2025

GUIDELINE FOR NATIONAL TENDERING PROCESSES
STANDARDIZED GUIDELINES FOR CONNECTING TO TTR IT

Version 1.0

Annex A2.7.4

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Version history

Version	Date	Changes	Responsible
0.1	2024-09-24	Creation of the document structure. Alignment with the “TTR IT Landscape technical specification v2.0” and the “TCR Tool and ECMT – Fusion specification for tendering”	Mario Toma
0.2	2025-01-15	Document update according to the feedback from the DCM group (RIS topic)	Tobias
1.0	2025-03-18	Approval by the DCM group members	DCM group

Disclaimer, application and transition period

This document describes the technical specifications for the tendering process of IMs, considering the necessary connection to the central RNE tools.

It describes the main functionalities from the IM point of view and connections to the advanced planning tools that are currently implemented in the ECMT and TCR tools. It does not consider the connection to the PCS CB or exchange the operational data needed for the TIS.

The document provides the basis for connecting to the central tools by considering the TAF/TAP TSI standards.

1 Table of Content

2 Executive Summary

This document aims to establish a unified connection to the TTR IT Landscape of RNE for all member organisations. The initiative is a crucial part of the modernization and harmonization of timetabling and capacity planning across Europe.

The document serves as a comprehensive guide to all IM companies participating in the tendering process and provides a detailed overview of the technical standards, modular architecture, user management and other procedures necessary to ensure smooth connectivity with RNE systems.

The connection will involve the integration of the members' systems with the RNE's systems developed to support the advanced planning and capacity-requesting functions.

Key stakeholders include RNE members (infrastructure managers), IT service providers, and member rail companies.

The expected outcome is to have the same understanding and the same requirements to be implemented in national tools in the sense of connection to the TTR IT Landscape of RNE to promote efficient data exchange and robust system integration.

3 Introduction

RailNetEurope (RNE) is an association of European Rail Infrastructure Managers. RNE facilitates the operational international business of its members by providing solutions that benefit all RNE Members as well as their customers and business partners. It serves as an umbrella organisation that helps coordinate its members' international processes in the areas of Capacity Management, Traffic Management, Corridor Management, IT, and Sales & Legal Matters

Timetable Redesign (TTR) is the programme to simplify, unify, and solidify improvements to the European rail timetabling system to significantly increase the competitiveness of railways. A systematic redesign of timetabling processes is needed as they differ considerably across European countries, which makes international cooperation difficult. Cross-border traffic is as important as ever for the rail sector, but the current system is leading to unnecessary delays due to poorly coordinated construction works and timetable clashes.

TTR aims to provide the market with more flexibility and promote better cooperation between all involved stakeholders. To achieve these improvements and ensure smooth communication in this complex environment, the timetabling process must be supported by European and national IT systems – called Digital Capacity Management (DCM).

DCM is the integral IT part of the TTR programme and will contribute to freeing up capacity on congested lines and boosting the modal shift to rail for both passenger and freight traffic. The

main goal of DCM is the digitalisation of TTR business processes and the reduction of manual data entry, using international standards (mostly TAF/TAP TSI framework) for information exchange

3.1 Definition of the terms

This document uses many terms that are already known within the TTR IT Landscape document, but still, it is worth mentioning those that will be frequently used in this document.

Term	Explanation
ECMT	European Capacity Management Tool – was initially developed to support TTR Pilots in capacity visualisation. The tool will cover the Capacity Hub module functionalities. The tool shall support the creation of the Capacity Model and Capacity Needs Announcements. ECMT is also the Capacity Supply tool.
TCR Tool	The central tool used for TCR creation and coordination. IMs and Applicants shall use the tool to visualize all TCRs and their statuses
DCM	Digital Capacity Management - provides central IT to handle and combine national IT in all process steps and connect all IT via interface
CM	Capacity Model presents information on the traffic volumes and shares for TCRs
CS	The Capacity Supply is a 365-day overview – capacity diagram, where objects such as pre-planned paths, bandwidths, TCRs empty spaces for tailor-made requests and already allocated capacity products are displayed. The supply is published by one or more IM(s) from X-11 onwards.
CP	Catalogue path – presents the capacity that can be requested
CB	Capacity band
CMO	Capacity Model Object represents information on traffic volumes planned by IMs
CNA	Capacity Needs Announcement presents information and the first idea on the future traffic from Applicant
PLC	Primary Location Code as defined by TAF TSI standard

TTPs	Timetable periods
X-#	A deadline referring to the Annual Timetable change (X) and the number of months (#) in advance of this deadline.
RNE	RailNetEurope
CI	Common Interface - a technical tool that supports the interoperable exchange of messages and which is usually locally installed within the user's IT environment
ICL	Intended capacity usage line - indicates the maximum number of traffic volumes which can be accommodated without paying special attention to capacity planning

4 Technical requirements

This chapter provides the basis for the RNE central IT architecture to which the systems will be connected.

It also provides information about the necessary communication and messages that will be used in the communication.

4.1 Architecture of DCM

To implement a connection to the central RNE tools, it's essential to first understand the underlying IT architecture.

RNE's strategy for Digital Capacity Management (DCM) focuses on aligning national IT systems to seamlessly participate in international capacity management processes. This involves providing central IT infrastructure to coordinate and integrate national systems at every stage of the process while connecting all IT systems through standardized interfaces.

Considering the RNE central IT architecture, there are three main pillars (tools):

- TCR Tool
- ECMT
- PCS Capacity Broker

The functionalities of the TCR Tool and ECMT will be merged into a new central system called Fusion, where the existing features of both tools will be integrated as distinct modules.

Each module has specific messages defined to facilitate data exchange for its particular functions, and Infrastructure Managers (IMs) will be responsible for sharing data from their national tools.

Fusion will manage advanced planning objects from the IM perspective, which include:

- Temporary Capacity Restriction (TCR)
- Capacity Model Object (CMO)
- Catalogue Paths
- Bandwidths
- Paths (Allocated paths)

All these objects must be exchanged between the national systems of the Infrastructure Managers and the RNE central system.

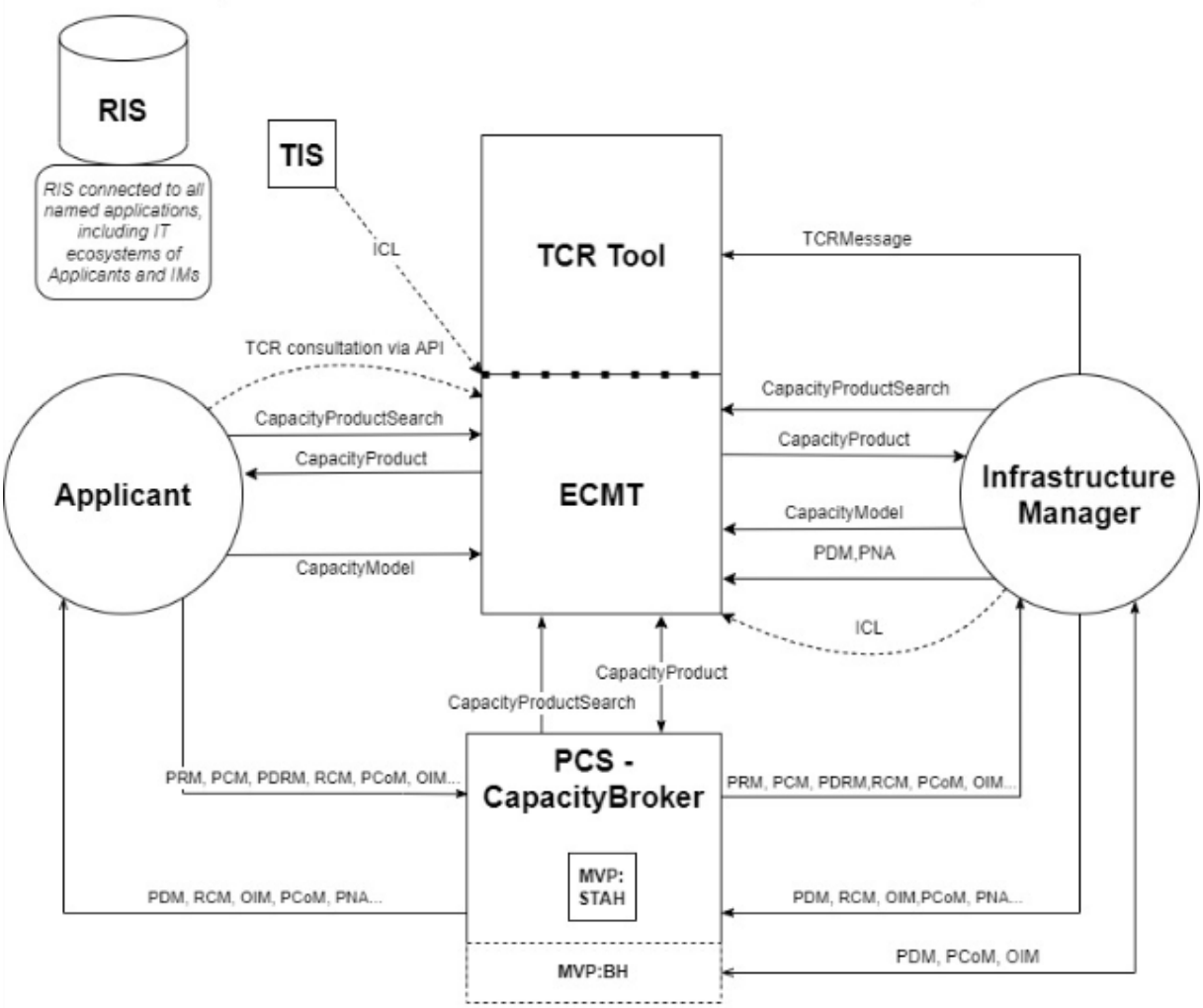


Figure 1 – TTR target IT architecture

Information on the tools defined in the IT architecture above:

TCR Tool – is used for managing the TCR objects (TC). It is the central source of information for the TCR objects. For the different visualisation needs, the TCRs shall be exchanged on the central side between different modules automatically.

ECMT – is used for managing the capacity model and the capacity supply objects. The capacity model objects (capacity needs announcements (CN) and capacity model objects (CM) – volumes) are created in an early stage of planning. The final version of the Capacity Model is the basis for the creation of the Capacity Supply object.

Capacity Supply visualized the "positive" capacities like "catalogue paths" (CP) and "bandwidths" (BA), and the "negative" capacities like "TCRs" and "allocated paths" (PA). The result of managing these objects is Capacity Products which are published at X-11 with the list of the objects that can be requested by the Applicants.

The IM has the option not to import TCRs from the TCR Tool and only provide positive capacity for the Capacity Supply, which is already nationally aligned in the sense of TCRs. In this case, the relevant TCR object of this IM does not appear on the time-space diagram of the Capacity Supply.

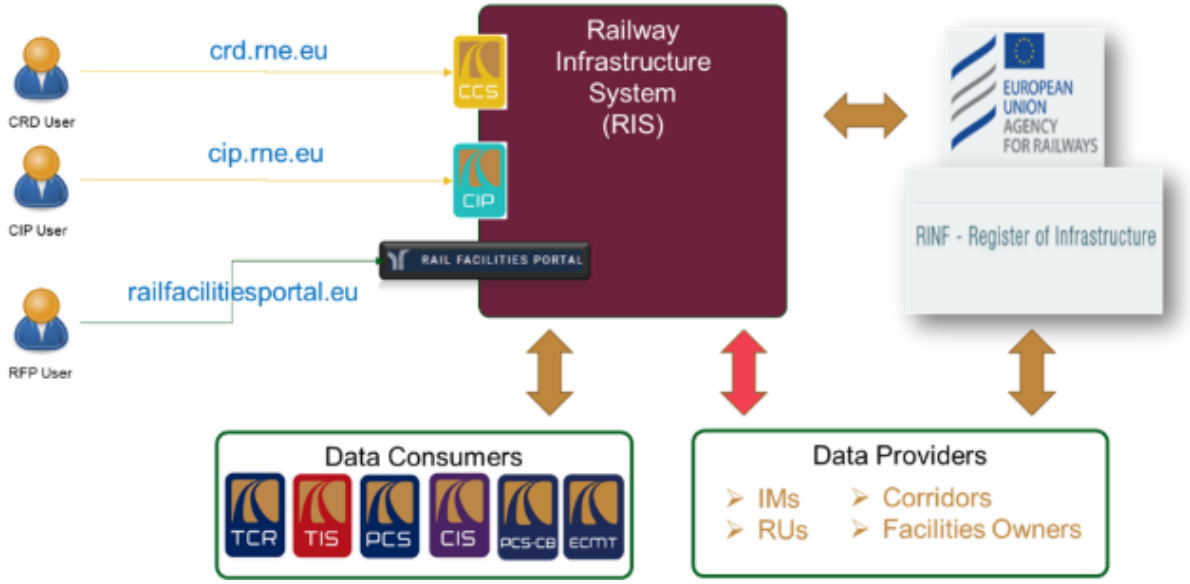
PCS Capacity Broker – the central tool for requesting, coordination and allocation of path requests. Information about the allocated paths will be continuously updated in the Capacity Supply module.

RIS – the tool for managing the infrastructure data and the only source of information about the infrastructure topology that will be used for the RNE tools. More information can be found below in chapter 3.1.1

TIS – is a web-based application that supports international train management by delivering real-time train data concerning international (partly national) passenger and freight trains.

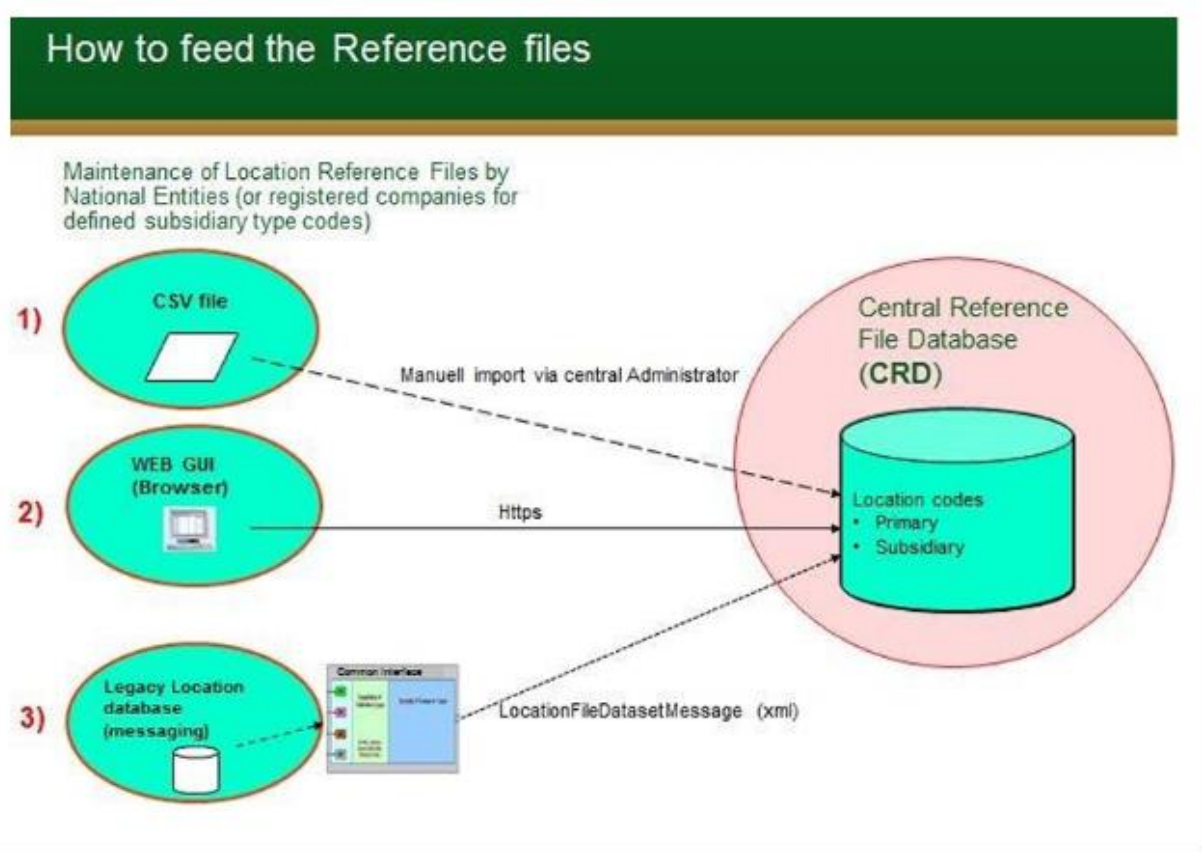
4.1.1 Railway Infrastructure System (RIS)

RIS is the system in RNE which manages and provides infrastructure data. The data consumers, which we consider to be the rest of RNE applications for capacity and operations, rely on RIS to provide accurate and precise infrastructure data. The data providers, such as Infrastructure Managers (IMs), Railway Undertakings (RUs), Rail Freight Corridors (RFC), and service facilities owners, manage their data directly in RIS, which is later either displayed in any of the presentation layouts or distributed to the data consumers.



The connection with RINF is a key driver for merging sector tools such as CIP, RFP, CRD, and Geo Editor. In line with the European Commission's vision to establish RINF as the sole source for railway infrastructure data, RIS will enable RNE to centralize data extraction from RINF and distribute it to various presentation layouts and data consumers. Ultimately, the goal is to eliminate the need for the red arrow in the diagram for any entity dealing with regulated infrastructure data, ensuring that all information currently provided by data providers is sourced from RINF. However, until RINF data meets RNE's requirements, the provision of data to RIS will continue.

There are three ways to supply CRD data (Reference Data): manually through the User Interface, using a dedicated CSV template, or via the TAF TAP LocationFileDatasetMessage.



Since August 2025, RIS contains a railML interface certified by railML.org that can be used for provision of segments, sections, line properties, etc. The railML version implemented is 2.5 and the complete set of data that can be imported can be found in the Annex DocumentationRIS-InterfaceRailML_v2.

4.2 Communication

All communication between the national systems of Infrastructure Managers (IMs) and the RNE central tools is managed through a Common Interface (CI). The CI acts as a middleware for message transformation, converting messages from their legacy formats into a standardized metadata format (XML) and back again.

The system is made up of two key applications: the Local Instance (LI) and the Central Repository Domain (CRD). From a user's perspective, the LI refers to the Common Interface. It can be used by either a single company or shared among multiple companies. Additionally, each LI can optionally be supported by a failover cluster to ensure reliability.

More information can be found at https://rne.eu/it/rne-applications/ccs/common-interface/

Up on request, each applicant can get the user manual and follow technical documentation related to the Common Interface

4.3 Connection specifications

In this chapter, the basic information on the Common Interface will be provided. A complete list of messages, that are currently defined for communication with the advanced planning tools, are listed.

4.3.1 Common interface

CI functionalities enable the exchange of messages between existing company applications residing within rail companies. These legacy applications can connect with the CI through one of the standard protocols (such as FTP, WMQ/JMS, JMS, File, Web service, Email, and IP Socket) and use different message formats (such as Text, CSV, XML or UIC 407-1). If necessary, messages can be translated from one format into another in the CI. The CI provides a graphical mapping layer that can be easily used both by IT and non-IT staff.

Message exchange between railway companies has been standardised: between two Common Interfaces, it is always a message in an XML format (Common message format) based on TAF/TAP TSI regulation or any shared message format agreed by two or more railway companies. All the required software for the Common Interface application can be installed by using the installation package/executable file. Afterwards, more customised parameters can be set manually.

Common Interface can be hosted either on dedicated hardware or any cloud solution and it is operated locally by the user company. Windows and Linux operating systems are supported. After the installation, all user functions can be accessed via a web browser.

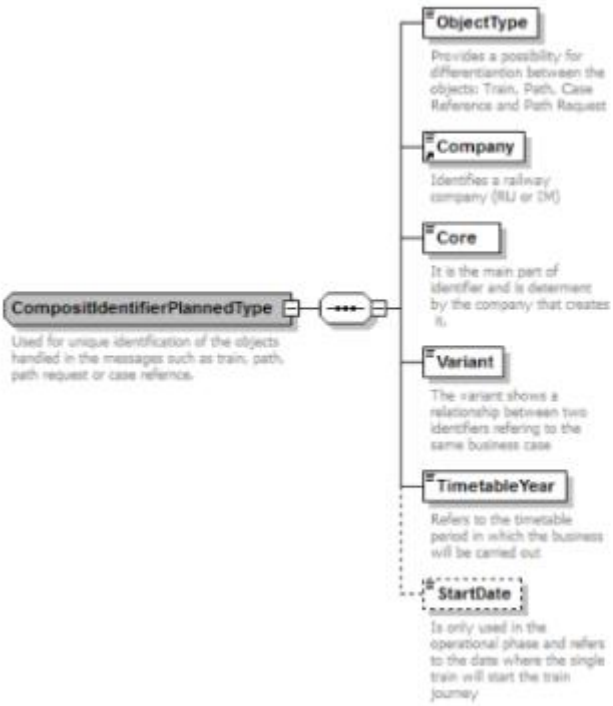
A short overview of the technical architecture of the CI:

- Common Interface is a system that supports message transfer between companies using common and shared message formats.
- A message transformation engine exists to convert messages from legacy formats to common/shared formats and vice versa.
- System is based on an open-source platform. The source of the developed software part is owned by RNE.
- Browser-based mapping tool exists to support schema-based mapping to legacy formats and vice versa.
- Support for multiple companies to use a single CI system.

4.3.2 TAF/TAP TSI data structure (IDs)

All data objects must follow the TAF/TAP TSI logic regarding data structure, their relation, and IDs.

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



ObjectType

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 recognise 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
- PA for Path
- CP for Catalogue Path
- BA for Bandwidth
- CN for Capacity Needs Announcements

- CM for Capacity Model Object
- IC for Intended Capacity Usage Line (currently doesn't exist in the schema, but could be created later)
- TC for Temporary Capacity Restriction

The object types are managed by the Sector Management Office to ensure their correct application.

More info can be found at Joint Sector Group's website http://taf-jsg.info/

Company

A four-character element indicates the company that 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 an alphanumerical format last until 31/12/2025.

Example of company codes: **0084** – ProRail, **0055** - Magyar Államvasutak Zrt. (MAV)

Core

The Core element is the main part of the ID. It is 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. Its length is fixed to 12 characters.

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.

Variant

The variant field has 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.

Considering the grouping of the objects to support various stakeholders' use cases, the variant "00" shall be used, called the referenced object. This referenced variant object will contain only mandatory information, and all other objects with the same ObjectType, Company, Core and TimeTable values but different Variant values will belong to the same reference object.

All "stand-alone" objects will have variants different than "00".

TimetableYear

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).

StartDate

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.

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 mandatorily allocated to the Reference TRID. For the objects Route, Path Request, Path, and Case Reference, the variant v00 shall not be used. The objects are identified by the variant v01 to vZZ.

4.3.3 Advanced planning messages

As already mentioned above, it was considered that all communication with the central RNE tools will take place via Common Interface, based on the TAF/TAP TSI messages[1].

The system of IM needs to be compliant with TAF/TAP TSI regulations. See also https://rne.eu/it/taf-tap-tsi/ and http://taf-jsg.info.

The list of the messages that are considered to be used is provided as follows:

- TCR Message
- TCR Canceled Message
- TCR Response Message
- Capacity Product Search Message
- Capacity Product Message
- Capacity Model Message
- Path Details Message (PDM)
- Receipt Confirmation Message
- Error Message
- Object Info Message

Some additional messages will be defined to support the coordination and harmonization of the objects among IMs and with the central RNE tool, but these are not defined yet.

Infrastructure managers <> TCR Tool and ECMT – Fusion

There must be a functionality in the application which would enable Infrastructure Managers to leverage CapacityProductSearch as a message used for querying the Capacity Model and Capacity Supply database (including TCRs). The result of this query will be returned with the CapacityProduct message. With the Capacity Model message, IMs will upload their CMOs needed for the Capacity Model module and TCRMessage to upload TCRs.

IMs shall use the Path Details message to provide information on catalogue paths and bandwidths from their national systems. The proper object type value should be provided for each object (CP – Catalogue Path, BA– Capacity Bandwidth). The final decision regarding capacity allocation will remain under the authority of the Infrastructure Managers.

In the case that IMs still haven't implemented the Common Interface and messages, they can use the Excel structure to provide data about the catalogue paths and bandwidths. The structure is described in the Annex B.

The sources of the information for the capacity supply are not only the inputs from the final capacity mode, but also national systems and PCS CB.

TCR Tool and ECMT – Fusion < Railway Infrastructure System (RIS)

RIS serves as the main source of topology data for "TCR Tool and ECMT – Fusion". The connection would most likely be established on the database level. Data synchronization of topology data shall be established daily.

Data synchronized would include:

- Primary Location Codes: data on operational points provided to CRD. This includes the PLC-Code itself (e.g. NL12345), Name of PLC, country of origin, Coordinates (Latitude, Longitude), and a validity period
- Segments: direct connection between two PLCs, which is done in RIS itself. Data includes from- and to-location, validity period, and distance
- Sections: grouping of Segments done directly in RIS. The main purpose of sections is to apply custom parameters to all objects created on routes within the section.
- Companies: data on railway related companies taken from CRD, which receives it from ERA. Data includes name, 4-number identifier, validity period, and classification (Freight RU, Infrastructure Manager…).

TCR Tool and ECMT – Fusion < Train Information System (TIS)

TIS is a web-based application that supports international Train Management by delivering real-time train data. The relevant data is obtained directly from the Infrastructure Managers' systems. All data is saved in its data warehouse which would serve (optionally) as input data for the creation of Capacity Model Objects for the complete network of one IM, including following Intended Capacity Usage Lines and other details described in chapter 3.3.7

The connection would be either established on the database level, or RNE staff would export data once per year to the predefined location where the Application could consume the data.

TCR Tool and ECMT – Fusion <> PCS – CapacityBroker

One another source of information for the CS is the PCS Capacity Broker. The paths that are allocated will be sent to the CS. The purpose is to visualize them and to show these timeslots as non-available capacity.

Even allocated paths present some sort of negative capacity which cannot be used, still, it is necessary to present them to avoid the situation that the time/space diagram looks like there is the available space for tailor-made.

Therefore, PCS CB will send information about the tailor-made and ad-hoc paths, to visualize them in the CS.

As PCS CB and ECMT (CS) are separated tools, data exchange among them will be made based on the TAF/TAP TSI messages. For this purpose, Capacity Product Search and Capacity Product messages shall be used. Applicants prepare and harmonize their requests in PCS CB. Capacities provided in the CS module can help Applicants in this task and therefore it is recommended to check CS capacities first, to find the capacity that fits their needs.

To facilitate using published Capacity Products in preparation of Path requests by Applicants, PCS CB will retrieve details of the published products from the CS module. For this to happen, Capacity Product Search message will be sent from PCS CB triggered by the Applicant's search in two ways: with a specified ID, or with a list of search criteria.

Once the Capacity product is used in a request, the process of Path Allocation continues in PCS CB.

When the Draft offer is provided by IM and again after the Path is allocated, PCS CB will return ("push") this information to the CS module via Capacity Product message.

Applicant should be able to transfer data of CNA / Capacity Product in ECMT to PCS CB in the form of pre-filled data for a path request, by avoiding double work.

5 Functional requirements

5.1 TCR functionalities

Considering the central implementation of the TCR module and harmonisation of TCRs between European railways, each IM should provide information about their planned TCRs. This data can be provided via three main channels:

- Manual input via Graphical User Interface (GUI)
- Mass input via Excel template file
- Input via Common Interface (TCRMessage)

The main business requirements to be fulfilled are the following:

- Exchange information about the planned TCRs (by using one of the channels)
  - Possibility of grouping TCRs that belong to the same project
- Coordination of TCRs where the company is affected

- Consultation of TCRs with Applicants
- Publication of TCRs according to the Annex VII deadlines
- Search and filter the central TCR module, to receive information about the TCRs planned by the neighbours
- Receiving email notifications from the central TCR module
- Receiving changes about TCRs by which IM is affected (via TSI message - CapacityProduct)
- Facilitate data exchange through CI using specialized TAF/TAP TSI messages

The central TCR module follows the processes defined in the "Procedure for Temporary Capacity Restriction Management" document given by the Sector via RNE working groups and technical standards.

For more info please visit:

- TCR Guidelines at https://rne.eu/wp-content/uploads/2022/10/TCR-Guidelines.pdf
- TCR management at https://rne.eu/wp-content/uploads/2022/12/HB_TCR_2.0_2022-12-06.pdf
- TCR Tool at https://tcr-online.rne.eu/

5.2 Capacity Model functionalities

The capacity model aims to provide transparency in capacity usage, and to detect the potential capacity conflicts and congestions already at an early stage, giving more time to mitigate the situation with suitable measures. The capacity model deals with three main data objects:

- Capacity model objects (CMO)
- Intended capacity usage lines (ICL)
- Capacity needs announcements (CNA) – Object created by the RUs and Applicants

The main business requirements to be fulfilled are as follows:

- Creation of Capacity Model Objects (shall be possible both with and without track level information) and Intended Capacity Usage Lines by Infrastructure Managers (by using one of the mentioned channels)
  - Capacity volumes (CMOs) are defined on an hourly basis, however, the IMs can add minute sharp information, as well
  - Five different layers were identified for defining the parameters of traffic volumes:

- Layer 1 (train type) - mandatory: Freight, Passenger, Other;
- Layer 2 (category) - mandatory: National, International, International or National;
- Layer 3 (traffic types) - optional: Passenger – high-speed, long-distance, express regional, regional, Freight – wagonload, block, combined transport;
- Layer 4 (basic parameters) - optional: Passenger – stopping pattern, acceleration, planned speed, maximum train length, Freight – average maximum standard train weight, average maximum standard train length, expected speed, dangerous goods, or extraordinary consignments (allowed or not), profile;
- Layer 5 (capacity product type) - optional: Annual Timetable request, Rolling Planning request, Ad-hoc volumes.

- Different variants can be defined by the IMs to cover various traffic solutions for changing needs

- Provide information about ICLs for the whole network
- Support CMO Harmonization process (workflow where two IMs are agreeing about Capacity Model Objects placed on border stations)

- Capacity volumes (CMOs) have to be harmonised with the connecting ones on the neighbouring network

- Search and filter the central capacity model module, to receive information about the CNAs, CMOs and TCRs

- IM should consider the CNAs planned by the RUs and Applicants in their CMOs

- Receiving email notifications from the central capacity model module
- Querying of Capacity Model Objects and Capacity Need Announcements via Common Interface
- Facilitate data exchange through CI using specialized TAF/TAP TSI messages

The Capacity Model module follows processes defined in the Handbooks given by the sector.

For more info please visit: Procedures for Capacity Model at https://rne.eu/wp-content/uploads/Capacity_Model-Handbook-4.0.pdf ECMT at https://ecmt-online.rne.eu/

5.2.1 CMO harmonization

At border locations, and before the deadlines for the draft (X-21) and final (X-18) publication of capacity models, IM has to check if there are CMOs that are not harmonized.

The IM starts the first round of international harmonisation with the involved IMs after X-30 when the initial Capacity Models are available in the Capacity Model module, which supports the IM's efforts during the whole harmonisation process. The harmonisation of Capacity Models is conducted both on the level of border points and on traffic flows. The main focus is on multi-network (i.e. international) volumes, however, the possible effects of changing national volumes on international ones have to be considered as well. The harmonisation of Capacity Model volumes is done primarily on a bilateral level i.e., with the involvement of neighbouring IM. The Capacity Model volumes are defined until either the last Primary Location Code (PLC) on the IM`s network or a pre-defined handover point, hence, bilateral harmonisation aims to make sure that each volume has its pair on the territory of the neighbouring IM. In addition, in case of closely interdependent border sections or for harmonising volumes on the traffic flow level the scope can be extended to the regional/corridor level (e.g. in case of travel time-sensitive traffic such as high speed or night volumes / particular freight volumes).

Messages for the CMO harmonization are not yet defined and it is expected that they will be ready during 2025.

5.3 Capacity Supply functionalities

The Capacity Supply deals with three main data objects: Catalogue Path, Bandwidth, and Path. All data objects are collected via three main channels:

- Manual input via Graphical User Interface (GUI)
- Mass input via Excel template file
- Input via Common Interface (based on TAF/TAP TSI standard)

Capacity Supply is dedicated to two different phases. The aim of the first phase (X-18 to X-11) is to publish an internationally harmonised Capacity Supply that contains preplanned capacity objects such as Catalogue Paths (CPs) and Bandwidths (BAs) which will serve as a basis for the path request of PCS CB and IM tools.

For this purpose, IM has to publish details on the available CP and BA objects that are offered for the requesting by RUs and Applicants.

After the publication of the Capacity Supply, the first general update on the content should occur by the final allocation when the second phase starts (X-5.25) and lasts until the end of the timetable year (X). During this time the Capacity Supply should be continuously updated (preferably

daily) with all additionally known capacity objects, including the allocated Paths (PAs) and additional TCRs indicating as not available capacity on the time-space diagram to show the actual capacity situation on IM's network.

Requested paths are allocated through the PCS CB and they don't need to be sent in addition to the Capacity Supply. However, information about the paths that are not allocated via PCS CB should be sent to the Capacity Supply directly from the national system. This can be done by using the PathDetails message.

The main business requirements to be fulfilled are as follows:

- Creation of Catalogue Paths, Bandwidths, and Paths by Infrastructure Managers or Allocation bodies (by using one of the channels)
- Search and filter the central capacity supply module, to receive information about the catalogue paths, bandwidths and paths
- Support the harmonization of the capacity supply objects with neighbouring IMs
- Receiving email notifications from the central capacity supply module
- Facilitate data exchange through CI using specialized TAF/TAP TSI messages

For more info, please check the Procedures for Capacity Supply document.

5.4 Notifications

Users should receive notifications via email or directly in the system from the central RNE tools when the following events occur:

- An object which the user from the company created, was changed (assessed or commented on)
- An object, in which the company is affected, was changed (edited, deleted, commented)
- A new object was created where the user's company is an affected IM or responsible Applicant
- An object of the user's company was chosen as a match in the CMO Harmonization
- Information such as password reset requests or other account-related information should be sent via email only.

5 Annexes

Annex A – Data model of CMO and CNA

"Group"	Field	Description	Level	CNA		CM
				Passenger traffic	Freight traffic	
	Changing/new need	It shall be used only for the CNA to indicate if it is a changing or new need. Allowed values: changing / new	Object	mandatory	mandatory	N/A
TAF/TAP TSI ID	**ObjectType**	Alphanumerical field (2 characters).	Object	mandatory	mandatory	mandatory
	Company	Alphanumerical field (4 characters) for the company code of the entity which created the object	Object	mandatory	mandatory	mandatory
	Core	Alphanumerical field (12 characters) for the core element of the planned transport identifier.	Object	optional	mandatory	mandatory
	Variant	Alphanumerical field (2 characters). For CNA only 00 shall be used.	Object	mandatory	mandatory	mandatory

	TimeTableYear	The timetable period where the business will be carried out. Example: for timetable period from December 2024 to December 2025: enter 2025.	Object	mandatory	mandatory	mandatory
Reference to existing TSI objects (status quo, changes status quo)	**RPTI_ObjectType**	Alphanumerical field (2 characters). The relevant type is only TR.	Object	optional	optional	optional
	RPTI_Company	Alphanumerical field (4 characters) for the company code of the entity which created the object, the codes can be searched here: https://teleref.era.europa.eu/	Object	optional	optional	optional
	RPTI_Core	Alphanumerical field (12 characters) for the core element of the planned transport identifier.	Object	optional	optional	optional
	RPTI_Variant	Alphanumerical field (2 characters).	Object	optional	optional	optional
	RPTI_TimetableYear	The timetable period where the business will be carried out. Example: for timetable period from December 2024 to December 2025: enter 2025.	Object	optional	optional	optional
	Reason of Reference	Filed with predefined values, explaining reason why particular object is given as reference for given CAN	Object	conditionally optional	optional	optional
	OTN	The "train number" or any national identifier that either the Applicant or the IM would like to assign to	Object	optional	optional	optional

		the CNA or CM object. It is only a desired number, no number allocation is part of the CNA process.				
	Title	An optional field to provide a user-friendly naming of the object, so you can recognise it easier. It does not need to be unique.	Object	mandatory	manda-tory	mandatory
	Harmonisation status	A mandatory IM field to provide information on the status of the CM objects. It defines whether the CMO is in “Preparation/Draft/Under finalisa-tion/Published final/Closed” status when it is being created/updated in ECMT.	Object	N/A	N/A	mandatory
	CMVariant	An optional IM field. It shall be used only for the CM objects to connect them to a variant. One object can belong to more variants.	Object	N/A	N/A	optional
	LeadRU	It shall be used only for the CNA to state who is the leading applicant for the CNA.	Object	optional	optional	N/A
	CoordinatingIM	Alphanumerical field (2 characters) IM field. It shall be used only for the CM, in case there is a coordi-nating IM.	Object	N/A	N/A	optional
	TrainType	Enter the train type (Passenger, Freight). Please note that TAF code list has more values (see the sheet Code list)	Object	mandatory	manda-tory	mandatory

	TrafficType	Related to the train type. Only valid traffic types can be selected: Passenger (high speed/long distance/express regional/regional), Freight (wagonload/block train/combined transport)	Object	optional	optional	optional
	CapacityProductType	This field is related to the capacity partitioning. For CNA, you indicate what capacity product would be suitable for the CNA (see the sheet Code list).	Object	optional	optional	optional
	Category	Write if the traffic is either national or international	Object	mandatory	mandatory	mandatory
	StatusQuo	This field is specific for CNAs and first years of TTR in case the applicant wishes to notify IMs also about the status quo. If the CNA is for a new or modified traffic skip it. For StatusQuo cases, write down the year from which the status quo is to be considered (e.g.2022). The applicant is given the chance to provide an OTN (see field OTN) of already allocated paths and and in this way notify the IM that wishes to keep the status quo also for the timetable period for which the CNA is submitted.	Object	optional	optional	N/A
	Traffic-Contracted	For passenger: write "1" in case the traffic is already contracted (e.g., PSO) or the traffic is planned as market (commercial) driven operation (e.g., open access). Write "0" if you are not fully	Object	mandatory	mandatory	N/A

		sure that your company will be selected to execute the carriage (e.g., ongoing PSO tender). For freight: write "1" in case the traffic is already contracted, or supply driven. Write "0" if you are not fully sure that your company will be selected to execute the carriage.				
	TypeOfContract	In case you wrote "1" in the field TrafficContracted, provide information on the type of contract (e.g., PSO/commercial-driven-operation/supply-driven-operation/demand-driven operation). In case you wrote "0" in the field TrafficContracted, write down the description for IMs for which customer and or what kind of transport will you apply for. This is to allow IMs to identify double CNAs for the same transport.	Object	mandatory	manda-tory	N/A
	MaxJourney-Time	It shall be used only for the CNA to indicate the limit of the journey time from the origin to the destination (hh:mm), wished by the applicant. The idea is that exceeding the maximum time journey would make the transport not economically viable anymore.	Object	mandatory	optional	N/A
Location	**CountryCo-deISO**	2-character ISO code of the country of the location on the particular row.	Location	mandatory	manda-tory	mandatory

	LocationPri-maryCode	Max. 5-digit field for the Primary location code (PLC) of the location on the particular row.	Location	mandatory	manda-tory	mandatory
	PrimaryLoca-tionName	The location name, note that only Location Primary Code is imported, so actually you can use any text for the location name here.	Location	optional	optional	optional
	TrainActivity	This field is used to indicate the train activity at the particular location. The overview of activities is in the sheet Code list. The values shall be provided with their 4-digit codes and comma-separated if more activities are executed in the same location, for instance; 0001,0013 (=commercial stop, attach wagon).	Location	optional	optional	optional
TimingAtLoca-tion	**ELA**	Earliest arrival time (hh:mm), adding minutes-based information is optional	Location	At last PLC: Adding one of the arrival times is man-datory, rest is optional	optional	At last PLC: Adding one of the arrival times is man-datory , rest is optional
	ELD	Earliest departure time (hh:mm) , adding minutes-based information is optional	Location	At first PLC: Adding one of the departure times is man-datory, rest is optional	optional	At first PLC: Adding one of the

						departure times is mandatory, rest is optional
	ALA	Actual arrival time (hh:mm) , adding minutes-based information is optional	Location	At last PLC: Adding one of the arrival times is mandatory, rest is op-tional	optional	At last PLC: Adding one of the arrival times is mandatory, rest is optional
	ALD	Actual departure time (hh:mm) , adding minutes-based information is optional	Location	At first PLC: Adding one of the departure times is mandatory,	optional	At first PLC: Adding one of the departure

				rest is optional		times is mandatory, rest is optional
	LLA	Latest arrival time (hh:mm) , adding minutes-based information is optional	Location	At last PLC: Adding one of the arrival times is mandatory, rest is optional	optional	At first PLC: Adding one of the departure times is mandatory, rest is optional
	LLD	Latest departure time (hh:mm) , adding minutes-based information is optional	Location	At first PLC: Adding one of the departure times is mandatory, rest is optional	optional	At first PLC: Adding one of the departure times is mandatory

						, rest is optional
	DwellTime	For the min. dwell time on the location in minutes (mm)	Location	optional	optional	optional
	MaxJourney-TimeSection	It shall be used only for the CNAs to indicate the limit of the journey time from a location to the next location, wished by the applicant (hh:mm)	Location	optional	optional	N/A
	ResponsibleAp-plicant	Alphanumerical field (4 characters): company code of the applicant responsible for/from the lo-cation on this row. The codes can be searched here: https://teleref.era.europa.eu/	Location	optional	optional	N/A
	TrainWeight	The weight of the train excluding locos in tons	Location	optional	optional	optional
	TrainLength	The length of the train excluding locos in metres	Location	optional	optional	optional
	TrainMaxSpeed	The maximum possible speed of the train in km/h, provided by the **Applicant**	Location	optional	optional	optional
	PlannedSpeed	The speed in km/h that was or will be considered in the path construction, provided by the **IM**	Location	N/A	N/A	optional
	Acceleration	The acceleration information in m/s^2. Note that comma is used, not dot, to separate the decimal part (correct: 1,2 incorrect: 1.2)	Location	optional	optional	optional

	BrakeType	Only valid brake types can be selected, see the sheet Code list.	Location	optional	optional	N/A
	BrakingRatio	The braking ratio for the selected brake type.	Location	optional	optional	N/A
	Number-OfLocos	A number that indicates the number of traction units to be used for the future train indicated in the CNA.	Location	optional	optional	N/A
	PushPullTrain	Write either 1 or 0. A boolean field that indicates if the train can change direction without shunting the loco around the train.	Location	optional	optional	N/A
	RollingStock-Type	Indicate the rolling stock type (see sheet Code list).	Location	optional	optional	N/A
	ETCSOnBoard	Write either 1 or 0. A boolean field that indicates whether the train is equipped with any kind of ETCS option.	Location	optional	optional	N/A
Profile	**P1**	Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.	Location	optional	optional	optional
	P2	Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.	Location	optional	optional	optional
	C1	Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.	Location	optional	optional	optional

	C2	Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.	Location	optional	optional	optional
	Dangerous-GoodsInidication	Write either 1 or 0. It is a boolean field that indicates whether the train includes any kind of dangerous goods.	Location	optional	optional	N/A
	Exceptional-Transport	Write either 1 or 0. It is a boolean field that indicates whether the train is an exceptional transport.	Location	optional	optional	N/A
	TiltingFunction	Write either 1 or 0. It is a boolean field, only for passenger trains, that indicates whether train is capable of tilting.	Location	optional	N/A	N/A
	ValidFrom	The start of the validity period of the object. YYYY-MM-DD	Object	mandatory	mandatory	mandatory
	ValidTo	The end of the validity period of the object. YYYY-MM-DD	Object	mandatory	mandatory	mandatory
CirculationDays	**Monday**	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	conditionally optional	optional

	Tuesday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	condi-tionally optional	optional
	Wednesday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	condi-tionally optional	optional
	Thursday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	condi-tionally optional	optional
	Friday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	condi-tionally optional	optional
	Saturday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer	Object	conditionally optional	condi-tionally optional	optional

		than one calendar day, select the day of the train departure from the origin.				
	Sunday	Part of the circulation days pattern, if the user does not want to provide daily bitmap for the calendar. Write either 1 or 0. For future train journeys longer than one calendar day, select the day of the train departure from the origin.	Object	conditionally optional	condi-tionally optional	optional
	TimeUnit	Only valid values can be selected (see sheet Code list). Then the applicant can provide a frequency for the selected time unit in the defined validity pe-riod.	Object	conditionally optional	condi-tionally optional	optional
	Frequency	This field relates to the TimeUnit filed for the de-fined TimeTableYear. If you select TimeU-nit=weekly and write Frequency=1, it will mean 1 train run per week.	Object	conditionally optional	condi-tionally optional	N/A
	BitmapDays	The length shall be in line with the selected validity period, and it indicates a daily calendar of the ob-ject. You can use the BitMapDays convertor sheet to create the BitMapDays, but note that the con-verter work only if you select the validity period for the whole annual timetable: 2024-12-15 to 2025-12-13	Object	conditionally optional	condi-tionally optional	optional
	Comment	Free text field	Object	optional	optional	optional

Annex B – Data model of the Capacity Supply

Column	Allowed type	Constraints / Values
ID	Number	*Not null*; ID that combines all Operational points (OP) related volumes defined on the same line or section
Title	Text	*Not null;* Title that will be displayed after importing
Hamonization status	Text	*Not null;* possible inputs: preparation, draft, published final, closed
Train type	Text	*Not null;* Only the valid train types (Passenger, Freight). Please note that TAF code list has more values (Maintenance, Locomotive, Maintenance, Emergency, Mixed, Other)
TTP	Number	Not null; Timetable period, in which the train is supposed to run
Valid from	Date	*Not null;* The start of the validity period of the object. YYYY-MM-DD
Valid to	Date	*Not null;* The end of the validity period of the object. YYYY-MM-DD
Line	Text	*Null;* Name of the PLC. This field is unused for importing purposes.
OP	Text (7)	*Not null;* Max. 5 digits field for the PLC of the location. It defines the location in the CS for which information about the timing at location is provided. This field has to include both CountryCode and the PLC number.
ELA	Time	*Null;* Desired earliest arrival at location/waypoint (together with LLD, defines the bandwidth length at location)
ALA	Time	*Not null;* Desired actual arrival at location/waypoint
LLA	Time	*Null;* Desired latest arrival at location/waypoint
ELD	Time	*Null;* Desired earliest departure at location/waypoint

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ALD	Time	*Not null;* Desired actual departure at location/waypoint
LLD	Time	*Null;* Desired latest departure at location/waypoint
Dwell time	Time	*Null;* Minimum dwell time at location/waypoint. Sets how many days after the previous departure the train arrives. This is mandatory if the arrival time is less than the previous departure time.
Weight	Number	*Null;* The weight of the train (including loco!!!) in tons
Length	Number	*Null;* The length of the train (including loco!!!) in tons
Speed	Number	*Null;* The max. possible speed of the train in km/h
Speed	Number	*Null;* The min. possible speed of the train in km/h
P1		*Null;* Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.
C1		*Null;* Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.
P2		*Null;* Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.
C2		*Null;* Belongs to the combined transport profile. It shall be fulfilled only for combined transport trains.
Monday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Tuesday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Wednesday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Thursday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Friday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.

Saturday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Sunday	Boolean	*Null;* Part of the circulation days pattern. At least one day has to be active.
Object type	Time	*Not null;* Possible inputs are **CP** (catalogue path), **BA** (bandwidth), and PA (path)
Company	Number	*Not null;* Company code of the creator's assigned company
Core element	Text (12)	*Not null;* The length shall be in line with the selected validity period, and it indicates a daily calendar of the object.
Variant	Text	*Not null;* 00-99

Annex C – Data Model of TCRs

Column	Interpretation	Allowed type	Constraints / Values	Mapping
B	IM	Text	Not null; Value must match the name of an Organisation Unit defined in the TCR-Tool	IM (Organisation Unit)
C	ID	Text	Not Null; The combination IM (column B) together with ID (column C) must be unique	Reference ID
D	Section	Text	Not Null; Value must match the section which is computed from the fields 'Location From' and 'Location To'	*Not mapped*
E	Direction	Text	Not null; Value must be in [<, >, <>]	Direction
F	From Location	Text	Not Null; Value must match a Location stored in the TCR Tool topology data	Location from
G	To Location	Text	if null, then the interpretation is that 'To Location' is the same as 'From Location' if not null, the value must match a Location stored in the TCR Tool topology data	Location to
H	Year From	Number	Not null	Year From

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I	Year To	Number	Not Null; Must be >= Year From (Column H)	Year To
J	Week From	Number	Not null; Value must be in [1-52]	Week From
K	Week To	Number	Not null; Value must be in [1-52]	Week To
L	Date From	Date	If not null, the date must be in the calendar week as defined by Year From and Week From	Date/Time From
M	Time From	Time	If not null, then also Date From must be not null; If null and Date From is not null, Time From is interpreted as 00:00	Date/Time From
N	Date To	Date	If not null, then also Date From must be not null; shall be equal or later than Date From	Date/Time To
O	Time To	Time	If not null, then also Date To must be not null; If null and Date To is not null, Time To is interpreted as 23:00	Date/Time To
P	Duration	Text	-	Duration
Q	Time of day	Text	Not null; Value must be in [continuous, periodical, periodical continuous]	Type of TCR
R	Reason of re-striction	Text	-; Value must be in Signal; Switch; Catenary; Track & Rail; Tunnel; Bridge; Miscellaneous*; Maintenance, Others**]	Reason of restriction

S	Total Closure	Text	-; Value must be in [X]	Total Closure (true if value = X)
T	Reduced Track Availability	Text	-; Value must be in [LT, ST, LT+ST]	Reduced Track Availability LT (true if value in [LT; LT+ST]) Reduced Track Availability ST (true if value in [ST; LT+ST])
U	Speed Re-strictions	Text	-; Value must be in [X]	Speed Restrictions (true if value = X)
V	Weight, Length, Profile	Text	-; Value must be in [W; L; P; W+L; W+P; L+P; W+L+P]	Weight (true if value in [W; W+L; W+P; W+L+P]) Length (true if value in [L; W+L; L+P; W+L+P]) Profile (true if value in [P; W+P; L+P; W+L+P])
W	No catenary (ex Diesel only)	Text	-; Value must be in [X]	No catenary (true if value = X)
X	Cancellation	Text	-; Value must be in [X], comma-separated (for the freight trains, long-distance trains and short-distance trains) e.g. [**X,,X**] applies to freight and short-distance trains	Cancellation Freight trains (true if value X)

Y	Re-routing	Text	-; Value must be in [X], comma-separated (for the freight trains, long-distance trains and short-distance trains) e.g. [**X,,X**] applies to freight and short-distance trains	Re-routing Freight trains (true if value = X)
Z	Train replace-ment	Text	-; Value must be in [X], comma-separated (for the freight trains, long-distance trains and short-distance trains) e.g. [**X,,X**] applies to freight and short-distance trains	Train replacement Freight trains (true if value = X)
AA	Delays	Text	-; Value must be in [D, X, or positive integers]	Estimated delays (true if value not null) Define delay minutes (if value represents a positive integer)
AB	Other	Text	-	Other
AC	Description	Text	-	Description
AD	International co-ordination	Text	-	International coordination
AE	In yearly timeta-ble	Text	-	In annual timetable (map-ping TBD: proposal to change allowed values to [Y] or [Y; N]
AF	IM project ID	Text	-	IM Project ID

AG	Last update	Datetime	-	Data status
AH	Classification	Text	Not null; Value must be in [Major; High; Medium; Minor; Unclassified]	Classification
AI	Weekdays	Text	-; Working days comma-separated-values, from 1-7 starting with Monday (1), Tuesday (2)...	Working Days
AJ	Interval	Number	-; Values must be in 1-5 (Defines weekly interval of planned works)	Weekly interval
AK	Affected estimated travel volume	Number	-	Affected estimated travel volume
AL	Affected border	Text	-; PLC codes of the affected border locations (in the case of more borders, they must be comma-separated)	Affected border
AM	Deviation location	Text	-; comma-separated location PLCs on the deviation route	Deviation location
AN	Deviation border	Text	-; comma-separated border PLCs	Deviation border
AO	Status	Text	If null the value will be calculated in the tool considering RIS coordination parameter; Value must be in [Planned, Coordination, Consultation, Published, Canceled or empty]	If null (empty) it will be set according to the import logic and RIS parameter; Status

AP	Additional information	Text	-; Currently will not be used	-
AQ	Automatic process	Text	If yes, then automatic publication in the tool will start, according to Annex VII deadlines. The value must be in [Y; N]	Automatic process
AR	BitmapDays			
AS	Variant Value			

Annex D - DocumentationRISInterfaceRailML_v2