it will not be possible to harmonise the path request with all other involved RUs in due time (e.g., RA at the end of the journey has not clarified the appropriate need for resources), the Lead RA shall have the possibility to change the element "Type of RA Harmonisation*"* in the message Path Request from "full" to "partial".
- If IMs are not able to send harmonised path details to the RA (in case of an Open Access request) or to all involved RAs (cooperation model) in due time, for example when there is insufficient time between placing a request involving several networks and the foreseen departure time at the origin of the train. The Coordinating IM or by default the first IM in the train's journey shall have the possibility to change the element "Type of IM Harmonisation" in the message Path Details from "full" to "partial".

13.8 Update of the object Route

The IM needs to be informed of a Route modification as the Route information is used by e.g. for support of direct manual communication, for information exchange with smaller RUs or IMs (or third parties) which don't fully implement TAF/TAP TSI messages and for timely preparation of several publication documents.

The object Route can be modified by the LeadRU :

- in path modification process if a new Route is requested (PathRequestMessage used for modification) ;
- in case of cancellation when the cancellation leads to a reduced route and the cancelled section includes the previous origin or destination (PathCanceledMessage).

The object Route has also be modified after an event triggered by the IM :

- in the path allocation process when a new Route (derived by agregation of the modified and booked paths) is different of the previous one (PathDetailsMessage in initial path request process or in path modification process) ;
- in case of alteration when the altered path includes the origin or destination of previous route and the alternative path doesn't allocate the same origin or destination (PathNotAvailableMessage and PathDetailsMessage for the alternative path).

Therefore, as indicated at the end of each process described above, if the process leads to a Route Modification when the updated booked paths are aggregated, the ROUTE UPDATE PROCESS is performed to inform all RUs and IMs of the new Route, even if their paths are unchanged.

This section is focused on the Route Update process during the Planning phase. Specific operational processes for Route Update are performed in operation and are not described here.

i) Main principles of the Route Update process

- The Route Update process is performed just at the end of path initial allocation, modification, alteration, cancellation.
- If the Route is updated by the LRU it has to inform all stakeholders of the new and/or updated Route by sending OIM.
- The link between the Path and the new/updated Route is performed by each stakeholder in its IT system.
- At the end of the Route Update process a Path can be linked to several Routes.
- On a network level and according to the Network Statement or according to an agreement between the parties a path can be linked only to one route object. In that case the path is split by the IM via the Path Alteration process in two paths with unchanged content but both with modified calendars depending on route calendars and linked to the initial Route with shortened calendar and to the new

Route.

ii) Overview of the Route Update process

When the paths are booked, each RA/RRU sends to the LRU the booked Paths via the PathCoordinationMessage.

The LRU checks the booked Paths to asses if should be created or updated :

- The objects Train inside the RU world (e.g. paths with variants due to different timings lead to new objects Train) [the related process is not described in this section] ;
- The object Route (if Origin, Handover or Destination has changed, or if the calendar has changed).

If the object Route is unchanged, no update is needed.

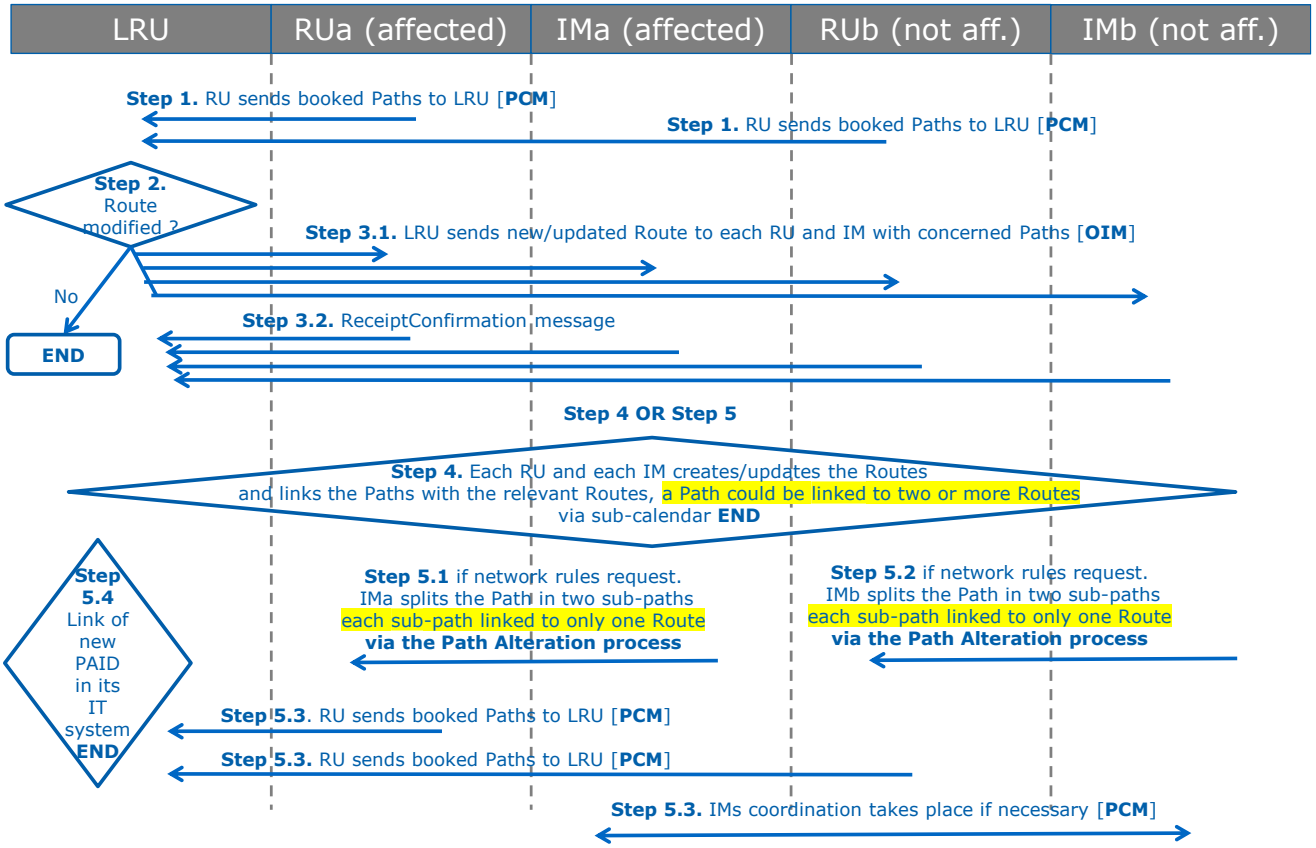
If the object Route has a shortened calendar (due to lack of capacity some days), the LRU decides either to shorten the initial Route calendar (recommended) or to let the calendar unchanged (so long no other Route is requested for the 'available days') [see also section 12.15.5] :

- To shorten the calendar of the initial Route the LRU sends the update Route via the ObjectInfoMessage to all involved actors (RUs, IMs) to update the object Route (shortened calendar) in their IT system. The links between updated Route and booked Paths are unchanged.

If the object Route has, for the complete calendar or for a partial calendar, different Origin or Handover or Destination, or if the calendar is changed due to midnight shifting :

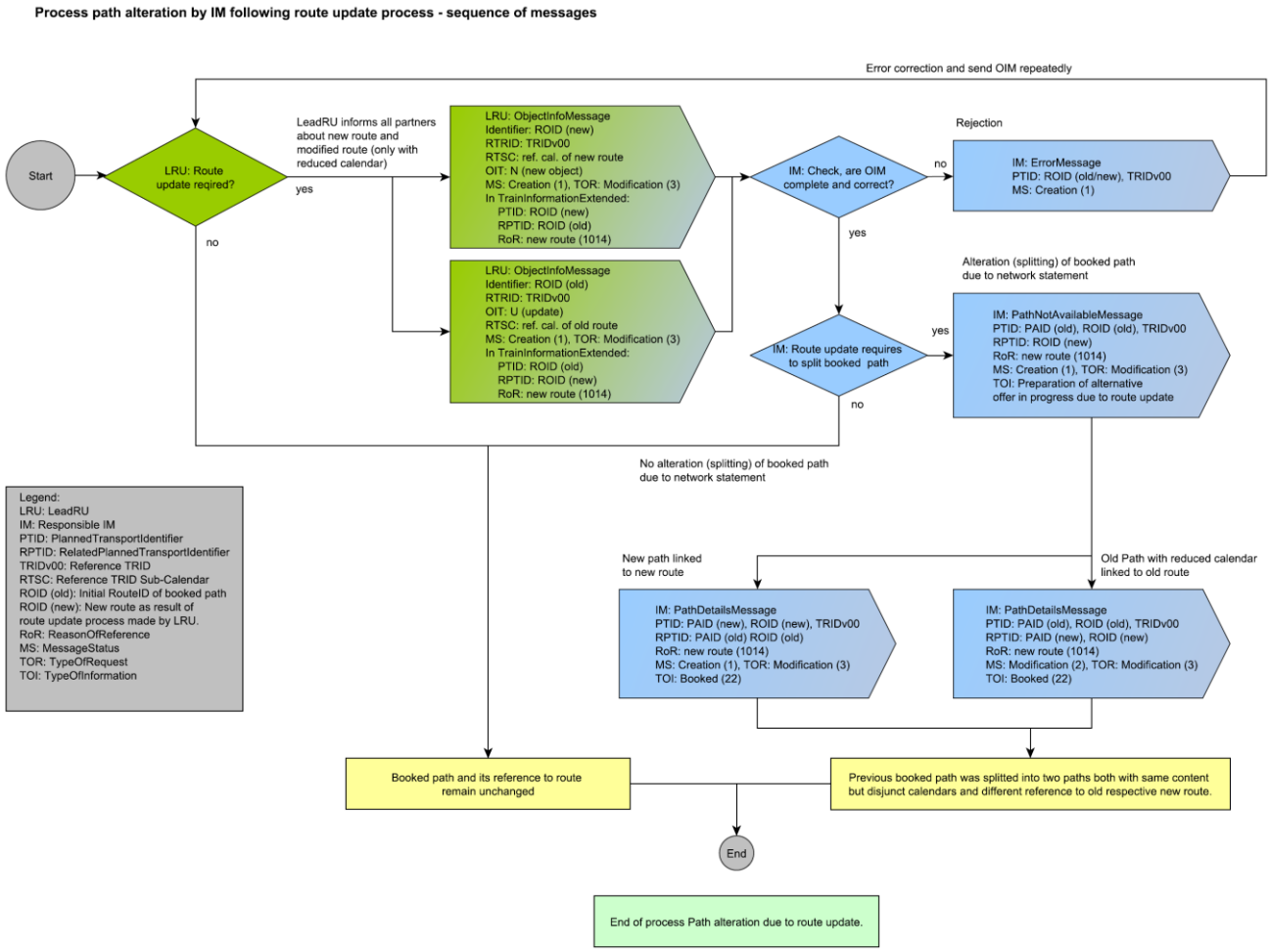
- The LRU sends the updated Route (shortened calendar) and the new Route (with new origin, handover, destination, calendar) by using ObjectInfoMessage to all involved actors (RUs, IMs) to update the object Route (shortened calendar) in their IT system.
- After this update the same Path (same PAID) can be linked to two Routes via sub-calendars.
- If it is allowed by the network rules, the route update process ends.
- If it is not allowed by the network rules, the Path Alteration process is performed by the concerned IM :
  - Cancellation of the Path to be linked to the new Route for the concerned calendar ;
  - Allocation of a new Path (new PAID) with the same characteristics than the cancelled one for the concerned calendar ;
  - Update of the initial Path with the remaining calendar.
- After Path Alteration process the RA/RRU sends the new Path (new PAID) and the remaining Path (same PAID with shortened calendar) to the LRU.
- Nota : the Path Alteration process described in section 12.8.5 includes the Route Update process.

The picture hereafter summarizes the Route Update process :



The logigramme hereafter described the simplified process for Path Alteration used in steps 5.1 and 5.2.

Process path alteration by IM following Route update process - sequence of messages



13.9 Train Identifiers

13.9.1 Identification of the train

With the full implementation of TAP and TAF the messages used in the Path Request will need to follow the Train Identification convention that will be applied as mandatory. It is a composite set of identifiers exchanged between LRU/RA/RRU andIM that uses the following:

13.9.1.1 Reference Train ID (TRIDv00). A unique ID provided by the LeadRU/RA that stays with train throughout the different planning activities and beyond into Operation. The link between Route ID, Path ID and Reference Train ID is confirmed/fixed with the Path Confirmation Message.

13.9.1.2 Route ID. A unique ID provided by the LeadRU/RA that stays with route throughout the different planning activities and beyond into Operation. The link between Route ID and Reference Train ID is established with PathRequestMessage (sent by RA) and confirmed/fixed with the Path Confirmation Message (path accepted by RA and booked by IM).

13.9.1.3 Path Request ID – A unique ID provided by the RA when making the path request (staying on through the whole planning process). After a path is booked, any request for Path Modification by the RA (planning or operation) must use a new PathRequest Identifier. The lifecycle of the PRID ends when the path is booked or the offer was rejected or no alternative offer was possible.

13.9.1.4 Path ID. A unique ID provided by the IM when offering a requested path

13.9.1.5 Case Reference ID – A unique ID that can be used to identify business cases that cover one or more trains that have been requested and can be used by both the RU and IM. For example, an RA requests a regular set services for a train travelling A – Z and then Z – A. The RU uses one single Case Reference ID for both services but there will be two separate trains, one for A – Z and another for Z – A. For more explanation see chapter 8.2.3.4.

The Train ID itself (TRID with variant v01 to vZZ) remains in LRU/RA/RRU ecosystem and is created and updated according to LRU/RA/RRU rules.

Within the “Identifiers” section of the messages, only one ID with the same object type (ReferenceTRIDv00, ROID, PRID, PAID, TRIDv01-ZZ in RU world) should be used (except CaseReferenceID)). The exception is the related Identifiers, where more than one relation can be represented.

Currently TAF/TAP regulation does not stipulate the use the Train Identifiers as mandatory for the initial implementation. However, provision has been made in the planning messages to allow the use the composite identifier. It is therefore possible, that for the initial implementation and up to the point where the use of Train Identifiers becomes mandatory, to use tailored identifiers as defined by the Actors and represented in the TAF and TAP message catalogues.

The use of a legacy identifier such as the ‘Operational Train Number’ as an identifier during the planning and operational phase will be possible for use as by an RA or IM for train identification until the proposed structure of the Train Identifiers has been implemented as a mandatory requirement.

For some Actors the initial implementation may see them using a combination of the Train Identifiers and the legacy identifiers as per their national regulations relating to train identification.

Further details on the aims and usage of the different identifiers throughout the different processes are explained in Chapter 8 of this document where also the link to the description of the TrainID is made.

13.9.2 Referenced objects as Part of RelatedPlannedTransportIdentifiersSection

Within the RelatedPlannedTransportIdentifiers section there are elements that are able to identify other objects that are related to the train in the Message itself. This is to show the relationship for business activities that are related to the train identified in the path request. This includes for example the following scenarios:

13.9.2.1 identifying the train with an earlier request e.g. a path study

13.9.2.2 identifying connecting services

13.9.2.3 induced traffic

These elements are held in the RelatedPlannedTransportIdentifiersSection of the Message.

They are used as follows

13.9.2.4 Case reference IDs. the path request is related to a case reference object or grouped by the CRID

13.9.2.5 Route ID – the path request is related to one or more other routes

13.9.2.6 Path IDs – the path request is related to one or more (other) specific paths

13.9.2.7 Path Request ID – the path request is related to another path requests

Within the related identifier section, more than one ID of the same type can be transmitted. It is currently under analysis of the sector how to indicate the purpose of the particular identifier in the “related identifiers” section by using specific ReasonOfReference.

13.9.3 Related Trains as Part of Train Activity

It is also possible to include other trains identifiers in a Message based on a relationship as a result of a specific train activity. Within the Train Activity section, it is possible to identify one or more trains as a result of specific activities that can take place on a location within the schedule.

If the Activity Code is related to another train, then one or both of the elements “associatedTrID” and/or “associatedOTN” (that is relevant for the transition to TrID) will need to be completed.

For example, it is possible to identify another train that are related to each other as a result of ”Connecting service to other train” (0044)/”Connecting service from other train” (0045) train activity that can take place at a specific train location. Both trains in connections are identified by their Reference TRID (TRID1v00 for one train and TRID2v00 for the other train).

13.10 Messages for Short Term Path Request

13.10.1 General remarks to all Messages

- An error (as defined by the codes used for Error Message (Annex 10.2) identified for an optional element will have to be treated in the same way as an error for mandatory element. It will have to be corrected and then resubmitted following the normal process if required.
- A message may contain an indication on the event in the business process. This is driven from the business context point of view in order to inform the recipient of this message regarding the consequence of the process activity that has just taken place (e.g. 'No alternative available' in the message 'path details'). For this purpose, the element TypeOfInformation is used.
- All messages have an element "Message status" that identifies its current status ('creation', 'modification', 'deletion'). This status is generated and subsequently updated only by the system as a result of process activity step that has taken place (e.g. 'modification' in the case when the RU changes a train parameter in the message 'path request' and re-submits the request).
- TypeOfRequest element indicates the applicable planning process: Path Request, Path Study or Path Modification. The element TypeOfRequest is used in all messages. When TypeOfRequest is used in Path Details message by IM, and the type "Path Modification" is used, it indicates the Path Alteration process (in the same way as it is used for Path Request to indicate that there is the Path Modification process ongoing).
- ProcessType element is optional and indicates the applicable business process type to which the message refers to.

13.10.2 Structure of the Message

This section aims to give a brief overview of the main message elements:

Message header
The message header is common for all RA/IM messages and therefore has no business relevance related to Short Term Planning process. It is purely a technical part of the message. See chapter 11.

Identifiers
This element group holds the composite identifiers for Reference TRID, RouteID, Path ID, Path Request ID and Case Reference ID (PlannedTrasportIdetifiers) and any other related identifier (RelatedPlannedTransportIdentifiers) that interacts with e.g. related Train ID could well be the one of another train that is attached to the main train during its journey.

Train information
When used inside the LRU/RA/RRU ecosystem, this element group is used to facilitate the harmonisation between the involved RAs, and to be used for information publication needs.

When the Train information is sent by the LRU/RA/RRU to the IM in Path Request message, it contains only the elements describing the Route (origin, handover, destination, planned calendar, OTR) completed by the Path Planning Reference Location (PPRL). Even if transmitted by the element Train Information, the PPRL is not part of the Route also transmitted by the element Train Information.

The element TrainInformation sent by the LRU/RA/RRU to the IM can also contain agreed elements such ResponsibleApplicant and ResponsibleIM in order to facilitate the coordination between IMs. These elements transmitted via TrainInformation are not part of the object Route.

The train information element contains the following information related to the train to permit Train Harmonisation in LRU/RA/RRU ecosystem and to prepare the Path Request message (where the Train Information contains only Route information, PPRL and ResponsibleApplicant / ResponsibleIM if agreed) :

13.10.2.1 Schedule for the entire journey which includes all the key locations (Origin, final destination, interchange, handover, points with commercial stops) and their timings and activities.

13.10.2.2 Path Planning Reference Location indicates the point from which the timetable needs to be planned to/from

- It is not always at the origin of a train run where the path planning starts. It may happen that an RA received a specific slot in a terminal at the final destination. In this case, the path planning is done backwards. The planning could also start in an interchange point in the middle of the journey based on an optimal engine circulation program. Therefore the (lead) RA has the possibility to choose the start of the path planning, according to the particular business case.

  The calendar provided in the Train object still represents the dates of departure at the first location provided in the Train Information.

  It means:

  - if the reference location is within the scope of the IM, the IM should start planning calculation from the reference location for the calendar calculated the following way : provided calendar in the request + offset at the location in the request which corresponds to the reference location in the Train Information
  - If the reference location is outside the scope of IM, the IM should start planning calculation from handover point for the calendar calculated in following way: the calendar in the request + offset corresponding to the handover point which is closest to the reference point.

13.10.2.3 planned train technical data which refers to the composition of the train and other technical parameters for the entire journey from the origin of the train until its final destination and the eventual change of composition and/or technical parameters during the run of the train. This is used for harmonization and information. The technical parameters for the path construction are derived from the Path Information Section.

Path information

This element group is used as a mechanism of communication by the RA and IM which holds the details from RA for each Path section or offered/booked journey section from one IM. The journey section starts at the origin of the train or at the handover point between IM's and ends at final destination or at the next handover point. This consists of all points that are specific to the Path Section (e.g. Station Stops, Run Throughs, Handover Points).

The data in the Path Information section is used to construct the path (from Path Request) and to inform about the offered path (in Path Details). The Planned Journey Location structure has the same elements as the train information. The Path Information section carries the planned calendar and the OTR but, differently as in Train Information, it does not carry the "Reference Point". In the Path Information section, the reference point for calculation of the offsets in the calendar is the first point of the Planned Journey Location array.

The Planned Calendar and the OTR permit to calculate the related Reference Calendar of any path.

The Reference Calendar is also indicated in the element ReferenceTRIDSubCalendar referring to the object described in the element PathInformation of the message.

Status of Harmonisation

This element identifies the type of harmonisation (Full, Partial). A dossier (especially path request and/or path details) may be fully or partially harmonised. This attribute indicates the relevant status.

In case of just one single RA and one IM where the train is travelling in one network only, either "full" or "none" can be used, but not "partially".

On Demand Paths

The usage of "on demand paths" is optional and subject to national rules. It has to be activated by RA for use of the path.

Operational Train Number (OTN)

This element, OTN, is given by the IM to the RA as soon as the foreseen OTN is known, at the latest before operation (before train preparation phase) by updating the message "Path Details" (status "modification"). In some networks it can be provided beforehand by the RA as part of the Path Request in conjunction with the IM. The OTN is seen as an attribute of the Path object and therefore it is contained in each path section (on each Planned Journey Location element level). Technically speaking, in the XSD it is an optional element since the RA may indicate the OTN in the path request in the conjunction with IM as indicated above. On the other hand, it is likely that the IM will treat the OTN as a mandatory part of each path section when the path details are provided to the RU, especially if the OTN is changed from one path section to another.

Network Specific Parameters section

This element group may be used for specific attributes which are not mandatory on all networks and can be used bilaterally by the RA and IM. This element group should only be used between an RA /IM on a national section when it is absolutely necessary and where no common element in the main message can be identified. Otherwise there is a danger that the RA /IM could start using elements in this group and not use the elements from the

common sections.

Before a company creates a Network Specific Parameter element it is required that the company checks the use of the element with the governance entity and its relevant work groups who will advise them if no common element can be created. See also chapter 22.

Affected Section

This element group will be applied only in case of planning activities related to the full or partial path cancellation, alteration or utilisation notification of a path section.

Affected section is a part of the path and it's defined by the start point of section (first point) and the end point of section (last point), where start point and end point appear only once in the section optionally with its BookedLocationTime (planning) or BookedLocationDateTime (operation) to avoid ambiguity, and is effectively used for identifying a specific train that is within a section.

Affected section is also carried in the messages as an array, and therefore serves to indicate which sections are affected as precise as possible. The level of the detail indicated by the array of affected sections should be the same as in the Path Information section of the Path object delivered in the Path Details message.

13.11 Overview of the messages

This section aims to give a brief overview of the messages, in particular showing the status of the message as governed by the process activities

Message	Relevant for TAP and TAF	Outside the TAF or TAP regulation, but recommended] developed from best practice in the rail sector
Path Request	X	
Path Details	X	
Path Confirmed	X	
Path Details Refused	X	
Path Cancelled	X	
Path Not Available	X	
Path Coordination		X
Path Section Notification		X
Error	X	
		X
Receipt Confirmation	X	

13.11.1 Message ‘Path Request’

This message is used for the following actions:

13.11.1.1 original path request from RA to IM with status ‘creation’

13.11.1.2 path request with status ‘deletion’ in case the request is withdrawn until the IM has sent a PathDetails message

13.11.1.3 path request with status ‘modification’ in case the RA wants to modify an element contained in the previously created and sent message until the IM has sent a PathDetails message

13.11.2 Message ‘Path Details’

This message is used for the following action(s):

13.11.2.1 path details from IM to RA with status ‘creation’ for an indication ‘offered’ (this includes draft offer, final offer). If a draft offer turns into the final offer the status of the message will be alteration with an indication “Final offer”.

13.11.2.2 path details message with status ‘creation’ for an indication ‘no alternatives available’

13.11.2.3 path details message with status ‘creation’ for an indication ‘booked’

13.11.2.4 path details message with status ‘modification’ for an indication (e.g. type of information = booked) of the path contract, at the end of the Path Alteration or Path

Modification process, which is executed after the path allocation.

13.11.2.5 The final Path Details message contains all data needed for the train run, i.e. the timing at all operational points along the train journey.

13.11.3 Message ‘Path Confirmed’

This message is used for the following action:

13.11.3.1 path confirmation from RA to IM with status ‘creation’

13.11.4 Message ‘Path Details Refused’

This message is used for the following action:

13.11.4.1 refusal of path details from the RA to IM with status ‘creation’

13.11.5 Message ‘Path Cancelled’

This message is used for the following action:

- (partial or full) path cancellation from RA to IM with status ‘creation’

13.11.6 Message ‘Path Not Available’

‘Path Not Available message’ means the path cannot be used.

If an alternative path is available, the TypeOfInformation 23 must be used and, together with this message or as soon as that path is known, the IM must send without any further request from the RA an alternative proposal. This is done with the ‘Path Details message’ related to this ‘Path Not Available message’.

If an alternative proposal is not possible, the IM must inform the RA immediately.

This message is used for the following action:

13.11.6.1 Information from IM to RU that the booked path is not available

13.11.6.1.1 Message Status: Creation

13.11.6.1.2 Type of Request: Modification

13.11.6.1.3 Type of Information:

13.11.6.1.3.1 Code 23: draft offer in preparation

This type of information is used when the IM is able to provide the alternative path. It means, a PathDetails will follow.

13.11.6.1.3.2 Code 21: no alternative available

This type of information is used if it is not possible for the IM to provide an alternative to the path that is not available any more. This is used only in the cases like natural disaster (e.g. the bridge is broken, or the tunnel is closed)

13.11.7 Message ‘Path Coordination’ and ‘Path Section Notification’

These messages are in addition to TAF and TAP. They follow best practice from the sector and are therefore recommended although it is not mandated by TAP and TAF. They are used for the following actions:

13.11.7.1 Holds the objects and elements related to the Short-Term Path Request process by keeping them up to date among the partners

13.11.7.2 For the purpose of coordination. One is containing all planned journey **locations** of train and path and the another one is strictly related to path **sections**

13.11.7.2.1 Path Coordination Message* is linked with the messages. Path Request, Path Details, Path Confirmed, Error. and holds the information related to train passing each of the locations of the entire train journey and the related path information

13.11.7.2.2 Path Section Notification Message** is linked with the messages Path Cancellation, Path Not Available, replaces Path Utilisation Notification and holds information related to path either for all path sections or for the specific sequence of sections of the path

13.11.8 Message ‘ErrorMessage”

This message follows best practice from the sector and is therefore recommended although it is not initially mandated by TAP and TAF. It has been processed as a change request by ERA CCM Working Party and accepted to be contained in the Common Metadata XSD 2.1.

It is used for the following action:

Error message will be sent in return in cases an IM receives an RA message indicating that

13.11.8.1 functional elements based on business rules (e.g. no path details mandatory elements missing, etc.) are wrong or missing

13.11.8.2 technical elements (e.g. system failure) are wrong or missing

13.11.8.3 both above mentioned are wrong or missing

In the same way, the RA can send the Error Message to the IM in the case of the incomplete offer or any other reason known to both parties to be the error source.

The Error Message has elements with defined coding structure for Type of error, Severity and Error Code. For further description of the Error message in itself see also 12.14.15.

In one Error Message, several Errors (an array!) can be contained. This is done for the purpose of avoiding unnecessary communication about the errors, if several errors are linked to the same source and would have been sent one after another anyhow.

Nevertheless, the error handling is up to the bilateral or multilateral agreement between the partners in the communication. If the partner still insists on sending the separate error messages for each error, it is possible with the message structure as well.

Note: ErrorMessage has replaced the “AnswerNotPossible” message. The ErrorMessage

as such can be used in any TAF/TAP procedure, it is not limited only to the path request related processes. The list of error codes is given in the Annex 10.2.

13.11.9 Message ‘Path Section Notification’

This message is in addition to TAF and TAP and it has been rejected by the ERA CCM Working Party since the procedure of activation of the pre-booked paths is used only by some IMs within the TAF/TAP stakeholder community. Therefore, the sector decided to replace this message by the Path Section Notification message and to use the “type of information” element accordingly. It is used for the following action:

13.11.9.1 RA requests to the IM to activate or de-active a path with message element “Type of information” and code for “utilisation notification”

Some networks offer the possibility to book an optional path in advance. This means, that capacity has been allocated to an RA who has to activate it in order to run the train or to de-activate in case the train is not running.

Additionally, this message is utilized in the Operations for the applications such as RNE TIS. It contains on the message level the **optional** element “Scheduled Date Time at Transfer Point”. This information is currently needed in the daily business when using applications such as TIS. The above-mentioned element is used as a key element for compiling single message to one entire train Practically speaking, it is used within the TAF TSI Framework also as the replacement of the UIC Train Failure message. The optional element is only used in Operations for communicating the train failure on the specific path. In the Planning phase, this element is not needed.

13.11.10 Message ‘Receipt Confirmation’

According to TAF and TAP this message should be sent from the recipient of the message to the originator of the message in order to acknowledge that its legacy system has received the message.

To identify which message is confirmed by the legacy system, the related reference of the actual message sender can be added in the RelatedSenderReference element.

This is required for purposes described in the Regulation where it is important to know at which point in time does the message arrive at receiving systems e.g. when a path request reaches a legacy system of an IM it has several days to plan and offer back the path.

13.12 Elements specific to actors

Key element data of the RAs, the content as for example train parameters, commercial information, cannot be changed by the IM or key element data of the IMs (e.g. received on time, maximum planned speed) by the RA. The data in these elements will be only passing through the messages and should not be allowed to be changed during the other stages of the process. For this purpose, the messages Path Request and Path Details have the structure to protect the data according to actors. Path Request message contains Train Information section to carry the route object data, and Path Information section to specify the all necessary details of the path request for the particular train. The Path Details message contains only Path Information section in order to be as precise as possible and to avoid the situation that the Train Information section, which is owned by RA is changed by IM.

A list of the key element data ownership can be seen in Annex 12.2.

It is up to the implementers to ensure that the mechanism of access control/validation is carried out according to their needs.

13.13 Business Scenarios

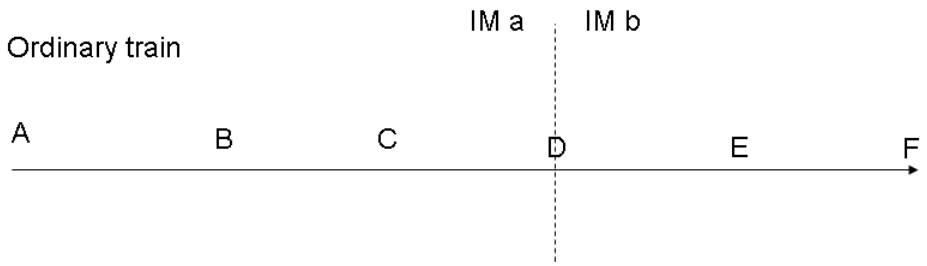
This section provides examples of specific real-life scenarios for a number of the different activities that take place during the planning phase. It shows how messages will be utilised during the communication between the RA and IM at the various stages of the exemplified scenarios.

In all examples described below the use of TrainID/OTN will only be shown where there is references to other trains being involved within the scenario e.g. attach train. This is because this section aims to focus the reader on the scenario itself as opposed to how the scenario works together with train identification – these are covered in other TAF/TAP documentation such as the Handbook on Train Identification, referenced in chapter 8. Additionally, the test cases (Appendix 8.6 and 8.7.1) for the TrainID cover some of the business scenarios given here, from the aspect of identifiers.

13.13.1 Ordinary train running across two IMs networks

Situation

Paths for a train are requested from A via B (commercial stop), C (no commercial stop but change of staff), D (change from IM a to IM b, run through only), to F. Location E is added by the IM as an additional operational location.



Preconditions

- Open access business model
- Handover point = Location D (which is a run through only)
- Location E is an additional run through location that is added by IM b to define the route and operational information
- Train composition is the same
- Change of crew at location C (Operational activity requested by the RU at the beginning)
- Information needs to be published as normal

Approach

The aim of this approach is to provide efficient RA /IM communication where a train is being requested to run across two different networks.

One approach for handling the RA and IM communication is described for this scenario and is explained as follows:

RA communicating with the IM

The RA sends one path request message to IMa for the section A – D (handover point). The path request message is sent with a Train Information section that contains the route with only the origin point A, handover point D and destination point F. The path request message is sent with a Path Information section that contains Stations A, B, C, and Handover point D. In this scenario in the Path Information section it is also mandatory to enter the activity type code for ‘Crew Change’ at Location C. In the Path Information section, the RA can enter the activity type code for ‘Crew Change’ at Location C.

The RA sends one path request message to IMb for the section D. F. The path request message is sent with a Train Information section that contains the route with only the origin point A, handover point D and final destination F. The path request message is sent with a Path Information section that contains Handover point D, run-through point E and final destination F.

IM communicating with the RA

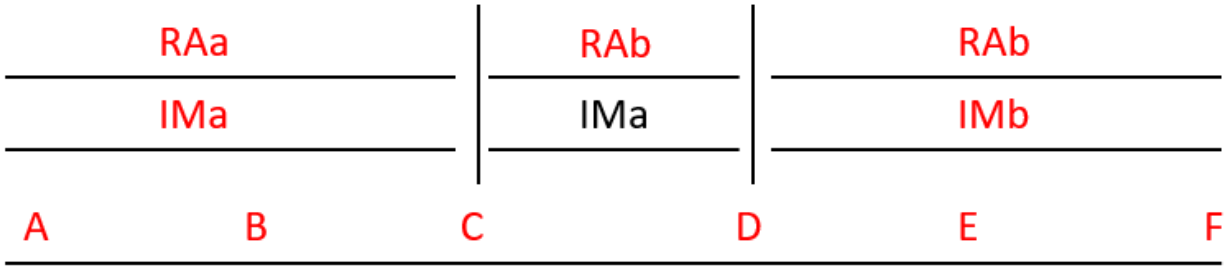
IMa sends one path details message to the RA for the section A – D. The Path Details message is sent with a Path Information section that contains Stations A, B, C, and Handover point D.

IMb sends one path details message to the RA for the section D. F. The path details message is sent with a Path Information section that contains Handover point D, Station F and in the run-through Location E.

13.13.2 Ordinary train running across two networks

Situation

Paths for a train are requested from A via B (commercial stop), C (no commercial stop but change of staff and RU interchange point), D (change from IMa to IMb, run through only), E (run through only) to F.



Preconditions:

13.13.2.1 Cooperation business model (2 RA involved)

13.13.2.2 RAa takes the Lead RU role in this scenario

13.13.2.3 There is a need for RU harmonization (not yet done e.g. in timetabling conference)

13.13.2.4 RAb requests the run through Location E in the Path Request

13.13.2.5 Handover point = D (run through only)

13.13.2.6 Train Composition is the same

13.13.2.7 Change of Crew at Location C (Interchange point, Operational Activity)

13.13.2.8 Information needs to be published as normal

Approach

The aim of this approach is to provide efficient RA/IM communication where a train – operated by two cooperating RA – is being requested to run across two different networks.

One approach for handling the RA and IM communication is described for this scenario and is explained as follows:

RA communication with cooperating RU

RAa (leading/coordinating RA) sends the Path Coordination message to RAb to start the harmonization between the RAs before placing a path request. This message is sent with a Train Information section that contains all commercial stops (A, B, F), station C, run through Location E and handover point D.

RA communicating with the IM

RAa sends one path request message to IMa for the section A – C. The Path Request message is sent with Train Information section that contains the route with origin A, handover point D and terminus F, the Path Information section that contains Stations A, B, until interchange point C. In the Path Information section, it is also mandatory to enter the

activity type code for ‘Crew Change’ at Location C, if known.

RAb sends one path request message to IMa for the section C.D and the second Path Request message to IMb for the section D. F. Both path request message are sent with Train Information section that contains the route with origin A, handover point D and the destination point F. It is up to the LeadRU to decide if C is also part of the route, together with additional information about change of ResponsibleApplicant . The Path Information section contains C and D. The second Path Request message has the same content in Train Information block but contains in the Path Information the locations from handover point D, run through location E to the station F.

IM communicating with the RA

IMa sends one path details message to RAa for the section A – C. The path details message is sent with a Path Information section that contains Stations A, B, C.

IMa sends the second Path Details message to RAb for the section C, D.

IMb sends one path details message to RAb for the section D. F. The path details message is sent with a Path Information section that contains Handover point D, run through location E and Station F.

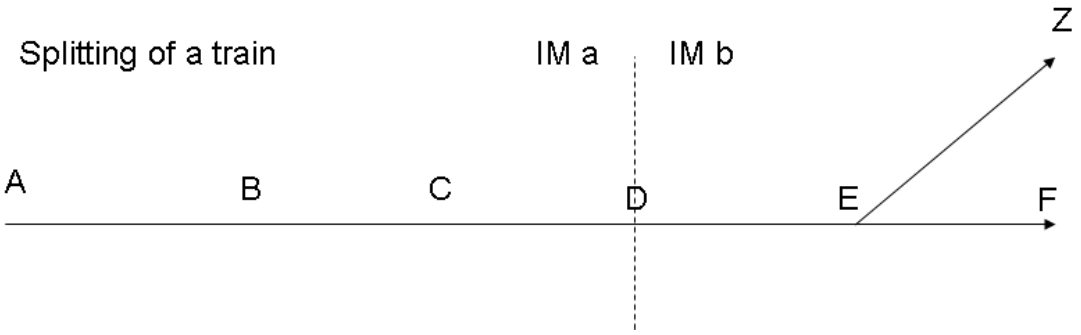
13.13.3 Splitting of a train

Situation

Paths for trains are requested from A via B, C, D, E to F and Z. The train service is formed of two

portions (e.g. two train sets) running jointly from A to E. In E (commercial stop), the train has different routes: one portion continues to F, the other portion to Z.

1) The trains on the path sections E-Z and E-F have the same train calendar (run on the same days)



Preconditions

13.13.3.1 Open Access business model

13.13.3.2 Handover point = D (run through only)

13.13.3.3 Train composition change and commercial stop in E.

13.13.3.4 Location B, C are run though locations, requested by the RU

13.13.3.5 Information needs to be published about the two trains and then the train split at Location E

13.13.3.6 Both trains have different Reference TrainID's and routes

Approach

The same running days on E - F and E – Z (overlapping calendar)

The aim of the approach described below is to provide efficient RA/IM communication where a train is being split during its journey. There are many ways to communicate, however the simplest and most generic approach is to treat this scenario as two trains, the main train (A – F) and the second train (E – Z). Both trains must have different Reference TrainID's. This approach for handling the RA and IM is explained as follows:

RA communicating with the IM

The RA sends one path request message to IMa for the section A – D. The path request message is sent with a Train Information section that contains the route with origin A, , handover point D and the final destination F.

The path request message to IMa is sent with a Path Information section that contains stations A, B, C and Handover point D.

The RA sends two path request messages to IMb. One for the main train (A – F) and one for the second train (E – Z). The first path request message is sent with a Train Information

section that contains the origin A, handover point D and destination F for the main train. The Path Information section of the first message (for the first train) contains the section D to F with E. In E the RA has to include train activity code 0017 and Reference TrainID of second train to give information to the split.

The second Path Request message for the second train with different ReferenceTrainID is sent with the Train Information with origin E and destination Z for the route. The Path Information section contains stations E and Z. It is also mandatory to enter the train activity code 0045 for ‘train split’ and add the associated/attached train code (Reference TRID of first train) at Location E,.

In RelatedPlannedTransportIdentifiers section the RA can include Reference TrainID of the other train to refer it, in both PathRequestMessages sent to IMb vice versa. That is similar valid and possible for the PathRequestID.

IM communicating with the RA

IMa sends one path details message to the RA for the section A – D. The path details message is sent with a Path Information section that contains stations A, B, C and Handover point D.

IMb sends two path details messages to the RA, one for the main train for section D – F and the other for the second train for section E – Z. For the main train the Path Information section contains stations E and F as well as the Handover point D. For the second train the Path Information section contains stations E and Z. Both PathDetailsMessages sent by IMb are linked to different Reference TrainID’s and routes. In location E the trainactivity codes are includes as similar as described for PathRequestMessage above.

How it looks like in the messages:

The messages layout can be examined in the reference system PCS. For this purpose, use the documentation for the test cases. We recommend to reader to validate the Test Cases in the Annex 8.6 and Annex 8.7.x. Annex 8.7.1 contains the general test cases provided by the TEG TrainID members, and Annex 8.7.2 contains the test cases which will be used in the Joint Sector Pilot Program for Short-Term Path Request and TrainID. The test cases contained in 8.7.2 are the simple test cases aimed to reflect the

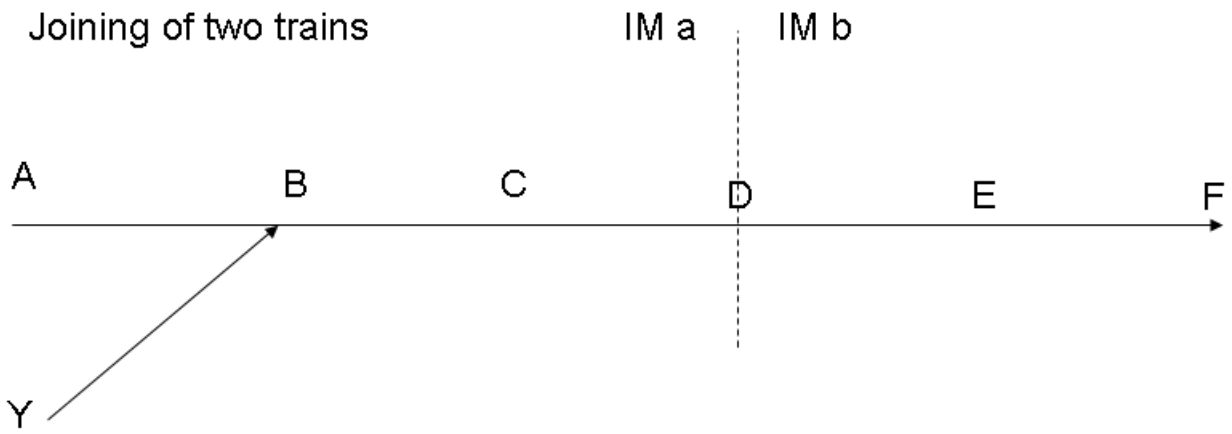
basic steps and information exchange within the Short-Term Path Request process with Identifiers.

13.13.4 Attaching of a train to another train

Situation

Two train services are running A – F and Y – F jointly coupled between B and F. The train is formed

of two portions (two train sets) running jointly from B to F. Both parts run individually from A – B and Y- B. In B they are attached at the commercial stop, the trains are joined and become one train.



Preconditions

13.13.4.1 Open Access business model

13.13.4.2 Two Trains attach in Station B

13.13.4.3 Location C is a run though location

13.13.4.4 Handover point = D (run through only)

13.13.4.5 Both Trains runs from B to F in one combined train set

13.13.4.6 Information needs to be published about the two trains attaching at Location B

13.13.4.7 Both trains have different Reference TrainID's and routes

Approach

The aim of the approach described below is to provide efficient RA/IM communication where two train sets are joining to create a combined train set for the rest of its journey. There are many ways to produce the efficient communication, however the simplest and most generic approach is to treat this scenario as two trains, the main train (A – F) and the attached train (Y – B). This approach for handling the RA and IM is explained as follows:

RA communicating with the IM

The RA sends two path request messages to IMa one from A to D for the main train (route A – F) and the other from Y to B for the attached train (route Y – B). Both trains must have different Reference TrainID's. For the main train the path request messages is sent with a Train Information section that contains the route with origin A, handover point D and destination F. The path request message for the main train (A – F) is sent with a Path Information section that contains stations A, B, C as well as the Handover point D. In the Path Information section, it is also mandatory to enter the train activity type '0016 at

Location B . The related train identifier (Reference TRID) / OTN (for the attached second train) that will be attached at Location B will also be added into the Train Activity section.

For the attached train Y – B the path request message is sent with a Train Information and Path Information section of Y and B only. In location B the train activity code 0044 and the related train identifier (Reference TRID) / OTN (for the main train) that the train will be attached to will also be added. In RelatedPlannedTransportIdentifiers section the RA can include Reference TrainID of the other train to refer it, in both PathRequestMessages sent to IMa vice versa. That is similar valid and possible for the PathRequestID.

The RA sends one path request message to IMb for the section D - F. The path request message is sent with a Train Information section that contains the route of the main train with origin A, handover point D and destination F. The path request message is sent with a Path Information section that contains Handover point D, location E and destination F.

IM communicating with the RA

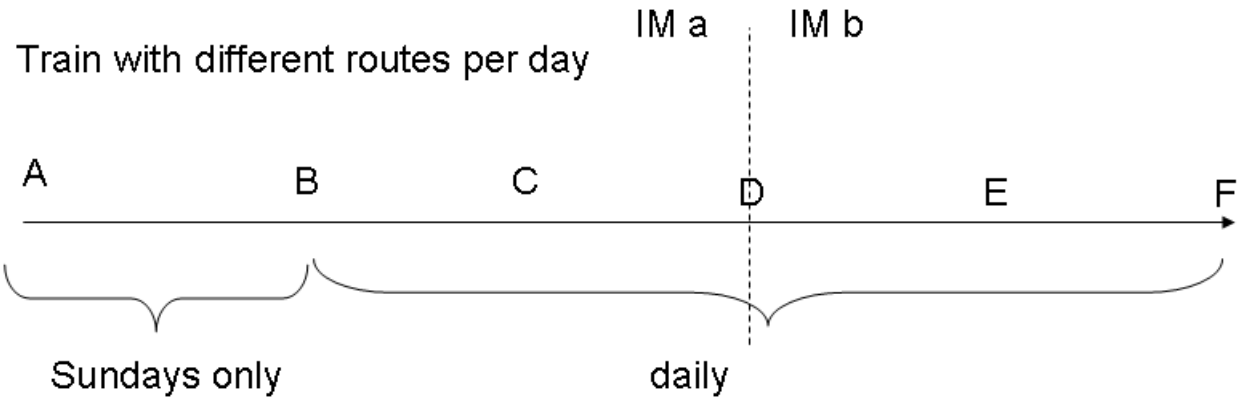
IMa sends two path details messages to the RA, one for the main train for section A – D and one for the second train Y – B. The path details messages are sent with a Path Information section that contains A, B, C, D in the message for the main train and stations Y and B for the attached train. Both PathDetailsMessages sent by IMa are linked to different Reference TrainID's and routes. In location B the train activity codes are includes as similar as described for PathRequestMessage above.

IMb sends one path details message to the RA for the section D - F. The path details message is sent with a Path Information section that contains E and F and Handover point D.

13.13.5 Trains with different routes on specific days

Situation

Paths for a train are requested from A via B, C, D, E to F. The train only runs on Sundays between A and B, but daily between B and F.



Preconditions

13.13.5.1 Open Access business model

13.13.5.2 Train Composition is the same for the different calendars

13.13.5.3 No specific operational activities taking place

13.13.5.4 Information needs to be published for the two trains

Approach

The aim of this approach is to provide efficient RA/IM communication where a train is being requested to run across two different networks for different running days and having extended locations on some of the days.

This approach is only one method of handling the RA and IM communication for this scenario. There are other approaches that can be implemented, e.g.

13.13.5.5 Approach 1: Treated as two different trains in one train's family (Reference TrainID) and with two different routes with different calendars (A – F & B – F)

13.13.5.6 Approach 2: Sunday train (A-B) continued by the daily train (B – F). Both trains have different Reference TrainID's and routes.

Approach 1 is described as follows:

RA communicating with the IM

The RA sends one path request message to IMa for the section A - D with a calendar element showing all Sundays (and the first RouteID) and another path request message to IMa for the section B - D, with a calendar valid for all days except Sundays (and the second RouteID). The two path request messages are sent with different Train Information sections (A – D – F for the Sunday Train and B – D – F for the Daily except Sunday train) and different RouteIDs as stated before. The two path request messages are sent with different Path Information sections (A – D for the Sunday Train and B – D for the Daily except Sunday

train). In both PathRequestMessages the same Reference TrainID can be used. But it is also possible to use different Reference TrainID's. It is up to the LeadRU to decide it.

The RA sends one path request message to IMb for the Sunday train and another path request message for train running every day except Sunday. The two path request messages are sent with different Train Information sections (A – D – F for the Sunday Train and B –D – F for the Daily except Sunday train) and different RouteIDs. The messages are sent with the same content in the Path Section (D – F) but different calendars (once only Sundays, and once for all other days except Sunday). Both PathDetailsMessages sent by IMa are linked to different Reference TrainID's and routes. In location B the train activity codes are includes as similar as described for PathRequestMessage above.

In RelatedPlannedTransportIdentifiers section the RA can include Reference TrainID of the other train to refer it, in both PathRequestMessages vice versa. That is similar valid and possible for the PathRequestID.

It is recommended to use the RelatedPlannedTransportIdentifier with specific ReasonOfReferenceCode to indicate that the RA wishes to get the same path and details for both Path Requests.

IM communicating with the RA

IMa will send back two path details messages one for Daily except Sundays train (B – D) and one for Sunday (A – D).

IMb will send back two path details messages one for Mon – Sat (D – F) and one for Sunday (D - F). This could be the same path (from Monday to Sunday same stops, timings, etc.) but as there are two Routes (Mon – Sat and Su) two PathIDs are allocated. Indeed, it is important for both RA and IM to keep the record about the links between Route and Path objects.

Approach 2 is described as follows:

The approach 2 covers the case where the planned train service is split into two trains and two path requests according to the geographical aspect, not the calendar (First a path for the Train A-B (Sundays) is requested, second a path for the train B-F is requested for all days including Sunday). Both trains have different Reference TrainID's and routes with different RouteID's.

RA communicating with the IM

The RA sends the first Path RequestMessage to IMa for the section B-D and the calendar containing all the days (including Sundays) with the first Reference TrainID. The TrainInformation contains the Route B – D – F and the Path Information contains the section B-D.

The RA sends the second Path Request to IMa for the relation A-B for Sundays with the second Reference TrainID. TrainInformation block carries the route A-B and the calendar containing Sundays. The Path Information section also carries only the section A-B and the calendar containing Sundays.

IMPORTANT: In the PathRequestMessage for the train only on Sunday in section A to B on location B the Train Activity Type 0044 must carry the information about the

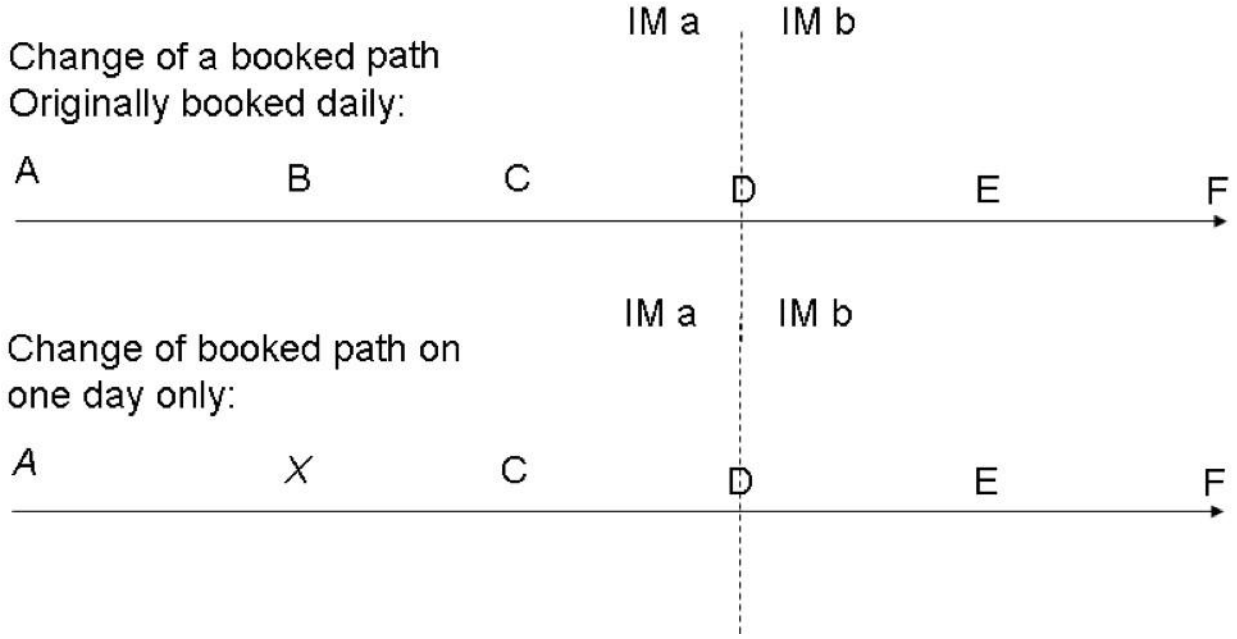
AttachedTrainID (Reference TRID of the other train for all days on section B-F). Vice versa in the PathRequestMessage for the train for all days in section B to F on location B the Train Activity Type 0045 must carry the information about the AttachedTrainID (Reference TRID of the other train for Sunday only on section A to B).

13.13.6 Change of a booked train for certain days (e.g. planned re-routing)

Situation

Paths for a daily train have been booked from A via B, C, D, E to F. The booked train runs daily. The RU originally wishes commercial stops in A, B and F

During the running period of the train, closure of station B is necessary for one day on short notice. The train has to be re-routed via X and will leave earlier in A (relates to the process “Path Modification by IM”).



Preconditions

13.13.6.1 Open Access business model

13.13.6.2 Handover point = D (run through only)

13.13.6.3 Standard RA /IM communication for the initial path booking

13.13.6.4 Train Composition is the same

13.13.6.5 Information needs to be published as normal

13.13.6.6 Information will be updated after the disruption – Closure of Station B

13.13.6.7 Closure of B is supposed to be known after the path request made by RU

13.13.6.8 Closure of station B is supposed to be known before the sale of the tickets begins for the day of B closure

13.13.6.9 The closure of Station B has no impact to the path of IM b

Approach

The aim of this approach is to provide efficient RA/IM communication where a train is being requested to run across two different networks for different running days and being rerouted one day.

One approach for handling the RA and IM communication is described for this scenario and is explained as follows:

IM communicating with the RA

When the closure of Station B is known IMa sends the Path Not Available with type 23 message to RA informing that Station B will be closed for one day.

It is recommended to send the PathNotAvailable for the whole path in IM territory. The affected Section starts at A and ends at D and includes B.

The Calendar will be for the one day of closure (Validity Period of one day).

As soon as possible IMa sends an alternative Path Details message for the whole path with Location *X* in the section (A – X – C – D) for the one day any altered timings will also be included in the message.

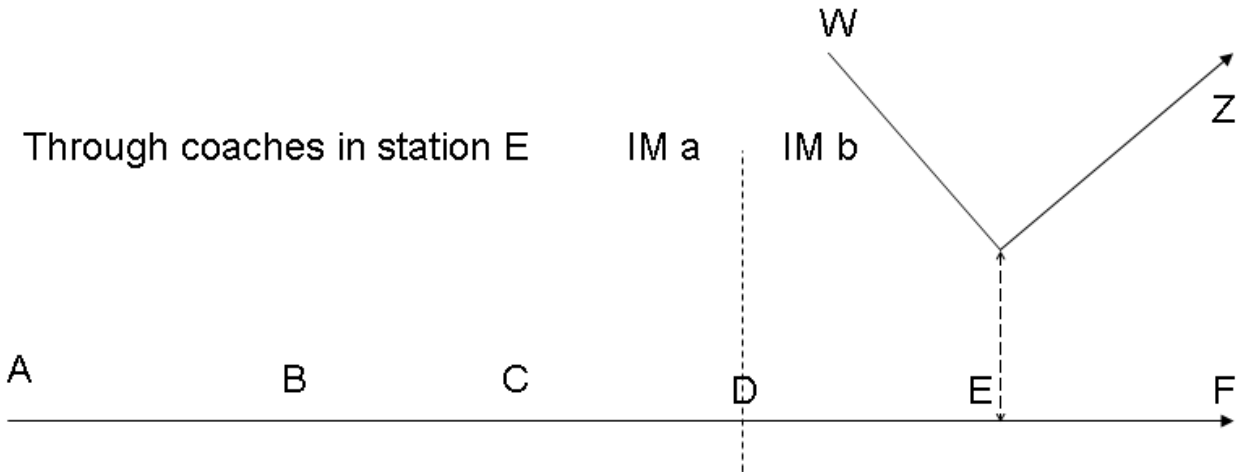
RA communicating with the IM

The RA is advised to answer to PathNotAvailable with the Receipt Confirmation message to the IM. The RA should answer which PathConfirmed or PathDetailsRefused messages to the IMs Path Details message with the alternative route. The rest is the matter of the agreement between RA and IM which is usually regulated through IMs' Network Statement.

13.13.7 Trains with Through Coaches

Situation

Paths are requested for a train A via B, C, D, E to F. Some coaches of the train are detached in E. These coaches are attached to another train from W via E to Z. Through coaches (coach groups) from A to Z are established.



Preconditions

13.13.7.1 Through coaches in a station of IMb

13.13.7.2 Train W – Z a priori unknown from IMa

13.13.7.3 Trains A – F and W – Z are nevertheless associated

13.13.7.4 Both trains have different Reference TrainID's and routes.

Approach

The aim is to provide efficient RA /IM communication, where two different trains stop at the same station, in order that a coach is detached from one train and attached to a second train.

RA communicating with the IM:

A Path Request Message is sent by the RA to IMa. The Train Information contains no train activity code at Location E "Detach Coach" as the Train Information contains origin A, handover D and destination F.

A Path Request Message is sent by the RA to IMb for train (A – F). The Message has to indicate that a coach is detached in Location E via the train activity type 0014 "Detach Coach". The related Reference TrainID and/or OTN on which the attached Coach will be added (train W – Z) at E will also be added into the Train Activity section by using code 0046.

```
<PlannedJourneyLocation JourneyLocationTypeCode="02">
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                        <LocationPrimaryCode>45000</LocationPrimaryCode>
                        <PrimaryLocationName>E</PrimaryLocationName>
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                    <Offset>0</Offset>
                </Timing>
            </TimingAtLocation>
            ....
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                <TrainActivityType>0001</TrainActivityType>
            </TrainActivity>
                <TrainActivityType>0046</TrainActivityType>

            <TrainActivity>
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                        <Core>*****0006789</Core>
                        <Variant>00</Variant>
                        <TimetableYear>2012</TimetableYear>
                </AssociatedAttachedTrainID>
            <TrainActivityType>0014</TrainActivityType></TrainActivity>
            <OperationalTrainNumber>0001234</OperationalTrainNumber>
        </PlannedJourneyLocation>
```

The Path Request Message sent by the Applicant to IMb for the other train (W – Z) has to indicate that the train in station E receives a coach from train A – F (related identifiers section: attached train's Reference TrainID). The Message has to indicate that a coach is attached in Location E via the Activity Code 0013 "Attach Coach". The related Reference TrainID and/or OTN on which the attached coach came from (train A – F) at E will also be added into the Train Activity section with train activity code 0047.

IM communicating with the RA:

A Path Details Message is sent by the IMa back to the RA.

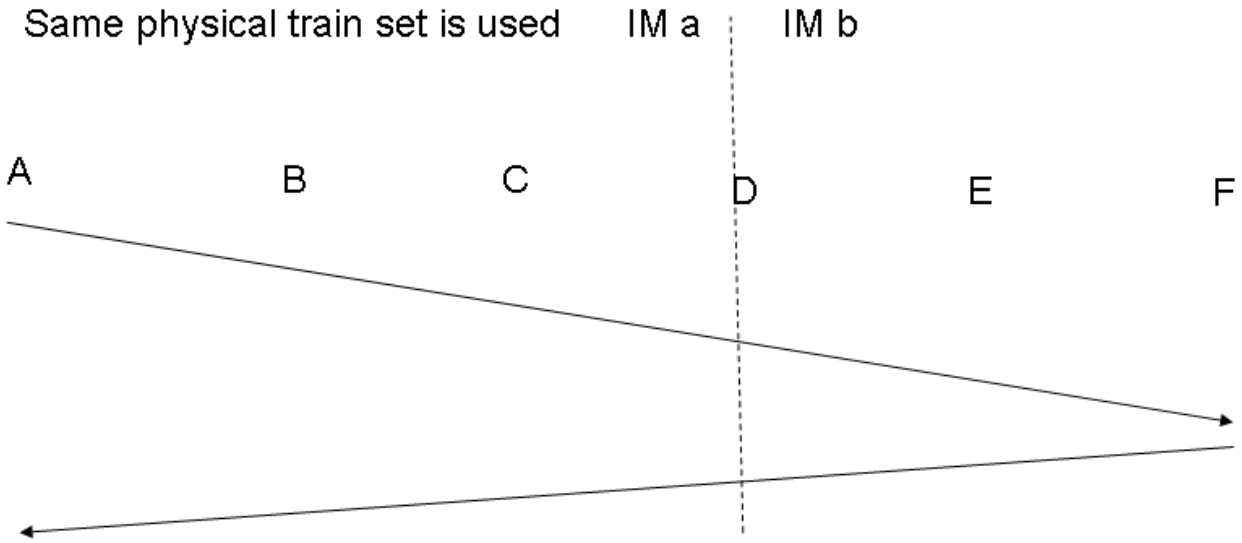
Two Path Details Messages are sent back by IMb to the RA. First Path Details Message is sent by the IMb back to the RA for Train A - F. The Message has to indicate the times at station E, the Reference TrainID and/or OTN of the train for which the coach is attached to (train W – Z) and the train activity types 0014 and 0046.

Second Path Details Message is sent by the IMb back to the RA for Train W - Z. The Message has to indicate the times at station E, the Reference TrainID and/or OTN of the train for which the coach is detached (train A – F) and the train activity types 0013 and 0047..

13.13.8 Trains that cannot leave before another train has arrived (diagram dependence)

Situation

Paths are requested for two trains: A to F and F to A. The RU has to use the same physical train set; therefore, the second train cannot leave F before the first train has arrived in F.



Preconditions

13.13.8.1 Open Access business model

13.13.8.2 Handover point = D (run through only)

13.13.8.3 No commercial stops except A & F

13.13.8.4 Train Composition is the same (same physical train set). RA requires the IM to take this into account.

13.13.8.5 Considered as two different trains where Train A – F is planned before Train F – A

13.13.8.6 Running days of train A – F are the same as for F – A

13.13.8.7 Both trains have different Reference TrainID's and routes.

Approach

The aim of this approach is to provide efficient RA /IM communication where a train is being requested to run in one direction, known as the first train (A – F), and then the train runs again (as a different service) in the reverse direction, known as the next train (F – A).

One approach for handling the RA and IM communication is by showing train activities (Next Working) to link the two trains (including the use of related Reference Train IDs and/or OTNs).

This scenario is explained as follows:

RA communicating with the IM
For the first train (A to F)

The RU sends one path request message to IMa for the path section A to D. The path request message is sent with a Train Information section which contains the route origin A, handover point D and destination F.

The path request message is sent with a Path Information section that contains Commercial Stop A and handover point D.

The RU sends one path request message to IMb for the path section D to F. The path request message is sent with a Train Information section which contains the route origin A, handover point D and destination F.

At Location F the train activity type 0044 (“Next Working Service”) is entered, together with associated attached Reference Train ID and/or OTN of the next train. The path request message is sent with a Path Information section that contains Commercial Stop F and handover point D.

For the second train (F to A)

The RA sends one path request message to IMb for the path section F to D. The path request message is sent with a Train Information section which contains the route origin F, handover point D and destination A.

The path request message is sent with a Path Information section that contains Commercial Stop F and handover point D. At Location F the train activity type 0045 (“Previous Working Service”) is entered, together with associated attached ReferenceTrain ID and/or OTN of the previous train.

The RA sends one path request message to IMa for the path section D to A. The path request message is sent with a Train Information section which contains the route origin F, handover point D and destination A.

The PathInformation section contains handover point D and commercial stop A.

IM communicating with the RA
For the first train (A to F)

IMa sends one path details message to the RA for the section A – D. The path details message is sent with a Path Information section that contains all locations of the path between Commercial Stop A and handover point D.

IMb sends one path details message to the RA for the section D – F. The path details message is sent with a Path Information section that contains all locations of the path between Handover point D and Station F. At Location F the train activity type 0044 (“Next Working Service”) is entered, together with associated attached Reference Train ID and/or OTN of the next train.

For the second train (F to A)

IMb sends one path details message to the RA for the section F - D. The path details message is sent with a Path Information section that contains all locations of the path between station F and Handover point D. At Location F the train activity type 0045 (“Previous Working Service”) is entered, together with associated attached ReferenceTrain

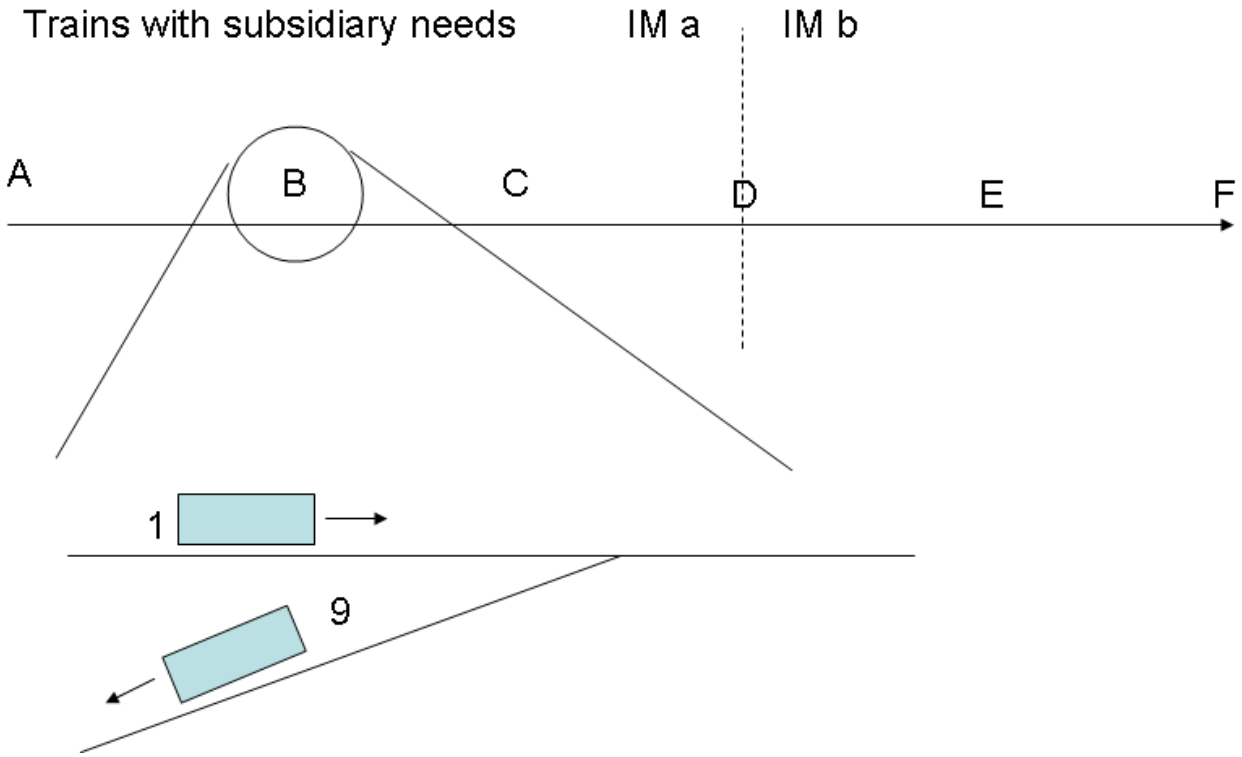
ID and/or OTN of the previous train.

IMa sends one path details message to the RA for the section D to A. The path details message is sent with a Path Information section that contains all locations of the path between handover point D and commercial stop A.

13.13.9 Trains that need to be shunted from one platform to another at a location during the train run

Situation

Paths for a train are requested from A via B to F. At B, the train needs to arrive at track 1 but has to leave from track 9. In reality, the train is shunting out of track 1 into track 9 and continues to the next station from track 9.



Preconditions

13.13.9.1 one RA and two IM (IMa , IMb)

13.13.9.2 assumption daily train

13.13.9.3 unchanged composition in B

13.13.9.4 train change platform because of track layout

13.13.9.5 publication as through train

13.13.9.6 Passengers can only alight on track 1 in location B

Approach

The aim of this approach is to provide efficient RA/IM communication where a train is being requested including shunting according to the track plan of station B and followed to run across two different networks

RA communicating with the IM

The following is just an example on how to handle the business scenario. Every solution is depending on national rules.

The RA sends one path request message to IMa for the section A – D with the path information section showing two subsidiary locations at B, one primary location with an

attached subsidiary location at B showing track 1 (LS1) with an arrival and a departure time and the same primary location this time with a subsidiary location for track 9 (LS9) including a departure time. The train information section contains origin A, handover D, destination F.

The path request message is sent for train running every day, else without any other difference. In the Path Information section RA will indicate the shunting operation in B with TrainActivityType0020 (shunting operation) and in that specific case with TrainActivityType 0006 (for change of direction and engine).

The RA sends one path request message to IMb for train running every day from D – F.

The train information section contains origin A, handover D, destination F. The path information section contains D, E, F as ordinary stops.

IM communicating with the RA

IMa will send back one path details message for running every day from A to D, including both subsidiary locations at B (LS1 and LS 9) and their relevant times.

IMb will send back one path details message for D – F.

In XML (Path Information block) it looks as follows:

```
<PathInformation>
        <PlannedJourneyLocation JourneyLocationTypeCode="01">
            <CountryCodeISO>XX</CountryCodeISO>
            <LocationPrimaryCode>10000</LocationPrimaryCode>
            <PrimaryLocationName>A</PrimaryLocationName>
            <TimingAtLocation>
                <Timing TimingQualifierCode="ALD">
                    <Time>06:00:00.00</Time>
                    <Offset>0</Offset>
                </Timing>
            </TimingAtLocation>
            ……..

            <TrainActivity>
                <TrainActivityType>0001</TrainActivityType>
            </TrainActivity>
            <OperationalTrainNumber>0001234</OperationalTrainNumber>
        </PlannedJourneyLocation>
        <PlannedJourneyLocation JourneyLocationTypeCode="02">
            <CountryCodeISO>XX</CountryCodeISO>
            <LocationPrimaryCode>20000</LocationPrimaryCode>
            <PrimaryLocationName>B</PrimaryLocationName>
            <LocationSubsidiaryIdentification>
                <LocationSubsidiaryCode
LocationSubsidiaryTypeCode="01">0123456789</LocationSubsidiaryCode>
                <AllocationCompany>1001</AllocationCompany>
                <LocationSubsidiaryName>Location B Platform
```

```
1</LocationSubsidiaryName>
                    </LocationSubsidiaryIdentification>
                    <TimingAtLocation>
                        <Timing TimingQualifierCode="ELA">
                            <Time>08:00:00.00</Time>
                            <Offset>0</Offset>
                        </Timing>
                        <Timing TimingQualifierCode="LLD">
                            <Time>08:02:00.00</Time>
                            <Offset>0</Offset>
                        </Timing>
                    </TimingAtLocation>
                    …
                    <TrainActivity>
                        <TrainActivityType>0001</TrainActivityType>
                    </TrainActivity>
                    <TrainActivity>
                        <TrainActivityType>0020</TrainActivityType>
                    </TrainActivity>
                    <OperationalTrainNumber>0001234</OperationalTrainNumber>
                </PlannedJourneyLocation>
                <PlannedJourneyLocation JourneyLocationTypeCode="02">
                    <CountryCodeISO>XX</CountryCodeISO>
                    <LocationPrimaryCode>20000</LocationPrimaryCode>
                    <PrimaryLocationName>B</PrimaryLocationName>
                    <LocationSubsidiaryIdentification>
                        <LocationSubsidiaryCode
LocationSubsidiaryTypeCode="09">0123456789</LocationSubsidiaryCode>
                        <AllocationCompany>1001</AllocationCompany>
                        <LocationSubsidiaryName>Location B Platform
9</LocationSubsidiaryName>
                    </LocationSubsidiaryIdentification>
                    <TimingAtLocation>
                        <Timing TimingQualifierCode="LLD">
                            <Time>08:10:00.00</Time>
                            <Offset>0</Offset>
                        </Timing>
                    </TimingAtLocation>
                    …
                    <TrainActivity>
                        <TrainActivityType>0020</TrainActivityType>
                    </TrainActivity>
                    <OperationalTrainNumber>0001234</OperationalTrainNumber>
                </PlannedJourneyLocation>
```

```
<PlannedJourneyLocation JourneyLocationTypeCode="02">
    <CountryCodeISO>XX</CountryCodeISO>
    <LocationPrimaryCode>30000</LocationPrimaryCode>
    <PrimaryLocationName>C</PrimaryLocationName>
```

…

13.14 Business rules

This section provides the specific business rules/conditions on how specific elements within the messages will need to be applied for certain situations.

The business rules for applying the calendar are explained in 12.15.

13.14.1 Train Weight/Train Length

Determining the Train Weight

If the “Traction Weight” and the “Weight of the set of carriages” are both entered into the message, the “Train Weight” can be calculated as the sum of the two elements.

If the “Train Weight” and the “Weight of the set of carriages” are both entered into the message, the “Traction Weight” can be calculated as the difference of the two elements: Train Weight – Weight of the Set of Carriages

If the “Train Weight” and the “Traction Weight” are both entered into the message, the “Weight of the set of carriages” can be calculated as the difference of the two elements: Train Weight – Traction Weight.

Determining the Train Length

Note: The element Length under the element group Traction Details denotes to the length of the Traction Unit. It is a global element that is reused in other Messages hence it is given the generic element name of Length.

Note: The Length element will need to be entered in millimetres and will need to be converted on application level only to metres if it is used in the calculation.

If the “Length” and the “Length of the set of carriages” are both entered, the “Train Length” can be calculated as the sum of the two elements.

If the “Train Length” and the “Length of the set of carriages” are both entered into the message, the “Length” can be calculated as the difference of the two elements: Train Length – Length of the set of carriages

If the “Train Length” and the “Length” are both entered into the message, the “Length of the set of carriages” can be calculated as the difference of the two elements: Train Length – Length

Therefore, as a general rule, at the application level, it will not be required to implement all three elements regarding the weight/length as mandatory elements in the XML. It might be left to the application to calculate one of the three elements – under the precondition that the two remaining elements are entered as mandatory.

13.14.2 Loco Type Number

Even if some principles are shared by most countries concerning the structure (based on the decision 2007/756), there is currently no common coding for the European Loco Type. It can be assumed that each IM is familiar with the Loco Types and its characteristics of its registered customers (the RUs). Therefore, this element will be based on national

basis, defined by each IM or by the Allocation Body. However, this element remains within main structure of the Message as opposed to being in the Network Specific Parameters section – this is because there is likely, at some point in time, to be a European Coding standard. It also serves to keep all traction details together in one section as opposed to splitting the information across the two sections.

In accordance with the specifications of decision 2007/756 (as amended by decision 2012/756), the 12 digits of the element “LocoTypeNumber” are structured as the following composite identifier:

13.14.2.1 Digit 1 = TypeCode1, Value 9 as in Part 0 of the Appendix of the decision 2007/756

13.14.2.2 Digit 2 = TypeCode2, Type of tractive rolling stock as in Part 8 of the Appendix 6 of the decision 2007/756

13.14.2.3 Digits 3-4 = CountryCode, Numerical country code as in Part 4 of the Appendix 6 of the decision 2007/756

13.14.2.4 Digits 5-8 = SeriesNumber, 4 digits representing the type according to the country rules and based on the national vehicle register of the country indicated with the CountryCode

13.14.2.5 Digits 9-11 = SerialNumber, Three digits representing the serial number of the traction of the series. Optionally used in Planning to identify the subseries. Composite identifier should be unique with the series number within a country.

13.14.2.6 Digit 12 = ControlDigit, 1 control digit as usual at the end of the 12-digit UIC identifier. Not used in Planning

First four elements identify the series of the loco, rest can identify the exact individual locomotive or a subseries of the serialNumber depending on the EVN structure in the country. Note that the element LocoNumber or EuropeanVehicleNumber is normally used to identify a defined locomotive or trainset in Train Composition message.

The list of LocoTypeNumber is defined, maintained and published by the Allocation Body or the IM of each country. The storage in the CRD will be studied.

13.14.3 Combined Traffic Load Profile

This element refers to combined load units that can be used for Freight Requests only. There are two entry options:

13.14.3.1 One option refers to “P” (Semi-trailer/road semi-trailer):

P1 requires the code in case the gauge of the semi-trailer is ≤ 2500 mm. P2 requires the code in case the gauge of the semi-trailer is > 2500 mm ≤ 2600 mm

13.14.3.2 The other option refers to “C” (Swap body): C1 requires the code in case the gauge of the swap body is ≤ 2550 mm. C2 requires the code in case the gauge of the swap body is > 2550 mm ≤ 2600 mm

The RUs may indicate the relevant values if they are familiar with the IMs line profiles. In case there is a path request for a train with combined traffic load, the IM should indicate in the Path Details Message the possible max. value for all 4 elements (P1, P2, C1, C2)

13.14.4 Highest planned speed and minimum break weight percentage

Data elements that need to be entered into the Path Details Messages to keep them consistent on their structure referring to IM requirements and information towards the RU. Not to be used in the communication from RA to the IM but only when the IM communicates back to the RA.

13.14.5 Braking weight and Minimum Brake Weight Percentage

Braking Ratio value is entered by the RA in a Path Request whereas the MinBrakedWeightPercentage value is entered by the IM in the Path Details. Both values are integers 1.999.

From a business perspective these elements must be referred to in terms of a % but have to be entered in the Message as a numeric integer value in the range from 1 up to 999 e.g. 11% will be entered as 11

13.14.6 Use of the Train Activity Type and Associated Trains

The list of Activity Type Codes is split into two types: Common European Codes that are available to be used by all countries and National/Company codes that are only relevant to a specific network and to be used in the RA / IM communication only for that network. In both cases the element size will be 4 alpha numeric.

Common European Codes will have the structure as follows:

13.14.6.1 4 Digit Code (numeric) that represents the Code List values for the common activities

National Codes will have the structure as follows:

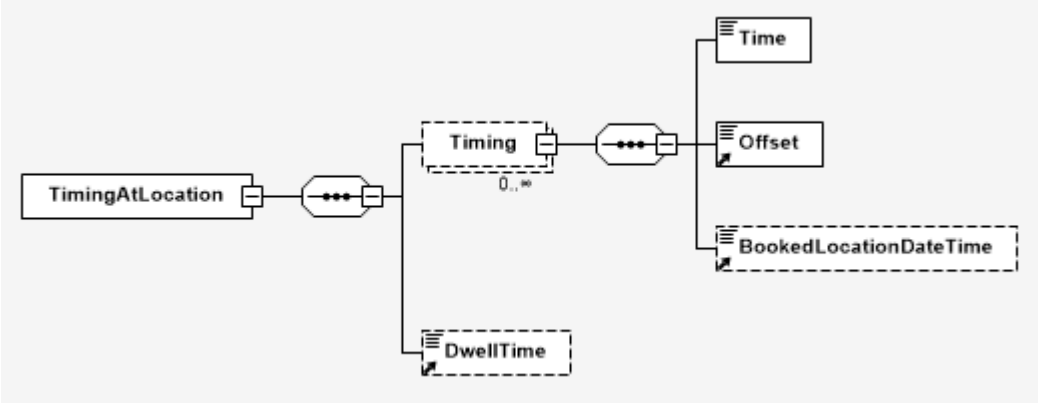
13.14.6.2 The first two characters will represent the country of the network in ISO format e.g. UK

13.14.6.3 The remaining two characters (represented as a numeric) will represent a single unique activity within the network e.g. 01 = Stops shorter than 30 secs

See also chapter 12.9.3

13.14.7 Timing at location

Applicants and IMs can provide the timetable information for locations of the train, path request or path with the “TimingAtLocation” element. Please find below the structure of this element.



The time provided in the Time element is the local time of the corresponding location without indication of the time zone.

As the child element of the Timing, the BookedLocationDateTime is provided. This element should not be used in the path request (planning) process. It is supposed to be used within the Operations procedures for notification about the daily object Path when the path object is transformed from planning to operation. The value of the element should correspond to the “Actual Location Departure/Arrival” timing.
As usual, the locations in the train, path request or path objects can have arrival or departure times. There are even more options. Thus, the meant timing on a location can be specified with a TimingQualifierCode (TQC).

The following codes are available:

- PLA = Public Location Arrival
- ELA = Earliest Location Arrival
- ALA = Actual Location Arrival
- LLA = Latest Location Arrival
- PLD = Public Location Departure
- ELD = Earliest Location Departure
- ALD = Actual Location Departure
- LLD = Latest Location Departure
- ERT = Earliest Run Through
- ART = Actual Run Through
- LRT = Latest Run Through

From the schema point of view, multiple times can be entered for a location, where the company is free to use the TQCs. Of course, logically, one code shall not be used more than once.

In the following paragraphs you will find further explanation of these codes, and how they are supposed to be used by Applicants and IMs.

From the aspect of an Applicant

When an RA is preparing its path requests, it can request the times with the following motivation:

1. No wish for the exact time, but knows when should be there at the earliest
2. No wish for the exact time, but knows when should be there at the latest
3. Clear preference of the time when should be on the location
4. Clear preference of the time when should be on the location, but can be there either a bit earlier or later
5. No wish for the exact time, but knows how long would like to stay on the station

These are all valid use cases, and the RA shall be able to communicate them in its PRM to the IM. The TQCs provide the possibility to specify the times accordingly.

Example 1 – earliest times

With the ELA and ELD, the RA is able to communicate to the IM, what shall be the earliest time (arrival or departure) when the train shall be on the station. They can be used together (ELA and ELD) or individually, depending on the business need of the RA.

Station	TQC	Time	Meaning
Loc A	ELA	11:00	The train shall arrive at the station at 11:00 the earliest. Later option is fine, but not earlier.
	ELD	11:45	The train shall leave the station at 11:45 the earliest. Later option is fine, but not earlier.

Example 2 – latest times

With the LLA and LLD, the RA is able to communicate to the IM, what shall be the latest time (arrival or departure) when the train shall be on the station. They can be used together (LLA and LLD) or individually, depending on the business need of the RA.

Station	TQC	Time	Meaning
Loc A	LLA	11:00	The train shall arrive at the station at 11:00 the latest. Earlier option is fine, but not later.
	LLD	11:45	The train shall leave the station at 11:45 the latest. Earlier option is fine, but not later.

Example 3 – exact times

With the ALA and ALD, the RA is able to communicate to the IM, what shall be the exact time (arrival or departure) when the train shall be on the station. They can be used together (ALA and ALD) or individually, depending on the business need of the RA.

Station	TQC	Time	Meaning
Loc A	ALA	11:00	The train shall arrive at the station at 11:00. Try to prepare an offer as close as possible.
	ALD	11:45	The train shall leave the station at 11:45. Try to prepare an offer as close as possible.

Example 4 – combined

There is no restriction for using always the same kind of TQCs (only earliest, only latest,

only actual). Applicants can combine them. With the combination it's possible to communicate that the train shall be on the station at an exact time, but not earlier or later than the defined timeframe.

Station	TQC	Time	Meaning
Loc A	ELA	11:00	The train shall arrive at the station at 11:10 the earliest. Later option is fine, but not earlier.
	ALA	11:15	The train shall arrive at the station at 11:15. Try to prepare an offer as close as possible.
	ALD	11:30	The train shall leave the station at 11:30. Try to prepare an offer as close as possible.
	LLD	11:45	The train shall leave the station at 11:45 the latest. Earlier option is fine, but not later.

In this example, the IM shall try to give an offer as close as possible to the 11:15/11:30 actual times, but it shall certainly remain in the time window 11:00/11:45 given by the Applicant.

Example 5 – Run Through Times

Note: before placing a path request, the Applicant shall consult the IM, which TQCs are supported.

From the aspect of an IM

The same options are available for the IMs as for the Applicants. However, it might happen that not all the scenarios are supported by a particular IM.

There might be IMs who fulfil only actual times (ALA, ALD) in the Path Details message, but there are IMs who apply more dynamic offers in their tools, and they would include earliest/latest times too.

Public times

Apart from the actual, earliest and latest times, there is an option for exchanging public times. Again, it's up to the bilateral agreement of the Applicant and the IM, but with this TQC they exchange the timetable information that will be presented to the passengers. The public location time may differ from the actual location time. This is relevant only for TAP. For example, it might happen that the train would leave the platform at 8:00 (ALD = 08:00), but to the passengers 7:55 is communicated (PLD = 07:55) and the platform is closed after that time.

Run through times

Depending on the agreement between the sender and receiver of the path request messages, when placing a Path Request the RA may enter the times if the location is the

"run-through" or leave Arrival and Departure blank. On the other hand, when preparing the Path Details, the IM can always enters the times if the location is a run through (depending on its Network Statement)

Either with time or without time, when a "run-through" location is entered, the Activity Type Code 0040 (Run Through) may be used.

From the time point of view, there are dedicated TQCs to provide the run-through time information.

Similar to the usual arrival and departure times, the schema provides the option to include earliest, actual or latest times. By default, in most of the cases, the actual run-through time (ART) will be used by the IMs in the Path Details message, however, there are special cases when earliest or latest options make sense.
It might happen that during a border harmonization an IM communicates the estimated run through times on a state border in a timeframe. The timeframe can be communicated with the earliest/latest options (ERT, LRT).
In Operations, when the IM sends Path Details Message about daily object and then about the train running information, it must use the actual time (ART).

When run-through time and activity type are applied on a location, the dwell time field (next chapter) shall be left empty and no stop-related activity type (commercial, operational, service, shunting, etc.) shall be used.

Example 1 – The RA leaves the Arrival and Departure times blank
The RA includes a run-trough location in a Path Request and has left the Arrival and Departure times blank.

Station	TQC	Time	Meaning
Loc A	-	-	No specific arrival time at this run-through location is required.
	-	-	No specific departure time at this run-through location is required.

Example 2 –The RA provides Arrival and Departure times
The RA has included a run-trough location in a Path Request with Arrival and Departure times.

Station	TQC	Time	Meaning
Loc A	ERT	11:10	The train shall arrive at the run-through location at 11:10 the earliest. Later option is fine, but not earlier.
	LRT	11:20	The train shall arrive at the run-through location station at 11:20 the latest. Earlier option is fine, but not later.

Example 3 –The IM provides a Run-through time (applicable for some IMs)
The IM has a run-trough location in a Path Details Message with a Run-through time.

Station	TQC	Time	Meaning
Loc A	ART	11:10	The train will run through at the run-through location at 11:10.
	-	-	-

13.14.8 Dwell Time

The Dwell Time element is entered in the Path Request to include a required minimum waiting time of the train at a particular location. It is given in the format of a one decimal numeric value whereby the integer part of the value represents the time minutes and the decimal part of the value represents the time in seconds.

The integer value will be represented in minutes only, therefore any dwell time that is in hours (> 60mins) will need to be converted to minutes e.g. 3 hours dwell will need to be represented as 180

The decimal value will be required in all cases (even if there are no additional seconds). Each decimal value represents 6 seconds of time e.g. 0.1 = 6 secs, 0.2 = 12 secs etc... Any other value will have to be rounded to the nearest 6th second e.g. 16 secs will be rounded to 18 seconds and will be represented as 0.3

For example: A Dwell Time of 12mins & 28 seconds will need to be represented as a value 12.5

And indication of a non-zero dwell time on the first or on the last location of a train may be used to request for a minimum delay before or after another (linked) train, requested or already booked by the RU.

When dwell time is fulfilled, and actual arrival and departure are also applied, the dwell time must be consistent with the actual times. Applicant cannot request, and the IM cannot offer longer dwell time on a station than the difference of the actual departure and actual arrival time.

13.14.9 Received on Time

This element, included in the sector messages only, is only to be used for the Long-Term planning purposes (for the annual timetable) in order to indicate whether a request has been placed before or after the deadline for placing request for the annual timetable (working timetable). An RA may place a path request either on time (before the second Monday in April of the year before) in order to “benefit” from the procedure as described in EU Dir. 2012/34, Articles 45 and 46 or may place a late path request (after the second Monday in April of the year before). The IM must indicate if the path request was received

on time. This is mainly a legal issue.

13.14.10 Status of RU/IM harmonization

These two elements in this group identify the status of the harmonisation Interchange harmonised or Handover harmonised – depending on RA or IM respectively.
If it is the Path Request Message from the RA this status reflects that the RA harmonisation has taken place (full or partial or none) in the element Status of RA Harmonization.
If it is the Path Details Message from the IM this status reflects that the IM harmonisation has taken place (full or partial) in the element Status of IM Harmonization.
Status of Harmonisation (Interchange & Handover) is a Global element – needs to be in all Messages within the Short-Term Path Request processes.

13.14.11 Use of Affected Section

This element group will be applied mainly in case of planning activities related to full or partial path cancellation, alteration or path utilisation notification of a path section to show the part of the train journey that has been impacted (= the affected section).

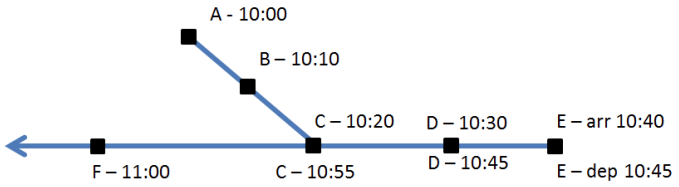
However, before the implementation of the Train ID the Affected Section shall also be used to identify the train (resp. the request) up to the point that it is being booked. This is for the following messages. Path Confirmed (PC) and Path Details Refused (PDR). The affected section is used to relate to the identification of the train in the earlier message(s) so it has to contain the same Train Number with the valid locations than in the earlier message(s). This is similar to the concept before implementation of Train ID described in chapter 8.

Affected section is defined as the first point of section (start point) and the End point of Section (last point), where start point, and end point appear only once optionally with its BookedLocationTime (planning) or BookedLocationDateTime (operation) in the section to avoid ambiguity. Until the Train ID is implemented, the affected section also includes the Train Number (optional afterwards).

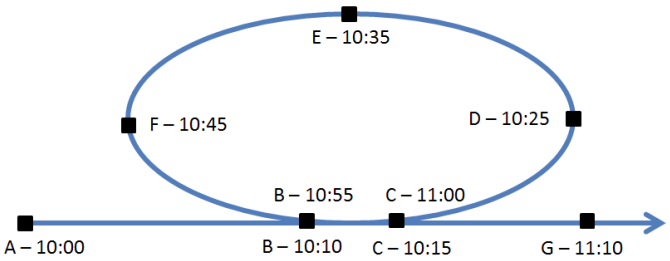
Affected section is also carried in the messages as an array, and therefore serves to indicate which sections are affected as precise as possible. The level of the detail indicated by the array of affected sections can be the same as in the Path Information section of the Path object delivered in the Path Details message.

As the child element of the Timing, the BookedLocationDateTime and/or BookedLocationTime is provided. The first element should be used in operation, the second in planning. BookedLocationDateTime is supposed to be used within the Operations procedures for notification about contracted timetable (daily object Path), when the path object is transformed from planning to operation. The value of the element should correspond to the “Actual Location Departure / Arrival” timing.

BookedLocationTime is supposed to used within the Planning procedures to avoid ambiguity in some special cases, like “U-turn” or “Loop” situation (see them below).



Path = A 10:00 ; B 10:10 ; C 10:20 ; D 10:30 ; E 10:40 -10:45 ; D 10:45 ; C 10:55 ; F 11:00



Path = A 10:00 ; B 10:10 ; C 10:15 ; D 10:25 ; E 10:35 ; F 10:45 ; B 10:55 ; C 11:00 ; G 11:10

13.14.12 Network Specific Parameters

Network Specific parameters are defined by IM in accordance with national conditions/rules where there is no commonly agreed element that fulfils the same business purpose between the various actors. The use of this shall be limited to the absolute necessary minimum.

For example, the element “Network Specific Parameters” in the Affected Section can be used for RA to IM or IM to RA communication after the path had been booked. The IMs may use it in the “Path Not Available” Message

For example, a booked path refers to a train length of 620 m. For a specific period, the train length needs to be limited to 400 m. The RA may use this element as agreed with the IM e.g. in the “Path Utilisation Notification” Message to indicate the train length of 400 m for the period the “Path Utilisation Notification” Message refers to.

13.14.13 Contact Detail

The Sender of a message must have a phone number or E-Mail entered or both. Both are shown as optional, but one has to be completed and shown within the message.

13.14.14 Use of the Error Message

Where there is a problem with the Path Request (note: Error Message is not limited only to path request process, it can be used anywhere within the TAF/TAP framework) an “Error Message” has to be used to communicate back to the RA by the IM. This message includes both functional and technical errors connected to the Path Request.

An Error Code is required to be used in the message. There will be an Error code for each element where a problem has been identified. The error code for the element is obtained

from the code list and is used to identify an invalid or missing element. In addition, there is a possibility to provide additional text along with the predefined code, known as the Error text. The element can remain as blank, does not need to be completed for each Error Code.

Optionally, additional information can be provided in the MessageSenderReference element about the message that caused the error.

The Error Codes have been structured so that it is possible to indicate there is an error with a specific element in the message or within the element group of the message. It can therefore be possible to populate the Error Message with specific errors or errors related to an element group. This will be done at the application level.

In addition, it is possible to enter a textural description of errors within the request message within the FreeText element that is also available. This can be for element specific errors but can also be extended to cover logical errors within the request, e.g. where the train locations do not make sense. Again, this will have to be built at the application level.

The code list of Error Codes element is split into two types: Codes for the Common elements in the Message and codes that are only relevant to the elements within the Network Specific Parameters.

Common codes will have the structure as follows:

13.14.14.1 4 Digit Code starting from 5000

Network specific codes will have the structure as follows:

13.14.14.2 4 Digit Code starting from 6000

These will be national Error Codes related to elements entered into the Network Specific Parameters section that have been agreed by RU/IM and held and maintained on the IM system only. These are not required as a common list.

The current Error Code list is given below in the Annex 10.2 “Important codes”.

Note: the elements of the error message, such as error code, type and severity, are packed into one complex element. This complex element, as already indicated in the 12.11.8, is an array (i.e. can be repeated several times within one message). This is done for the purpose, as explained in 12.11.8, to reduce the effort for the communication about the errors, if multiple errors are related to the same error cause.

Note: ErrorMessage has replaced the “AnswerNotPossible” message. The ErrorMessage as such can be used in any TAF/TAP procedure, it is not limited only to the path request related processes.

13.14.15 Type of Request

The “Type of Request” element indicates the applicable planning process the RA is applying for. Indication of the request type is necessary for IMs to start the corresponding planning process (study, or binding path request or modification of the existing contracted object). Indicating the type of request is mandatory in the PathRequestMessage and PathDetailsMessage, but optional in ReceiptConfirmation (as this just provides additional information about the process from which the receipt is required). The available request types are the following:

- The planning process “Study” is always starting with a PathRequestMessage to request a path study or a study program and is ending with the offer submission with a PathDetailsMessage.
- The planning process “Request” is always starting with a PathRequestMessage to request a path allocation and is ending with the process step “booked” with a PathDetailsMessage, the refusal of the offered path with a PathDetailsRefusedMessage if the RA refuses the path offered by the IM, or the non-availability of an offer neither for the requested path nor for an alternative with a PathDetailsMessage if the IM cannot neither offer the requested path nor an alternative.
- The planning process “Modification” contains modification, alteration or cancellation of a booked path. The process is starting either with PathRequestMessage or with PathNotAvailableMessage and is also ending with the process step “booked” or the refusal of the offered path by the RA with a PathDetailsRefusedMessage if the RA refuses the path offered by the IM. In case of a cancellation the process starts with the PathCanceledMessage sent by RA and is ending with PathDetailsMessage “booked” sent by IM.

13.14.16 Process Type

Please refer to section 12.5.1

13.14.17 Type of Information

The “Type of Information” is used in several messages and are used several times for different purposes. Therefore, the recipient has to know the status which indicates why the message was sent. To recognise to which process does this message fit, and also to which particular process step does this particular message have to be considered. It is Mandatory in Path Request, Path Details and Path Section Notification, optional in Receipt Confirmation.

13.14.18 ReasonOfReference

The ReasonOfReference indicates why a RelatedPlannedTrainIdentifier is mentioned (see also section 12.9.2).

The current list is following :

Value	*Description*	*Rules/additional information*
1000	Same path offer is desired as for stated PathRequestMessage	For a train requested with more than one PathRequestMessage (all with different bitmapdays) the same (or nearly the same) routing and timing at location in path offers for all PathRequestMessages (PathRequestIDs) is desired by Responsible Applicant (if it is possible). RPTID: All others PathRequestIDs
1001	Same path is desired as for stated train/path	For that path request the same (or nearly the same) routing/path elaboration/offer is desired by Responsible Applicant (if it is

		possible) as for stated train/path (may be in a previous period). RPTID: TrainID or PathID
1002	Full replacement of stated previous path	The current path given in PathDetailsMessage will replace the stated path fully after confirming the path offer. The code is used to mark an alternative offer after PathNotAvailableMessage/PathCanceledMessage or path alteration by IM. Calendar of previous path and offered path contain the same dates. The previous path doesn't exist anymore. RPTID: PathID
1003	Partial replacement of stated previous path	The current path given in PathDetailsMessage will replace the stated path partially after confirming the path offer. The code is used to mark an alternative offer after PathNotAvailableMessage/PathCanceledMessage or path alteration by IM only for a part of the previous calendar/traffic days. Calendar of offered path is only part of the calendar of former and changed path. The calendar of the previous path has to changed (less days and shorter validity period) after confirmation of the offered path. RPTID: PathID
1004	Reference to sub train of Y-train bundle	The current PathRequestMessage contains the main train of a Y-train bundle; the TrainID stated in RPTID is for the sub train which will be joined with or splitted of the main train
1005	Reference to main train of Y-train bundle	The current PathRequestMessage contains the sub train of a Y-train bundle. The TrainID stated in RPTID is for the main train with which the sub train will be joined with or splitted of.
1006	Reference to another PathRequestMessage after interruption train's journey by a foreign infrastructure area	The referencing indicates that another PathRequestMessage (specifying PathRequestID as RPTID) for the same train exists after passing a foreign infrastructure area to continue train's journey.
1007	Reference to another PathRequestMessage before interruption train's journey by a foreign infrastructure area	The referencing indicates that another PathRequestMessage (specifying PathRequestID as RPTID) for the same train exists before passing a foreign infrastructure area
1008	Reference to further path offer for the PathRequestMessage	There are more than one path offers for the PathRequestMessage. RPTID: All other PathIDs.
1009	Reference to booked path before interruption by railway replacement traffic by bus	The stated train/path is continued following a railway replacement traffic with that new requested train/path. RPTID: PathID
1010	Reference to a PreArrangedPath	Reference to a PathID of existing PAP, which is to be used by an annual train requested with that PRM. RPTID: PathID
1011	Only the new train object shall be linked with the existing booked path for the specified validity period; no new path elaboration is needed	The code is used, when a new train object has to be linked with an existing booked path for a specified validity period and no new path elaboration is needed. It is used in modification process of planning phase only instead of using UpdateLinkMessage and ObjectInfoMessage. Result: Internal path modification (reduce of validity period of calendar) for previous Path. New path with new PathID for the specified validity period. RPTID: Previous TrainID and PathID

1012	New final offer to former draft offer	Reference to (old) draft offer in case of IM is making a (different) new offer (TypeOfInformation : Final offer). Code is used only in process PathRequest (annual timetable); RPTID : PathID of draft offer
1013	Replaced path after modification by ResponsibleApplicant	Reference to replaced path when IM is making an offer after receiving PathRequestMessage sent by RA for modification of booked path. Code is used only in Path Modification process in PathDetailsMessage. RPTID: PathID
1014	New route	Reference to previous Route replaced by the new Route [subject to CCM WP approval in November 2021]
1015	Updated route	Reference to the Route that is updated [subject to CCM WP approval in November 2021]
1016	Related path request submitted to Pre-booking	Reference to a path request previously submitted to the Pre-booking phase. Applicable for a path request created as a result of the Pre-booking phase.
1017	Reference to another path request/path(offer) after the closure	Reference to indicate the link between path requests or path offers split and connected via a railway replacement service.
1018	Reference to another path request/path(offer) before the closure	Reference to indicate the link between path requests or path offers split and connected via a railway replacement service.
DE01	Reference to an associated empty/transfer train	Stated train is a related train without passengers before or behind the current requested path for a train with passengers. RPTID: TrainID
DE02	Reference to an associated main run	Stated train is a related train with passengers before or behind the current requested path for a train without passengers. RPTID: TrainID
DE03	Notice stated PathRequestMessage	For path elaboration of current PathRequestMessage the stated PathRequestMessage should be considered. RPTID: PathRequestID
DE04	Replacement of stated train	Full or partial replacement of the named former train; example: Change of passenger trainset (like ICE or TGV) by set of loco and wagons in case of technical problems, delay or other reasons. It is not only change of TrainID. RPTID: TrainID
DE05	Reference to a reserved capacity	This code can be used to refer to a study offer (with booking option) as a result of the KFB process (internal process for a specific product of DB InfraGO AG). RPTID: PathID
DE06	Use of same OTN as of stated train	Responsible Applicant wants to use same OTN as in stated train because of all trains are part of same family. The trains have only slightly differences on various days. RPTID: TrainID
DE07	PathID from a framework contract	Responsible Applicant has a booked perennial framework contract with DB InfraGO AG. The RA refers in the PathRequest for the annual timetable on this contract. DB InfraGO AG sends it back in the path offer. RPTID: PathID

13.14.19 TractionMode

Details on the usage of TractionMode and the associated roles of the locomotives in the train are described in the Train Preparation section of the operations part of this handbook. Please refer to chapter 14.1.4.

13.15 Application of the Calendar in the Message

13.15.1 Overview of the Calendar

There is a key business requirement to include calendars into all of the STPR Messages that have been defined. The aim of the Calendar is to provide the recipient of the message with the necessary information on the operational status of the train either during the planning stages or after a train has been booked. For example, to include calendar related changes such as cancellation of days run. The (Planned) Calendar contains

13.15.1.1 A validity period of the calendar defined by a start date and end date

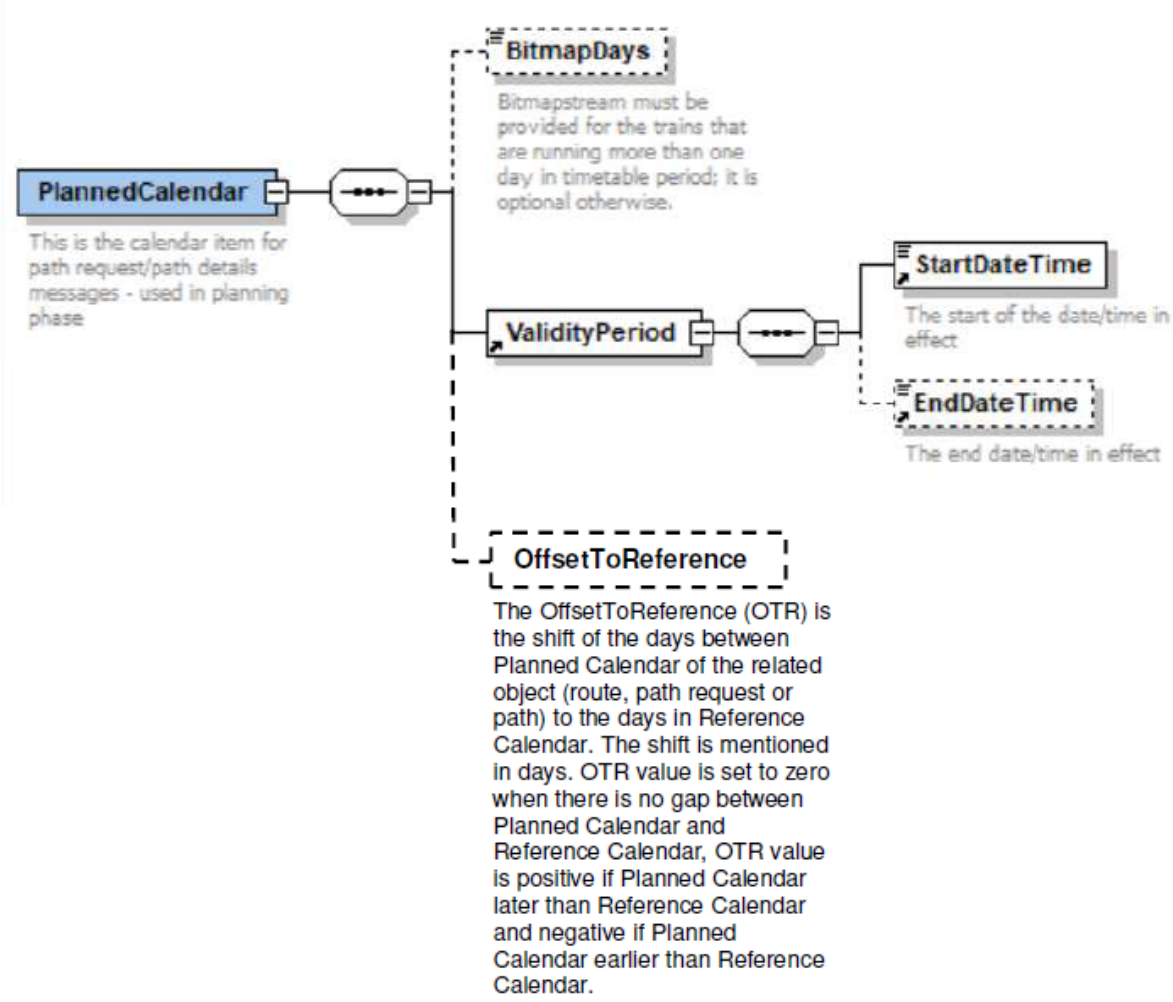
13.15.1.2 A bitmap defining the running pattern.

13.15.1.3 The OffsetToReference (OTR) which permits to define the related Reference Calendar.

The first value in the bitmap corresponds to the start date of the validity period.

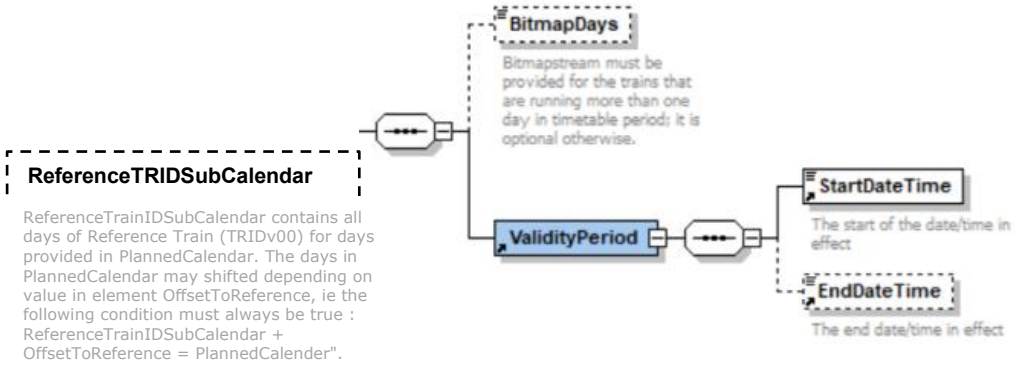
The last value in the bitmap corresponds to the end date of the validity period.

The element Planned Calendar is modeled as :



The PlannedCalendar+OTR is sufficient to retrieve the Reference Calendar of any object Route, Path Request or Path.

Nevertheless, in order to check the consistency, an additional element ReferenceTRIDSubCalendar is exchanged between RUs and IMs. It corresponds to the PlannedCalendar given in the element PathInformation or AffectedSection depending on the respective message (see chapter 8.2.3.6, part iv.).



Nota :

The OffsetToReference and the ReferenceTRIDSubCalendar are temporarily optional to allow backwards compatibility during the transition period as some actors have already implemented the PlannedCalendar without the OTR.

It will be changed to mandatory when the object Route will be implemented (expected in 2023 or 2024 for Yearly Timetable 2024 or 2025).

The planned calendar is used for the following business purpose:

During the processes of booking a path:

- Path Request – The RA requests a path for a train for a path section the message sent to IM will contain two calendars in the message. There will be a:
    - Calendar for the whole journey (linked to the ROUTE object in the TRAIN INFORMATION section).
    - Calendar for the path section requested (linked to the PATH REQUEST object and held in the PATH INFORMATION section).

  Both of the calendars will include the proposed operational dates/pattern of the route and path section respectively. The dates in the ROUTE and PATH planned calendar are defined by the departure time from:
    - The first location of the whole journey for the ROUTE Calendar (contained in the Train Information section)
    - The first location of the path section for the PATH REQUEST Calendar (contained in the Path Information section). The offset of the other locations in path section is calculated from this location
    - As reminder, the Planned Calendar in Route and Path contains the OTR at the first location of Route and Path, which permits to define the related

Reference Calendar and consequently the Reference Day completing the Reference TRID (TRID v00) to ensure uniqueness in operation.

- Error (Answer Not Possible) – If, for whatever reason, the IM is not able to process the path request the message will contain the indication of the logical errors (schedule does not make logical sense) and/or physical message content errors (element in the message is unknown /missing)

- Path Details – If the Path Request is processed by the IM who makes an offer back to the RA the message will contain the PlannedCalendar that is linked to the first location of the Path Information section. It contains
    - the offered operational calendar for the path section that was requested. The RA makes one request with one path section calendar, but the IM could reply offering one or more Path Details message each containing a different path section calendar that complements the originally requested RA calendar (except if there is a date offset between request and offer. In this case the RequestedCalendar element in the Path Details will complement the originally requested RA calendar).
    - the OTR which is changed only if the IM provides a path with 'midnight shifting'. If not the OTR is the same than the OTR indicated in the PathInformation of the PathRequestMessage.

  For example: An RA requests a train service for Mon to Fri in the path section calendar of the Path Request. The IM may offer back two path details messages covering the overall Mon – Fri request with one path details message for the service for Mon to Thu and the other message for the Fri only service.

  If the offered path on Friday starts on Thursday due to midnight shifting (e.g. Path Request with start at Friday 00:10 and Path Details with start at Thursday 23:50), the OTR is then modified by -1.

- Path Confirmed & Path Details Refused – The RA either confirms the IM offer or rejects it the message will contain the path section calendar of the IM from the Path Details Message

After a path has been booked

- Path Cancelled – The RA is able to make a partial or complete cancellation of the booked path the message will contain the calendar that is linked to the first location of the affected section together with the operational dates/pattern the RA wishes to cancel.
- Path Not Available – If the IM has to withdraw an allocated/contracted path (e.g. as a result of a disruption) the message will contain the calendar that is linked to the first location of the affected section together with the operational dates/pattern that the IM has to cancel

Activating/Deactivating a Path

- Path Section Notification with TypeOfInformation for activation and de-activation – For certain networks there is a requirement for the RA to indicate whether a train will run or not against a booked path the message will contain the calendar that is linked to the first location of the affected section together with the operational dates/pattern that have either been activated or deactivated.

Receipt Confirmation

- A calendar will be an optional element in this message which relates to the affected Section. The message will contain the calendar that is linked to the first location of the affected section.

13.15.2 Preconditions for the use of the calendar

The Calendar for Train Information and Path Information in the messages between LRU/RA/RRU and IM are always calculated from the origin of each object (whole journey for Route object, first location of Path or Path Request object) irrespective of Path Planning Reference Location.

The rule for the Offset is always from the Origin Location and offsets in both Train Information and Path Information sections are always calculated from that point forwards. This will result in always a positive offset in all cases.

The Calendar contains the OTR at the first location of TrainInformation (for the Route) and PathInformation (for PathRequest or Path) , which permits to define the related Reference Calendar and consequently the Reference Day completing the Reference TRID (TRID v00) to ensure uniqueness in operation. The OTR is usually null, can be negative or positive in some cases (see 8.2.3.6).

The Reference Location for planning is still the location for which the RA requests that the planning is made from. It remains unchanged throughout the communication with the IM and every participant will need to calculate the calendar at the Reference Location based on the calendar at the Origin Location in conjunction the Offset in the Path Request Message. In the case where the Reference Location needs to be changed by the RA then the revised Reference Location needs to be defined.

13.15.3 Calendar used in section related Messages

For all of the messages related to an affected section within a Path the calendar is used linked to the start location of that section. That is, OTR gives an information about the shift of the calendar days that apply at start location of affected section structure to the ReferenceCalendar.

The affected section can be for the whole path section or part of a section.

Offsets will not be required to be calculated for these messages as no specific locations are identified in these messages – only the start and end of a section are provided in the

message.

The messages that are based on the affected section are:

13.15.3.1 Path Confirmed

13.15.3.2 Path Cancellation

13.15.3.3 Path Details Refused

13.15.3.4 Path Not Available

13.15.3.5 Generic sector message Path Section Notification

13.15.4 Rules related to the Calendar Element

13.15.4.1 Both the Start Date and End Date are mandatory elements and must be present with a date that is within the Timetable period

13.15.4.2 Bitmap Days elements is a mandatory element and need to be included along with the Start date.

13.15.4.3 The Bitmap Days is a string of values where 1 represents a day that the train will run and 0 represents a day that the train will not run Each value signifies a day between the Start and End Date

13.15.4.4 Where a specific pattern is needed (e.g. running every Friday) or the train is running more than one day a Bitmap must be included in the message to reflect that pattern

13.15.4.5 If there is a Bitmap days string

13.15.4.5.1 The size of the string for Bitmap days must equal the number of days between Start Date and End Date inclusive and cannot be more or less. If the pattern is different than this will give rise to an error

13.15.4.6 If the Start and End Date are the same

13.15.4.6.1 Then the Bitmap String will still apply even though the train is only running for one day

13.15.4.7 Midnight crossing: The midnight crossings are handled by the Offset element in the PlannedJourneyLocation/TimingAtLocation. If the offset is greater than 0 for the particular location, the legacy systems have to recalculate the bitmap stream accordingly (offset to the reference location). The offset is expressed in days.

13.15.4.8 The Calendar used in TrainInformation and PathInformation contains the OTR at the first location of Route and Path, which permits to define the related Reference Calendar and consequently the Reference Day completing the Reference TRID (TRID v00) to ensure uniqueness in operation. The OTR is usually null, can be negative or positive in some cases (see 8.2.3.6). If no OTR is indicated that means that OTR=0.

13.15.5 Rules related to the Calendar of the Route

- The Route calendar sent to the IM after initial RU harmonisation can be the longest

calendar in sum of the calendars for the journeys described by the Path Requests (each individual PR or the set of PRs after harmonisation) and consequently the related Paths Details.

- No Route update in the past, only for the future.
- It can happen that after path booking, even if the Route is unchanged, the Route calendar is different than the sum of the booked paths calendars due to lack of capacity for some days. In this case the LRU decides either to shorten the initial Route calendar (recommended) or to let the calendar unchanged (so long no other Route is requested for the 'available days').
- It can happen that after path booking, the initial Route is partially or totally changed. In this case see section 12.8.9.
- If the Route calendar is extended, it is recommended to create a new object Route (new variant) for the additional calendar.
- It can also happen that the Origin, Handover, Destination is changed.
- The LRU shall update the Route according to the Route Update Process.
- The calendars of two Routes attached to the same TRIDv00 cannot have same days, especially after paths booking, an update of the initial Route calendar and the creation of a second Route is mandatory. 'Calendar' is meaning the associated Reference Calendar (or the Planned Calendar + OTR).

13.15.6 Using the calendar element

Following examples is for showing the use of the different calendar elements. They are only seen as support for exemplifying for implementation and are not covering all scenarios. Each IM and RA is responsible for correct implementation of these functionalities in their national applications so all situations according to national allocation rules are covered.

In all following examples start day and Reference day are the same.

Train running for one day

- Start Date = 1/1/12 End Date = 1/1/12
- Number of Days the train will run = 1 day
- Bitmap Days = "1"
- OTR = 0

Train running for all days for a period

- Start Date = 1/1/12 End Date = 6/1/12
- Number of Days the train will run = 6 days
- Bitmap Days = "111111"

- OTR = 0

Train running for all days for the rest of the Timetable

- Start Date = 12/11/12 End Date = (8/12/12)
- Number of Days the train will run = 27 days
- Bitmap Days = “111111111111111111111111111”
- OTR = 0

Train running daily except Sundays for the rest of the Timetable
(O denotes the days the train will not run

13.15.6.1 Start Date = 12/11/12 End Date = End of Timetable (8/12/12)

13.15.6.2 Number of Days the train will run = 24 days

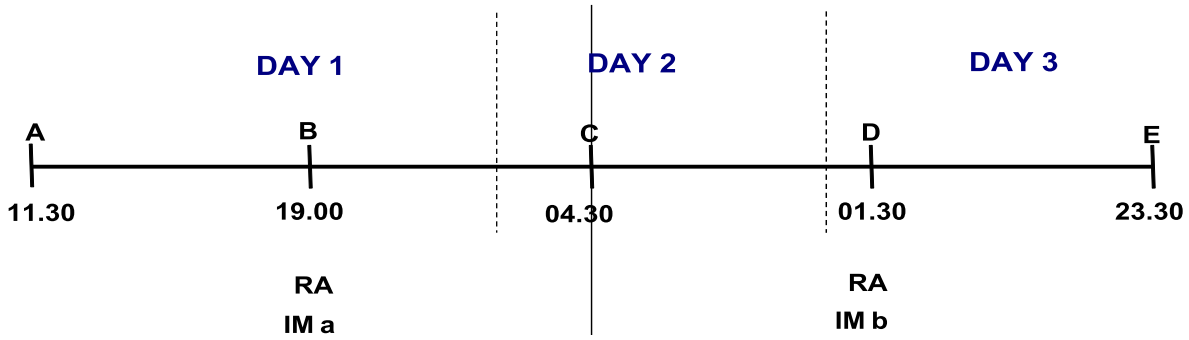
- Bitmap Days = “111111011111101111110111111”
- OTR = 0

13.15.7 The use of the Calendar for a Path Request

The application of the Calendar can best be described by the following scenario that shows its interaction within the message.

Situation

A path for a train is requested from location A to E passing through two different path sections. The Handover location is at location C which is also the Reference Location in this case. The train travels for 3 days leaving Location A on Day 1 at 11.30, passing across midnight and reaching Location C at 04.30 on Day 2 and then passing across midnight and reaching Location D at 01.30 on Day 3. The train finally reaches its destination Location E at 23.30 on Day 3.



Preconditions

13.15.7.1 This is an Open Access Model with one RA and two IMs (IM a, IM b)

13.15.7.2 A single train has been requested to start on the 30th of July 2025 and to arrive on the 1st of August 2025

13.15.7.3 The train travels across 3 day leaving A on Day 1 at 11.30 and arriving on Day 3 at 23.30 (based on the RA requested timetable)

13.15.7.4 The train is offered back with one Path Details Message per IM (IMa and IMb)

13.15.7.5 Location times arrival and departure will be treated as the same for request and offer

13.15.7.6 The Path Request is correct and contains no logical or physical errors

13.15.7.7 All train activities and other preconditions have been ignored in this scenario

Approach

The aim of this approach is to provide efficient RA/IM communication where a train is being requested and offered. In particular this scenario shows how the Calendar and offsets will work together.

Message

RA -> IMa

Path Request Message

RA populates Train / Path Information with proposed Locations (TrainInfo and PathInfo) / Times (PathInfo)

RA populates the two Calendars in Train Information &
Path Information Path Planning Reference Location is
Intermediate Location C

Offsets in Train (Route) / Path Information are calculated from first Location (Journey / S

OTR in Train (Route) / Path Information are calculated according the Reference Calendar (30/07/2025)

Train Information (Route)				***Path Information***			
Path Planning Reference Location							
C							
Planned Calendar				**Planned Calendar**			
	Start Date		30/07/2025		**Start Date**		30/07/2025
	End Date		30/07/2025		**End Date**		30/07/2025
	Bitmap Days		1		**Bitmap Days**		1
Planned Journey Locations				***Planned Journey Locations***			
Location	**Time**	**OTR**	**Offset**	**Location**	**Time**	**OTR**	**Offset**
A		0	0	A	11.30	0	0
				B	19.00		0
C			1	C	04.30		1
E			2				

RA -> IMb

Path Request Message

RA populates Train / Path Information with proposed Locations (TrainInfo and PathInfo) / Times (PathInfo)

RA populates the two Calendars in Train Information & Path Information Path Planning Reference Location is Intermediate Location C

Offsets in Train (Route) / Path Information are calculated from first Location (Journey / S

OTR in Train (Route) / Path Information are calculated according the Reference Calendar (30/07/2025)

Train Information (Route)				***Path Information***			
Path Planning Reference Location							
C							
Planned Calendar				**Planned Calendar**			
	Start		30/07/2025		**Start**		31/07/2025
	End		30/07/2025		**End**		31/07/2025
	Bitmap		1		**Bitmap**		1
Planned Journey Locations				***Planned Journey Locations***			
Location	**Time**	**OTR**	**Offset**	**Location**	**Time**	**OTR**	**Offset**
A		0	0				
C			1	C	04.30	1	0
				D	01.30		1
E			2	E	23.30		1

RA Populated	
IM a Populated	
IM b Populated	
Offset calculated	

IMa -> RA

Path Details Message

IM populates Path Information with offered
Locations / Times Locations / Times and
Calendar remain unchanged by the IM

Offsets in Path Information are calculated from first Path Location in the Section

OTR in Path Information are calculated according the Reference Calendar (30/07/2025)

Path Information			
Planned Calendar			
	Start		30/07/2025
	End		30/07/2025
	Bitma		1
Planned Journey Locations			
Location	**Time**	**OT**	**Offset**
A	11.30	0	**0**
B	19.00		0
C	04.30		**1**

Unchanged

Original Path Request			
Planned Calendar			
	Start		30/07/2025
	End		30/07/2012
	Bitma		1
Planned Journey Locations			
Location	**Time**	**OT**	**Offset**
A	11.30	0	**0**
B	19.00		**0**
C	04.30		**1**

IMb -> RA

Path Details Message

IM populates Path Information with offered Locations / Times Locations/Times and Calendar are changed by the IM

Offsets in Path Information are calculated from first Path Location in the Section

OTR in Path Information are calculated according the Reference Calendar (30/07/2025)

Path Information			
Planned Calendar			
	Start		31/07/202
	End		31/07/202
	Bitma		1
Planned Journey Locations			
Location	**Time**	**OT**	**Offset**
C	04.30	1	**0**
D	01.30		1
E	23.30		**1**

Unchanged

Original Path Request			
Planned Calendar			
	Start		31/07/202
	End		31/07/202
	Bitma		1
Planned Journey Locations			
Location	**Time**	**OT**	**Offset**
C	04.30	1	**0**
D	01.30		**1**
E	23.30		**1**

RA	**Populated**
IM a	**Populated**
IM b	**Populated**
Offset	**calculated**

13.15.8 Application of the Calendar in the Affected Section

This element group will be applied only in case of planning activities related to the full or partial path cancellation, alteration or path utilisation notification of a path section.

Affected section is defined by the first location within the path section (start point) and the end point within the path section (end point). The start point, and end point could be all or part of the path section. The Start, End and Bitmap elements are mandatory in the Calendar). The calendar of the Affected Section must be consistent with the calendar that has been offered or allocated in the Path Details message. It will be the one linked to start point of the affected section.

13.16 Handling of Handover in Border Sections

This section provides information on how messages will need to be applied for certain situations crossing network borders.

A border section is a special section between two IM's. The problem is the differences between IM responsibilities. Some border sections can have different definitions of where the responsibility lies. This is the:

- Legal responsibility between IM's for interoperable traffic

  The network border is a point where legal responsibility changes between the IMs (this is the handover point). This can be but does not have to be in conjunction with a state border.

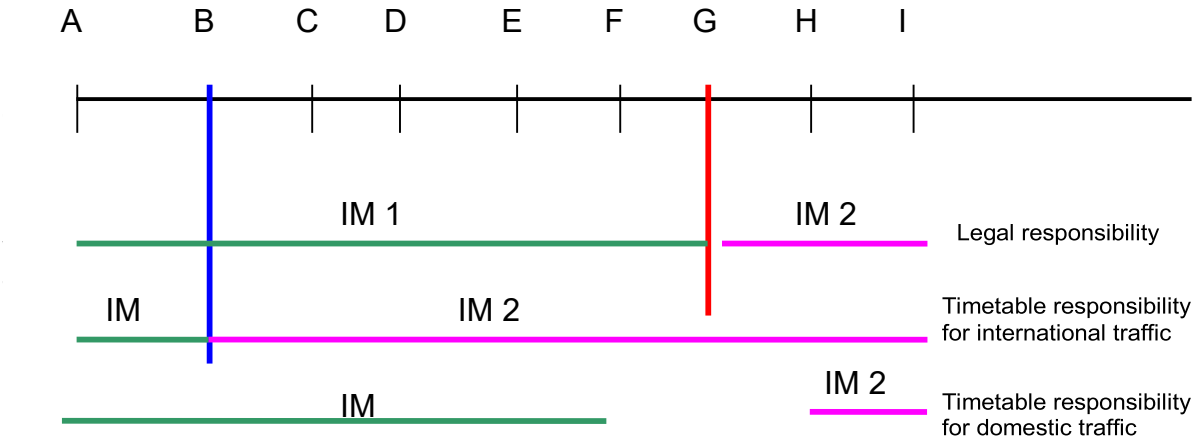
- Timetable responsibility between IM's for interoperable traffic

  This is the point where there is a change to the timetable responsibility. This can be a mutual border point agreement between the IM's.

In some cases, the border section can consist of one or more points which are important for both of the IM's. Those points can have an implication for interoperable or domestic traffic. If more than one IM is involved in the path request and allocation process, the coordination of the border points is needed. For this purpose, the sector recommends using the "sector-only" message Path Coordination.

This can be shown using the following example.

Required parameters are missing or incorrect.



border between two IMs on a state border

The Path Information element will contain[9]:

- the timetable responsibility points (intermediate)
- the sections between the origin and timetable responsibility point (if origin is in the

[9] There is an ongoing activity of the Telematic Expert Groups for handling of the border, interchange and handover points. If the new results will be conducted, the Sector Handbook is going to be updated accordingly.

network section)

- the sections between the timetable responsibility point and destination point. (if destination is in the network section)

- all the sections need to carry the indication “ResponsibleIM” in order to differentiate which section is operated by which IM. The Path Information element will have all mutual agreed points from the border section (especially state border point where is changed legal responsibility between IM’s and often between RA too). This solution solves the problem how to have the necessary information for both IM’s and both RA for every type of border section.

13.17 Usage of Identifiers in Planning Related Messages

The explanation on how to utilize the concept of new identifiers in planning related messages is given in the UML model attached to this Sector Handbook. The following UML diagrams are recommended (in the folder “Business Process Model/Business Use Cases/Planning/Handbook Planning):

. 4.6 Planning

. 4.7 Utilization Notification

. 4.8 Planning Y-Traffic

13.18 Re-planning

Reserved

Part C Operation of Trains

14 General Information

The following chapters describe the messages used in the operations phase and the modalities of their exchange. Guidelines on the message exchange in incident management in operations are laid down in Annex 13 (Business Cases Operations).

14.1 Data sharing with involved stakeholders for Freight traffic

TAF TSI (regulation 2021/541) states in chapter 4.2:
In addition to the provisions from the Chapter 4 and its sub-chapters every stakeholder may exchange the messages according to Chapters 4.2.2.3 (only during operation or preparation of train operation) [Path Details], 4.2.4.2 [Train Running Forecast], 4.2.4.3 [Train Running Information and Train Delay Cause], 4.2.5.2 [Train Running Interruption], 4.2.6.3 [Wagon ETI/ETA] and 4.2.6.4 [Alert message] with other stakeholders involved in the same freight service, under the condition that the stakeholders are identifiable. These exchanges of messages may be charged by the sender.

Nota:
- ‘May exchange’ means each stakeholder may decide to exchange (or not) the messages to another stakeholder on request.
- ‘The stakeholders are identifiable’ implies that they have received a Company Code.
- The exchange can be charged e.g. if the message is adapted before sending to the other stakeholders.
- Wagon ETI/ETA message and Alert message are not subject to this document and are subject to RU/RU data exchange

14.2 Use of some key elements in operations messages

The following key elements are used in various in operations messages and are to be used as described here:

- ScheduledTimeAtHandover = The scheduled date and time of departure or entrance at the network border between two different IMs
- ScheduledDateTimeAtTransfer = The scheduled date and time of arrival or exit at the network border between two different IMs
- TransferPoint = Last location on a network (network border)

The most recent information available shall be used to populate these elements (e.g. for rescheduling of trains).

15 Train Preparation

15.1 Train Composition

ResponsibleRU sends the train composition message to all relevant IMs, with which the ResponsibleRU operates for a journey section within a path contract if IM contractually requires receiving TCM. In case the train is taken over as a whole by the next RU, the Responsible RU shall send the Train Composition to the next Responsible RU.
Responsible RU should send TCM to IM before departure of the train from origin or before it will enter the network, unless National rule, Network statement or contract states otherwise.
Whenever there is a change in the composition during the journey of a train, the Responsible RU has to update this message to all parties involved. Compliance with TAF/TAP TSI requirements cannot be regarded as compliance with safety requirements unless agreed otherwise by IM and RU. Therefore, values given in the message will have no impact on the safe operation of a train, unless stated by national rules or Network Statement. ResponsibleRU is however always responsible for providing the exact and up-to-date composition of its trains.
Freight Train Composition Message is mandatory according to TAF TSI. Passenger Train Composition Message is optional and it is subject to companies' agreements.

15.1.1 ResponsibleRU informs the IM, SM and next RU about restrictions on the rolling stock

The ResponsibleRU must inform the IM of any modification or anomaly to the characteristics of the train affecting its performance or affecting the ability to accommodate the train in its allocated path (§ 4.2.2.7 and § 4.2.3.3.2 of OPE TSI decision 2012/757), e.g. any operational restrictions on a vehicle concerned (gauge, speed restrictions, etc.). Based on local rules this could be done using the TAF TrainComposition message/ TAP PassengerTrainComposition message. According to agreed rules, the ResponsibleRU could also inform involved RU(s) and/or SM(s) of any modification or anomaly affecting the access doors, internal fitting and comfort requirement, or in case of non-availability of commercial services that were planned.

In this chapter, the word "restriction" could concern:

a) any modification in the train composition that prevents the train to run according to the allocated path (e.g. addition of a coach with lower maximal speed than the planned speed)
b) any anomaly or defect that implies specific disposition in the train preparation, access to network authorization, train run
c) any anomaly or defect that heavily decrease the level of services offered to the passengers (e.g. air conditioning failure in summer).

For the restrictions a) and b), the process between ResponsibleRU and IM of information exchange and route continuation/alteration has to be according to network statement. The RU must follow the operational process, if not available the RU has to wait for the feedback of the IM before running the train.

The information about restriction is transmitted prior to departure and during the journey according to agreed rules (which define the timing) from ResponsibleRU to IM and/or from ResponsibleRU to the involved RUs and/or from RU to the SM, depending on the kind of restriction.

15.1.2 Passengers Train Composition – Complement on Unit identification and Unit description

Unit identification

The units composing the train can be identified by their type or by their number.

The type is indicated as following:

- For locomotive and (tractive) trainset, the type is the element LocoTypeNumber ;
- For coach or hauled passengers composition (without motors), the type is the element HauledTypeID.

The number of the unit is:

- For individual vehicle: the European Vehicle Number;
- For tractive trainset or hauled passengers composition: the Trainset ID (number identifying the trainset/composition as a whole and usually indicated in front and rear of the trainset/composition);
- If the TrainsetID is used, the LocoTypeNumber or the HauledTypeID shall be mandatory filled to ensure the unicity.

For energy settlement, the EVN of the tractive unit(s) shall be sent by the RU to the IM.

For (tractive) trainset, the composition message can send simultaneously:

- The trainset type (LocoTypeNumber) and the TrainsetID, commonly used in operation and traffic management;
- The EVN of all vehicles composing the trainset, to be used by the IM in the energy settlement process.

Unit Description

There are two manners to describe the units of a passenger train, especially when trainsets are used:

- either vehicle per vehicle (UnitCount = 1), all vehicles (tractive, hauled, incorpored in a trainset or in a fixed hauled composition) are listed;
- or trainset per trainset (UnitCount = 2), each trainset is considered as a whole; for fixed hauled composition pushed/pulled by a locomotive, the fixed hauled composition is one unit and the locomotive is another unit;
- if the composition is described per trainsets, the list of all vehicles can be provided via the element EuropeanVehicleNumber, e.g. for energy settlement purpose.

Example

TGV Duplex, type 93 87 0029000, trainset number 239, composed by 10 vehicles with EVNs:

93870029077-9, 93870291737-9, 93870292737-8, 93870293737-7, 93870294737-6, 93870295737-5, 93870296737-4, 93870297737-3, 93870298737-2, 93870029078-7

If UnitCount = 1 (vehicle), then:
NumberOfUnits = 10
UnitData = 10 occurrences (one for each vehicle)
UnitData / UnitIdentification / EuropeanVehicleNumber = the EVN of the vehicle which is described

If UnitCount = 2 (trainset)
NumberOfUnits = 1
UnitData = 1 occurrence (the trainset is considered as a whole)
UnitData / UnitIdentification / LocoTypeNumber = 93870029000
UnitData / UnitIdentification / TrainsetID = 239
UnitData / UnitIdentification / EuropeanVehicleNumber = the list of the 10 EVNs above

15.1.3 Description of the element TractionMode

The TractionMode refers to the role and the position of a power unit inside a train. A power unit is a self-propelling train or a traction unit according to the definition of the LOC&PAS TSI.

First digit (traction role):

- Role 1 (train traction in the front of the train) indicates that the relevant group of power units is in front of the train.
- Role 2 (intermediate traction) concerns power units that have not one of the four other roles.
- Role 3 (banking locomotive) is allocated to a locomotive (or other powered vehicle) coupled to the train that temporarily helps a train with additional power or traction to climb a gradient or bank.
- Role 4 (banking locomotive not coupled) is allocated to a locomotive (or other powered vehicle) not coupled to the train that temporarily helps a train with additional power or traction to climb a gradient or bank.
- Role 5 (train traction in the rear of the train) is allocated to power units at the rear of the train and remote controlled from the front.

Second digit (position in group of traction units with the same role)

A *group of power units* is defined as: “Set of consecutive power units with the same role, the intermediate traction power units could be not consecutive”.

Examples:

Active power unit
Wagon or Coach

Examples	Veh.1 (front)	Veh.2	Veh.3	Veh.4	Veh.5	Veh.6	Veh.7	Veh.8	Veh.9	Veh.10 (tail)
2 locomotives in front	11	12								
1 locomotive in front 1 intermediate locomotive 1 remote controlled locomotive at the rear	11				21					51
1 locomotive in front 2 intermediate locomotives in the middle	11					21	22			
3 locomotives in front 2 locomotives for banking coupled to the train	11	12	13						31	32
2 locomotives in front 2 locomotives for banking coupled to the train 2 locomotives for banking not coupled to the train	11	12					31	32	41	42
1 locomotive in front 1 intermediate locomotive in the first half 2 intermediate locomotives in the second half	11			21		22	23			
Push-pull passengers train with 2 remote controlled locomotives at the rear	Vehicle with driving coach								51	52
Push-pull passengers train with 2 locomotives at the front	11	12								Vehicle with driving coach
Passengers train with 2 trainsets of 5 vehicles	11					12				

15.1.4 Train composition and energy settlement

Sector associations signed in November 2020 the ‘EU railway sector declaration on traction energy metering and settlement’. According to the declaration, the RUs commit ‘to deliver to the IM train compositions (including EVNs of all traction units) by 2023. This shall be done preferably at departure of train-run and latest 48 hours later’.
Therefore, the Freight or Passenger Train Composition message sent by the RU to the IM must contain:

- either the EVN of the tractive rolling stock (element LocoNumber in TCM, element EuropeanVehicleNumber for PTCM);
- or, for passenger trains composed by trainsets and under agreement with the IM, the type of the trainset (element LocoTypeNumber) and the identifier of the trainset (element TrainsetID).

If the EVN of the tractive rolling stock is not available, the rolling stock type (element LocoTypeNumber) must be sent.

Handling of message status

Use of element message status:

1 (creation) = new message

2 (modification) = can be used (if used, provided information about composition of train for specified journey section(s) in TCM with message status = 2 replaces information for these section(s) provided in previously sent TCM(s))

3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for deletion – i.e. the content of SenderReference of the message with status 3 shall be the same as the original one with status 1, that shall be deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be deleted can also be found by its content, which should be identical except for the MessageStatus. Key elements to identify a message are: TrainOperationalIdentification/ OTNIdentifier, JourneySection.

15.2 Train Ready message

According to TAF/TAP TSI, the ResponsibleRU shall send a ‘train ready’ message to the infrastructure manager every time a train is ready to start after train preparation, unless under national rules the infrastructure manager accepts the timetable as a ‘train ready’ message. In the case of combined transport, the Terminal Operator shall send a ‘train ready’ message to the RU every time a wagon set is ready to start. The RU providing traction to the IM entry point shall send the ‘train ready’ message to the RU operating the train service on the IM network (ResponsibleRU).
In addition, other existing standards (e.g. GSM-R) may be used for the same purpose if there is a specific agreement between the parties involved.
Acceptance of the timetable as TrainReady message means the IM assumes the train to

be ready for departure when the departure time is reached and ResponsibleRU did not report any problems. In this case, the ResponsibleRU shall inform the infrastructure manager and, if applicable, the station manager if the train is not ready as soon as possible.

Local rules specify how long before the departure a “train ready” messages has to be sent.

15.2.1 Content of the message

OTN is mandatory in this message as it is used for verbal communication between RU/IM/SM/terminal staff.
If the TrainReadyStatus element is not used, the IM shall assume the train to be ready.

Handling of message status

Use of element message status:

1 (creation) = new message

2 (modification) = not used for changes to TrainReadyStatus (if used, it shall be handled like status 1)

3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for deletion – i.e. the content of SenderReference of the message with status 3 shall be the same as the original one with status 1, that shall be deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be deleted can also be found by its content, which should be identical except for the MessageStatus. Key elements to identify a message are: TrainOperationalIdentification/ OTNIdentifier, TrainLocation, TrainReadyStatus

16 Train Running Information and Forecast

16.1 Process triggering the Train Running Information message

The IM has to provide train reporting at appropriate reporting points indicating actual time and the delta-time value (as described in OPE TSI § 4.2.3.4.2.1). This message is sent to the ResponsibleRU to inform RU controllers.

The IM sends to the ResponsibleRU a Train Running Information message as soon as the train reaches/leaves:

- origin,
- destination,
- handover points,
- interchange points,
- other contractually agreed reporting points.

Reporting at additional points than the agreed ones can be sent by the IM to the ResponsibleRU.

The time limit to send the message after the train has reached the reporting point is defined by national rules or contractual agreement. In practice, the sending is done in “real time” in case of electronic tracking and tracing systems.

16.2 Running Status Report Message

Process triggering the Running Status Report Message

This message can be used in data exchange between Railway undertakings, Infrastructure Managers, Wagon and Container operators for real time information about moving objects like Wagons, Containers or Swap Bodies. It is based on GNSS (Global Navigation Satellite System) such as Galileo or GPS. Satellite navigation devices on objects determine their location in real time (longitude, latitude, and altitude/elevation) to high precision (within a few centimetres to meters). Besides other advantages, this message can close the real time information gap in areas, where no other real time information is available.

The message is composed of multilevel structure of optional and mandatory elements.

Content of the Message

As this message can be used for several moving objects, only some elements are mandatory to be able to cover all use cases. Several optional elements can be used to cover the needs of the involved stakeholders.
The optional elements of the TrainsportDeviceID varies between Operational Train Number, Loco Number, European, Vehicle Number, Wagon Number Freight up to Load Unit Number to cover Load Units (Container, Swap Bodies …) as well.

Besides the message header and the Message Status these are the mandatory elements.

- TelematicDeviceID – ID of the Tracking Device on the Transport Device
- TransportDeviceID – Type and Identification of the object that is tracked by the telematic device

Geolocalisation – information about reported location

16.3 Process triggering the Train Running Forecast message

The IM sends to the ResponsibleRU a Train Running Forecast message as soon as the train reaches contractually agreed reporting points and/or the forecast delay (increasing or decreasing) varies more than an agreed threshold to deliver a forecast time for:

- destination,
- handover points,
- interchange points,
- other contractually agreed points.

Each IM provides forecasts for points for which it is responsible for traffic management. This implies that the forecast time can be defined. If not, a Train Running Interrupted Message is sent. The message can also be sent before the train starts running.
The message is also sent by the IM to the next IM involved in the train run, details of sending conditions can be defined in a bilateral agreement. The time limit to send the message after the train has reached the reporting point is defined by national rules or contractual agreement. The method to calculate the forecast time is defined by each IM.
By contractual agreement, this message can also be sent from ResposibleRU to the IM.

If agreed, the message shall also be sent from ResponsibleRU to the next ResponsibleRU/LeadRU for the estimated time of interchange (change of responsibility for the train).

In the case of combined transport under contractual agreement, the LeadRU/ResponsibleRU shall ensure the Train Running Forecast message is provided to the Terminal Operator.

16.4 Information to the Station Manager

According to TAP TSI, the Station Manager receives Train Running Forecast messages and Delay Cause messages.
These messages are sent in due time under contractual agreement by:

- IM to SM or
- by IM to RU and then RU to SM (depending on national railway organisation) according to contractual agreement. The RU may change the value of the message before passing the message on to the SM.

16.5 Content of the messages

The element LocationDateTime is populated with the actual time in the Train Running

Information message and populated with the forecasted time in the Train Running Forecast message.

<u>For both messages:</u>

The planned time of a train at the reporting point can be specified in

16.5.1 ReferencedLocationDateTime: contains the date and time which IM and RU commonly reference to e.g.as the goal/target on how the train should run if there are no incidents. This usually is the date and time indicated in the path contract. Planned connections or penalties for delays might for example be managed on this basis.

16.5.2 BookedLocationDateTime : contains the most recent planned date and time including re-planning in planning and operations phase, which is the date and time of the last PathDetailsMessage status “booked”.

If no re-planning has taken place, both elements contain the same datetime.

If the delay (actual/forecasted) is given in the TrainDelay section, the element AgainstBooked is used to indicate the delay according to the (last) booked timing. The AgainstReferenced is used to indicate the delay to the originally planned timing.

Pattern for the delta-t value in the TrainDelay element as listed below (examples):

- (+0024) indicating the train is running with 24 min delay
- (-0023) indicating the train is running 23 min before schedule
- (-0000) indicating the train is running on time
- (+0000) indicating the train is running on time
- if the element is not given, the delta t value is not known

With the schema version 3.x and above the TrainRunningForeast message can report multiple locations though the element TrainLocationReport. Forecast for missing locations in sequential messages for the same train run should not be considered as canceled, ensuring that the previous information remains valid unless explicitly canceled (with status 3).

<u>Handling of message status</u>

Use of element message status:

1 (creation) = new message

2 (modification) = not used (if used, it shall be handled like status 1)

3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for deletion – i.e. the content of SenderReference of the message with status 3 shall be the same as the original one with status 1, that shall be deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be deleted can also be found by its content, which should be identical except for the MessageStatus. Key elements to identify a message are: Location, LocationStatus, LocationDateTime, TrainOperationalIdentification/OTNIdentifier.

In case a previous TrainRunningForecast message for the same train included more than one TrainLocationReport, the deletion message is valid only if the same list is provided – or use of SenderReference. Partial deletion aren't accepted and will trigger ErrorMessage in reply.

16.6 Accuracy of train running forecast information

16.6.1 Background and purpose of Forecasts and ETAs for planning operations

Train running forecast information serves to plan onward operations in a specific train service or for onward connections either by rail or other transport modes. As the train forecast information is an estimate, any operator, who intends to use the information for planning the onward connection, needs to be aware of the level of accuracy and reliability of the information.

16.6.2 References to Forecasts and ETAs in TAF-TSI

TAF TSI defines the Train Running Forecast message as having the purpose to carry information about estimated time of trains at forecast points and to give the forecast time for agreed forecast points. As of 2022 the TAF TSI will also prescribe that it should be possible for the recipient of the train running forecast information or of an Estimated Time of Arrival (ETA), Estimated Time of Interchange (ETI), or Train Estimated Time of Arrival (TETA), which is computed and shared with stakeholders, to assess its accuracy and reliability. The terminology and principles for such assessment are summarised in Annex IV of the TAF TSI. Against this background this chapter in the joint sector handbook elaborates on the definition, computation and use of qualifiers for forecast information.

As regards the use of the Train Running Forecast messages the TAF TSI specifies that Infrastructure Managers (IMs) must send this message to Railway Undertakings and neighbouring IMs. In practice the message is resent when there is new information on the forecast time of arrival. Evidently train arrival information consists of estimates, which get more accurate as the train approaches. The practice is further that on international trains there will be several IMs sending Train Running Forecast messages to the RUs involved. Moreover, the TAF TSI also specifies that the Lead Railway Undertaking (LRU) must send train running forecast information to the customer and to the Terminal Operator.

The train running forecasts are in their simplest form computed as the time originally planned in the timetable plus or minus the deviation from the timetable as accrued in the course of a train service, the so-called linear time shifting method. This method is commonly applied by Infrastructure Managers, besides their own forecast methods. Railway Undertakings may apply also other methods. Additionally, algorithms using e.g., artificial intelligence may be applied to compute forecasts.

All in all, this makes that there are series of forecast messages with varying accuracies from different sources for every train run. The TAF TSI therefore specifies since 2022 that the recipient of a forecast must be able to assess the source and reliability of the information.

16.6.3 Examples of Forecasts and ETAs used by operators/planners

Examples are presented for operators, which work for IMs, RUs, Combined Transport Operators and Terminal Operators and are using train running forecast information for the planning of onward operations.
Dispatchers working at IMs use the forecast information for their decision on the train running management for specific trains approaching their network section. The decisions requires inputs on train running forecasts with a high level of accuracy i.e., high probability for the train to have a small absolute error.
Operational planners working at RU's use the forecast information to plan e.g., train inspection and preparation or change of train drivers. The information is used to direct RU employees to a location at a specific time and to prepare the train timely for a train run.
Combined Transport Operators use the forecast information typically for informing their customers, who are planning the collection of the loading units at the terminal of destination for onward transportation from the terminal to destination.
Terminal Operators use the forecast information typically to allocate terminal capacity to trains in arrival.

16.6.4 Description and definitions of terms used in the sector

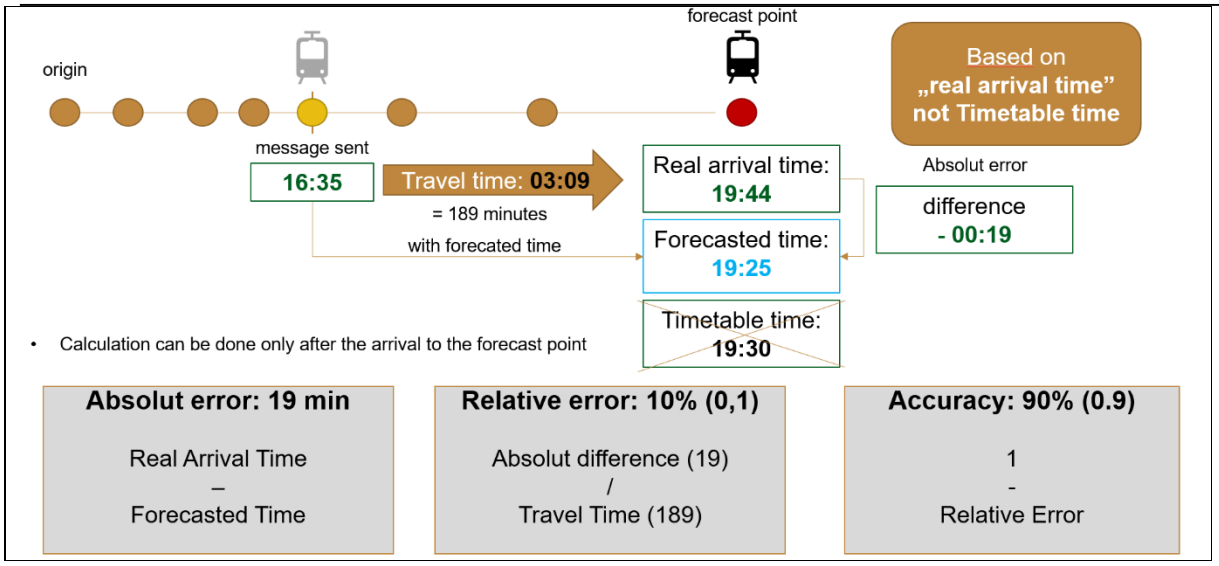
Annex IV of the TAF TSI gives the definitions for the parameters, which are applied to describe the accuracy of running information for trains arriving at reporting points10. The assessment of the predicted value's accuracy with these parameters is done after the train has arrived at the reporting points.

An experienced operator knows the likely level of accuracy of train running information, which he receives from a source and makes by experience his judgement on whether and when to rely on such information. Similarly, an algorithm, which generates values on accuracy of train running forecasts, makes such assessment based on historic data for a group of representative previous train services. Such values are typically the median and average values of the errors, relative errors or accuracies for a selection of train services or a network section with their stochastic probability.

16.6.5 How to compute ETA qualifiers (based on relative error, error, accuracy, probability, threshold values etc.)

The calculation of (absolute) error, relative error and accuracy for a forecast message is explained on the basis of the example below. Note that the calculation is based on actual arrival time, and thus not on time of arrival as scheduled in the timetable.

[10] **Absolute error** is the (absolute) value of the difference between Real-time of arrival and Forecasted time at the reporting point.
Relative error is equal to the absolute error divided by remaining train journey time, which is the difference between the time of prediction and real-time of train arrival to the reporting point.
Accuracy is the complement of the relative error to 1 (or to 100%, if the relative error is presented as a percentage).

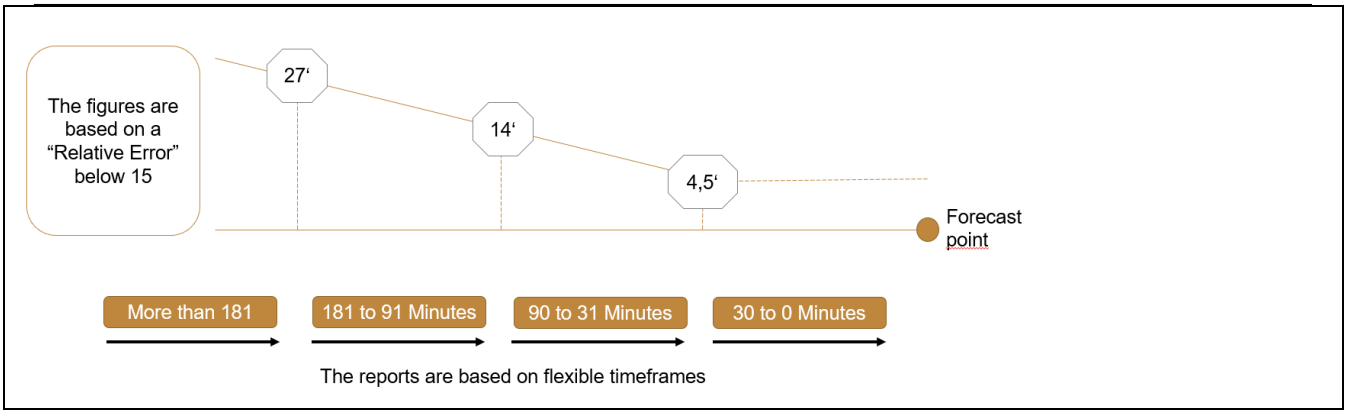


In the example a train forecast message was sent at 16:35 with a forecasted time of train arrival of 19:25, while the actual time of arrival was 19:44. The absolute error in the forecasted time was thus: 19:44 minus 19:25 = 19 minutes. The message was sent at 19:44, thus 19:44 minus 16:35= 189 minutes before actual arrival time. In the example the relative error for the message is 19/189 = 0.1 (or 10% if expressed as percentage). The accuracy is 1 minus 0.1= 0.9 (or 90% if expressed as percentage).

The principal parameter to describe the quality of a single forecast is its relative error, which is also called the ETA Qualifier, which is abbreviated as ETAQ. As forecast messages at a specific point are sent for every train service and the amount of data may therefore become vast, it is practical to generate from the mass of data a representative statistical value as indication for the reliability of the source of the message. Such statistical value could be the average or median ETAQ value. Because the forecasts can also reach extreme values, which could disproportionally affect the average value, it is recommended to use not the average, but the median value11 as more representative statistical indicator. The median of ETAQ values is called the METAQ. The METAQ value from different data sets enables the user as indicator for the overall reliability of the source of information and to compare the quality of the source with that of other sources, if available. If other sources are available, the METAQ is a suitable indicator for selecting the most accurate source of forecast information. The METAQ value is calculated in TIS for each sender and for each forecasted prediction point (PLCs and SLCs) for last 45 days. The overall METAQ for the sender and all predictions represents its network accuracy. Both values enable user to select the most accurate predictor for network or prediction points.

Recipients may require thresholds (minimum/maximum values) for the accuracy and reliability of forecasts. For example, the RNE working group on the ETA subject with experts from IMs decided on an acceptable value of relative error as a value below 0.15 (accuracy 0.85). For the calculation of ETAQ and overall accuracy indicator represented by METAQ the forecast messages from the last 30 minutes of a train journey are disregarded, in particular for freight trains, to avoid extreme values. This is illustrated by means of the figure below, which presents the case of a train service whereby the information recipient requires that the relative error should be less than 0.15 (or 15%).

[11] The median value represents the array of data eliminating extreme values as it takes the middle element from the values.



Combined Transport Operators as recipient of ETA information required that the absolute error of the ETAs, which are provided by a source for the destination terminal of the train, must be less than 60 minutes with 95% probability not later than 4 hours before train arrival.

16.6.6 How RNE TIS facilitates the assessment of forecast quality for the recipient

The RNE Train Information System (TIS) facilitates the exchange of messages in the format of TAF TSI amongst parties, which are connected to TIS and are entitled to receive the information. TIS can forward for a train run also train running forecast messages from different sources, if these are available.

Starting on 2022 TIS also presents in a new Forecast tab in the User Interface (UI) for each source of forecast information the median value of ETAQ for train services, which are identified by their train number, and which are calculated from the train runs in previous 45 calendar days. In case there are different sources of forecast messages, TIS will compare the METAQ values for each source and advise on the use of the most accurate source in the Train info tab UI.

17 Service Disruption/Train Running Interrupted

17.1 Process triggering the message

If the train has been stopped due to a disruption (e.g. line blocked, loco breakdown) and no forecast of its further run is yet available, the Train Running Interrupted messages must be sent from IM to ResponsibleRU. The message is the trigger to inform the ResponsibleRU (and the next IM if relevant). In the case of combined transport under contractual agreement, the LeadRU/ResponsibleRU shall ensure the Train Running Interruption message is provided to the Terminal Operator.

A train could not yet has reached the disruption but is likely to be affected (i.e. forecasts for locations after the disruption point are not possible). In this case, a warning can optionally be issued from the IM to the ResponsibleRU using the Train Running Interruption message with an indication in the TrainNotAtInterruptionPoint element.

Each IM may apply a different rule beyond which the Train Running Interruption message is sent. This is agreed between IM and ResponsibleRU.

When the disruption is on the RU-side (e.g. loco breakdown) it has to inform the IM according to § 4.2.3.3.2 of OPE TSI. The ResponsibleRU could use the Train Running Interruption message if this agreed.

After the problem is analysed, ResponsibleRU and IM decide on a way of action (e.g. rerouting, cancellation, delaying the train). Guidelines for message exchange in such situation is described in annex 13.

17.2 Information storage

To fulfil passenger’s rights regulation, TAP TSI requests to store service disruption data for 12 months. As service disruption means only that the forecast cannot be sent immediately, the utility is limited as the train running information and forecast can nevertheless be sent later.
To fulfil the passenger’s rights regulation, the requirement for data to be stored should therefore be understood for Train Running Information instead. It has to be compliant with the requirements of European Performance Regime process.

17.3 Content of the message

The Location where the interruption occurs must be given. If the train is stopped at a place not existing in the reference file (between two locations), the next location from the reference file has to be given.
For the exact specification of the place the optional element Detailed Description of Location can be used (free text).

There are 2 options how the interruption message can be used:
1. train already interrupted – element TrainNotAtInterruptionPoint empty or equals 0
2. train might be interrupted – element TrainNotAtInterruptionPoint equals 1

In addition, the cause of interruption and the estimated duration (earliest and/or latest estimated end time) can optionally be stated. At the very moment of sending the message the possible cause doesn't have to be yet identified. However, whenever possible the delay cause coding should be used.

The Train Running Interruption message will be treated only as a message to inform about the interruption of a single train run.

Handling of message status

Use of element message status:

1 (creation) = new message

2 (modification) = used (it shall be handled like status 1)

3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be updated/deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for update/deletion – i.e. the content of SenderReference of the message with status 2/3 shall be the same as the original one with status 1, that shall be updated/deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be updated/deleted can also be found by its content, which should be identical except for the MessageStatus. Key elements to identify a message are: Location, date part of InterruptionDateTime, TrainOperationalIdentification/OTNIdentifier.

18 Temporary Capacity Restriction Message (TCR Message) in Operations

The TCR messages can be used to support the International Contingency Management, by coordinating incidents and disruptions. TCR usage in operations should not be mixed with the usage of the TrainRunningInterruptionMessage which refers to a single train only.

In the event of disruptions to the European network, prompt communication is essential for Infrastructure Managers (IMs) to effectively manage both the situation and impacted train operations. To streamline this process and minimize manual effort during disruptions, all relevant information can be automatically transferred from domestic traffic management systems to further common traffic management tools.

The existing TAP/TAF TSI framework and other conventional data exchange protocols do not support the sharing of incident-related data. Consequently, a new solution was needed to facilitate automatic data exchange for disruptions. After evaluating various options, it was determined that the content of the TCR Message adequately meets these requirements.

Upon the occurrence of an interruption, the relevant IM must promptly document information in the national system, triggering the generation of a new TCR Message to upload the incident details.

Any subsequent updates regarding the incident can be communicated through TCR Messages, ensuring visibility to all affected IMs and Railway Undertakings (RUs). To formally conclude an interruption case, the same message can be transmitted with the appropriate status designation.

For the technical implementation and the proposed changes, a Core Group established (CG TCR) as a subgroup the TEG Operations and the below changes introduced to cover the Incident Management cases in Operations.

- Incident element introduced as enabler for incident management cases in operations. If there is an incident, the element should be populated with “True” value.

- The Whole Network element introduced for cases where the whole network is affected by an Incident. The Whole Network works as a choice between the elements StartLocation and EndLocation.

- Currently there are 3 types of incident statuses that need to be covered by the TCRMessage. 1st is “Published” for which the element already has the value (40 Published). 2nd and 3rd created for “Notified” and “Solved”.

    - "Published" interruptions are disturbances with a major impact on traffic and capacity restriction.

    - “Notified” interruptions are minor disturbances that do not affect the capacity of the interrupted track and these do not block the running of the trains.

    - "Solved" status would be dedicated to forward information regarding the incident that is solved.

19 Change of Track/Platform

This information is needed to enable the Station Manager to fulfil passenger information requirements according to TAP BP 4.2.12. The SM shall inform the passenger about changes of track (or platform) for train services. The information needs to be delivered to the SM, Change of Track message may be used for that purpose.

By using the different SubsidiaryLocationTypeCodes this message may indicate a track by TypeCode “01” (normally the technical designation of the track, like track “103”) or a platform by TypeCode “15” (normally the designation indicated to the customer, like platform “8”).

The message may be sent in due time under contractual agreement by:

- either IM to SM and ResponsibleRU
- or IM to ResponsibleRU and then ResponsibleRU to SM (depending on national railway organisation).

Handling of message status

Use of element message status:

1 (creation) = new message

2 (modification) = used (it shall be handled like status 1)

3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be updated/deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for update/deletion – i.e. the content of SenderReference of the message with status 2/3 shall be the same as the original one with status 1, that shall be updated/deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be updated/deleted can also be found by its content, which should be identical except for the MessageStatus. Key elements to identify a message are: Location, TrainOperationalIdentification/OTNIdentifier.

20 Train Delay Cause

This chapter applies when IM has to inform the RU of the reason of a delay.

20.1 IM informs the RU on the delay cause

The IM has the responsibility to find when possible, the cause of a delay, according to national rules, and to enter the code of the Delay Cause into the IT system. The dedicated Delay Cause message is issued by the IM to the ResponsibleRU as reasonably possible to make known the cause of an additional delay in a train's journey. The acknowledgement of the Delay Cause is made by internal process. Dispute process is described by national rules. Under agreement, the Delay Cause can be sent from the ResponsibleRU to the partner RU(s).

TAP TSI only **The section hereunder is relevant for TAP TSI only and has no impact on TAF.**	TAF TSI only **This section hereunder is relevant for TAF TSI only and has no impact on TAP.**
If the RU wants to inform the passengers in stations of the reason of a delay, the Delay Cause message can be used. The message is delivered to the Station Manager under a contractual agreement by the IM or the RU according to the national railway organization. It is delivered in due time i.e. which permits to undertake the announcements (voice, screen, etc.) before the train arrives in the station.	[Not applicable.]

Main rules concerning Delay Cause message are:

- every delay (incl. every additional delay[35]) should be reported, not only those happening at reporting points
- if a delay occurs in a place not included in reference file, it will be shifted to the next reference file point
- Delay Cause message should be sent at the moment when the code for a delay is assigned (according to UIC leaflet 450-2) and always when the code is changed
- Unspecified default codes (like „00“) can be used to send a message informing about the delay if the cause is not yet known.
- one message is sent for each Delay Cause.

It is out of the scope of the TAF and TAP TSI to define the detailed rules for coding or validating the delay causes, or to specify any threshold values for coding of delays. The threshold for coding the additional delay is depending on the national law or internal IM rules. The only requirement is that whenever the code for the delay is defined or changed, the Delay Cause message should be sent to the ResponsibleRU.

20.2 Content of the message

The time, when the delay occurred (DelayEventDateTime), the amount of the delay (DelayTime) and the cause of delay (DelayCause) have to be stated. The Internal Reference Identifier can optionally be used to specify the IMs internal system reference (e.g incident number or national delay cause code). DelayCodingDateTime can optionally be used as a time stamp when the coding was done. This can serve to create a history of coding.

Handling of message status

Use of element message status:

1 (creation) = new message

2 (modification) = used (usage of SenderReference is strongly recommended to allow the recipient to identify the correct message)

3 (deletion) = message is deleted (reason can be an error in the message or normal procedure of changing/splitting a delay cause for which a message has already been sent).

To allow the recipient to find the message, which shall be updated/deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for update/deletion – i.e. the content of SenderReference of the message with status 2/3 shall be the same as the original one with status 1, that shall be updated/deleted. It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness.

If either the sender or the recipient is not able to use this option, the original message to be updated/deleted can also be found by its content, which should be identical except for the MessageStatus.

Key elements to identify a message are: Location, TrainLocationStatus, DelayEventDateTime, DelayCause, TrainOperationalIdentification/OTNIdentifier

[35] Additional delay – occurs, when the new delay event appears. It is the first delay and every increase of the delay during the train run. Examples:
b) train was on time in previous point and now is delayed for 5 minutes: additional delay is 5 minutes
c) train had 5 minutes delay and now is delayed for 7 minutes: additional delay is 2 minutes
d) train was 10 minutes in advance and now is only 5 minutes in advance: no additional delay
e) train was 5 minutes in advance and now is 3 minutes delayed: additional delay is 3 minutes.

20.3 Train Forecasted Delay Cause Message

The TrainForecastedDelayCauseMessage is a Sector message used to inform as soon as possible about the cause of a forecasted delay during the Train's Journey, that hasn't occured yet.
It may be sent by an IM to the same recipients who receive the TrainDelayCauseMessage.

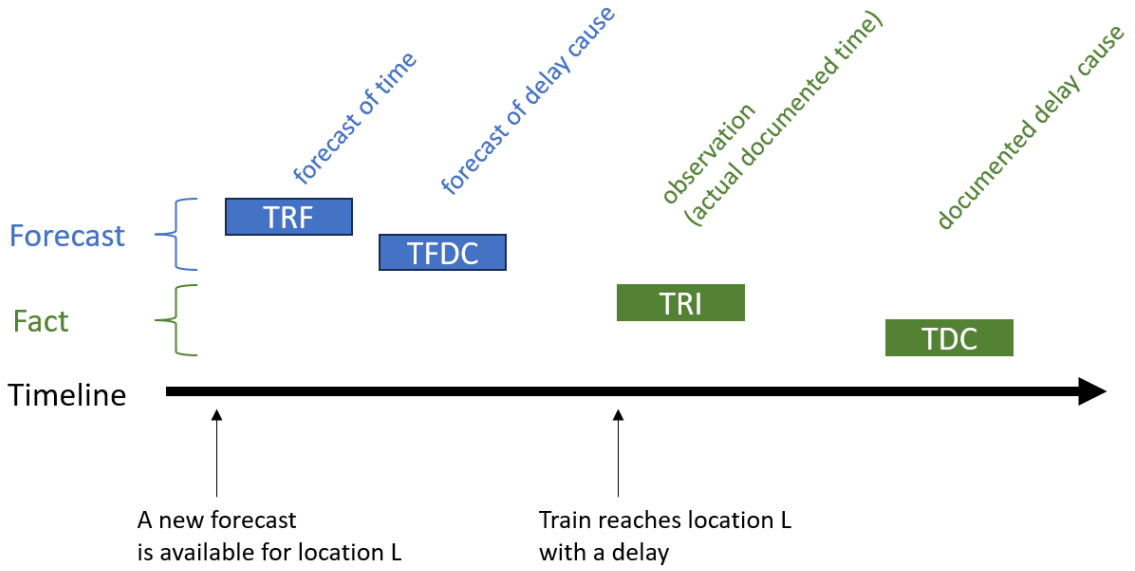
As the forecasted time sent in TrainRunningForecastMessage, it can be updated, by using MessageStatus 2 with SenderReference or by using MessageStatus 3 then re-creation of a new message.

Whereas the TrainDelayCauseMessage documents the proven cause of a delay that has occurred, the TrainForecastedDelayCauseMessage might be used to provide non-contractual information at an earlier stage.

This message is informational only and can't in any case be used to assign any responsibility or penalty regarding the delay.

Its structure is functionally similar to that of TrainDelayCauseMessage, except that TrainLocationStatus element is optional.
The use and interpretation of all the elements are identical to those of the TrainDelayCauseMessage (see above).

Typically, the IM would send the following messages during the run of a train journey:



21 PathDetailsMessage

The PathDetailsMessage can be used in Operations according (but not limited) to Sector Handbook Annex 13. If the message is used in Operations the StartDate is mandatory for object types TR, PA, RO and the Reference Day is mandatory for the Reference TRID (TRIDv00).

Handling of message status
Use of element message status:
1 (creation) = new message
2 (modification) = if used, it shall be handled like status 1
3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be updated/deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for update/deletion – i.e. the content of SenderReference of the message with status 2/3 shall be the same as the original one with status 1, that shall be updated/deleted.
It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness. If either the sender or the recipient is not able to use this option, the original message to be updated/deleted can also be found by its content, which should be identical except for the MessageStatus. Key element to identify a message is the PathID.

22 PathSectionNotificationMessage

The PathSectionNotificationMessage can be used in Operations according (but not limited) to SH Annex 13. The message is used to report a partial or full cancelation of a path. Additionally , the PathSectionNotificationMessage may be used for activation or deactivation of paths, under contractual agreements between stakeholders.
Example1
Assuming we have a PathDetailsMessage from A to Z and the section from point A to D shall be cancelled, with departure of the train in D instead of A. In the PathSectionNotificationMessage the StartofSection element will be populated with location A and the element EndofSection with location D.



Example2
Assuming we have a PathDetailsMessage from A to Z and the section from point D to Z shall be cancelled, with arrival of the train to D instead of Z. In the PathSectionNotificationMessage the StartofSection element will be populated with location D and the element EndofSection with location Z.



Handling of message status
Use of element message status:
1 (creation) = new message
2 (modification) = it should not be used
3 (deletion) = error in message content, message is deleted.

To allow the recipient to find the message, which shall be deleted, the best option is to populate the SenderReference element in each message and to refer to that reference for deletion – i.e. the content of SenderReference of the message with status 3 shall be the same as the original one with status 1, that shall be deleted.
It is recommended to use the message identifier to populate the SenderReference element to ensure uniqueness. If either the sender or the recipient is not able to use this option, the original message to be deleted can also be found by its content, which should be identical except for the MessageStatus. Key element to identify a message is the PathID and StartofSection/EndofSection.

23 Passengers information in station area and vehicle area

Information has to be provided to passengers by displays or voice announcements in stations at which trains performing international service stop and within the vehicle area of trains performing international service. That concerns planned information and also real-time information in case of deviation of the plan.

23.1 Passenger information in station area

The Station Manager has the responsibility to inform the passengers with train running information within the station via voice announcements and/or display.

Information described in TAP TSI § 4.2 is provided to Station Managers by IM and/or RU according to contractual agreement. That is essentially information about a change of track, a delay or another deviation from the plan like a rerouting or (partial) cancellation of a train service. This can be done using the following messages:

- TrainRunningInformation/Forecast/Interruption
- TrainDelayCause
- ChangeOfTrack
- PassengerTrainCompositionMessage (Can also be used in planning phase for planned train data)

Other means of information can also be used.

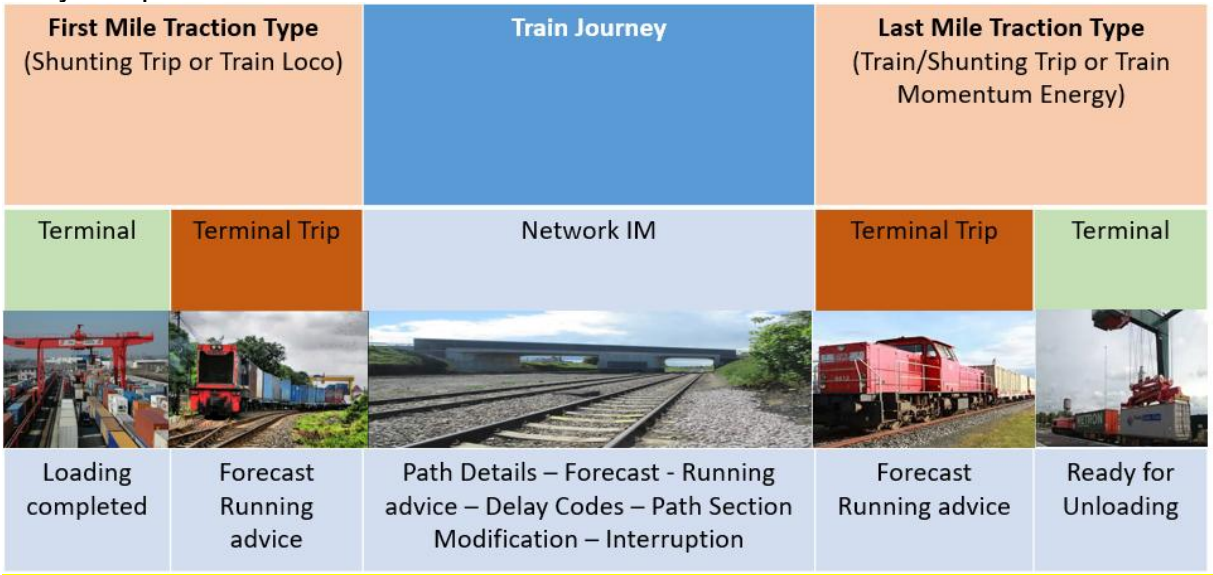
23.2 Passenger information in vehicle area

The RU has the responsibility to inform the passengers with train running information within the vehicle area via voice announcements and/or display systems according to TAP TSI § 4.2.

Real time information is provided by IM to ResponsibleRU according to messages described in the sections above. Other information can be provided under contractual agreement (other means, rules, process, etc.).

24 Combined Transport operations

Draft text for TAF_TSI sector handbook on Combined Transport operations.
Combined Transport is a form of transport whereby different transport modes are used for the movement of goods packed in standardised loading units. Combined Transport services are organised by a Combined Transport Operator (CTO) and are based on block trains running in a fixed composition of wagons from terminal of origin to terminal of destination on a regular (weekly) time schedule. The CTO sells slots for containers, intermodal loading units or (semi-)trailers on the wagons to his customers being e.g. freight forwarders, logistic service providers or road hauliers. The CTO verifies that the characteristics of the containers or intermodal loading units match the wagon on which they will be loaded and the profile of the infrastructure on the transport route (See paragraph below on the European Intermodal Loading Unit Reference Database). The CTO usually hires the wagon sets and engages Railway Undertakings (RUs) for the transport of its wagon sets. The CTO contracts terminal operators at origin and destinations for the (un-)loading of the wagons as well as for the (un-)loading of the vehicles doing the connecting transport legs. The contracting of the railway undertakings is normally done by means of single transport contract with the Lead Railway Undertaking (Lead RU), who may subcontract other RU's for sections of the train journey. The Lead RU is responsible for the organisation and the fulfilment of the contractually agreed train path e.g. from the Infrastructure Manager (IM) network entry point to the IM network exit point or from terminal of origin to terminal of destination. At terminal of origin or terminal of destination, the services from a shunting operator may be contracted by the CTO directly or by the Lead RU for the movement of the wagon set between the terminal and the network entry/exit point.



The Lead RU must have the capability of:
— defining the services rendered in terms of price and transit times, wagon supply (where applicable), production and transmission of wagon/Intermodal unit information (location, status and the wagon/intermodal unit related estimated time of arrival 'ETA' and 'TETA'), where shipments can be loaded on empty wagons, containers etc.,
— delivering the service that has been defined in a reliable, seamless manner through the use of common business processes and linked systems,
— exchanging information electronically with IMs, its customer (the CTO), other service providers and stakeholders such as Terminal Operators and custom authorities,
— assessing the quality of the service delivered compared to what was defined in the transport contract i.e. billing accuracy against price quoted, train transit and arrival times as defined in the time table against actual transit and arrival times, wagons ordered against wagons

supplied.

Information exchange at (terminal of) origin
The transport process starts with the receipt of the train consignment note by the Lead RU from its customer (the CTO). The consignment note specifies the train composition with all wagon numbers and for each wagon the details of loaded containers or Intermodal Loading Units (ILUs). The RU prepares the Consignment Order Message (TAF-TSI paragraph 4.2.1.2) and Train Composition Message (TAF-TSI paragraph 4.2.3.2) based on the consignment note.

The CTO will send a loading list directly to the terminal of destination with information on wagon numbers and per wagon the details of containers or ILUs.

The execution of the transport starts with the release of the wagon set by the terminal operator. Either the CTO, the Terminal Operator or the shunting operator shall provide train related status information to the responsible RU and the IM responsible for the network entry point.

When the wagon set has been loaded and has been released for transport by the wagon master, the operator of the departure terminal shall send information that the wagon set is ready for departure with a time stamp (the so-called Heure-Limite-de-Remise or HLR) to the Lead RU or to the RU providing traction from the terminal to the IM network entry point and possibly to the IM. The departure terminal will send this information based on the ‘train ready’ message (TAF-TSI paragraph 4.2.3.3).

Information exchange when the train is running
When the train is running on the public rail infrastructure network, the IM shall send Train Running Information messages (TAF-TSI paragraph 4.2.4.3) and Train Running Forecast messages (TAF-TSI paragraph 4.2.4.2) with a forecast time for the contractually agreed forecast points to the Responsible RU and the next IM.

The TAF-TSI mentions in paragraph 4.2.6.3. that under contractual agreement the Lead RU shall calculate and provide an accurate ETA or TETA to its Customer and to the Terminal Operator. In practice the Lead RU is however not always in position to do so. Moreover, the reference to the contractual agreement implies that in many cases the Lead RU will not be calculating and providing an ETA. However, the CTO has the possibility to receive the Train Running Information messages (TAF-TSI paragraph 4.2.4.3) and Train Running Forecast messages (TAF-TSI paragraph 4.2.4.2) by means of the RNE/TIS database based on the so-called Rotterdam clause in TAF-TSI paragraph 4.2, which specifies that these messages may be exchanged with identifiable stakeholders.

Information exchange at (terminal of) destination
Before the train arrives at the IM network exit point, the Terminal Operator at destination will receive a Train Running Forecast message from the IM.

The Terminal Operator will inform the responsible RU or, if applicable, the shunting operator on the time slot allocated for the handling of the wagon set at the terminal of destination. Upon arrival of the wagon set at the terminal the last RU must send a Wagon Yard Arrival message according to paragraph 4.2.7.4 of the TAF-TSI to the Lead RU. Based on the so-called Rotterdam clause in the TAF-TSI also this message may be exchanged with identifiable stakeholders such as the CTO.

The time that the wagon set has arrived at the terminal of destination and has been handed

over to the Terminal Operator for being unloaded is called the Mise-A-Disposition (MAD) of the train.

The wagon ETIs are also ETIs for the loading units on the wagons. Based on these ETIs, the ETA or TETA, the Terminal Operator will provide to the CTO the time that loading units can be picked up from the terminal, the so-called Estimated Time of Pick-Up (ETP). The CTO will inform his customers (such as freight forwarders or logistics service providers) on the ETP.

The definition of the mandatory structure of Train Composition, Train Ready, Train Running Information and Train Running Forecast messages and the elements to be followed are described in the document ‘TAF TSI — Annex D.2: Appendix F — TAF TSI Data and Message Model’ listed in Appendix I.

The European Intermodal Loading Unit Reference Database
Because the CTO, the operator of its service facility and its RUs must verify that an intermodal loading unit (ILU) is technically suitable for transportation on a CT train, they must be able to retrieve the technical specifications of intermodal loading units. To this effect each ILU has a unique identification number under which its relevant technical and loading characteristics and its administrative data related to certification and ownership are registered. These data can be obtained by means of the European ILU Reference Database as defined in paragraph 4.2.9.3 of the TAF-TSI.

Part D Overall requirements

25 General remarks

This chapter provides information on general requirements, further explanations and information to be taken into account when implementing the RU/IM Message exchange.

Use of new identifiers and their combination with the existing legacy identifiers is explained in chapter 8 and additionally referenced through the chapters 12, 15, 16 and 18.
For the full concept of the new identifiers the following attached documents and references are provided (see list of Annexes for Chapter 8 – Annex_8.x):

- UML Model of the concept for the new identifiers
- Update Link Framework
- UpdateLinkMessage
- ObjectInfoMessage

Baseline document used for the initial content of this Sector Handbook: WG10 Identifiers Handbook, endorsed by the industry after TAF Phase 1 in November 2011.

- **Use of common elements in the messages**

Free text field
Normally local language is to be used but in bilateral agreements a different rule could be agreed upon.

Message reference
In case of alteration or deletion of the message the reference to the original message should be made via the functional data as a key (e.g. Train Ident, Location Ident).

- **Mandatory or Optional Elements in the Messages**

Within the message structure, there are number of elements that are either mandatory or optional.

- Mandatory elements have to be in the message content for all message exchange.
- Optional fields only need to be filled in where there is a need to have them between RU/IM or where network regulations may well dictate or where there is mutual agreement to do so.

Optional status may well apply to individual elements or groups of elements (e.g. the use of ON DEMAND path element may only be relevant to the RU and IMs in certain networks).

Optional elements may also apply to groups of elements where the entire group may be either needed or not needed.

Where a message element is identified as ‘optional’, this may be changed by the IM who may declare it as mandatory according to the requirements in their Network Statement for their path section. It will be mandatory for interoperable/international trains where there is a requirement to use an element as per their national regulation or bilateral agreement between RU and IM. This will mean that all validation rules of the element(s) will be applied as per normal.

If there is no Network Statement demand for the optional parameter or no bilateral agreement between RU and IM underpinning that, no one can force the partner (RU and/or IM) to use the particular parameter as mandatory.

In addition, some elements and sub-elements are conditional. That means, they are optional in a technical sense, but if there is a specific business need or purpose – based on IMs requirement published in the Network Statement – some or all of the (sub.) element will be mandatory.

There are also a number of elements that are either mandatory or optional depending on whether they are for freight or passenger traffic.

Several message elements are global, that means they are used for communication purposes in several processes (e.g. for planning and operations). E.g. some message elements used in the ‘Short-term path request’ have to be optional from the technical point of view because they are optionally in operations but must be mandatory when they are applied for planning and vice-versa.

- **Message exchange partners**

Messages are exchanged between parties having a business relation with each other. That means that a message exchange is between the

- IM and the RU that wants to or already has booked a path with this IM
- IM and the neighbouring IM involved in the train panning or operation
- IM and/or RU and the SM involved in the operation of the train
- RU and any partner RU involved in the train planning or operation (this possibility is on bilateral agreement outside TAF and TAP obligations).
  For example, for a train running on two IMs and operated by two RUs (one per IM) the information flow can be
  - IM 1 to IM 2 and then IM 2 to RU 2 or
  - IM 1 to RU 1 and RU1 to RU 2 depending on the agreement.

Note on Network specific or national specific parameters

The agreement of the sector is that no new national specific elements in the Common metadata should be introduced.

- All national specific elements should be defined in the Shared metadata
- When building the shared metadata, the common metadata can be included
- Any message from Common metadata can be adapted in the shared metadata according to the BILATERAL / Multilateral agreement

Rules

- Shared metadata must contain the TAF/TSI Header with the message type
- If the message with additional national parameters is an extension of the message from Common metadata, the Message Type has to be different from the one from the Common metadata

- **Masterplan**

Each individual actor has submitted its own implementation masterplan for TAF and TAP.

These masterplans were consolidated in two European-wide documents, respectively 20130117_TAF.TSI.Master.Plan.pdf and 20130428_TAP Master Plan Delivery_final.pdf available on JSG website.

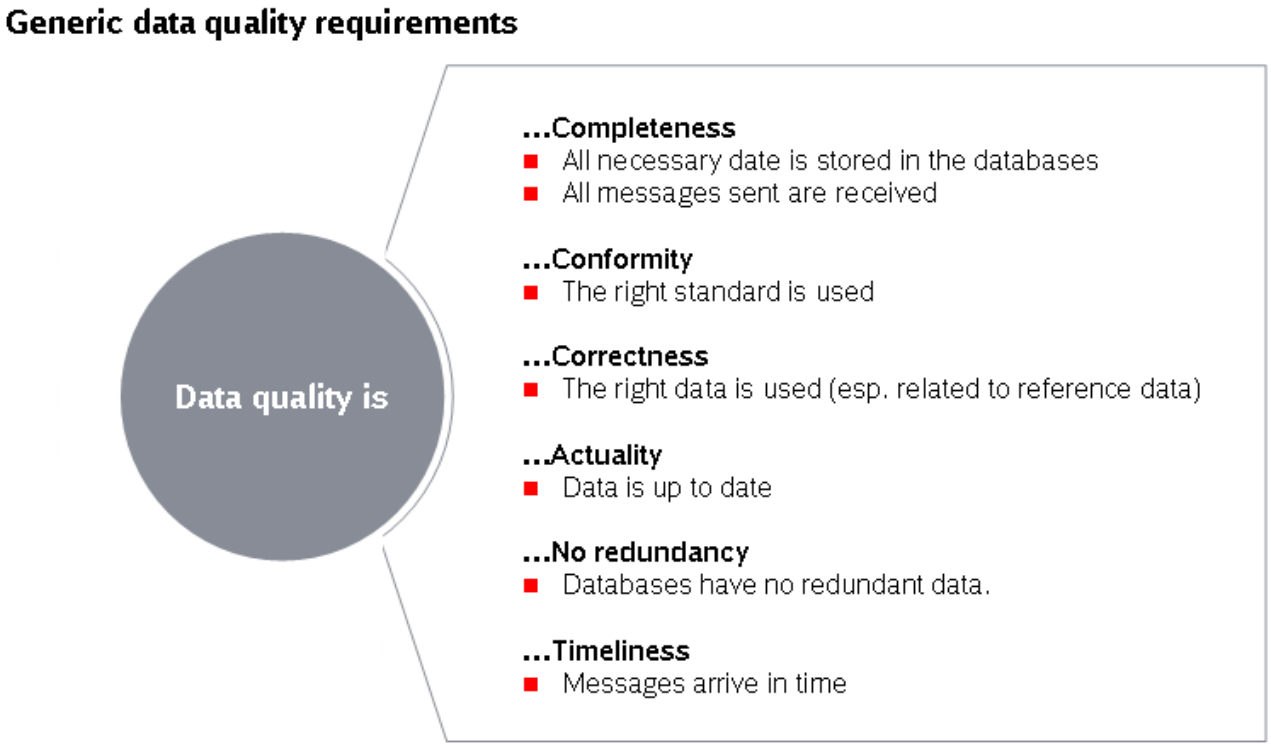
The target dates contained in the consolidated masterplans are:

- Recommended for actors having delivered their masterplan (delivered dates remain mandatory)
- Mandatory for actors having not delivered a masterplan.

The reporting process is described in the governance document TAF_org 2014 20130829 V8.pdf.

26 Data quality

In order to efficiently use the RU/IM message exchange and the related applications good data quality is essential. Data quality requirements are shown in the following picture:



The following general rules to reach a high data quality in the RU/IM message exchange apply:

- Data quality is the responsibility of the sender.
  - Before having been sent messages must be checked by the sender in order to ensure that it is well-formed, complete and valid (against the message/elements as defined in the message catalogue).
- Data quality (can and) will be measured by the receiver of the message.
- The receiver talks to sender in case the data quality needs to be increased.
- Messages sent shall be secured by signing, encrypting[37] and compressing the message:
  - All IMs and RUs involved in the communication shall have the certificate from the Certification Authority to use encryption and signing certificate.
  - Encryption (using SSL/TLS) shall be provided assuring privacy and authentication of the sender and avoid man in the middle attacks.
  - Signing shall be used to assure integrity of messages.

[37] It is up to the involved parties to decide whether every message (type) needs to be signed and encrypted beside the secure transport.

- Two actors keeping a communication should have the certificate generated with same Root certificate to work with encryption functionality and a security alias of the certificate should be provided.

The following possibilities are supported by the RU/IM architecture to detect and increase data quality:

- Syntactically incorrect messages are placed in temporary storage for analysis and reporting (Dead letter queues. storage of message that could not be delivered in a Common Interface or on application level). This would indicate problems in format data quality.
- In case a message is not delivered (no acknowledgment by the CI) the message can still be found in sending queues. – It is up to the sender to check the delivery.
- The Error message can be used to report and measure semantic data quality (content level). The Error message is sent from the receiver of an earlier message to the sender of that earlier message. The message is used when the information in the original message was not good enough to create an answer. The message supports a list of elements that have errors or could also be business related errors (e.g. a schedule is not logical). The level of detail of this Error message will depend on the application that emits this message. It should be as detailed as feasible with the legacy system with the minimum information: Message was not usable. Detailed information, if supported by legacy system, shall use a subset or all of the common error codes described for the Error message.
- In case of the same message with the same content (e.g. train running message for train X at location Y sent several times), rules like “Last message wins”, relying on the MessageHeader time stamp, would avoid the handling of ambiguous message information. This has to be implemented at application level.
- For the central reference database, specific Entities are responsible for the storage of specific codes (e.g. national entity for primary codes in its country). This Entity has to makes sure, that one location is coded once – avoiding ambiguous codes like 10 different primary codes for the same physical station (for example only). See also chapter 9.6 for quality requirements on reference data.
- Timeliness of message exchange can be checked on application level, e.g. comparing the actual timing of a train run and the timestamp of the message arriving. It depends on contractual agreements.

27 Functional Governance

This chapter provides information about contact and processes for receiving the certification for the RU/IM message exchange and for functional changes. This includes ways to request code values and also ways to request changes in the message structure.

Code allocation

Codes are divided into three categories:

- **A** for functional codes that have no impact on the message exchange. It represents functional information that is sent through the messages for functional use within the business processes (e.g. planning of a short-term train)
- **B** for process codes that have a relevance for the way applications deal with the message (e.g., the status of the message new, update, delete)
- **C** for external codes that are used within the business processes but are controlled by different domains (e.g., Retail, UN Codes) that have their own governance processes. A reference to the controlling body is given.
- **D** for codes used only in messages out of the scope of TAF and TAP.

Processes for the maintenance of codes

- Category A and Category B

Any involved actor (e.g., RU, IM, AB, SM) can put the request for a change (new, alteration, deletion) to the JSG/SMO. The entity can consult relevant expert working groups on the need for that change. The proposal is submitted to ERA CCM process (described in document *ERA_Telematics_CCM_Guide_V1_3_r11609 2013.docx*). If relevant, a migration strategy has to be developed as well.

- Category C.> see respective controlling body. The entity publishes these codes as well for information as soon as they are known. A delay notice until the use of these codes can be agreed.

- Category D

Any involved actor (e.g. RU, IM, AB, SM) can put the request for a change (new, alteration, deletion) to the JSG/SMO. The entity can consult relevant expert working groups on the need for that change. The proposal is agreed according to the sector internal governance (tbd). If approved, a migration strategy has to be developed as well.

Change of messages and/or the structure of the reference file

Any involved actor (RU, IM, AB, SM) can put the request for a change (new, alteration, deletion of a message) to the <sector RU/IM governance entity>. The entity can consult relevant expert working groups on the need for that change. The working group can reject, ask for clarifications and give recommendations, eventually following an impact analysis within a given timeframe. If approved, a migration strategy has to be developed as well.

The proposal is submitted to ERA CCM process (described in document *ERA_Telematics_CCM_Guide_V1_3_r11G09G2013.docx*). If relevant, a migration strategy has to be developed as well.

Change of message can only be once per year on a given date. Migration plan needs to allow companies to implement it (communication of change at least 1 year before usage).

A migration plan should be proposed by the WG, including a minimum period in which the change is optional and a time from which the change is mandatory.

The WG of the TAF and TAP governance entity should take into account both business and IT needs.

Allocation of certificates for messages

Every participant in the RU/IM message exchange will have to use valid (X509) certificates for secure communication and if needed for message encryption and signature. These certificates are issued under the authority of the governance entity.

Every company has to register once to central admin (currently this is the admin of CCG) The governance admin service will verify the user and will subsequently grant access to a secured website where certificate can be downloaded.

The Expiry dates of the certificate are mentioned in the certificate. The company has to make sure to get a new certificate before.

Access to reference data

Every actor in the RU/IM message exchange needs to register for the message exchange (see 23.3 on allocation of certificates) through the governance admin service. Following certification, the actor has access to all location codes stored in the Central Repository File Database. The reference data can be used for all TAP and TAF purposes and related processes. To perform these processes, actors may give the data to suppliers under the precondition that the actor ensures the data is solely used for these purposes and is not used for other commercial activities.

Access to all reference data will be provided through the use of a reference data service managed by the governance entity. This service will meet the requirements described in this Implementation Guide or as subsequently decided by the governance entity. Access requirements are not subject to approval by the TAP.CCM or TAF.CCM.

28 List of Appendices

Messages

- **Annex 1 – Message Catalogue** (target TAP TD B.30 and TAF Annex D.2, Appendix F)

  The XSD is stored by the sector in http://taf-jsg.info/?page_id=172

  The XSD is organized as follows:

- taf_cat_complete_sector.xsd: One merged schema with comments to differentiate the "sector" messages and elements from the official (ERA) common metadata. This schema contains both sector as well as the ERA (TAF/TAP mandatory) messages. Namespace for the sector is provided, to differentiate from the official schema since it contains sector messages and elements. Sector baseline will always be made after ERA publishes the official baseline. Version identifier of ERA contains two digits (e.g. 2.1). The version identifier of the sector contains 3 digits: 2.1.1. The third number is incremented on any change in the schema except annotations (textual descriptions of the elements).

- taf_cat_codelist_sector.xsd: all codelists used in the main schema.

  The Messages are in xsd. Note that rtf/document formats should only be looked at by xml/message experts and it is not recommended to be printed for all others. It is anyhow recommended to look at the specific messages in an xml.editor/viewer.

  The both schemas (“complete” and “codelist”) are provided as MS Word documents (exported from the XML processing tool) in the Annex 6.2 and Annex 6.3 respectively. The explanation of the XSD model graphic representation is given in the Annex 6.1

Annexes to Part A

- **TrainID – OTN Framework (Annex 8.1)**
  This framework document explains the relationship between new TAF/TAP identifiers and Operational Train Number (OTN).

- **TrainID – Variant Framework (Annex 8.2)**
  This framework document contains the basic rules for the usage of the Variant element in the composite identifier TrainID.

- **TrainID – Update Link Framework (Annex 8.3)**

This document contains the explanation of the usage of UpdateLinkMessage which serves primarily for indication and update of the relation between business object train and path.

- **TrainID – Case Reference Framework (Annex 8.4)**
  This document explains the framework for the usage of the Case Reference ID as the new identifier in TAF/TAP TSI.

- **TrainID – Object Info Framework (Annex 8.5)**
  This document explains the usage of the ObjectInfoMessage which serves for efficient information exchange on the content of the objects, primarily Train, Path and Path Request.

- **TrainID – UML Model (Annex 8.8)**
  The UML model is provided in the form of activity diagrams for all business scenarios given in the WG10 handbook as well as the object model and object lifecycle (state) diagrams. This UML model is not limited only to the identifiers, it can be used for the simple business cases in Planning, Re-planning (change management of objects Train and Path, “fine-tuning”) and Operations.

- **Annex 9.4 Table of codes for Subsidiary locations (subsidiary type codes)**

- **Annex 10.1 Code lists**
  The export from XSD containing code list is provided. Any change to the code list will be registered in XSD and exported again from the XSD tool. Every code in the code list should have the explanation. In the annotation of the code list element, the source of the code should be written.

Annexes to Part B

- **Annex 12.1 – Elements specific to actors**
- **Annex 12.2 – UML Model for Path Request processes**
  UML model was provided in the TAF phase 1 and adapted to the current messages in 2015. It is recommended to be used when planning the bilateral or multilateral communication in the Path Request process by using TAF/TAP TSI message framework (both mandatory as well as the optional sector messages).

Annexes to Part C Operations

- **Annex 13**
  The annex document covers operational processes diagrams, containing the TAP and TAF process diagrams relevant for chapter 13 to chapter 19.

Annexes to Part D