Timetabling and Capacity Redesign (TTR)

Description of the Timetabling and Capacity Redesign Process

Version 4.0

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Developed under the TTR Programme

Funded by the European Union

This document provides the target vision of the TTR process and its elements. For detailed and up-to-date procedures reflecting the current maturity of the project, please refer to the relevant RNE handbooks available at https://rne.eu/downloads/ under 'Capacity Management. Note that the process described in the Handbook does not yet fully reflect the targeted TTR elements.

The Proposal for a Regulation of the European Parliament and of the Council on the use of railway infrastructure capacity in the single European railway area builds to a good extent upon the TTR Project. Therefore, once the regulation will be in force, all the related TTR documents may be adjusted accordingly.

Version	Date	Description	Responsible
0.1	03 June 2016	Compilation of documents 'Rolling Planning Description' and 'Safeguarding cap. & Product Portfolio' and consideration of feedback from RU Task Force on these documents	Timetable Task Force
0.2	21 June 2016	• Inclusion of feedback/proposals from Timetable Task Force members • Input from TCR Task Force • Concluding telephone conference M. Dupuis, Ph. Koiser & D. Haltner	D. Haltner
0.3	01 July 2016	Final check by Timetable Task Force members	D. Haltner
0.4	19 July 2016	Description of Capacity Model added	F. Visser
0.5	11 August 2016	Changes following review comments	F. Visser
0.6	12 August 2016	Changes and additions from TCR point of review	J. Deeleman
0.7	15 August 2016	Meeting M. Dupuis, P. Koiser & D. Haltner (11.8.16): Alignment of doc. in comparison with executive summary and inclusion of feedback from RNE S&TT HLG	D. Haltner
0.8	23 August 2016	Review of updated version of document	D. Haltner
0.9	24 August 2016	Input from common meeting WGs 2&3	D. Haltner / J. Deeleman
0.10	25 August 2016	Inclusion of 'document fine-tuning' meeting	D. Haltner
0.11	30 August 2016	Input from review of chapters 1-4 by WG2 members in order to prepare review of RNE S&TT HLG	D. Haltner
0.12	23 September 2016	Input from review of chapters 5–16 by WG2 members	D. Haltner
0.13	29 September 2016	Finalisation of document at WG2 meeting 28/29.09.16	D. Haltner
0.14	05 October 2016	Clean version for iteration with WG1	D. Haltner
0.14-1	17 October 2016	Replacement graph in Section 6.5., correction of figure in Section 8.6.1 and a few typing errors, modification in Annex 1 (X-16 cap. planning)	D. Haltner
0.15	19 January 2017	Inclusion of conclusions of workshop WGs 1-3 (1/2.12.16), meeting WG2 (8.12.16), workshop WGs 1-3 (17/18.1.17) and meeting WGs2&3 (18/19.1.17)	D. Haltner / WGs 2&3 members
0.15-1	27 January 2017	In-depth index; new fig. 1 which better explains the approach; replacement of Annex 3 by the previous version; last findings	D. Haltner
0.16	16 February 2017	Editorial proofreading	R. Powell / D. Haltner
0.17	07 March 2017	Last alignments after proofreading; conclusions during Core Team meeting 3.3.17 in the context of the preparation of the SteCo (6.3.17) and Round Table (9.3.17) meetings	D. Haltner
0.18	25 September 2018	Review of document based on first experiences in TTR pilots, conclusions from the Action Plan preparation and new findings	D. Haltner / WG Process Implementation

0.19	26 September 2018	Revision by members of the Process Implementation WG	D. Haltner
0.19-1	04 October 2018	Restoration of the erroneous deletion of milestone X-11 (publication)	D. Haltner
0.20	12 June 2019	Inclusion of several findings (TTR pilots, WP allocation rules, TTR Core Team, contacts with various parties)	D. Haltner
0.21	17 July 2019	The document edited and proofread	E. Gruber S. Čarek D. Haltner
1.00	19 March 2020	Revision of document based on feedback from the TTR Roadshow and first findings of the TTR pilots, results of sub-group “Process Implementation” meetings (29.10.19, 29.01.20 & 10.3.20)	D. Haltner S. Čarek
1.01	29 June 2020	Inclusion of processes for the path alteration, path modification and ad hoc. Inclusion of several definitions and small updates.	D. Haltner S. Čarek
1.02	30 March 2021	Inclusion of: • alignment with the last developments and work of the TTR Process Group in 2020 • inclusion of TCRs in TT concept • inclusion of the updated path alteration process • inclusion of the new capacity optimisation process • inclusion of the short text on leading entity • inclusion of the short-term ad hoc request • update of the standard ad hoc process based on the latest developments • inclusion of technical details about Capacity Models • check of definitions and outdated parts • findings from subgroup Process to IT • update of allocation principles in the allocation manual (results of ICM revision) Restructuration of the document to improve readability, inclusion of separated annexes directly into the document, review of executive summary.	D. Haltner S. Čarek S. Naundorf L. Del Giudice A. Kertai
2.0	07 April 2021	Consistency check by the TTR Process Task Force, editorial changes to improve readability.	S. Čarek A. Kertai L. Del Giudice D. Haltner
3.0	7 December 2021	Approval of the version 2.0 by the RNE General Assembly on 7 December 2021	RNE General Assembly
3.1	11 September 2024	Added reference to RNE Handbooks	A. Bianchi
4.0	10 December 2024	Approval of the version 4.0 by the RNE General Assembly on 10 December 2024	RNE General Assembly

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About This Document

Several years ago, RailNetEurope (RNE) and Forum Train Europe (FTE) supported by the European Rail Freight Association (ERFA) have joined forces to start an ambitious project – “Timetabling and Capacity Redesign”, or shortly TTR. Over 100 business experts from both Infrastructure Managers and Railway Undertakings from areas of timetabling, asset management, legal, sales and production have worked and contributed to this document, in order to define a desired state of the art process. This document describes the general framework of the TTR process, once fully implemented. Furthermore, over the years, the TTR project teams received various questions on potential methods and future visualisation, therefore, this document provides specific guidance also in this field.

The management summary at the beginning guides through the main ideas of the process on few pages, while the process is defined in a detailed way in the main text of this document. The chapters follow the main new TTR process elements such as Capacity Strategy, Capacity Model, Capacity Supply, Rolling Planning, but also adjusted TCR, ad hoc, modification, alteration processes to fit to the complete picture. Several annexes accompany the document, some of them still being under elaboration. Their role is to provide more details and connections for the people who will be involved in the future capacity management processes of TTR.

Management Summary

This summary provides a short introduction to why we need TTR, what the key elements of the TTR process are, and the envisaged timeline.

Why We Need TTR?

Today's capacity management process, created in the past century, does not reflect the market needs anymore. It calls for improvements in regards of flexibility, efficiency, and effectiveness, besides being not entirely cost-optimal. Moreover, the national particularities complicate the international harmonisation and stand in the way of seamless cross-border transport, better utilisation of existing infrastructure and further development of the single European railway area. The final and ultimate benefit of the TTR process is to support the shift to rail by:

- **Earlier ticket sales** to passengers than today by 2 months.
- **Safeguarded capacity of sufficient quality** for moments when the transport details are known for a reliable request (higher flexibility). No need of “just to get some capacity” and “just in case it is needed” requests anymore.
- Introduction of the possibility to place **single capacity requests valid for several years,** in contrast to today when such a capacity shall be requested by up to 4 separated requests at 3 different points in time.
- **Decrease of redundant work** for both, IMs and capacity applicants, which currently originates from the need to repetitively rework the timetables caused by market and works planning instability. TTR aims at balancing the demand for stable timetables and allowing certain flexibility for TCR planning.
- **Earlier detection of congestions and capacity needs**, providing much more time for countermeasures and better solutions than today.
- European harmonisation of fragmented national processes to **simplify access to capacity, international train operation** and potential expansion to other networks.

Naturally, the TTR process is supported by digitalisation, progressive IT solutions, proper legal framework, steering commercial conditions. Nevertheless, the main point of focus of this description is the process itself.

Key Elements of TTR process

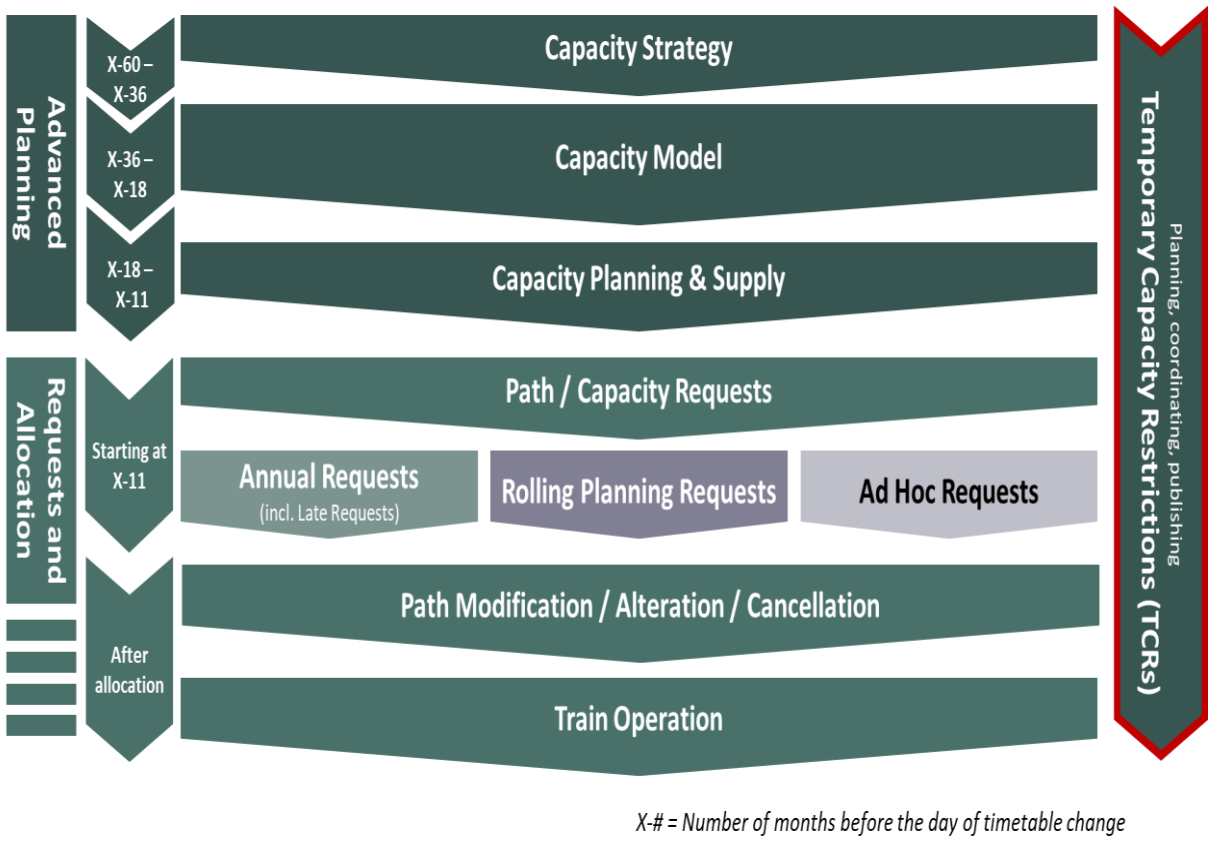


Figure 1: Key elements of TTR Process

TTR provides a structured, transparent, and harmonised process between the IMs, applicants and various other stakeholders taking into consideration different business and social needs. The accompanying figure shows the key TTR elements.

Essential part of the TTR process is the advance planning. It allows to come from an agreement on the main planning principles in the **Capacity Strategy** to building the **Capacity Model**, where the focus is on the expected traffic volumes and capacity needed for temporary capacity restrictions (TCRs). Thanks to this, potential capacity conflicts and congestions are detected at an early stage, giving more time to mitigate the situation with suitable measures. The final step in advance planning is preparation of the **Capacity Supply**, when various capacity objects such as paths, bandwidths and TCRs are put into a 365-days capacity diagrams.

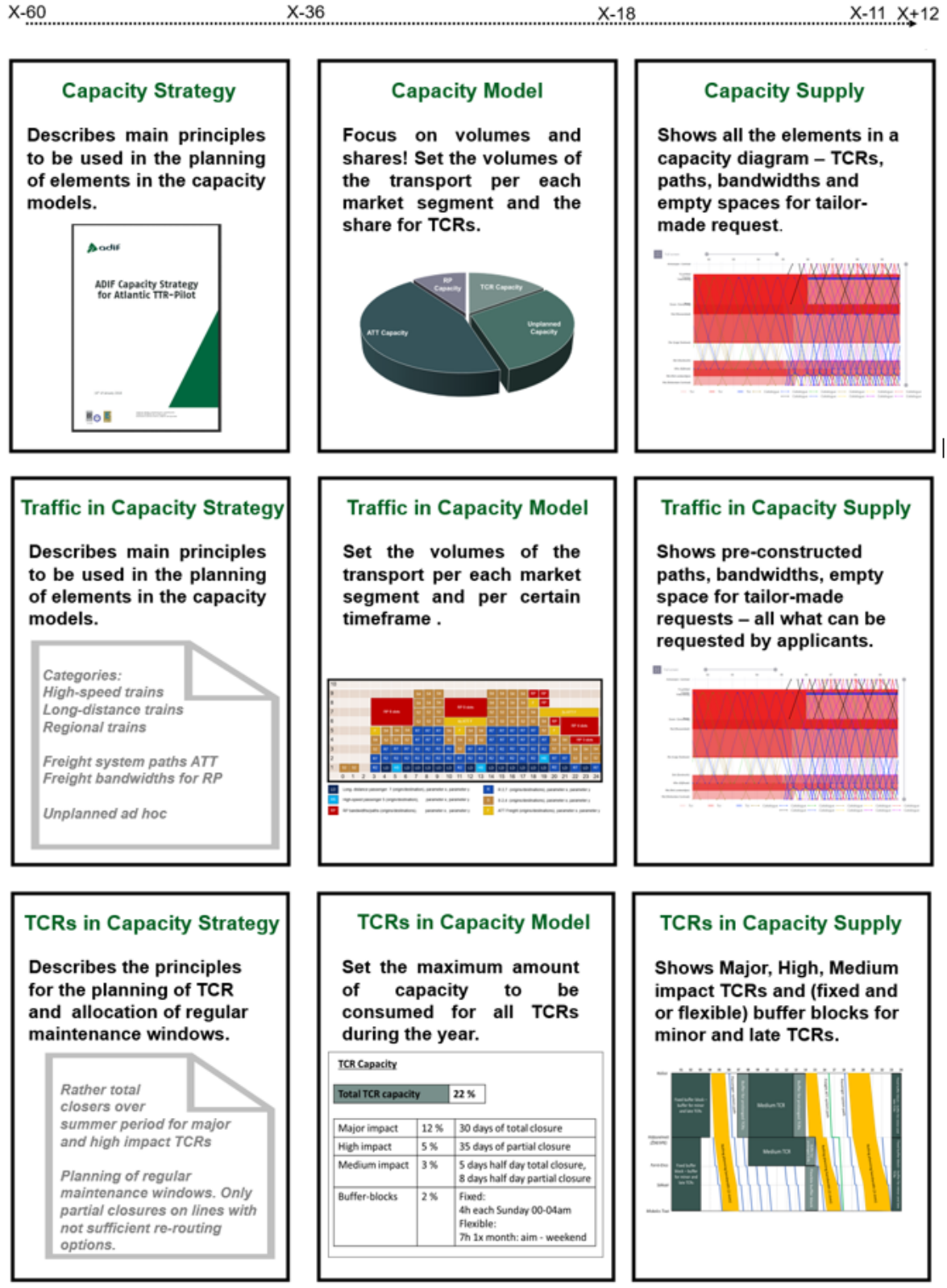


Figure 2: Differences between Capacity Strategy, Capacity Model, and Capacity Supply

When it comes to requesting capacity, various request types are supposed to serve the different market needs with different periods of validity and capacity that shall satisfy these capacity needs.

Planning phase	Annual Timetable Planning	Rolling Planning	Short-term Planning	
Request possibilities	Annual Timetable & Late requests (⇨ X-2)	Rolling Planning requests (M-120 ⇨ M-30 days)	Ad hoc requests (X-2 ⇨ M-30 days)	Short-term ad hoc requests (< 30 days)
Validity	X ⇨ X+12	Multi-annual up to 36 months	X ⇨ X+12	
Capacities used	Pre-constructed Annual Timetable capacity; Unplanned capacity	Pre-constructed Rolling Planning capacity	Unplanned capacity; Residual Annual Timetable capacity; Pre-constructed Ad hoc capacity (if applicable)	Unplanned capacity; Residual Annual Timetable capacity; Residual Rolling Planning capacity; Residual Ad hoc capacity (if applicable)
Timetable process	Annual Timetable process	Rolling Planning process	Ad hoc process	

X = Timetable change in Mid-December; M = day of operation

Figure 3: Different request types

Overview of TTR Elements in Timeline

The following table provides an overview of the TTR process from the early stage of the advance planning starting at X-60 until the train operation. X refers to the timetable change, while the digit afterwards indicates the months prior to this change.

Activity / process step	Time	Explanation
Capacity Strategy	X-60 to X-36	IMs start the advance planning with the creation of Capacity Strategies. The focus of the strategy is on the future infrastructure development and the planning principles, already here international coordination is needed, as various planning approaches exist between IMs. The Capacity Strategy is also the main connection between political and social requirements of citizens and the capacity planning process, since competent authorities have a prominent role in this phase. The validated final strategies set the rules for the Capacity Models and next planning steps.
Capacity Model	X-36 to X-18	A Capacity Model is a visualisation of » Volumes of capacity for commercial traffic » Volumes of capacity to be used for TCR The model is used to transparently communicate and discuss more in detail the expected volumes (not path or TCR details) and detect pressure points. In case of lines with international relevance, harmonisation with involved IMs is obligatory. The final model at X-18 is subject to the Capacity Partitioning, where the available capacity is partitioned according to market needs. The partitioning should in minimum consist of a maximum share of capacity to be used for TCRs and minimum capacity safeguarded for Rolling Planning requests (or ad hoc where applicable). However, on lines where the capacity is scarce, a more detailed partitioning, for instance to the particular market segments, might be needed.

Involvement of applicants into the planning	X-24 to X-12	Over this period, applicants will be consulted on various issues, namely: » TCRs » Capacity Needs Announcements » Capacity Models » Network Statements » Capacity Supply
Capacity Planning (Capacity Supply)	X-18 to X-11	Based on the partitioned Capacity Model, a feasible timetable according to axis characteristics will be elaborated and published as Capacity Supply. The Capacity Supply is a 365-day overview that shows all the elements in the capacity diagram – TCRs, maintenance windows, pre-planned paths, bandwidths and empty spaces for tailor-made requests. All objects shall be harmonised between IMs.
Feasibility Studies	From X-15	Applicants have the possibility to request feasibility studies at any time after X-15. They can be used for instance to investigate: » if a new/changed traffic concept, which was not part of the Capacity Model can (and in what way) be introduced, » If the traffic concept on not pre-planned network is feasible, » If the new traffic concept is feasible, taking into consideration already allocated paths (e.g., in running timetable)
Publication of Capacity Supply	X-11	Capacity for Annual Timetable requests can be published in the form of: » pre-planned paths » capacity bandwidths (for tailor-made requests with published conditions) » empty space for tailor-made requests Capacity for Rolling Planning requests can be published in the form of: » pre-planned paths » capacity bandwidths with number of available slots Capacity for ad hoc requests can be published in the form of: » pre-planned paths (only if safeguarded) » capacity bandwidths with number of available slots (only if safeguarded) » empty space for tailor-made requests – unplanned capacity Capacity for TCRs is also part of the Capacity Supply, all Major, High and Medium impact TCRs and the maintenance windows shall be published.

Types of path requests	by X-8.5 X-8.5 to X-2 M-4 to M-1 After X-2	<u>Annual Timetable requests:</u> » New path requests: requests for traffic which are stable and requested for an entire TT year or less, by the defined deadline; » Late path requests: requests for Annual Timetable placed after the annual path request deadline; the residual capacity for Annual Timetable requests placed on time or unplanned capacity is used to accommodate them. <u>Rolling Planning requests:</u> Requests answered according to the principle of first come – first served, as long as the operation period starts between 1 and 4 months after the request. A Rolling Planning has multi-annual validity up to 36 months ahead of operation. <u>Ad hoc & short-term ad hoc requests:</u> Traffic for which the published capacity for Annual Timetable and Rolling Planning cannot be used (from X-2) or traffic requested in a very short notice (short-term ad hoc requested after M-1 for all remaining capacity).
Path allocation Annual Timetable (requests placed by deadline)	X-8.5 X-6.5 X-5.5 X-5.25	Start of the path elaboration based on dedicated Annual Timetable or available capacity, this includes potential conflict resolution procedures. » Draft offer, start of consultation phase » Final offer, start of acceptance phase » Final allocation (2 months earlier than is done today)
Path allocation Annual Timetable (requests placed after deadline)	X-5.25 to X-1	Path elaboration (based on residual capacity for Annual Timetable requests or unplanned capacity) starts after the allocation of capacity for Annual Timetable requests placed on time. The allocation is completed at X-1 at the latest.
Path allocation Rolling Planning	Ongoing	The request for Rolling Planning capacity is answered: » With a path offer for the running TT period as soon as possible and in 1 month at the latest. The first come first served principle applies; » With a capacity commitment for upcoming TT period(s), which will be converted in a path every year.
Path allocation Ad Hoc	From X-1	The request for ad hoc capacity is answered as soon as possible and based on the first come - first served principle. However, the allocation shall not start before all Annual Timetable requests placed after the deadline are allocated.
Path modification and cancellation	After allocation	Applicants will be allowed to ask for modifications of two types: » Major modifications: considered as cancellation of allocated path/slot and new request » Minor modifications: IMs take them into account In case an applicant is not interested in a particular or all running days, the path can be cancelled or partially cancelled. One of the aims of TTR is to minimise number of modifications and cancellations.

Path alteration and withdrawal	After allocation	In case the initially allocated path is not usable anymore, IMs may start path alteration process. In case there are no alternatives or applicants do not find the alternatives suitable the affected running days are withdrawn. One of the aims of TTR is to minimise number of alterations and withdrawals, especially in a short notice.
Path optimisation	After allocation	IMs can trigger the path optimisation process to ensure the best possible matching of all path requests and or to increase the line capacity by timetable optimisation. However, any shift of already allocated path, which could still be used for the train run, is subject to applicants´ consent.
Train operation	M	Train operates according to the path allocated by the IM and accepted by the applicant.

Preconditions (Enabling Factors)

Being an innovative and having fresh approach to an outdated process, TTR requires a set of pre-conditions to be fully successful. These must be seen as integral parts of TTR:

- Common commercial conditions: needed to effectively steer the process, prevent misbehaviour in all steps and promote the efficient use of capacity and resources; possible approaches currently under development,
- Common procedures for partial withdrawals of requests before allocation: to prevent over-booking with intention to get advantage (priority) in the allocation principles,
- IT: TTR aims for a digitised timetabling process, with fast and easy communication across all European capacity planning systems, and short response times for applicants,
- Legal framework: adaptations of the legal framework are needed to prevent a heterogeneous patchwork of prerequisites across Europe and to ensure the same process standards in all countries.

Glossary

This document uses many terms that are already known within the current timetable process. However, some new technical terms and not widely known terms are in the overview below:

Advance planning	Set of processes in TTR that covers the Capacity Strategy, Capacity Model and Capacity Supply phases.
Affected IM	Infrastructure managers of the subsequent and preceding path sections, which are affected by the path modification triggered by the initiating applicant or the path alteration triggered by the initiating IM.
Applicant	A railway undertaking (RU) 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.' Applicants can be divided into two groups: - 'RU applicant': RU or international grouping of RUs

	- 'non-RU applicant': other persons or legal entities with a public-service or commercial interest in procuring infrastructure capacity.
Capacity band	Time frame up to several hours that includes capacity for at least one path for ATT and RP requests. Publication in the form of a number of paths and/or 'slots' per defined capacity band.
Capacity Broker	An IT module, part of the TTR IT landscape, which will cover the IT aspect and communication for the capacity requests, and closely work with the path management module (Path Coordination System - PCS).
Capacity commitment	In the form of a slot with a status similar to a contract.
Capacity Hub	An IT module, part of the TTR IT landscape, which will cover the IT aspect and communication for the Capacity Model and Capacity Supply phase.
Capacity Supply	Capacity Supply refers to pre-constructed capacities for ATT (on time and LPR) and RP requests offered to the market and published by one or more IM(s) from X-11 onwards.
Coordinating IM	The IM in charge of path allocation on the network where the applicant initiating a path modification holds the rights to the allocated path.
IM	Infrastructure manager or allocation body; they are both referred to in this document as an IM.
Initial path request	First request for a path (at the beginning of the path request and allocation process).
Initiating applicant	The applicant holding the rights to the allocated path and placing the path modification request.
Initiating IM	The IM triggering a path alteration.
International leading entity	An entity that supports and internationally coordinates the capacity planning and capacity allocation.
International railway traffic	A traffic which requires the use of an international train path or several successive national train paths situated in at least two States and coordinated by the infrastructure managers or the bodies in charge of allocation of train paths that are concerned (according to OTIF CUI). Path requests and path offers serving international or multi-network railway traffic shall be harmonised by the involved applicants and IMs.
Leading applicant	The applicant which » coordinates the request; » especially, where an active response from applicants is needed; » is the primary communication point for the leading entities; » can trigger the cancellation of the entire traffic; If mandated by all other involved RUs/applicants, the leading applicant may act on their behalf during the path allocation process.
Leading IM	The IM, which » is available for leading applicants for general advice;

	» monitors that the appropriate product is selected by the applicants and the request is formally correct; » coordinates the path construction, the harmonisation and the post-processing; » initiates all possible steps to ensure harmonised offers » interacts and actively communicates with all involved IMs and the leading applicant. Acts as an information turntable for involved IMs; » monitors path withdrawals.
Line or train path line section with international relevance	A line or section which is or might be important for international harmonisation. In general, those are the cross-border lines, lines with mixed (national and international) traffic, lines that serves as re-routing for lines with international traffic.
M - #	A deadline referring to the first day of a train operation (M) and the number of months (#) in advance of this deadline.
M - # days	A deadline referring to the first day of a train operation (M) and the number of days (#) in advance of this deadline.
Maintenance window	Regular capacity blocked in advance during which preventive maintenance and TCRs are expected to be executed. The maintenance windows serve as a cushion against fluctuations in available capacity for train runs and TCRs.
Multi-network impact in path alteration and modification process	A multi-network impact shall be expected if the agreed running days, border times, path number, operational train number and or parameters affecting the timetable might be changed. A multi-network impact shall also be expected in the path alteration process in a case where the alternative path would affect the operational concept to the extent that the applicant will have to request a path modification in one of the subsequent networks (i.e. additional operational stop).
Operation day (day of operation)	A particular calendar day in a train operation, a single train run can have more operation days.
Pre-planned path	Path pre-constructed by the IMs based on the outcome of the capacity partitioning.
Remaining capacity	See unplanned capacity.
Residual capacity	Prepared capacity for ATT and RP requests, but not being requested or used yet.
Running day	One particular train run, a running day of a train can have more operation days.
Safeguarded capacity	Capacity reserved by IMs for a dedicated period and type of requests.
Short-term ad hoc request	A sub-category of the ad hoc requests. A short-term ad hoc request is a request placed in less than 30 days before the operation for all remaining capacity.
Slot	‘Capacity usage possibility’ within a capacity band that will be converted into a path year after year
System path	System Paths are a timetable construction principle set up by IMs/ABs rather than a concrete offer to the customer. They are based on standardised path parameters.

Tailor-made path	A path constructed exclusively to fit a particular path request.
Temporary Capacity Restrictions (TCR)	Temporary capacity restrictions: this term covers the earlier used ‘works’, ‘possessions’, ‘works and possessions’ and ‘capacity restrictions. It indicates that the restrictions are planned (no force majeure restrictions) and temporary (no long-lasting bottlenecks).
Train path line section	Clearly defined part of the network of one IM, or part connecting the networks of two IMs. A train path line section is determined as an area where significant timetable or traffic operation differences occur: beginning or ending services, different number of trains, train mixture and/or train sequence. The exact methodology is described in the UIC Leaflet 406 – Capacity (2nd edition, 2013).
Unplanned capacity	Capacity on a line that is still available after pre-planned capacity for ATT and RP traffic as well as TCRs (incl. maintenance) have been assigned.
X - #	A deadline referring to the Annual Timetable change (X) and the number of months (#) in advance of this deadline.

1. Capacity Strategy (X-60 to X-36)

The Capacity Strategy of an IM takes into account some key elements that can be described in a long-term plan:

- demand forecast (incl. own requirements for maintenance/known works),
- assignment of the demand,
- capacity analysis,
- capacity investment scenarios, in case the above analysis has revealed any bottlenecks.

From the capacity management point of view, a rough demand forecast for the various requirements is of high importance. A Capacity Strategy is a precondition for the development of a Capacity Model for a line, a part of the network or the entire network. For lines with international relevance, the Capacity Strategy (including TCR planning principles) needs to be shared and harmonised with the other involved IM(s).

The defined Capacity Strategy is only a document describing the main principles of capacity planning including all types of capacity needs. The IMs should set up joint procedures for the Capacity Strategy and a template and respected in all networks.

1.1. Scope of the Capacity Strategy

Geography: The capacity strategies shall be prepared for the complete network with the exception of regional lines/feeders/outflows with a single applicant. However, IMs are encouraged to prepare the capacity strategies for these lines as well.

Unit: It is up to the IMs to define whether a single strategy for the complete network is sufficient or whether is more suitable to have more capacity strategies for various geographical areas (e.g. per corridor, per axis, per region). However, it is essential that each strategy which concerns or might have an impact on other IMs is also harmonised and validated with these IMs.

1.2. Main Focus Points of the Capacity Strategy

The result of the Capacity Strategy should be a document in a standardised format consisting of chapters covering the following aspects of early planning.

Expected capacity of infrastructure	Describes the expected available positive (additional) capacity and also the expected negative non-TCR related capacity (for instance track removal).
TCRs	Describes the principles for capacity allocation for regular maintenance windows and for the planning of TCRs (for instance selection of lines where due to not sufficient re-routing capacity only partial closure will be planned).
Traffic flows	Describes main principles to be used in the planning of elements in the Capacity Models (for instance long-distance passenger train paths, regional passenger paths, bandwidths, ad hoc only as unplanned capacity etc.)

1.3. Timeline for Capacity Strategy

The Capacity Strategy phase has to follow the main milestones below:

X-60	IMs define all connected geographical areas for each individual Capacity Strategy, including detection of other concerned IMs. The work on Capacity Strategy starts.
X-60 to X-54	IMs collect input from the competent authorities (e.g. ministries of transport) and input from terminals/service facilities.
X-54 to X-36	Harmonisation of capacity strategies between IMs. Applicants are updated on the ongoing works on the strategies.
X-36	IMs publish all capacity strategies. Each of the strategies is validated by other concerned IMs.

1.4. Involvement of Competent Authorities

It is essential to have a functioning connection between the political requirements of citizens and the capacity planning and management process. Through this link the competent authorities can apply their policies for instance in regards of the environment. It is assumed that the scope of the institutions involved in the strategy phase will differ from country to country. Generally, at least the ministry in which the portfolio of transport and infrastructure is included shall be involved. However, the involvement of other entities such as municipalities, regions, transport associations, supranational institutions and so forth is recommended to ensure broad social consensus.

The institutions are asked to provide key input to the strategy, especially:

- political requirements on future positive and negative changes in the available capacity
- intended future development in the PSO transport
- available financial resources for future investments and maintenance

Note that the Capacity Strategy phase is not the last process step, where political institutions can influence the future capacity and its usage. However, in the later stages such as the Capacity Model phase, their role is similar to non-RU applicants.

Further information regarding Capacity Strategy can be found here:

- Roadmap to Capacity Strategy (Including Basic Requirements
- Process Diagram: Capacity Strategy

2. Capacity Model (X-36 to X-18)

The aim of the Capacity Model is to show, harmonise and discuss more in detail the expected volume of capacity consumed by each market segment (commercial needs) and TCRs. It does not define exact paths (timetable), which is the aim of the Capacity Supply. Similarly, it does not define TCR details, which are set by the ordinary TCR planning process. The following sub-chapters define the timeline, scope, and objects of the Capacity Models.

The Capacity Model consists of a 24-hour overview reflecting market needs and overview of capacity consumed by TCRs. The capacity picture for medium-term planning is based on an IMs' Capacity Strategy principles, it takes into account known TCRs as well as some capacity for TCRs fixed only at a later stage according to the regular TCR planning, and new service or production plans by applicants known well in advance.

2.1. Scope of the Capacity Models

Geography: The Capacity Models shall be prepared for the complete network with the exception of regional lines/feeders/outflows with a single applicant. However, IMs are encouraged to prepare the Capacity Models for these lines as well.

Unit: The units for the partitioning will be "train path line sections", which are defined by each IM. The model/partitioning is done for each direction. The IT tool can afterwards combine the Capacity Models of the train path line sections and display overviews for complete lines, corridors and whole networks (the origin to destination view is shown in Annex 'Network x Train Path Line Section Approach').

Time-TCRs: The Capacity Model shall be done at least for a timetabling year. Once the IT support is implemented and IMs gather more experience, the IMs should consider more detailed partitioning, for instance for seasons, day/night, months. More detailed partitioning can make the harmonisation of TCRs and the Capacity Supply later easier.

Time-traffic: The Capacity Model is prepared at least in a 24h-overview of traffic volumes per each market segment on a standard non-TCR day. Once the IT support is implemented and IMs gather more experience, the IMs should consider more models for the same train path line section, for instance for seasons, particular months, particular TCRs.

2.2. Objects – Traffic Part of the Model

The traffic part of the Capacity Model consists of the following objects, the volumes are accompanied by a set of parameters which are important to identify the capacity consumption:

Expected volume ("demand/supply/market needs") of Annual Timetable requests – passenger trains	The volume of paths, expected by the IM, that will be needed for Annual Timetable requests. Categories in train path line sections on cross-border lines must be harmonised (preferably already in the strategy phase). IMs are recommended to keep these standardised basic categories: » high-speed trains » long-distance trains » express regional trains » regional trains IMs should keep only the following basic parameters and avoid using additional ones if they are not entirely necessary: » high-level stopping pattern (only clusters to avoid 20 different patterns) » acceleration » planned speed » maximum length For the sake of confidentiality, not all parameters can always be part of the public Capacity Model.
Expected volume ("demand/supply/market needs") of Annual Timetable requests – freight trains	The volume of paths, expected by the IM, that will be needed for Annual Timetable requests. Categories in train path line sections on cross-border lines must be harmonised (preferably already in the strategy phase). IMs are recommended to reflect in their categories only if the train is: » domestic or international (in the sense of origin-destination), » wagonload/block/combined transport train.

	IMs should keep only the following basic parameters and avoid using additional ones if they are not entirely necessary: » maximum weight, » maximum length, » expected speed, » dangerous goods or extraordinary consignments (allowed or not). For the sake of confidentiality, not all parameters can always be part of the public Capacity Model.
Expected volume of Rolling Planning requests	The volume of paths expected by the IM that will be needed for Rolling Planning requests. It includes already allocated Rolling Planning requests from previous timetable period(s) Categories in train path line sections on cross-border lines must be harmonised (preferably already in the strategy phase). IMs are recommended to reflect in their categories only if the freight train is: » domestic or international (in the sense of origin-destination), » wagonload/block/combined transport train. IMs should keep only the following basic parameters and avoid using additional ones if they are not entirely necessary: » maximum weight, » maximum length, » expected speed, » dangerous goods or extraordinary consignments (allowed or not). For the sake of confidentiality, not all parameters can always be part of the public Capacity Model.[1]
Expected volume of ad hoc requests	On networks with an increased volume of ad hoc traffic, i.e., capacity requirements that cannot be planned in advance, capacity can also be partitioned for this kind of traffic. The volume might be accompanied by a set of parameters important to identify the capacity consumption.
Maintenance window/particular TCR	In case a regular maintenance window (or particular TCR in case there is a version of the model for a specific TCR period) occupies a certain amount of capacity – it can be displayed in the 24h overview as well.
Unplanned capacity	There might be some capacity left on a line. Depending on the usage of a line, this unplanned capacity can vary between 'nothing' and 'a lot of' – it is displayed in the form of empty space in the diagram.

Each of the traffic volumes can be displayed as a single train run or package of future slots. Depending on the line saturation and IMs' experience, the volumes can be displayed for a particular hour or as an interval for several hours or as an interval for the complete day. The

[1] Even though no extensive demand for Rolling Planning from the passenger RUs was expressed, the IMs can count with Rolling Planning volumes for passenger trains as well. In that case the categories and parameters should be identical to the used in Annual Timetable.

stakeholders should acknowledge that the number of slots is based on the standard parameters of the particular category, a deviation can lead to usage of more slots for a single train run. The examples below show a potential visualisation of the future traffic part of a Capacity Model:

» Example A: an IM displays ATT, RP, and ad hoc volumes, most of them are planned using intervals; it is expected that 20 RP slots and 12 ad hoc slots will be offered over the day in an indefinite period; a maintenance window is planned from midnight to 03.00am, with only single passenger train run over this period.

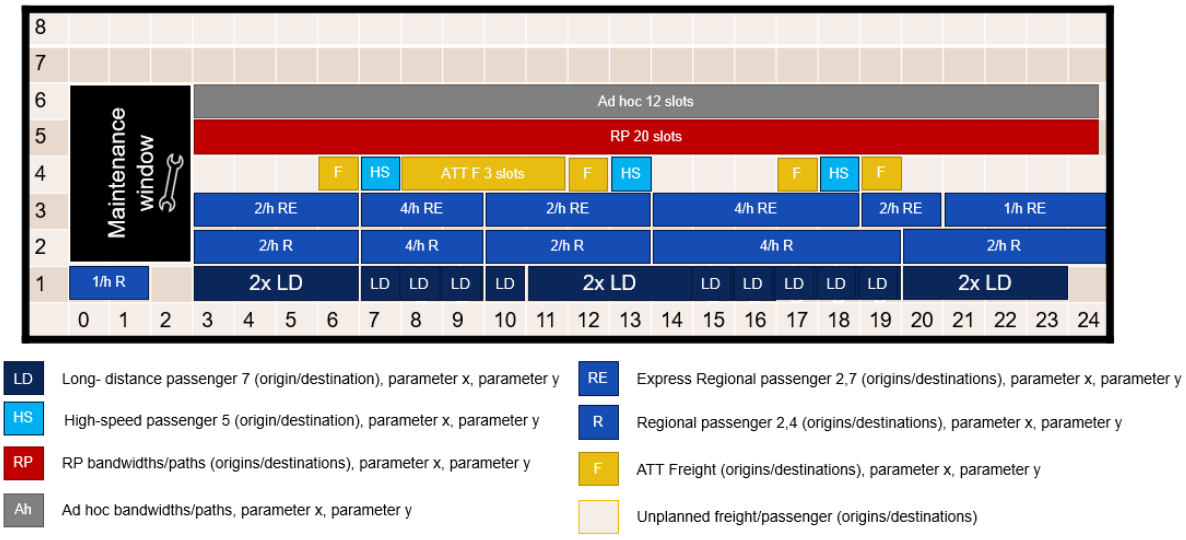


Figure 4: Example of the traffic part of the Capacity Model A

» Example B: an IM displays ATT, RP volumes, the passenger trains and some ATT freight are planned in detail (volume per particular hour), RP volumes are mostly assigned in intervals to particular day periods (off-peak).

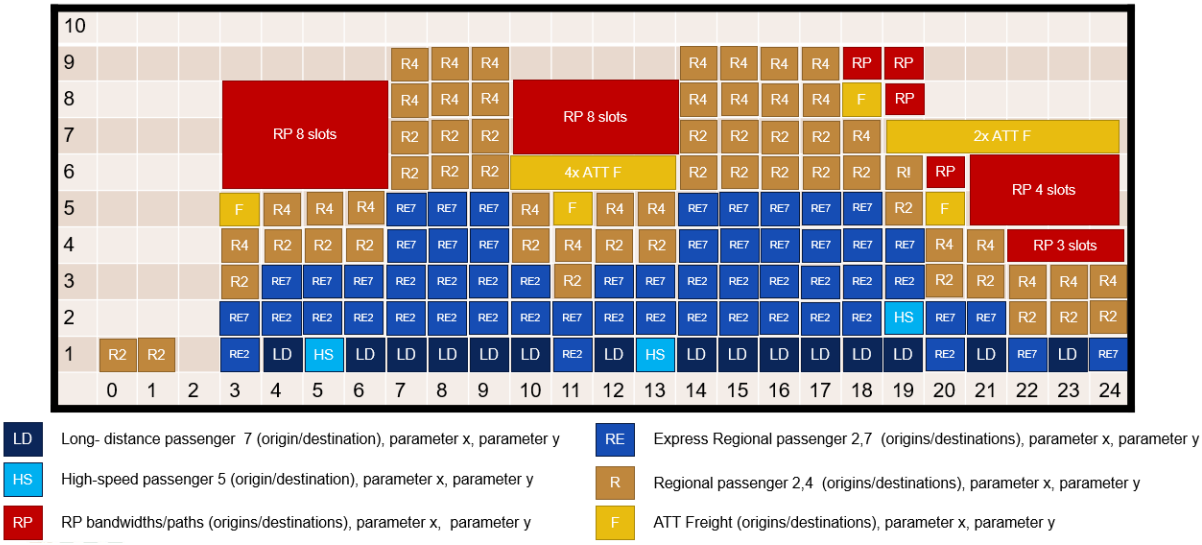


Figure 5: Example of the traffic part of the Capacity Model B

» Example C: is a regional single-track line with low importance; lite version of the model can be used; an IM published frequency of passenger trains in peak and off-peak periods, rest of the capacity left as unplanned.

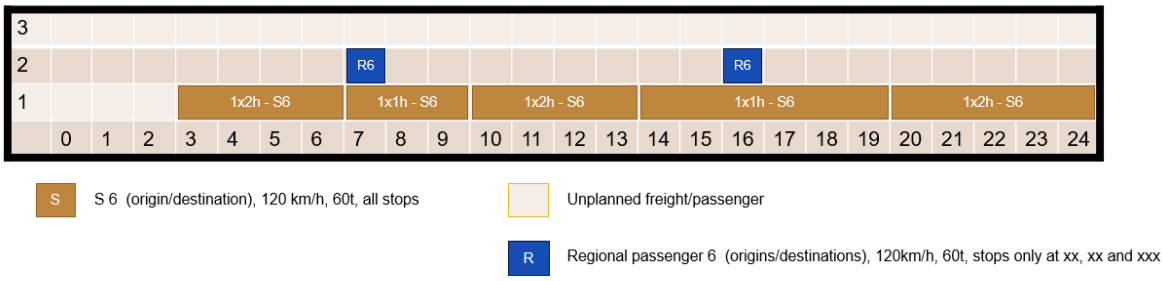


Figure 6: Example of the traffic part of the Capacity Model C

» Example D: a line with low importance and sufficient capacity for expected demand, lite version of the model shows only a regular maintenance window between midnight and 04.00am, the rest of the capacity left as unplanned.

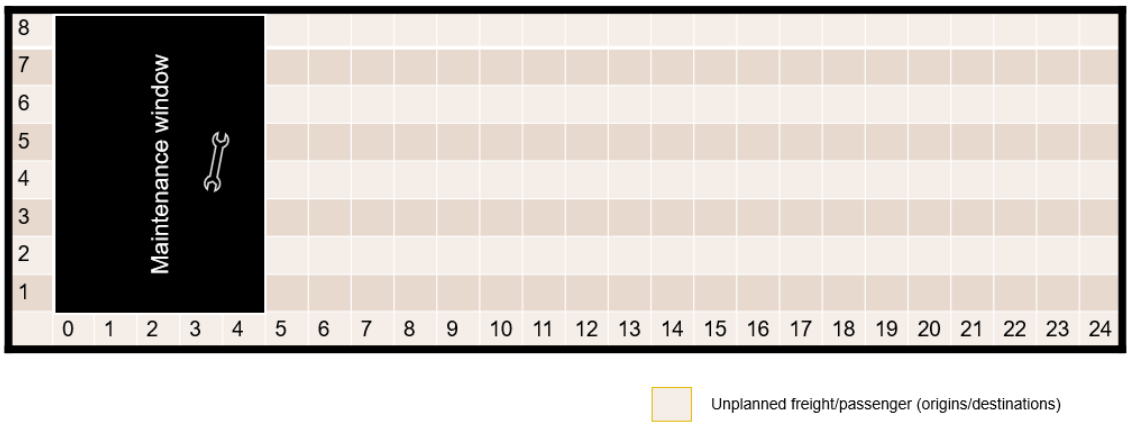


Figure 7: Example of the traffic part of the Capacity Model D

» Example E: shows the ATT and RP volumes for freight traffic as prepared by the ÖBB Infra TTR pilot for TT2021.

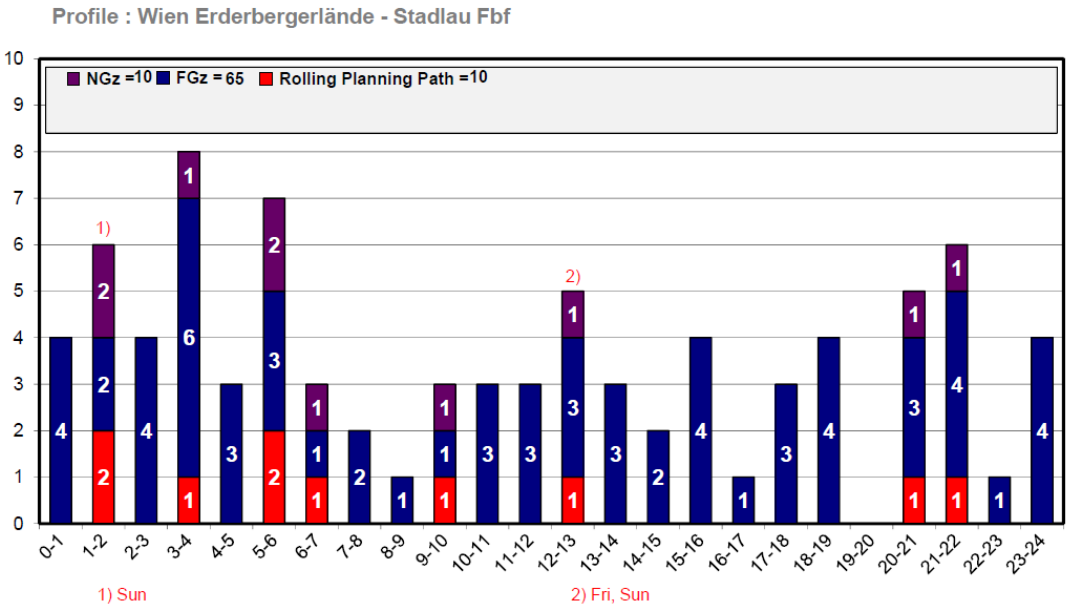


Figure 8: Example of the traffic part of the Capacity Model E

Below is an overview of the suggested assignment of type of traffic to the three commercial categories of the capacity partitioning:

Annual Timetable:	**Rolling Planning:**	**Ad hoc:**
Passenger trains operating on a regular basis	Freight trains with a contract with the customer for a longer period (> 1 year)	Irregularly running passenger trains (charter trains, holiday/seasonal trains, additional trains for events, etc.)
Freight trains operating primarily in a supply-driven way (e.g. single wagon load, rolling highway) where the needed path details usually are known well ahead of time	Regular freight trains with a contract with the customer for a short period (< 1 year) where the needed path details are not known well ahead of time	Freight trains, which only run on one or a few days and where no preconstructed Rolling Planning Capacity is available
Regular freight trains with a contract with the customer for a short period (< 1 year) where the needed path details are known well ahead of time	Passenger trains operating only sporadically (holiday/ seasonal trains, etc.)	Spontaneous needs for transfers to/from rolling stock depots
	Regular transfers to/from rolling stock depots	All other trains for which no capacities have been preconstructed.

2.3. Objects – TCR Part of the Model

The maximum amount of capacity to be consumed by TCRs has to be estimated and transparently inserted into the model. The calculation of the capacity in a standardised way is a challenge, for the time being, the simple % of capacity occupied by the TCR will be used. In the future, the sector should evaluate and be open to any further methods. It was noted that percentages have only a value for a combination of train path line sections and for comparison between timetable periods; more details are needed for each section. The percentage should be complemented by an overview of volumes for each category of TCRs, accompanied by data on whether partial or total closure is expected. Where possible, the approximate placement of the future TCRs such as day/night, summer/winter, frequency should be stated. This was found to be a good compromise between RUs' needs and what IMs are able to provide and to stick to it in practice. The focus is on the volumes and principles, the exact timing of each TCR will come according to the regular TCR planning. The final Capacity Model should also contain the link to information on already published TCRs and IMs can also use the model to communicate the expected impact on the traffic volumes for a particular TCR.

Major impact TCRs	The volume of capacity expected by the IM to be used for major impact TCRs, approximate placement of the TCRs and information if total or partial closure is expected. The data should be available from the first publication at X-24 and calculation performed by the IT system.
High impact TCRs	The volume of capacity expected by the IM to be used for high impact TCRs, approximate placement of the TCRs and information if total or partial closure is expected. The data should be available from the first publication at X-24 and calculation performed by the IT system.

Estimated capacity for Medium impact TCRs	The volume of capacity expected by the IM to be used for medium impact TCRs, approximate placement of the TCRs and information if total or partial closure is expected. The data are transferred automatically by the IT system, if the medium TCR is inserted into the TCR tool already. Only if the data is missing, information is added manually.
Estimated capacity for minor, changed and late TCRs	The volume of capacity estimated by the IM to be used for minor impact, late and changed TCRs. Indicative timings of the maintenance windows, and indicative periods, when the IM would like to execute future minor and potential late TCRs. The information can be added manually by using the investment plans and statistics from the past, the methodology is to be developed.

The example shows how the overview of TCR volumes might look like for TT2025. Afterwards, IMs should gather experience and discuss how to further develop the TCR share overview.

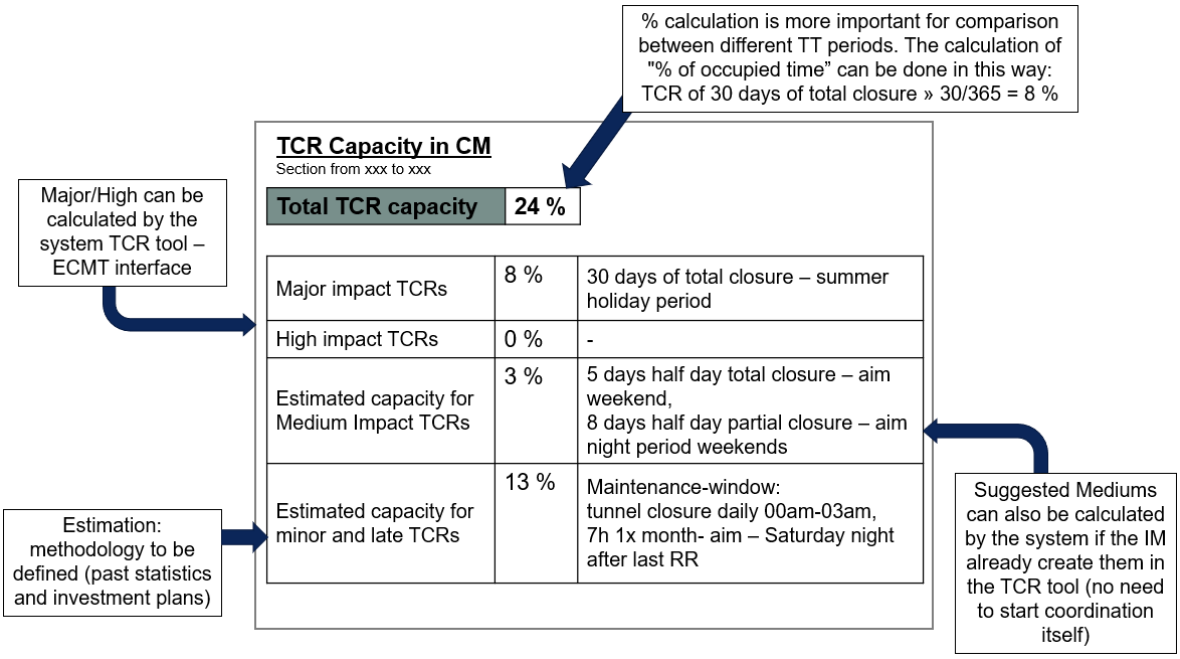


Figure 9: Example how the overview of TCR volumes might look like for TT 2025

2.4. Timeline for Capacity Model

The Capacity Model is an intermediate step, which is used by IMs to help the transformation of expectations about future demand into capacity products that can be planned, safeguarded, and offered to customers.

X-36	IMs start to work on Capacity Models.
X-36 to X-24	All applicants and potential applicants can submit capacity needs announcements; they are regularly exchanged between IMs.
X-24 to X-21	IMs analyse the collected data (plausibility check of data, detection of multiple data entries for the same train service, comparison with own traffic forecast hypothesis, etc.). Draft internationally harmonised Capacity Models are finished.

X-21 to X-18	IMs consult the applicants of which capacity needs cannot be fully considered in the models and try to find alternative solutions. IMs fine-tune the Capacity Models.
X-18	The capacity partitioning of the volumes is performed (final Capacity Model publication), start of the capacity planning/supply phase.

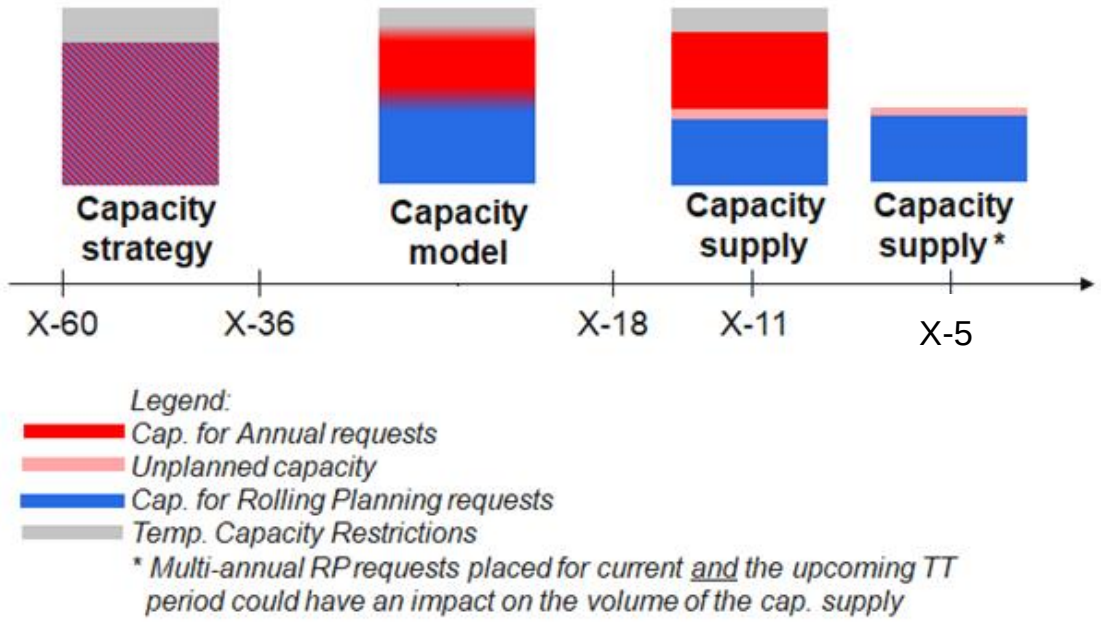


Figure 10: From the Capacity Strategy to the Capacity Model to the Capacity Supply (sample)

2.5. How to Create a Capacity Model

The first step for the IM is: to construct a clear picture of the available infrastructure on its network three years in advance. Every change that impacts capacity on lines and in stations/nodes should be taken into account.

The second step is to make plans about how the infrastructure will be used in the future. The IM can do this on its own or in consultation with applicants. On international lines, harmonisation with involved IM(s) is essential. This includes studies about routings and frequencies of national and international connections on the network. Also, changes in national regulations may play a role in this phase. For example, national governments may decide that on certain lines there is a need for minimum service levels for dedicated market segments (e.g. a minimum of two local trains per hour).

The Capacity Model divides the capacity on a line into an IM's own needs (TCRs) and commercial needs. A Capacity Model can have a high added value in case of:

- congested lines;
- expected substantial volume of Rolling Planning requests;
- lines with mixed traffic (different applicants, passengers & freight);
- lines with international traffic;
- lines with an expected high volume of TCRs that will cause capacity problems.

IMs need to calculate the expected demand for capacity in the various market segments for a time frame of about 36 months[2]. This can be done by taking into account:

- information provided by the competent authorities in the capacity strategy phase,
- placed multi-annual Rolling Planning requests,
- data about train services operated in the current or previous year,
- estimation and own hypothesis of future market developments,
- capacity needs announcements,
- framework agreements.

2.5.1. Capacity Needs Announcements (CNA)

Applicants have required a process that enables them to participate in the design of the future capacity, balanced between freight services, passenger services, and capacity restrictions.

Information parameters of applicants to indicate their future needs for capacity shall be standardised. The system should allow them to enter all necessary information and parameters in order for IMs to plan capacity. If possible, any data input fields should be as much as possible based on the agreed content for TAF/TAP messages for path requests (potential later utilisation for feasibility study and or path request). The entire process will be managed under the control and responsibility of the IMs, preserving full confidentiality.

Capacity needs announcements can be submitted by:

- Freight/passenger RUs,
- Non-RU applicants (regions, governments, transport associations, industries),
- Terminals and service facilities,
- Other entities with interests in capacity usage, but which will not apply for capacity directly.[3]

It can be assumed that applicants in the passenger market will make use of the possibility to deliver very detailed information. However, most applicants in the freight market will find it difficult to indicate detailed data. They probably would like to present their needs in terms of volumes (e.g., number of paths per day and line sections). Therefore, future IT systems should not only be user-orientated[4], but allow submission of lite-version of CNA with only general information.[5]

Capacity needs announcements can be expressed in different ways:

- Indication ‘Status quo’ if no changes to the current offer are intended,
- Indication ‘Status quo’ with adaptations,
- New traffic (as much detailed and reliable input as possible such as parameters, stops, rough timetable requirements).

Timeline:

1) Until X-24, applicants may indicate their needs for capacity. For international traffic, capacity announcements need to be harmonised by the involved applicants.

[2] In a particular Capacity Model, IMs consider only single TT-period and 12-month outlook. However, with the TTR full rollout, the work will be ongoing simultaneously on several TT-periods. For instance, in December 2024, the IM will start with the model for TT2028, close capacity needs announcement collection for model of TT2027 and finish work on Capacity Supply (based on the published model for TT2026).

[3] For instance: coal powerplant planning tender for an RU to transport coal, car factory organising carriage of components and cars.

[4] Taking into consideration that not all who submit CNA are deeply involved into the railway business, the future IT tool must guide and allow submission to lay persons as well.

[5] For instance, in a form: “wagonload train loaded with coal from place A to place B, 3x per week.”

2) Between X-24 and X-21, IMs analyse the collected data (plausibility check of data, detection of multiple data entries for the same train service, comparison with own traffic forecast hypothesis, etc.). In case of announcements concerning international traffic, an alignment of the analysis and conclusions between other IMs should take place. Those who submitted CNA might be contacted for clarification (e.g. lack of plausibility).
3) X-21 to X-18: if the CNA could not have been fully taken into account, a consultation process with applicants might follow to clarify their needs (non-fulfilment of their needs due to missing capacity, assessment of alternatives, etc.).
4) From X-18 to X-11: those who submitted CNA are available for further consultation on the process of Capacity Supply construction (already part of the Capacity Supply phase).

Conflict in CNAs

Explanations and criteria of what to do in case of conflicts popping up while planning the capacity and leading to a congested line will be published in Annex 'Allocation Guidelines for Conflicting Capacity Announcements and Requests'.

2.5.2. Estimation of Future Volumes by IM

In the example below (calculation of volumes of system paths needed for the market segment 'international freight trains with parameters 90km/h, 2000t, 690m), the estimation of volumes is done by assuming that the infrastructure is available 20 hours a day and that the IM closes the line for four hours for daily maintenance. These calculations will need to be translated into design parameters for future timetables. For instance, 'How many system paths/how much bandwidth is needed per hour to fulfil the expected need for capacity in a market segment?

The figure below shows how this calculation is done in an example (Line A to B). On this line, there is a large number of freight trains every day. To facilitate these trains, the IM has planned two system paths per hour that can be used by freight trains with standard characteristics. Based on historical market growth and data about development in the future, the IM expects an annual growth of 10% in the number of trains after 2021. This example shows that starting in 2023, the Capacity Supply in this market segment will have to be increased.

Line: A ⇨ B	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**Harmonisation needed with involved IMs?**
Realisation: average number of freight trains per day	30	25	28						
Offered system paths/hours for freight trains	2	2	2						
Offered capacity based on 20-hour/day availability	40	40	40	40	40	40	60	60	Yes, volumes
Market growth (%)		-17%	+12%	+10%	+10%	+10%	+10%	+10%	
Daily closure of line for maintenance (01:00-05:00)	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs	Yes
Number of expected freight trains/per day				31	34	38	42	46	IMs exchange expectations
Of which converted into a path following Rolling Planning requests of previous years				10	8	2	-	-	IMs exchange this information
Slots/hour needed				1.55	1.7	1.9	2.1	2.3	
Slot/hour offered				**2**	**2**	**2**	**3**	**3**	

For the purpose of harmonisation at the international level, it is recommended to calculate expected volumes at the level of detail of a standard non-TCR day (a day in the middle of a normal week), which is also the basic requirement for TTR implementation.

2.6. Capacity Partitioning

At X-18, IMs perform the so-called “capacity partitioning” within the Capacity Model, it can be also understood as the publication of the final Capacity Model. By applying this capacity partitioning procedure, the capacity of a train path line section is set aside in the Capacity Model for dedicated purposes:

» Annual requests for both passenger and freight (very stable traffic)
» Rolling Planning requests
» Ad hoc requests
» TCRs[6]

As mentioned in chapter ‘Objects- TCR Part of the Model’, the partitioning shall be set for TCRs at least for the whole timetable period and for the traffic volumes for a standard non-TCR weekday. It is up to the IMs to perform more detailed capacity partitioning where needed, this partitioning can differentiate capacity from the time point of view (ATT against RP and ad hoc as written above), but also market segments can be subject to the partitioning (passenger against freight).

2.7. Capacity Model Evaluation

At X+12, when the timetable is over, it is a good opportunity for IMs to evaluate whether they were able to keep their previous commitment from the capacity partitioning. This knowledge is essential to gather data and improve the capacity partitioning and planning in the upcoming TT periods.

It is most important to evaluate whether the estimated share for TCRs was kept, and if not, for which reason. The IMs should also evaluate whether the TCR share was sufficient for maintenance in the long-term view.

The accompanying picture shows the amount of capacity set aside for TCRs in the capacity partitioning and possible final consumption of capacity by TCRs. The desired state is Result A (with a certain acceptable deviation). The Result B should be considered as the second-best. Here TCRs consumed finally less capacity than expected and this capacity was released for ad hoc requests. Result C must be prevented by IMs as it would be against the transparency introduced by capacity partitioning. The only exception where Result C is acceptable are the lines with a very low level of saturation and a significant amount of unplanned capacity to accommodate late TCRs.

[6] For the TCR share, only the maximum amount of capacity consumed for TCRs is published. The IM may any time cancel any planned TCR that will not be performed in the particular TT year at any time and convert this part of TCR share into the unplanned capacity.

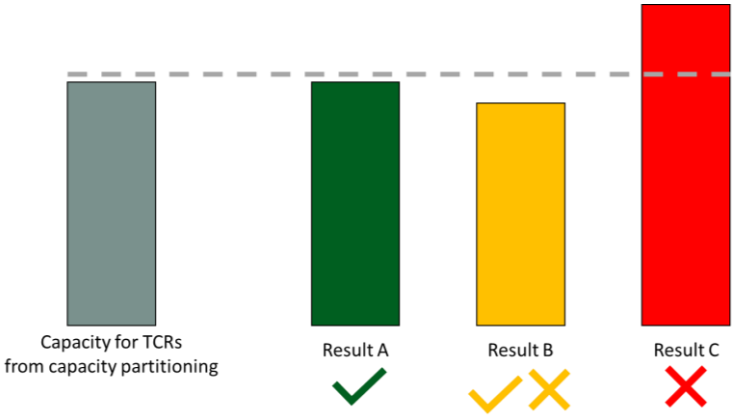


Figure 11: Evaluation of the Capacity Model (sample)

The evaluation of IMs should not be limited to a simple two per cent figures comparison, it has to be transparent and go deeper to the particular shares of TCR impact types and where needed even to particular TCRs. The stakeholders have to understand that special attention has to be given to the TCRs caused by force majeure, of which most are unpredictable.

The IMs should develop a joint methodology, how to also evaluate the Capacity Model and consult the methodology with applicants.

Further information regarding Capacity Model can be found here:

- Roadmap to Capacity Model (Including Basic Requirements
- Process Diagram: Capacity Model
- Process Diagram: Capacity Needs Announcement

3. Capacity Planning/Supply (X-18 to X-11)

The capacity partitioning (final version of the model) is the basis for the construction of Capacity Supply. The Capacity Planning phase starts at X-18 and IMs start to work on internationally harmonised Capacity Supply from X-16 at the latest. The supply consists of a 365-days overview – capacity diagram, where object as pre-planned paths and or wider bandwidths with the number of available slots are displayed.[7] It is up to the IMs to decide in which form (which objects) the Capacity Supply will be published. Nonetheless, the international Capacity Supply has to be harmonised. The IMs should start harmonisation of the international Capacity Supply as soon as possible and latest at X-13 actively come with the proposals of the Capacity Supply to the neighbouring IMs to coordinate the products and their publication. For days when the traffic will be affected by TCRs, IMs should jointly prepare harmonised sufficient Capacity Supply on the diversionary lines. Alignment of the maintenance windows is also part of this harmonisation.

Explanations and criteria of what to do in case of conflicts popping up while planning the capacity and leading to a congested will be published in Annex 'Allocation Guidelines for Conflicting Capacity Announcements and Requests'.

The following sub-chapters define the objects of Capacity Supply, timeline and further details concerning the Capacity Supply construction for X-12 and its later updates.

[7] The future Capacity Hub should allow the visualisation not only for a particular day, but also for longer time-frames due to needs for longer international route views (trains running more than 24h).

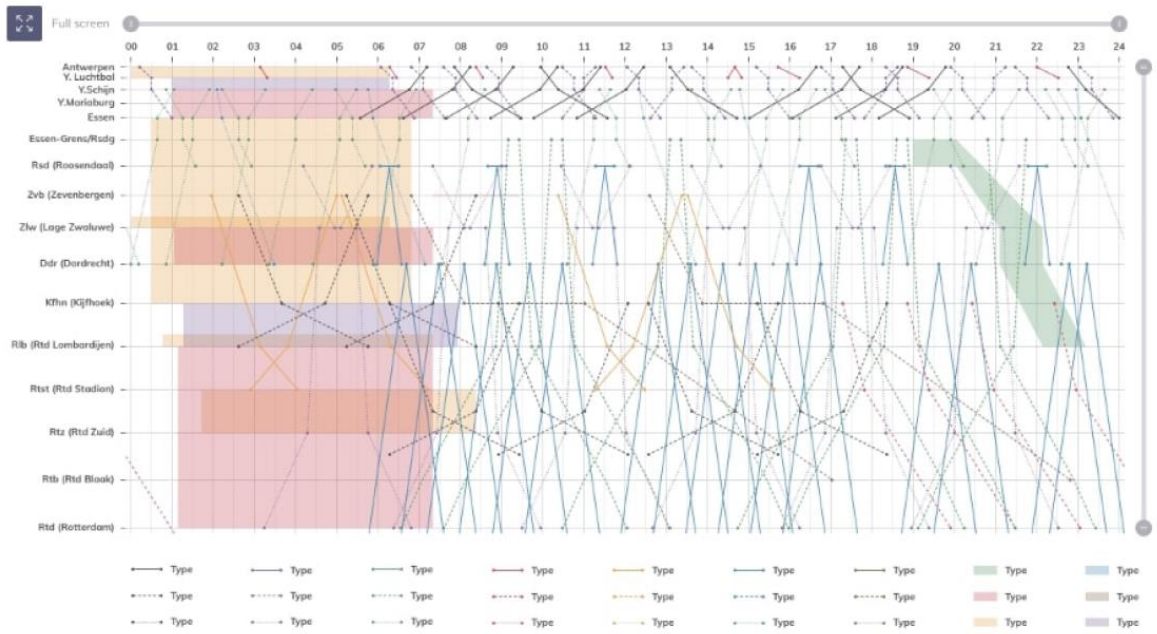


Figure 12: Example of the Capacity Supply from the TTR pilot line Antwerp-Rotterdam

3.1. Objects in Capacity Supply

The Capacity Supply at X-11 can consist of more types of objects. In the Capacity Supply TCRs and future traffic are displayed in the same capacity diagram.

Capacity type	Form of objects that can be used for visualisation
Capacity for Annual Timetable requests	• Pre-planned paths • Bandwidths for requests (including potential number of slots) • Empty space for tailor-made requests (unplanned capacity) [8]
Capacity for Rolling Planning	• Safeguarded pre-planned paths • Bandwidths for requests (including safeguarded number of slots)
Capacity for ad hoc	• Safeguarded pre-planned paths • Bandwidths for requests (including safeguarded number of slots) • Empty space for tailor-made requests (unplanned capacity)[9]
Negative capacity	• Known and published TCRs • Fixed rectangle or trapezium for a maintenance window (to be used for minor, late TCRs)

[8] The unplanned capacity of train path line sections shall be connected as much as possible to allow seamless train operation, otherwise will lead to capacity wastage.

[9] The unplanned capacity of train path line sections shall be connected as much as possible to allow seamless train operation, otherwise will lead to capacity wastage.

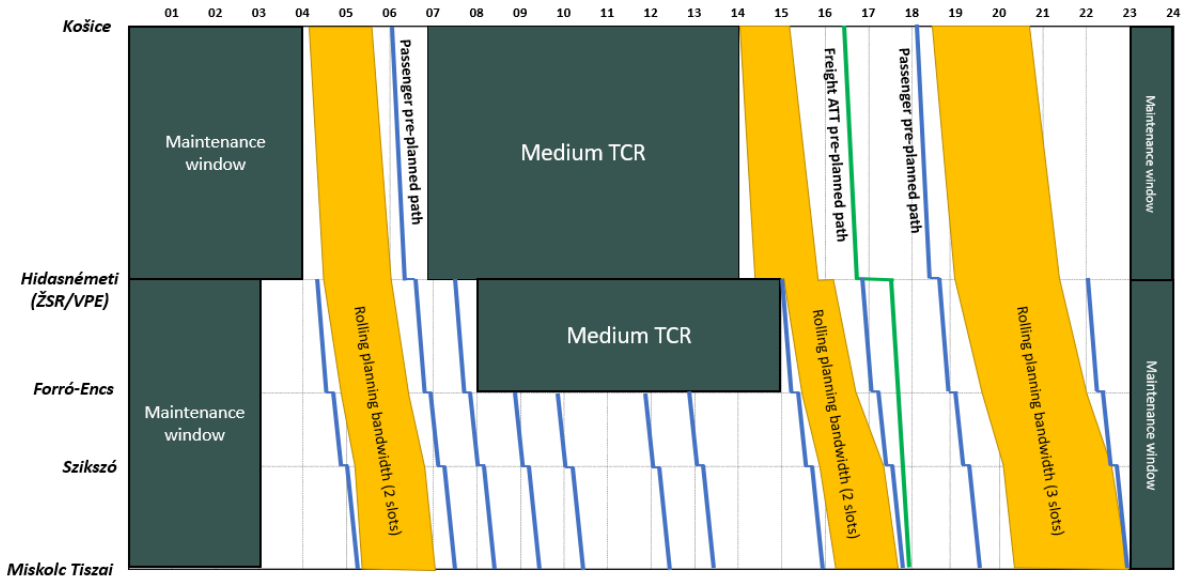


Figure 13: Theoretical example of a capacity diagram for a particular day, where all types of objects are used.

3.2. Commercial Share in the Capacity Supply Phase

On the basis of the capacity partitioning, at the latest from X-16, IMs will work on the complete timetable by combining pre-planned paths, system paths, bandwidths and empty spaces. The result is a feasible timetable according to lines and/or network characteristics. In the case of cross-border lines, these activities shall be harmonised with the neighbouring IM(s) by using the Capacity Hub.

3.2.1. Pre-Planned Paths

A pre-planned path is a path that an IM has planned at the beginning of the Capacity Supply process on the basis of the capacity partitioning as well as its own expectations regarding market needs, requirements contained in framework agreements and 'capacity needs announcements' made by applicants. TCRs have to be taken into account as much as possible and the path position in the capacity diagrams adjusted once the exact details of TCRs are published.

These paths refer primarily to anticipated and stable traffic. Therefore, their characteristics cover a very narrow range and have a restricted degree of flexibility for the final path construction.

3.2.2. Capacity Bandwidths

Capacity bandwidth (often also referred as capacity bands) is an indicative time frame up to several hours that includes capacity for at least one future path. Within these capacity bandwidths, IMs will offer a number of paths and slots. The size of these capacity bandwidths may vary and may take into consideration existing restrictive time windows (e.g. rush hours). It is not advisable to publish a capacity bandwidth wider than 24 hours at one infrastructure point.

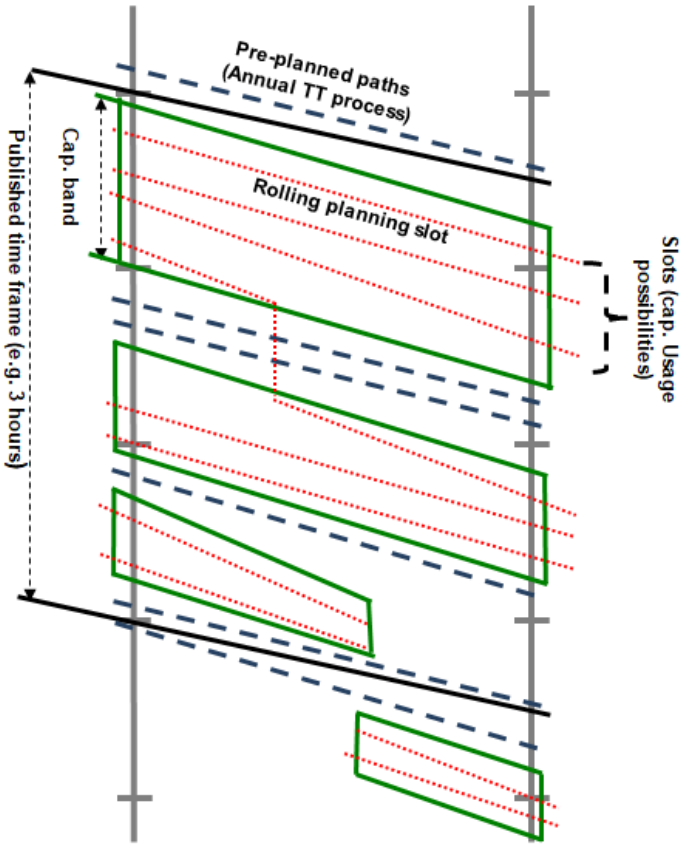


Figure 14: Pre-planned paths and Rolling Planning slots inside bandwidths

This is a capacity usage possibility within a capacity bandwidth that will be converted into paths. The indicative number of paths is published as the number of expected available slots. The slots are accompanied by the envisaged train – parameters (length, speed, weight, proposed maximum running time). It is up to the IMs to define rules how far the envisaged parameters shall be respected and harmonise them with neighbouring IM(s). Requests not fitting to the envisaged train parameters might result in the usage of more slots for a single train run.

3.2.3. Safeguarding Capacity for Rolling Planning Requests

In order to make sure that the capacity for Rolling Planning requests will not be used for Annual Timetable requests this capacity needs to be safeguarded. The safeguarding of capacity is a capacity reservation for an explicit purpose and categories of paths. Common regulation will be needed in order to ensure that the capacity remains available until it is requested.

3.3. TCRs in the Capacity Supply Phase

3.3.1. Major/High/Medium Impact TCRs

Major, high and medium impact TCRs have to be included in this phase of the Capacity Supply development. IMs need to know about the impact of TCRs on capacity. The impact of a TCR can be that there is no capacity left for paths at all (closure of the line) for a period of time that can vary between days and months. It can also mean a reduction of capacity during a given time frame: some tracks are closed but other tracks will be available.

Depending on the impact on capacity, an IM (or IMs) need(s) to develop ideas about how to handle the consequences. IMs should be in contact with involved applicants to find out how they want to deal with the consequences of TCRs. This can mean the rerouting of international trains, the use of buses, or other timetabling schemes. The ideas have to be harmonised by

the IMs. In the Annex 'Allocation Guidelines for Conflicting Capacity Announcements and Requests', possible approaches for handling such situations will be presented.

The Capacity Hub should support the publication. During periods of TCRs, IMs can decide to publish the split of the market segments in greater detail and include the impact on alternative routes.

3.3.2. Maintenance Windows

The aim of thorough TCR planning is to eliminate changes in the Capacity Models and minimise impact allocated paths. Changes in TCRs that result in major replanning and large uncertainties for the applicants need to be reduced to an absolute minimum. Similarly, late TCRs need to be reduced as much as possible and triggered only by external factors, which are out of any IMs' control.

However, the Capacity Supply is published already at X-11, which is too early for exact details for minor impact TCRs, not speaking of late TCRs. Therefore, IMs can establish regular maintenance windows to be able to react on many of these TCRs when they become known. The maintenance windows shall be sufficiently extensive for the TCRs while being ambitious to allow for all foreseeable traffic volumes. Their size has to be decided by IMs based on their experience from the past. For the cross-border lines, maintenance windows have to be coordinated between the neighbouring IMs (and where applicable also other IMs that might be affected). The aim of the coordination should be to minimise the impact on the traffic,[10] to synchronise future TCRs on a given route and avoid restricting capacity on diversionary routes. The maintenance windows have a definite shape form, and they are part of the published Capacity Supply.

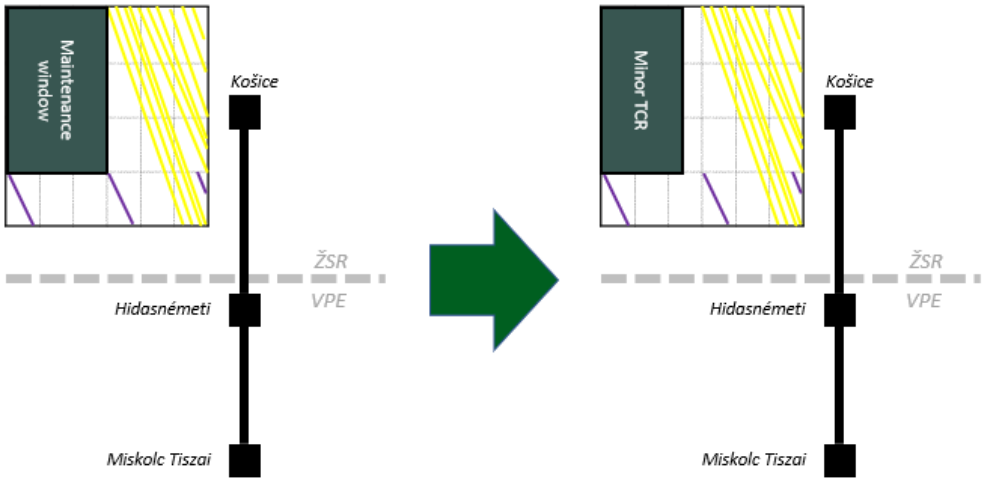


Figure 15: Example of situation, where a minor TCR is published in the maintenance window.

Naturally, the usage of maintenance windows does not eliminate the need for path alteration as not all minor and late TCRs can be planned inside them. However, a sufficient number of maintenance windows of proper duration can accommodate a substantial number of minor and late TCRs without an impact on allocated paths and without the need for coordination (as the maintenance windows were already subject to coordination in the Capacity Supply phase).

3.3.3. Release of Maintenance Windows

[10] A typical example where maintenance windows can be considered as not harmonised is when on the same international line one IM plans short maintenance windows daily at night, while the other a long maintenance window over weekend.

In case an IM does not plan to make use of a particular maintenance window, it shall be released for ad hoc requests at the latest 14 calendar days before the operation day. It is in the interest of both, IMs and applicants, to make the release as soon as reasonably possible, as the IMs want to monetise the capacity, while applicants would like to use it for train runs. On the other hand, if the release is too early, it can lead to a situation when there is no maintenance window for an unexpected late TCR (undesired path alterations at short notice).

3.4. Timeline for Capacity Supply

X-18	The IMs start preparation of the Capacity Supply. Start of the consultation with applicants on how to design Capacity Supply on the days affected by major impact TCRs. The construction shall start at X-16 at the latest.
X-13	The latest deadline for IMs to actively advance with the non-TCR Capacity Supply harmonisation.
X-12	Consultation and Coordination of high and medium impact TCRs finished.
X-12	Publication of Major/High/Medium impact TCRs. Publication of these TCRs as fixed negative capacity.
X-11	Publication of internationally harmonised Capacity Supply including maintenance windows for minor and late TCRs.
X-10.5	The deadline for IMs to correct inconsistencies in the Capacity Supply notified by applicants, service facilities...)
X-6.5 to X-4	Publication of minor impact TCRs.
X-5	The Rolling Planning capacity published at X-11 can be updated for the last time. The update shall not decrease the capacity safeguarded for Rolling Planning. The aim of the update is to narrow the bandwidths published at X-11 or conversion of bandwidths to pre-constructed paths. The updated Rolling Planning capacity shall not be in conflict with the fixed minor TCRs.
X-2	Conversion of unused ATT capacity to RP capacity or unplanned capacity.
M-150 days to M-30 days	Update of the Capacity Supply by the path alteration process due to new fixed minor TCR (for more details, see path alteration chapter).
M-30 days	Conversion of unused RP capacity to residual capacity.
M-14 days	The latest deadline to release the unused maintenance widows for ad hoc requests.

3.5. Updates to the Capacity Supply After X-11

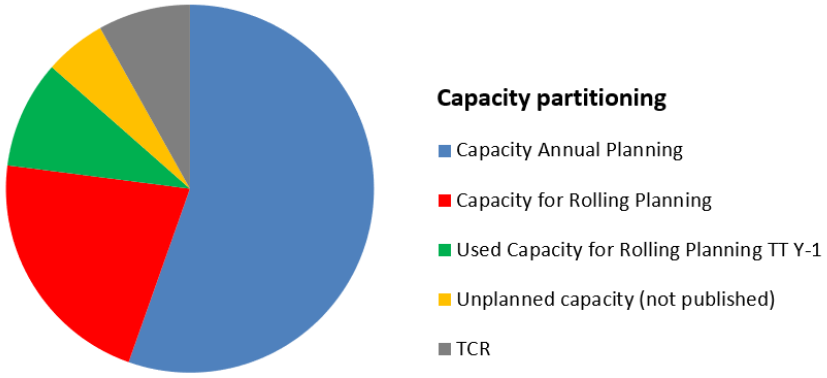
The Capacity Supply after its publication at X-11 and inconsistency checks by X-10.5 shall be stable and accessible for all applicants. However, there are several triggers due to which the supply is in a certain term dynamic until X+12.

	Until X-8,5	During the TT construction (X-8,5 to X-6,5)	After construction	M-1 (1 month before operation)
Annual Timetable capacity	Used for Annual TT	Used for Annual TT	Used for Annual TT	Used for Annual TT
	Residual capacity	Open for request after deadline	Open for any request (paths and TCR)	Open for any request (paths and TCR)
Rolling Planning capacity	Used for RP	Used for RP	Used for RP	Used for RP
	Residual RP capacity	Residual RP capacity	Residual RP capacity	Open for any request (paths and TCR)
Unplanned capacity	Used for Ad hoc/ short-term traffic	Used for Ad hoc/ short-term traffic	Used for Ad hoc/ short-term traffic	Open for any request (path and TCR)
TCR capacity	Blocked for TCR	Blocked for TCR	Blocked for TCR	Blocked for TCR

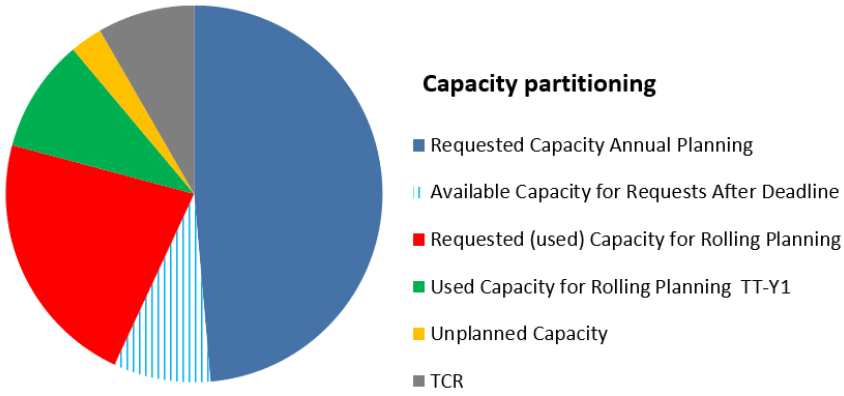
- **RP updates until X-5:** The Rolling Planning capacity published can be updated for the last time at X-5. The update shall not decrease the capacity safeguarded for Rolling Planning. The aim of the update is to narrow the bandwidths published at X-11 or conversion of bandwidths to pre-constructed paths. The updated Rolling Planning capacity shall not be in conflict with the fixed minor TCRs.
- **Path (un)booking**: the availability in the Annual Timetable and Rolling Planning supply needs to be updated after a path has been allocated or cancelled. This dynamic update of the available capacity should be done immediately. Due to the first come – first served principle, time is a very important criterion. The Rolling Planning capacity is visible and requestable for all applicants until it is allocated. The Rolling Planning capacity that is subject to harmonisation between the applicants will be labelled.
- **Inclusion of minor TCRs:** The impact on draft offers has to be minimised, to avoid inefficient changes in the path offers in post-processing. If possible, the draft offers should already take into account minor TCRs.
- **Handling of late TCRs, changed TCRs and force majeure:** for unexpected situations beyond the influence or control of IMs, maintenance windows can be considered as a potential time when the TCR execution can minimise the impact on allocated paths. However, this is not always realistic especially for force majeure. In these cases, the path alteration process is triggered.
- **TCR cancellation:** In case a TCR is cancelled for a certain reason, the IM can convert the capacity into the unplanned capacity and or can consider keeping it for other TCR or as a maintenance window. Unused maintenance windows shall be released for ad hoc requests at the latest at M-14 days.
- **Conversion of unused ATT capacity**: at the end of the ATT path allocation process, not requested and unused capacity for Annual Timetable requests remains available for further requests or might be converted into Rolling Planning capacity. For example: The intended pre-planned paths in the Annual Timetable for a new regional passenger service will not be requested due to budget problems by the regional authority. As no other applicant will request these pre-planned regional passenger paths, the IM might convert them into Rolling Planning capacity in case of a predictable increased demand – but only for the upcoming timetable period.

» **Conversion of unused RP capacity to residual capacity**: In case no applicant requested offered products for Rolling Planning by M-30 days, the capacity is converted to the residual capacity and utilised by the IMs for instance for ad hoc traffic.

Capacity supply at X-12 = published capacity



Capacity supply at X-8,5 = annual requests received



Capacity supply at X-4:
1st request for RP for upcoming TT

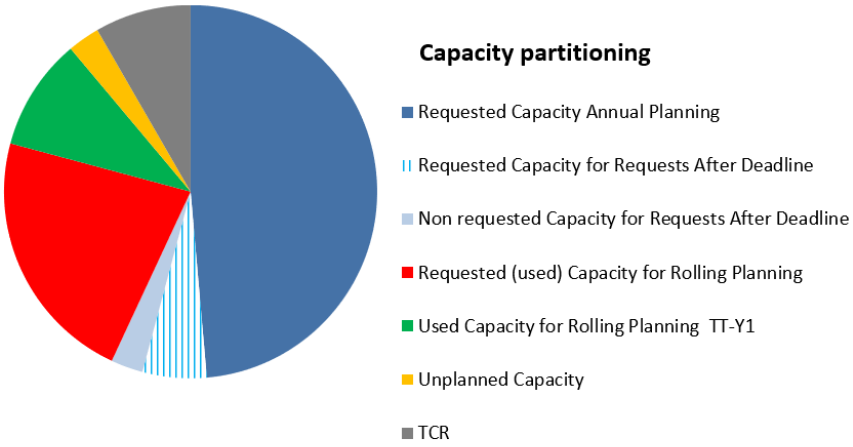


Figure 16: Development of the available and used capacity for the upcoming timetable period

3.6. Framework Agreements

Framework Agreements may be concluded between an IM and an applicant for more than one timetable period. The conclusion of Framework Agreements has to be requested well ahead of the start of operation and the Annual Timetable planning. Consequently, it serves for transport needs that are known well ahead of time and thus fit into the annual planning process.

The legal and procedural requirements for the conclusion of framework agreements are not suitable for transport needs with very short lead times between path request and operation, which nevertheless require a longer transport period than just one timetable year. These will be served in Rolling Planning with the multiannual aspect.

Further information regarding Capacity Planning/Supply can be found here:

» Roadmap to Capacity Supply (Including Basic Requirements
» Process Diagram: Capacity Supply

4. Temporary Capacity Restrictions

Temporary capacity restrictions are necessary to keep the infrastructure and its equipment in good condition and to allow for infrastructure development in accordance with market needs. Hence, TCRs are in the best interest of all stakeholders. However, the overall goal of IMs is to have the traffic flow despite the capacity-reducing effects of re-investing into the rail infrastructure with the stakeholders' specific interests in mind.

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 harmonised way, and to ensure TCRs alignment to allow maximum traffic flow.

This sub-chapter describes the types of TCRs, main process steps and timelines.

4.1. TCR Life Cycle

Each TCR has a certain life cycle from the definition of the initial need to its execution. From the international point of view the following activities are the essential ones:

Definition of the need	The IM or the investor coordinated by the IM defines a certain need for a TCR.
Coordination	The activity aimed at finding the best way how to plan and execute TCRs. The aim of coordination efforts within and between infrastructure managers is the safe implementation of railway operations and to find the best solution for planning operational restrictions resulting from construction measures while taking into consideration the requirements of the market.
Consultation	An active exchange process about TCR between the IM(s) and applicants in formal communication channels. IMs ask the opinion of applicants about the envisaged measures to be implemented for capacity restrictions before publishing. Depending on a particular TCR and stage of planning, the consultation focuses on: • Timing of the TCR execution • Volumes of traffic that will be able to operate during the TCR on the partially closed line and its re-routing • Impact on Capacity Supply/allocated paths
Publication with exact timings	Insertion of the published TCR objects into the capacity diagram

4.2. Criteria for TCR Coordination and Publication

Capacity restrictions may vary widely as regards their duration and impact on rail traffic. Therefore, publication criteria have to be defined for TCRs, depending on their effects on capacity and rail traffic.

To provide guidance on how each TCR should be handled, an impact cluster has been created (both criteria must be fulfilled):

Type of TCR	Consecutive days	Impact on traffic (estimated traffic cancelled, re-routed or replaced by other modes of transport)
Major impact TCR	More than 30 consecutive days	More than 50% of the estimated traffic volume on a railway line per day
High impact TCR	More than 7 consecutive days	More than 30% of the estimated traffic volume on a railway line per day
Medium impact TCR	7 consecutive days or less	More than 50% of the estimated traffic volume on a railway line per day
Minor impact TCR	unspecified	More than 10% of the estimated traffic volume on a railway line per day

The specific conditions and needs of the various IMs may be different. This should be taken into consideration; if necessary additional criteria and/or more stringent thresholds than those described in these guidelines may be defined. IMs should seek to handle TCRs (coordination, publication and consultation) in a way to best suit the passenger and freight market requirements, even if not required by any definition.

4.3. Timeline to Coordinate TCRs

Depending on the impact cluster of the TCRs, different timelines and actions are required. Also, influence on neighbouring IMs has to be taken into consideration. Note that in any case, only two rounds of consultation and coordination can be applied by the IMs.

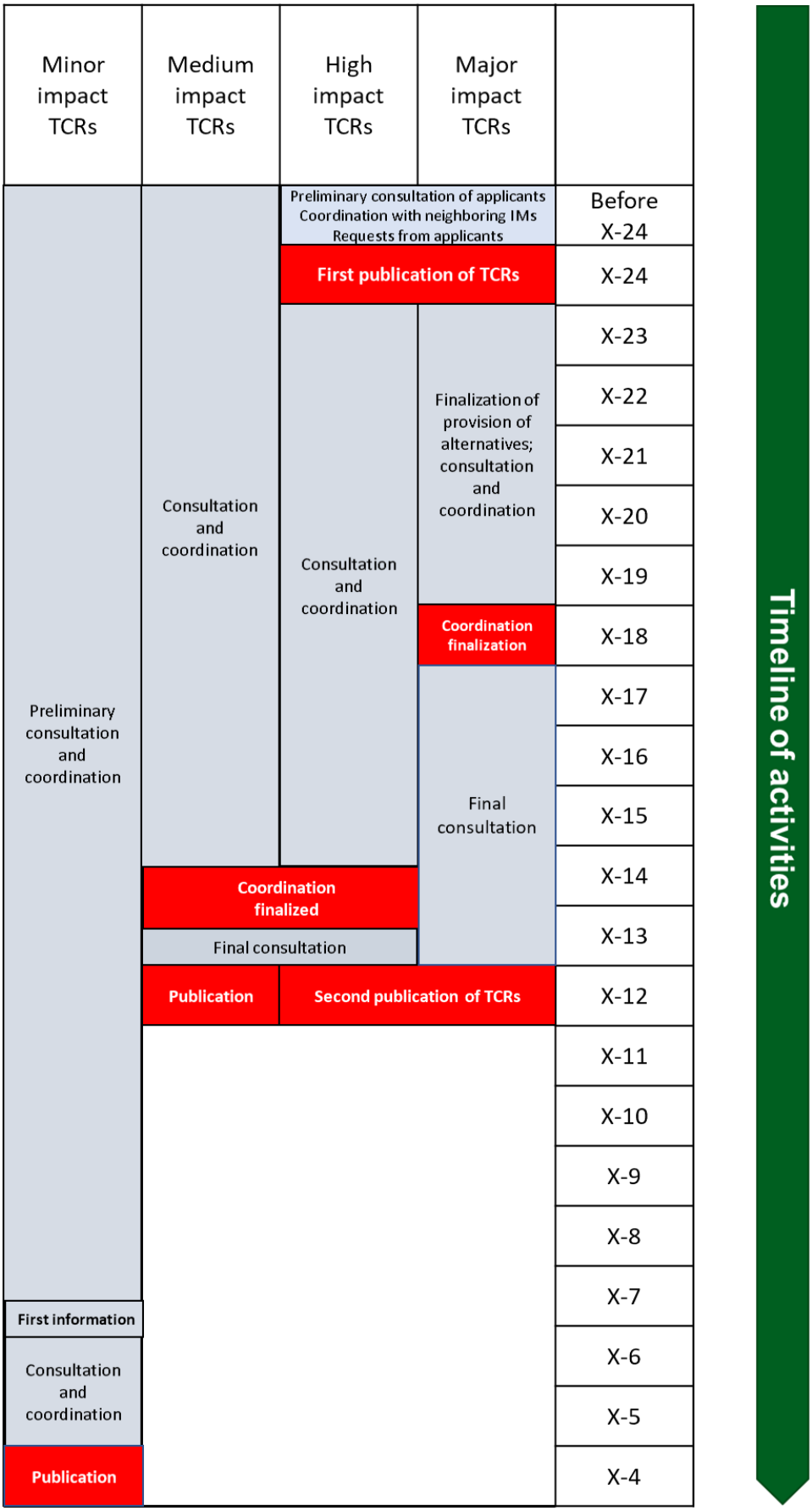


Figure 17: Timeline of TCR activities from X-24 to X-4

4.3.1. Late TCRs

Any TCR, which was not published according to the timeline above is considered as a Late TCR. Late TCRs are related to events the nature of which makes it not possible for IMs to be aware of them before the publication deadlines. The impact of late TCRs on applicants shall be minimised.

4.3.2. Changes in Fixed TCRs

It is not always possible due to objective reasons to keep the TCR timing as published (fixed). Changes in TCRs that occur after the publication according to the deadlines above are referred to as changes in fixed TCRs. They shall be avoided as much as possible by proper planning and risk management.

4.3.3. Handling of Late TCRs, Changed TCRs and Force Majeure

For unexpected situations beyond the influence or control of IMs, maintenance windows can be considered as a potential time when the TCR execution can minimise the impact on allocated paths. For cross-border lines, the publication of a new late TCR within a maintenance window can be done without prior coordination. In other cases, IMs shall coordinate the late TCRs, reasonably minimise the number of affected paths and consult the applicants. The allocated paths are altered according to the path alteration process.

4.3.4. Connection Between TCRs and TTR Elements

The TCR planning is not entirely independent from early timetable planning. TCRs are essential part of the Capacity Strategy, Capacity Model and Capacity Supply, nonetheless, they have various form of interference and detail specification. Annex 'Connection Between TCRs and TTR Elements' shows how TCRs are displayed and connected to TTR main elements.

Further information regarding Temporary Capacity Restrictions can be found here:

- » Connection Between TCRs and TTR Elements
- » Process Diagram: TCRs
- » Use case related to TCRs

5. Feasibility Studies

Path studies (feasibility studies) enable applicants to examine the feasibility of new or amended service concepts, using an iterative process with IMs and/or partner applicants to develop them further with a view to ordering paths for the annual or running timetable. The IMs' answer to a feasibility study should be in line with the outcome of the capacity partitioning. The reception of a feasibility study request should not lead to a revision of the Capacity Model. Either there is foreseen pre-constructed capacity which could suit the study request or if not, then unplanned capacity has to be used for checking the feasibility. If applicants intend to launch new traffic, they should use the "Capacity Needs Announcement (CNA)" and not wait until the possibility for placing study requests. In order to work on a study request, IMs need much more details than for a CNA.

Feasibility studies can be requested from X-15 until X+12 and can be placed for traffic in Annual Timetable and ad hoc. There is no guarantee that an applicant will receive positive feedback to a study request. The feasibility study result is also not a commitment to a path allocation.

The IMs should set up joint procedures for the feasibility studies to treat them in a harmonised way and to guarantee certain lead times for feasibility studies answers.

Further information regarding Feasibility Studies can be found here:

- » Roadmap to Feasibility Studies (Including Basic Requirements)
- » Process Diagram: Feasibility Studies

6. Requests for Capacity in the Annual Timetable

The Annual Timetable constitutes a re-evaluation of the capacity situation once a year. In addition, the Annual Timetable provides the opportunity to coordinate incompatible requests and find optimised solutions. From the IM point of view, yearly planning with a regular form of update (today known as 'the timetable change') forms the backbone of a reliable timetable.

In order to guarantee the robustness of a timetable, a precondition is to have a relevant proportion of trains with a static timetable. There are various market needs in the segments of passenger and freight traffic that are compliant with this prerequisite.

Requests for capacity in Annual Timetable can be divided into:

- » Annual requests placed on time (new path requests)
- » Annual requests place after the path request deadline (late path requests)

6.1. Annual Requests Placed on Time (New Path Requests)

This subchapter summarises the timeline and the process for requests for Annual Timetable capacity placed on time.

After implementing TTR, thanks to advanced planning and IT system developments and optimisation, the time frame will look as follows:

	Current time frame (2020)	After implementation of TTR	Intermediate solution in case 2012/34/EU cannot be adapted until TT 2025
Path request deadline	X-8	X-8.5	X-8.5
Path elaboration	X-8 to X-5	X-8.5 to X-6.5	X-8.5 to X-6.5
Draft offer; start of consultation phase	X-5	X-6.5	X-6.5
End of consultation phase	X-4	X-6	X-5.5
Final offer	X-3.5	X-5.5	X-5
Start of acceptance phase	X-3.5	X-5.5	X-5
Final allocation	X-3.25	X-5.25	X-4.75

6.1.1. Path Request Deadline

Initial path requests for the upcoming Annual Timetable have to be placed at the latest at X-8.5. Within the time frame between the publication of all known TCRs (at X-12) and the path request deadline, IMs will only add new TCRs or modify existing TCRs with a minor impact.

6.1.1.1. Requests for Pre-Constructed Products

Applicants are encouraged to request pre-constructed products (pre-planned paths and slots in bandwidths) published by IMs as Capacity Supply in the capacity diagram. These pre-constructed products already take into account published high, major and medium impact TCRs. It is possible for more applicants to request the same pre-planned paths and to place more requests for slots than is the number of slots available in the bandwidth. Nevertheless,

applicants should consider that IMs will apply, in case of the unsuccessful coordination process, allocation rules and there might be no capacity allocated to them in ATT.

6.1.1.2. Tailor-Made Requests in ATT

Tailor-made requests are possible in Annual Timetable as well. Nevertheless, applicants should utilise the published Capacity Supply for ATT requests. Only in the situation when there is no published Capacity Supply for their need, they can place a tailor-made request.[11] IMs accept tailor-made requests, but the answer will depend on the saturation of the line. In order to satisfy tailor-made requests in ATT, IMs:

- » can use the capacity of not requested pre-constructed products by X-8.5;
- » can use the capacity previously determined for a TCR, if the IM is in possession of new information that this TCR will not be executed;
- » shall not use the capacity safeguarded for Rolling Planning products;
- » can use unplanned capacity that was not safeguarded in capacity partitioning for ad hoc usage

Furthermore, the tailor-made requests shall respect the published TCRs, and not be placed over closed tracks/lines.[12] The future Capacity Broker will support applicants in the process of request creation, they will be notified about the conflicts with blocked capacity, and they will be asked to create for these days a subsidiary timetable.

6.1.2. Path Elaboration Phase in ATT

The IM will check if the path request reflects the expected dedicated pre-planned paths. In case of cross-border traffic, the IMs affected by the path request need to agree on which of their available pre-planned paths (out of the capacity for Annual Timetable requests) shall be used to propose an internationally harmonised path offer to the applicant(s). The offer should take the requirements in the path request into account. In case of a conflict between several requests, IMs will coordinate these requests to try to ensure the best possible matching of all requirements. An approach for treating unsolvable conflicts will be described in Allocation Guidelines for Conflicting Capacity Announcements and Requests.

Sometimes, a path request characteristic does not correspond to the assumption made by the IM when constructing the Capacity Supply for Annual Timetable requests and or the capacity is not pre-planned (empty space diagram). In these cases, the IM will try to prepare a tailor-made path offer on the basis of the unplanned capacity or the non-requested pre-planned capacity for the Annual Timetable.

6.1.3. Consultation Phase in ATT

Applicants may make observations on the draft offer within two weeks. The observations should refer to a deviation of the draft offer from the initial path request (e.g. path offer does not reflect the chosen pre-planned path). See also chapter 'Applicant Wishes to Change the Initial Path Request' for cases where applicants wish to make changes to the request.

6.1.4. Post-Processing Phase in ATT

If an observation is linked to a deviation of the draft offer from the initial path request, IMs should do their utmost to comply with the initial path request. If the observation refers to a path for cross-border traffic, the involved IMs have to cooperate during this phase. The post-

[11] IMs will strongly recommend applicants to announce such non-standard traffic via capacity needs announcement process and or using the feasibility study process.

[12] IMs indicate in the Capacity Supply through which TCRs is possible or not to place a request. Use cases how the published supply has to be supply are presented in Annex 'Use Cases Related to Tailor-Made Capacity'

processing phase lasts two weeks. During the post-processing, IMs can already incorporate into the timetable minor TCRs.

6.1.5. Acceptance Phase in ATT

If the applicant(s) agree to this final offer within seven calendar days, the paths will be allocated accordingly. In case of no agreement from the side of the applicant, the allocation will be withdrawn by the IM and the capacity will be made available for further needs.

6.1.6. Applicant Wishes to Change the Initial Path Request

If an applicant wishes to change the initial path request (e.g. changed parameters, additional requirements) between path request deadline and final offer, IMs will treat these change requests depending on whether they are considered as minor or major. Annex 'Minor/Major Changes to the Path Requests and Modifications' shows an overview of minor and major changes.

Minor changes to the path request: will be taken into account immediately.

Major Changes to the path request: cannot be taken into account, applicants will be asked to place a new request.

6.1.7. Inclusion of Minor TCRs

At the latest at X-6.5, IMs should start consultations on minor TCRs. The impact on draft offers has to be minimised, to avoid inefficient changes in the path offers in post-processing. If possible, the draft offers should already take into account minor TCRs.

6.2. Late Path Requests

Applicants are given the possibility to request capacity in the Annual Timetable until X-2. However, only requests placed until X-8.5 are processed with priority, the rest (considered as late path requests) are only processed after the final offer deadline.

Residual, suitable capacity taken from the Annual Timetable capacity (either non-requested pre-planned paths or unplanned capacity) will be used to respond to these requests. The treatment of requests placed after the X-8.5 deadline will start immediately after the finalisation of the requests concerning Annual Timetable capacity placed on time.

If there is neither residual Annual Timetable capacity nor unplanned capacity available, the IM will try to offer alternatives via a different itinerary. In the worst case, the final allocation by the IM will be done not later than one month before the timetable change. The relevant treatment of such requests will be on first come first served basis. The offered capacity will only be valid for the upcoming timetable period. Rolling Planning capacity will not be used in any case, except the non-requested Rolling Planning capacity is being shifted to the unplanned capacity one month prior to the first day of operation.

Further information regarding Requests for Capacity in the Annual Timetable can be found here:

- » Roadmap to New Path Requests (Including Basic Requirements)
- » Roadmap to Late Path Requests (Including Basic Requirements)
- » Process Diagram: Path Request
- » Minor/Major Changes to the Path Requests and Modifications

7. Requests for Capacity in Rolling Planning

A Rolling Planning request is a path request placed at any time by respecting the relevant deadlines (between four and one months before the first day of operation). It concerns a path

that is consistent with the dedicated, displayed IM Capacity Supply, with operation starting as soon as needed, and for a maximum duration of 36 months. The answer to such a request, built on the basis of 'first come – first (and best) served' and in the order in which the request was received, is:

» a path for the running timetable period
» a slot, which will be converted into a path year by year, for the subsequent timetable period(s)

7.1. Timeline for Rolling Planning

The initial path request can be placed at any time, for a period of up to 36 months[13], irrespective of the number of operating days requested. However, in order to give the IM enough time for the preparation of a good-quality offer, a maximum and a minimum time period between request date and first day of operation is fixed (120 days as a maximum; 30 days as a minimum) in order to have time for establishing the draft offer, making observations, post-processing and final allocation). If the train is only to run on a few days, applicants can select a path from the displayed, residual Rolling Planning capacity for the running timetable period if it fits to the request.

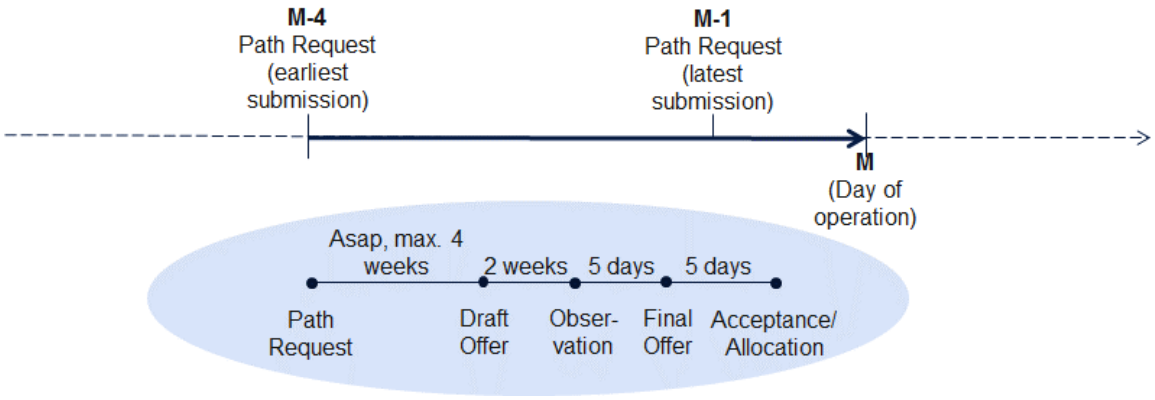


Figure 18: Timeline of Rolling Planning process

7.2. Initial Rolling Planning Request

The initial path request has to follow certain rules:

» Data is harmonised, if more than one applicant is involved in train operation,
» All elements (characteristics) have to fit to the mandatory parameters describing the Rolling Planning supply (speed, weight, etc.). Requests need to be compatible with the published characteristics of the capacity bandwidth, however, within these bandwidths, a tailor-made request can be placed,
» Operation period: first day of operation until last day of operation (max. duration: 36 months) with a detailed calendar for the current timetable period and the requested days of the week for the subsequent timetable period(s).

[13] In a first step, Rolling Planning capacity can be requested for the current, the next and the second next timetable periods. This is due to the fact that the Capacity Model will be available at X-36. If an applicant submits the request very early (e.g. first day of the current TT period), the offered capacity will be available for almost 36 months (until the end of the second but next TT period). If an applicant requests very late in a TT year (e.g. a month prior to a TT change), the offered capacity will be available for just little bit more than 24 months. However, it is the intention of the IMs to increase the validity of the Capacity Model in order to accept all Rolling Planning requests with an operational period of 36 months.

Example of an initial path request:

» Operation period: 1st August 2025 until 30th April 2027
» Traffic periods:
- timetable 2025: Mo, We, Fr, not on public holidays and not on 2 November
- timetable 2026: Mo, We, Fr
- timetable 2027: Mo, We, Th

Remark: Presentation of days of the week from the visualisation point of view only. In future, under TAF TSI, requests will make use of the calendar feature.

Due to the first come – first served principle, time is a very important criterion. The Rolling Planning capacity is visible and requestable for all applicants until it is allocated. The Capacity Broker should for 24h mark with label a particular Rolling Planning capacity that is subject to harmonisation between applicants (but not requested yet) – "the supply is used in preparatory works of other applicants' request".

7.3. IM's Answer to a Rolling Planning Request

IMs involved in the path request need to agree on how they will prepare a harmonised path offer for the applicant for the running timetable period. In addition, they need to check, if there will be enough capacity in the selected time window for the subsequent timetable period(s). The appropriate path for the running timetable and the capacity (slot) for the subsequent timetable period(s) need to be marked and blocked. The offer should take the requirements in the path request into account. IMs have to ensure that they are able to provide an answer for all requested days of the week, according to the pre-defined supply description (characteristics, time frame, transit time, etc.) for the entire operation period. If not enough capacity remains to answer in the same way for the whole requested period (e.g. due to TCRs on one weekday), the IM should offer an alternative possibility for the affected period. In principle, the above IM activity should be executed by an IT tool as far as possible.

7.3.1. RP Traffic With a Short Period of Operation

Taking into consideration that the supply is pre-constructed, it should be as soon as possible or at the latest within two calendar days for a path for an individual train run (one running day) if only one IM is involved; as soon as possible or at the latest within seven calendar days if the path involves the networks of more than one IM.

7.3.2. RP Traffic With Extended Period of Operation

As soon as possible, but maximum in four weeks. IMs will jointly forward the answer to the applicant(s) for the running timetable period and upcoming/next timetable period(s).

7.3.2.1. Answer for the Running Timetable Period

IMs will jointly forward a harmonised answer to the applicant(s) for the running timetable period (or in case it is between X-4 and X also for the upcoming timetable period) in the form of a detailed path offer; built to match the request as closely as possible.

7.3.2.2. Answer for the Upcoming Timetable Period(s)

IMs will jointly forward a confirmation to the applicant(s) for the upcoming/next timetable period(s) that they received a multi-annual request for a slot also in these periods. The conversion of these slots to a real path each year is explained in chapter 'Timeline for Converting a Slot into a Path'.

Certain flexibility is given to the IMs in which they can deviate from the initial path without pre-consultation of applicants, this is in line with the aim to efficiently optimise the capacity usage and fulfil path requests of other applicants. The size of time window for IMs capacity commitment regarding subsequent timetable periods is the following:

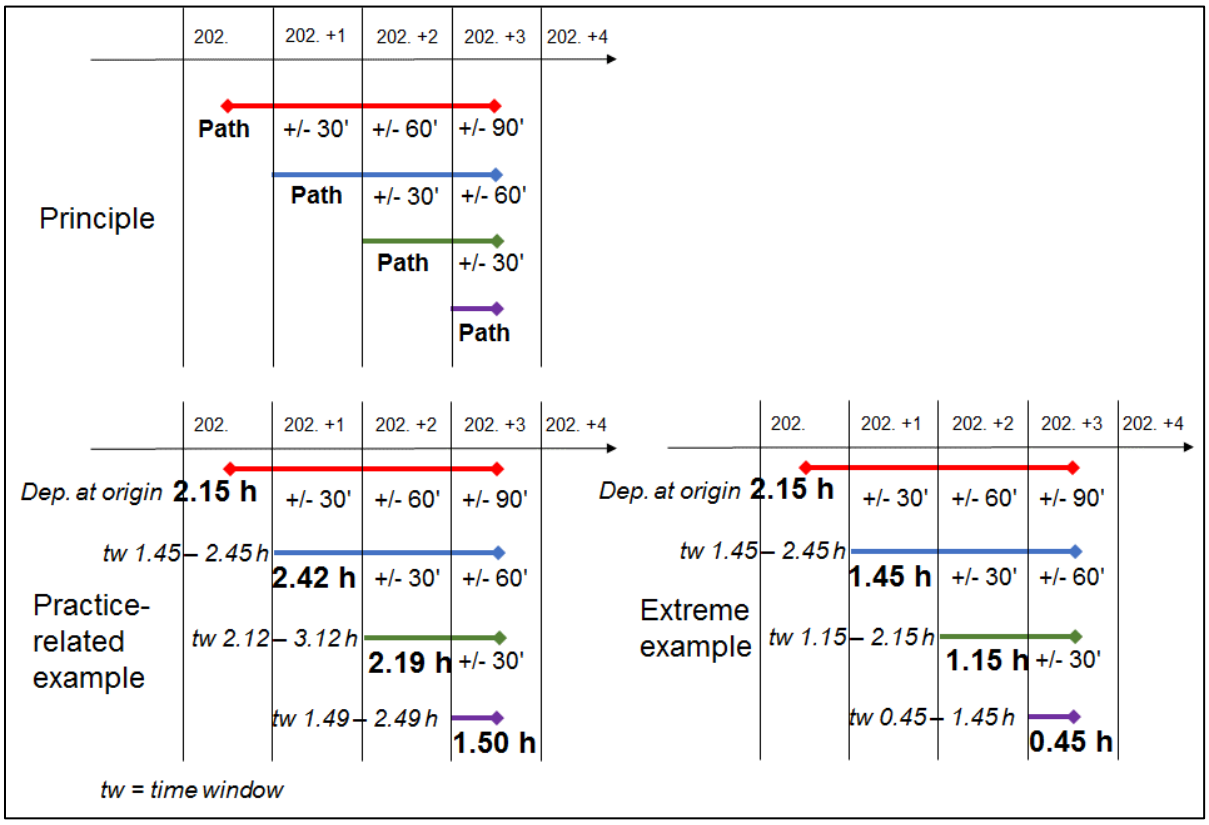


Figure 19: IM's answer (path & slot offer) to initial Rolling Planning request

The size of time window for IMs capacity commitment regarding subsequent timetable periods is the following:

- +/- 30 minutes for upcoming timetable period
- +/- 60 minutes for second next timetable period (timetable+2)
- +/- 90 minutes for third next timetable period (timetable+3)

These time windows for the upcoming and subsequent timetable periods refer to the IM's detailed path offer for the running timetable period. The time window refers to the entire train run from origin to destination. However, if the applicant has indicated an activity in an intermediate location (e.g. change of engine), the size of time window has to be respected. If it is just an operational stop, an extension of the time window could be accepted, however, applicants still have the possibility to make an "observation" to times in the draft offer.

In case of already known major TCRs (e.g. rerouting for several months), this should be indicated, as relevant for the applicant.

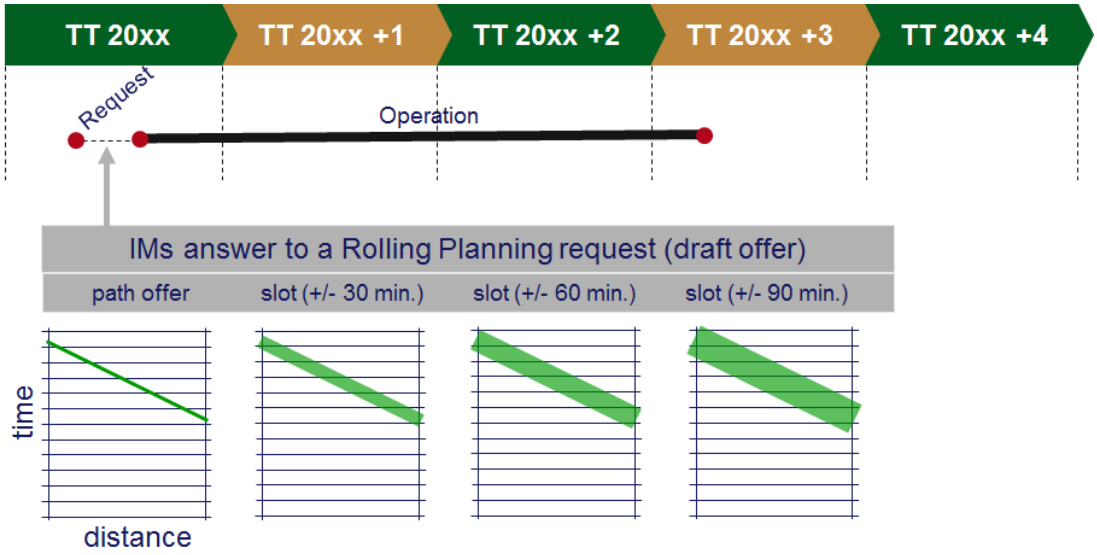


Figure 20: IM's answer (path & slot offer) to initial Rolling Planning request

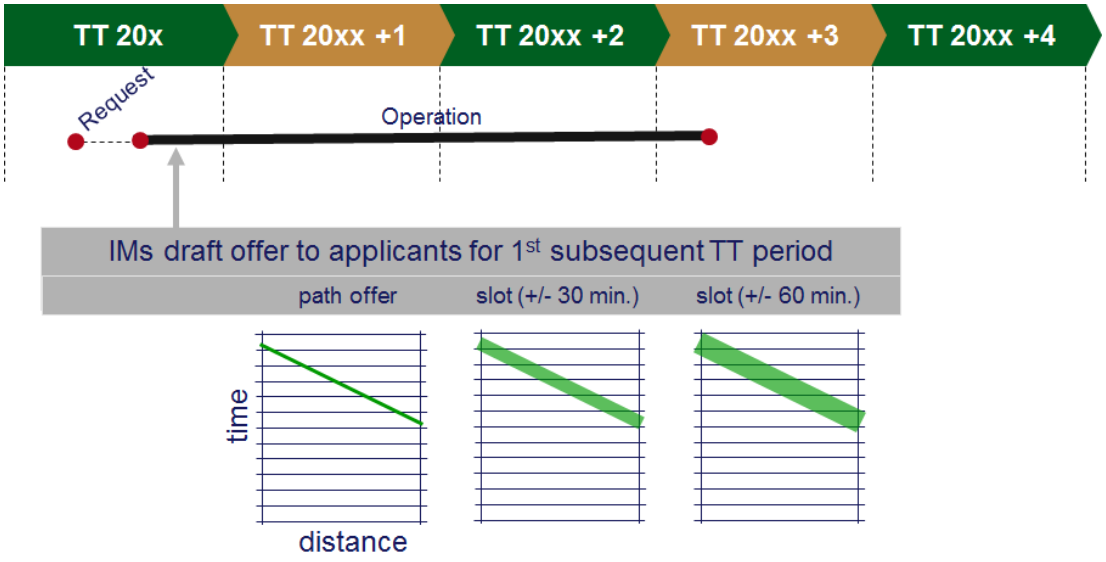


Figure 21: IM's path offer for the first subsequent timetable period

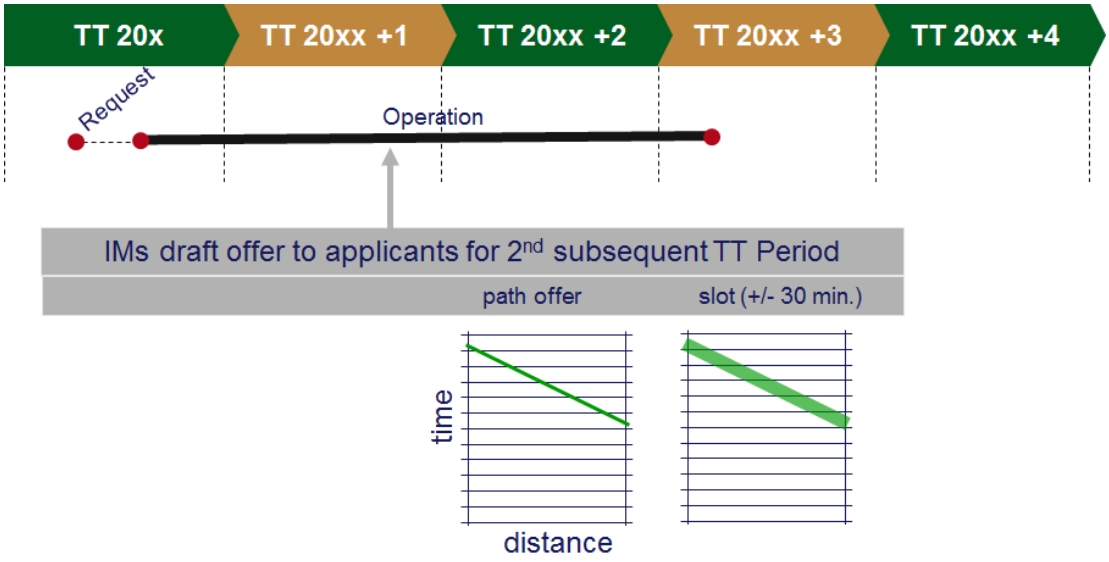


Figure 22: IM's path offer for the second subsequent timetable period

7.4. Consultation phase in RP

Applicants may make observations, within two weeks of reception of the draft offer, on the

- » path offer for the running timetable period
- » slot for the subsequent timetable period(s).

Observations should refer to a deviation of the draft offer from the initial path request (e.g. path offer outside the chosen time window) and might include minor changes as described in Annex 'Minor/Major Changes to the Path Requests and Modifications'. An applicant may make observations on both the path offer and slot, on the path offer only, or on the slot only.

7.5. Post-Processing phase in RP

If an observation is linked to a deviation of the draft offer from the initial path request, the IMs will do their utmost to comply with the initial path request as far as possible. If it is a wish for a minor change, IMs can try to take it into account. Similarly, to the applicants' observations, the IMs' post-processing will handle both the path offer and the slot, the path offer only, or the slot only.

7.6. Acceptance Phase for the Running Timetable in RP

After the post-processing phase, IMs will send the final offer (with the path details) for the running timetable period. Applicants can accept or refuse it. In case of refusal, IMs will cancel the entire dossier; this includes the withdrawal of the slot from the subsequent timetable period(s). Acceptance/rejection has to be communicated within five calendar days.

7.7. Final Allocation in RP

If the applicant(s) agree(s) to the final offer, path(s) will be allocated accordingly. In case of no agreement from the side of the applicant within seven calendar days, the allocation will be withdrawn by the IM and the capacity will be made available again.

7.8. Treatment of Upcoming TT Period in RP

In principle, the allocated path in the running timetable serves as a basis for converting the guaranteed slot into a path for the upcoming timetable period. This sub-chapter explains the process of conversion of a slot into a path.

7.8.1. Early Acknowledgement by Applicants

Applicants may, if they wish, acknowledge the content of their initial path requests for the upcoming timetable period (either without any adjustments or with adjustments within the time window as described in 10.5.3) until X-5.

7.8.2. Path Elaboration Phase for the Upcoming TT Period in RP

If the applicant's wish for adjustment is communicated within the agreed time frame, the IM(s) will prepare an offer (including path details) for the upcoming timetable period based on the attributed slot.

If an applicant has not sent the early acknowledgement, the IM will do the path preparation on the basis of the path used in the running timetable. TCRs, new Rolling Planning requests or any other influencing event during the upcoming timetable period will be taken into account as well as respecting the initial Rolling Planning attribution. In any case, the committed time window will be respected. At X-4, the IM will send the draft timetable to the applicant.

If the published slot contained an indication of TCRs, the IMs will propose a revised path offer. The general involvement of applicants in TCRs is described in the RNE TCR Guidelines.

7.8.3. Consultation Phase for the Upcoming TT Period in RP

Applicants may make observations on the forwarded path offer in the upcoming timetable period within two weeks. The observation should refer to a deviation of the path offer (e.g. path offer outside the chosen time window) and might include minor changes as described in Annex 2). It should be possible for an applicant to ask for an alternative offer, as long as the wish for an adjustment is within the initially selected time window. Otherwise, the applicant has to place a new request.

If the observation includes the need for a change beyond the initially selected time frame, the IM rejects the observation and invites the applicant to place a new request for Rolling Planning capacity. If the applicant accepts this and places a new request, the IM withdraws the slot from the subsequent timetable periods.

7.8.4. Post-Processing Phase for the Upcoming TT Period in RP

In case of an observation, the IM should do its utmost to comply with its own initial capacity commitment as much as possible. If it is a wish for an adjustment, the IM can try to take it into account. The post-processing phase lasts for a maximum of four weeks.

7.8.5. Acceptance Phase for the Upcoming TT Period in RP

After the post-processing phase, IMs will send the final offer (including path details) for the upcoming timetable period. Applicants can accept it (within seven calendar days) or refuse it. In case of refusal, IMs will cancel the entire dossier, including the withdrawal of the capacity commitment from the subsequent timetable period(s).

7.8.6. Timeline for Converting a Slot into a Path

Applicants: Early acknowledgement for upcoming timetable period	X-5
IM: Draft offer; start of consultation phase	X-4
End of consultation phase	X-3.5
Start of post-processing	X-3.5
Final offer	X-3
Acceptance	X-2.75
Final allocation	X-2.5

X = timetable change

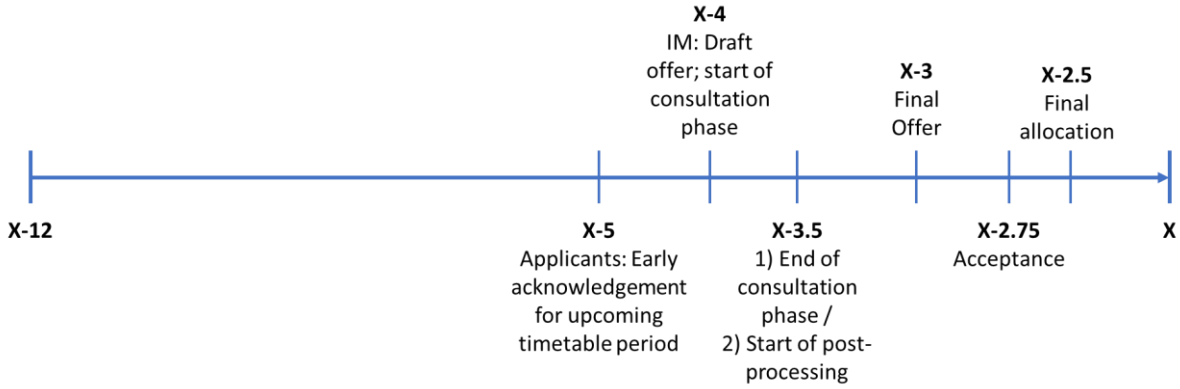


Figure 23: Timeline for converting a slot into a path for upcoming timetable periods

Further information regarding Requests for Capacity in Rolling Planning can be found here:

- » Roadmap to ATT: Rolling Planning (Including Basic Requirements)
- » Process Diagram: Rolling Planning-Multiannual Aspect
- » Minor/Major Changes to the Path Requests and Modifications

8. Ad Hoc & Short-Term Ad Hoc Requests

Certain traffic can be requested in ad hoc, namely, traffic for which the published capacity for Annual Timetable and Rolling Planning cannot be used (from X-2 to M-30d) or traffic requested in a very short notice (short-term ad hoc requested in less than 30 days before the operation for all remaining capacity). It is possible for applicants to place standard ad hoc requests at any time after the last day for late path requests (X-2) and during the running timetable. The very last running day of an ad hoc train can be on the day before the timetable change (X+12).

In order to satisfy ad hoc requests, IMs shall use unplanned capacity, residual capacity from ATT and any delimited capacity for ad hoc (if decided in the capacity partitioning). Any answer to these requests shall not affect safeguarded capacity for Rolling Planning. The requests will be processed on the first come first served basis.

If the running days are in less than 30 days (M-30 days), the request is considered as a “short-term ad hoc request”. Besides unplanned capacity, residual capacity from ATT and any delimited capacity for ad hoc, the IM can also use residual capacity from Rolling Planning.

The leading IM coordinates the process of path construction and initiates all possible steps to ensure harmonised offers. The IMs should set up joint procedures for the ad hoc requests to treat them in a harmonised way and agree on the operational details that have to be respected in all networks as for instance the harmonised response time, acceptance timeline and allocation principles. In case IMs offer products with shorter timeframes (for instance with automated path construction) than indicated below, joint procedures need to be agreed in order to ensure harmonised requesting and allocation.

8.1. Ad Hoc Requests for Individual Paths

IMs shall respond as soon as possible but not later than in 7 calendar days. The response could be a path offer or an alternative path offer or rejection.

If the path has been pre-accepted in the path request, the path will be allocated immediately after sending the path offer. In other cases, the applicants’ acceptance should be sent within 24 hours of receipt of the path offer, excluding Saturdays and Sundays. If applicants do not send an answer within the timeline, the offer is to be considered as rejected.

In case the departure time is very close to the time, when the ad hoc request is placed, the IM of the train departure might provide a partially harmonised offer until the last reasonable infrastructure point at its network. This can be followed by the next partial offer from IMs being in charge of the subsequent network of the train run.

8.2. Ad Hoc Requests for Recurrent Paths

Ad hoc request for a recurrent path is a request for more than one train running day with the same origin, destination, timetable and same train parameters (profile, length, etc.).

IMs shall respond as soon as possible but not later than in 30 calendar days. The response could be a path offer or an alternative path offer or rejection.

If the path has been pre-accepted in the path request, the path will be allocated immediately after sending the path offer. In other cases, the applicants’ acceptance should be sent within

7 calendar days of receipt of the path offer. If applicants do not send an answer within the timeline, the offer is to be considered as rejected.

Further information regarding Ad hoc and Short-Term Ad hoc requests can be found here:

» Roadmap to ATT: Ad hoc Requests (Including Basic Requirements)
» Process Diagram: Path Request

9. Path Modifications

The freight and passenger markets require certain adoptions from the applicants to adapt to market changes. This activity is the so-called “Path Modification”. However, the market should already be respected when placing initial requests.

A path modification may refer to one single running day, several days or all remaining days in a yearly timetable; it is possible to modify the whole path section or just a part of it. It applies to paths in a yearly timetable and to those booked using the short-term planning process as well.

The IMs should set up joint procedures for the modifications to treat them in a harmonised way and agree on the operational details that have to be respected in all networks as for instance the harmonised response time, acceptance timeline and allocation principles.

9.1. Triggering Path Modification

It is possible for applicants to place a path modification request any time after a path has been allocated. The applicant holding the rights to the allocated path and placing the path modification request becomes the initiating applicant. The initiating applicant always has the right to withdraw the modification request. If relevant, the initiating applicant shall ensure that the modification request is harmonised over the complete train run. The IM responsible for the network where the initiating applicant submitted a path modification request becomes the coordinating IM.

9.2. Major and Minor Modifications

Two types of modifications should be recognised: major and minor modifications. In general, major modifications are changes in parameters of an allocated train path that have a substantial impact on the allocated timetable, therefore, making it impossible to respect the allocated train path. Exact differences are described in Annex ‘Minor/Major Changes to the Path Requests and Modifications’.

If it is a major modification of the allocated path, the applicant has to cancel the path and place a new request. Naturally, the cancellation of the original path will only be made after the applicant has accepted the offer for the new path. However, if the new offer does not fulfil the needs of the applicant, then the cancellation will not be made. The original path will be kept until further information has been received from the applicants. Additionally, a (process or IT) solution should be developed at a later stage (most likely under the umbrella of TAF/TAP TSI implementation), to allow the two activities ‘path cancellation by Applicant’ and ‘path request’ to be merged into a single ‘major modification’ operation.

9.3. Coordination and Construction in PM

The coordinating IM should be the first IM to provide the modified path. The second IM to provide a modified path is the affected IM responsible for the subsequent path section and so forth. The affected IMs, coordinated by the coordinating IM, might deviate from the defined order in case it increases efficiency and suits better a particular path modification. The IMs in

the process of construction also need to take into account infrastructure availability and check it with their partners. Infrastructure availability may be reduced due to temporary capacity restrictions (TCRs). This work needs to be fully integrated into the process of harmonisation.

9.4. Path Offer and Acceptance in PM

Once the last IM in the chain of construction of the offer has provided its modified path section, the harmonised and consistent offer is sent. If all affected applicants agree with the modified path offer, the initiating applicant sends a formal acceptance notification; the original path is still active during the whole process until the end of path acceptance.

If any of the applicants disagree with the offer, it has the right to reject it; nevertheless, it has to indicate whether it is interested in an investigation of another alternative or that by the rejection the process of path modification ends. IMs will try to treat any corresponding remark as far as possible. If “no alternatives” are available and the request for an alternative offer is refused, however, the original path still remains active. The applicants should evaluate themselves whether they would like to keep the original path, or they prefer to cancel the allocated path and place a new request.

If no response is provided by the applicants within seven calendar days, the modified offer is considered as rejected and the original path is kept.

9.5. Modification of Allocated Rolling Planning Capacity

A two-step approach for the multi-annual modification is needed:

- Modification to running timetable: follows the standard modification process, applicants have to be aware that the IM will not automatically modify the capacity commitment for the subsequent timetable period(s).

- Modification to subsequent timetable period: can be requested during the preparations for converting a slot into a path as described in chapter ‘Timeline for Converting a Slot into a Path’. No IM activities regarding the capacity commitment (time window) for the timetable period(s) after the next one will take place.

9.6. TT Updates

The final goal of IMs is to use only 365-days timetables with the daily dynamic updates of the Capacity Supply. After full implementation of TTR, no TT updates for path changes will exist anymore, they will remain only to update IT systems and infrastructure data.

Further information regarding Path Modifications can be found here:

- » Process Diagram: Path Modification
- » Minor/Major Changes to the Path Requests and Modifications
- » Use cases related to Path Modifications

10. Path Alterations

Based on the path agreements, applicants can expect that an allocated path is available up to its operation. However, in several cases, it may be necessary for infrastructure managers and allocation bodies to alternate, adjust, replace or withdraw already allocated paths. This activity is the so-called “Path Alteration”. The need for path alteration shall be reduced to a minimum.

A path alteration may refer to one single running day, several days or all remaining days in a yearly timetable; It is also possible to alter the whole path section or just a part of it. It applies

to paths in a yearly timetable and to those booked using the short-term planning process as well.

The IMs should set up joint procedures for the alterations to treat them in a harmonised way and agree on the operational details that have to be respected in all networks as for instance, the harmonised response time, acceptance timeline and allocation principles.

10.1. Triggering Path Alteration

The applicant holding the rights to the initially allocated path shall be informed immediately when the IM intends to trigger the path alteration process or when the IM gets into the possession of information on which basis it can be presumed that triggering the path alteration is highly probable. The IM triggering path alteration becomes the initiating IM.

Firstly, the initiating IM has to evaluate if the path alteration process will have multi-network impact (for definition see Glossary) or not. The initiating IM always has to analyse a possibility to provide an immediate economically viable alternative that causes no multi-network impact. The initiating IM always has the right to withdraw the alteration request.

In addition to the applicant holding the rights to the initially allocated path, the initiating IM informs about the start of the process all potentially involved stakeholders, (e.g. IMs of the subsequent path sections, but also IMs of preceding path sections if they might be potentially affected). The involved IMs are referred to as affected IMs.

Each affected IM has to inform immediately the applicants and all other IMs as soon as it becomes aware that there is no economically viable alternative.

10.2. Coordination and Construction in PA

The affected applicants and IMs jointly define in which way the harmonised alternative offer should be prepared. Depending on the alternative and the impact on neighbouring IMs, the relevant activities need to be harmonised.

The IMs should agree in advance when every affected IM will finish the construction process. In the process of determination of the time frame, it has to be ensured that all affected IMs have sufficient time to construct their path section; the coordination is ensured by the initiating IM.

10.3. Path Offer and Acceptance in PA

Once the initiating IM and all affected IMs have provided a harmonised alternative, the initiating IM is in charge of sending the consistent offer – with remarks if necessary.

If all affected applicants agree with the alternative path offer, the applicant holding the rights to the formerly initially allocated path on the network of the initiating IM sends a formal acceptance notification. IMs have to adjust the path agreements accordingly.

The applicants' acceptance should be sent within 7 calendar days of receipt of the path offer. if no response is sent by the applicants the IMs withdraw the concerned running day. IMs might set up different harmonised timelines for cases when the alteration is performed closer to the day of operation (for instance, in case of contingencies or when the safe train operation shall be re-established).

If any of the applicants disagree with the alternative, it has the right to reject the path alteration offer and ask for adaptation; any corresponding remark will be treated as far as possible in the second offer. In case the originally allocated path is not available anymore, and any of the applicants rejects the offer, it is recommended to withdraw the unharmonised running days of the path; however, IMs can also leave the remaining national path section to the particular applicants and / or shorten the allocated path until the reasonable infrastructure point.

10.4. Timeline for Path Alterations due to TCRs

The following timelines for the path alteration process should be applied for all minor TCRs, late TCRs and changes in known TCRs. In cases the IMs need to re-establish safe train operation and or a contingency appears, the IMs might apply shorter, but harmonised timeframes.

10.4.1. Timeline for Alteration of Passenger Trains

Deadline	Action
M-5 (M-150days)	The last day for IMs to trigger the path alteration in relation to the upcoming TCR
M-4.5 (M-135days)	IMs provide harmonised alternative offers
M-4.25 (M-128days)	The last day for applicants to accept/reject offers or ask for adaptation
M-4 (M-120 days)	The last day for IMs to allocate accepted offers or provide harmonised second offers

10.4.2. Timeline for Alteration of Freight Trains

Deadline	Action
M-2 (M-60days)	The last day for IMs to trigger the path alteration in relation to the upcoming TCR
M-1.5 (M-45days)	IMs provide harmonised alternative offers
M-1.25 (M-38days)	The last day for applicants to accept/reject offers or ask for adaptation
M-1 (M-30 days)	The last day for IMs to allocate accepted offers or provide harmonised second offers

The IMs can start the path alteration for freight trains earlier as the longer delay in the freight alteration reduces flexibility in alternatives. The timeline above is the framework only for the latest deadlines.

10.4.3. Limited Capacity on Infrastructure

In some cases, the remaining capacity of the route and the alternatives is not sufficient to provide all applicants holding the rights to the originally allocated paths with economically usable alternatives. Allocation rules in a fair and non-discriminatory manner shall be applied. The rules will be defined in the Annex 'Allocation Guidelines for Conflicting Capacity Announcements and Requests'.

10.4.4. Path Optimisation Process

The path optimisation process is a special case of the path alteration. Compare to the standard path alteration process, in the path optimisation process the original path is still available for the train operation and active for the applicants holding the rights to this allocated path. The IMs trigger the path optimisation process to ensure the best possible matching of all path requests and or to increase the line capacity by timetable optimisation.

The IM triggering path optimisation process also becomes the initiating IM. The initiating IM always has the right to withdraw the path optimisation request. The initiating IM informs about the start of the path optimisation process all affected IMs and applicants (if there are no affected IMs, then only affected applicants). The communication has to include the information

that the process is driven by the optimisation and not by the fact that the original path is not available anymore.

Any path optimisation attempt with a multi-network impact is subject to confirmation of affected IMs before it is submitted as an alternative path offer. If no response is provided by the applicants in the time frame given by IMs, the alternative path offer is considered as rejected and the original path remains active and allocated.

Further information regarding Path Alterations can be found here:
- » Process Diagram: Path Alteration
- » Process Diagram: Path Optimisation

11. Path Cancellation

This process applies to paths in the Annual Timetable, Rolling Planning and ad hoc/short-term processes. An applicant may always cancel an allocated path. This path cancellation may refer to one single day, several days, or all remaining operation days. It is also possible to cancel the entire train run (all path sections) or just one or more sections of the train run (one path section).

However, if more than one applicant is involved in the path sections, it may be possible for one of the involved applicants to keep its allocated path section and reuse it for another traffic with identical parameters. In such a case, the path modification request shall be placed (following the cancellation process for the not needed path sections) by the applicant that still wishes to use its path section for another train service. Partial cancellation of an allocated path is not recommended without harmonisation with partner applicants, in order not to destroy the path. In case there is no connected path in the preceding or subsequent network the IM has right to shorten the allocated remaining national path to a reasonable infrastructure point to avoid traffic jams and other issues in traffic management area.

12. Coordinating/Leading Entity

Over the complete process between X-60 and X+12 where more than one IM is involved, there is a market need for certain leading entities which would coordinate and steer the process of international alignment. TTR envisages these leading roles in the process:

Entity	Where to find more information	Selection
International leading entity for capacity planning and management (ILE)	Definition of Roles	With the start of the capacity strategy phase a single ILE has been assigned by the concerned stakeholders
Leading IM	Glossary Definition of Roles	Selected by the leading applicant when new traffic dossier is opened in IT systems
Leading applicant	Glossary Definition of Roles	Agreed between cooperating applicants in a certain transport before the new traffic dossier is opened
Coordinating IM	Glossary Definition of Roles Path modification	IM in pair with an applicant that placed a path modification request
Initiating IM	Glossary Definition of Roles Path alteration Path optimisation	IM triggering a path alteration

13. Key Performance Indicators (KPIs)

TTR will provide the capacity management process that is as close to reality as possible. However, this also requires monitoring and improvement. To measure the effectiveness and efficiency of the process, KPIs will be applied. Due to the fact that there is currently no common IT system used by all IMs and applicants for all process steps and for all paths, only a small number of KPIs can be calculated. It is the aim to apply European KPIs in order to measure the quality and success of the processes from advanced planning to operation, as well as compliance with frameworks and deadlines.

Example of KPIs for the capacity strategy

- *Do all involved IMs have a validated Capacity Strategy for TT 2025?*
- *Has it been implemented in the Capacity Model?*
- *Has the proposed template been used?*

The IMs, applicants and the international leading entity should set up a common KPI manual and standard format for reporting and monitoring of the capacity management processes.

14. Network Statements

The Network Statement (NS) should contain information allowing known applicants, potential new applicants and other involved stakeholders to know their obligations and possibilities within the TTR process. The consultation of the Network Statement has to be introduced in all networks and the timeline for consultation harmonised.

X-16	IMs should present (or make publicly available) the intended changes in comparison with the previous version of the network statements. Applicants are invited to give their feedback.
X-15	Observations by applicants related to the Network Statement consultation. IMs/ABs will analyse them. The decision to take them into account is the responsibility of the IMs.
X-12	Publication of the final version of the network statements.

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Annex 1.1: Example of Capacity Model Without Dedicated IT Visualisation

In this lite example, a TCR with major impact is expected between 1/7 and 1/9 in 2023. This TCR will reduce the capacity on the line during these two months by 30 per cent. To solve this problem, the IM plans to reduce capacity for local and regional trains. During the summer period, there are fewer passengers and trains can be replaced by a bus. Because of the TCR, less maintenance will be needed on the relevant line, therefore the slot for maintenance can be reduced from four to three hours. Not shown in the figure below is any unplanned capacity that might still be available (e.g. during the night).

Line C ⇨ D

System paths designed for	**Freq./ Hour**	**Volume/ Day**	**2020**	**2021**	**2022** 1/7-1/9	**2023** 1/1-30/6, 2/9-31/12	Aligned with other IMs?
Local train	4		4	4	2	4	
Regional train	2		2	2	1	2	
Intercity	2		2	2	2	2	
Int. high speed passenger train	0.5		0.5	0.5	1	1	Yes
Freight train with characteristics of Annual TT traffic	0.25		0.25	0.25	0.5	0.5	Yes
Inspection train	0.1	2	0.1	0.1	0.1	0.1	
Charter train (e.g. internat. holiday)	0.05	1	0.05	0.1	0.1	0.1	Yes
Int. freight train	1	20	1	1	1	1.5	Yes
Nat. path for empty rolling passenger stock	0.2	4	0.2	0.2	0.2	0.2	
Nat. freight train	1	20	1	1	1	1.5	
Daily maintenance window	1:00-5:00	4 hours	4hrs	4hrs	3hrs	4hrs	
Estimated impact on traffic affected by TCRs			No	No	Yes -30%	No	Yes

Fig. xx: assigning capacity to market segments per line

	Capacity for Annual TT requests
	Capacity for Rolling Planning requests
	TCRs

Annex 1.2: Building the Capacity Partitioning (Traffic Part)

Capacity for Annual Timetable Requests for Timetable 20xx	
• Volume to be defined by	IM's own hypothesis concerning market development, framework agreements and capacity needs announcements by applicants; must also comply with capacity requirements for Rolling Planning requests and TCRs
• To be used for	» Annual requests for timetable 20xx placed in 20xx-1yr until X-8.5 » Annual request traffic for TT 20xx placed in 20xx-1yr after deadline at X-8
Capacity for Rolling Planning Requests for Timetable 20xx and Upcoming Timetable Periods	
• Volume to be defined by	IM's own hypothesis on market development and capacity needs announcements from applicants; must also comply with capacity requirements for Annual Timetable requests and TCRs **plus** the possible inclusion of part of the residual capacity for Annual Timetable requests made in the middle of 20xx-1yr (after finalisation of Annual Timetable 20xx)
• To be used for	» New Rolling Planning requests placed in 20xx-1yr for timetable 20xx (and perhaps for timetable 20xx+1yr and 20xx+2yrs) » New Rolling Planning requests placed in 20xx for timetable 20xx (and perhaps for timetable 20xx+1yr and 20xx+2yrs) » IM's Rolling Planning commitments (slots) for timetable 20xx made in the previous year(s) » Rolling Planning requests with a short operational period of just some days for the timetable 20xx
Unplanned Capacity	
• Volume	Leftover capacity not being used for potential requests for Annual Timetable and Rolling Planning
• To be used for	» Annual Timetable requests for timetable 20xx placed in 20xx-1yr placed on time or after the deadline at X-8.5, where the pre-planned capacity does not fit to the customer requirement » Any other path requests placed at short notice that were not anticipated in the capacity partitioning for Annual Timetable and Rolling Planning » Ad hoc requests for individual or recurrent train runs / short-term requests

Annex 1.3: IM's Answer to the Market Needs

Applicants have differing requirements regarding the processing of their transport needs. During the development of the new timetable process, several different market needs were introduced by the applicants, which all have a different need for the process. These requirements have been incorporated into the TTR process now available.

Various Kinds of Customer Requirements

a) Stable Demand without Impact on the Path

In passenger and freight traffic, there are trains running, using more or less identical paths for many years. This stability allows the IM to pre-construct these paths in the preparation of the Annual Timetable. The pre-construction is based either on the inputs from the applicants received in the capacity needs announcement process or by the IM's own view for optimal usage of the capacity. In general, this traffic is more supply than demand driven.

b) Stable Demand for a Longer Period but with Impact on the Path

Especially in the freight business, applicants in many cases have a contract with their customers for a defined period which is independent of the fixed timetable year. In addition, behaviour and demand for a transport from the side of the applicant's customer is unpredictable. Despite a contract, there is often a need to change something in the production concept during the term of the contract (e.g. different slot in the terminal). In addition, applicants might also have a need to modify the path (e.g. switch of intermediate location for driver change to increase efficiency).

c) Stable Demand for a Shorter Period but with Impact on the Path

Similar to b) but the period of operation is shorter. Nevertheless, it might involve even two timetable years (e.g. operation from November to February).

d) Demand for a Short Period

Today known as ad hoc (or short-term or spot) traffic for a very limited number of operational days (mostly for a single train run).

Difference Between Annual Timetable and Rolling Planning Traffic

As the Annual Timetable is in many cases driven by the supply of an offer, it is the applicant who chooses the period of operation. Therefore, a timetable change with a fixed date can be accepted easily from the applicant point of view.

In the demand driven traffic, it is the applicant's customer who decides on the first day of operation. It is quite understandable that the applicant's customer does not worry about any timetable change dates.

It is therefore the idea of Rolling Planning to start and end a train operation irrespective of any timetable change. In addition, Rolling Planning enables an applicant to request capacity for the term of the contract, for up to 36 months. In today's situation, where applicants that are running trains on saturated infrastructure must fear that they receive a totally different slot in the following timetable year, despite a binding contract with their

customer, the Rolling Planning approach reduces this risk for not receiving a similar path as in the previous timetable year(s).

a) Target Group for Annual Timetable

The Annual Timetable process is focussing on the following customer requirements:

» Characteristic: supply-driven offer
» Applicants can specify the offer primarily independently based on their market needs.
» Early availability of reliable data (timetable) in order to publish the offer (e.g. opening of the booking systems)
» No changes to the final timetable (end customers might have purchased a transport service)

b) Target Group for Rolling Planning

The Rolling Planning product covers the following market needs:

» Production details for a new traffic that are relevant for the preparation of the path request are NOT known many months ahead of start of operation
» Very first day of operation does in most cases not correspond to a timetable change
» Applicant is interested in receiving a quick response (draft offer) in order to confirm the timetable towards its customer
» Applicant has a contract with its customer for a defined period and is therefore highly interested in requesting and receiving capacity for the entire term of the contract
» Although there is a contract, there is a need to modify the path during the term of the contract

An overview with practice-related use cases for Rolling Planning traffic will be published in 'Annex Use Cases Related to Capacity Requests'.

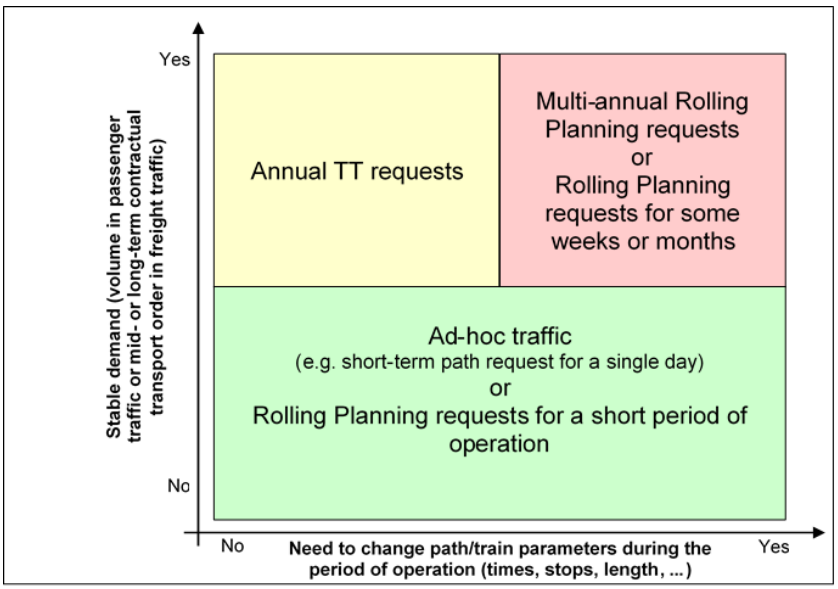
c) Target Group for Ad hoc and short-term traffic

The Capacity Supply of an IM with pre-planned and pre-constructed products for Annual Timetable and Rolling Planning will never cover all market needs. In order to meet this need, it will be possible to request paths for ad hoc traffic. The only limitation could be the volume of available unplanned capacity, which varies according to the saturation of a line.

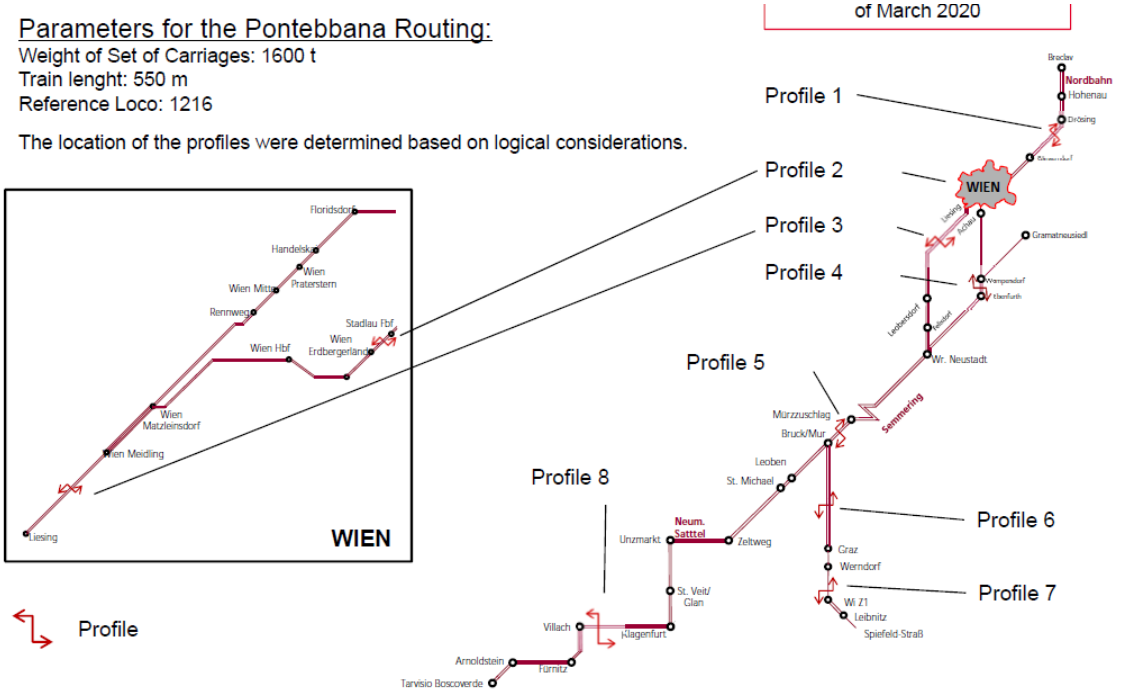
d) Target Group for Traffic with Special Requirements

There is a market need for non-standard traffic that needs special treatment. (e.g. exceptional transport, military transport, radio-active transport). For this, IMs will offer tailor-made solutions using either unplanned or residual capacity.

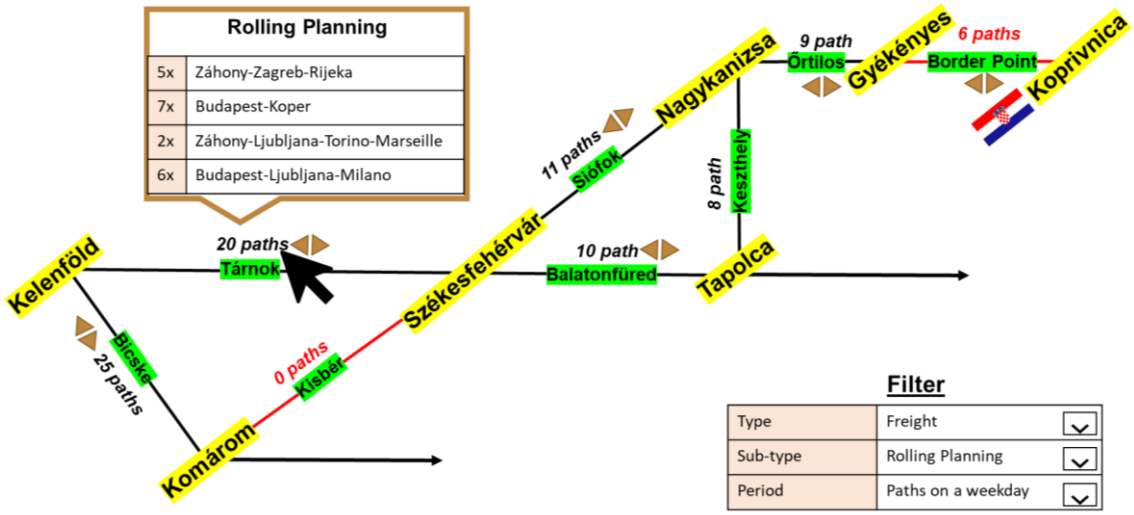
Visualisation of the Boundary Between Annual Timetable, Rolling Planning and Ad Hoc/Short-Term Traffic



Annex 1.4: Network x Train Path Line Section Approach



Even though the work on Capacity Models and later on Capacity Supply is done at the level of train path line sections, for the long-distance traffic and overall planning is important to visualise capacity on more aggregated level. There is a need for a network map that provides a general overview (e.g. complete Europe), and with a possibility to view general information from all train path line sections already in the network map as for instance number of Rolling Planning slots per day (figure below). This goes together with the filtering function for a specific type of traffic, period and pattern. In the final solution there is a business need to search for sections and combine them into an origin-destination overview, including all possible relevant routings.



Annex 1.5: Minor/Major Changes to the Path Requests and Modifications

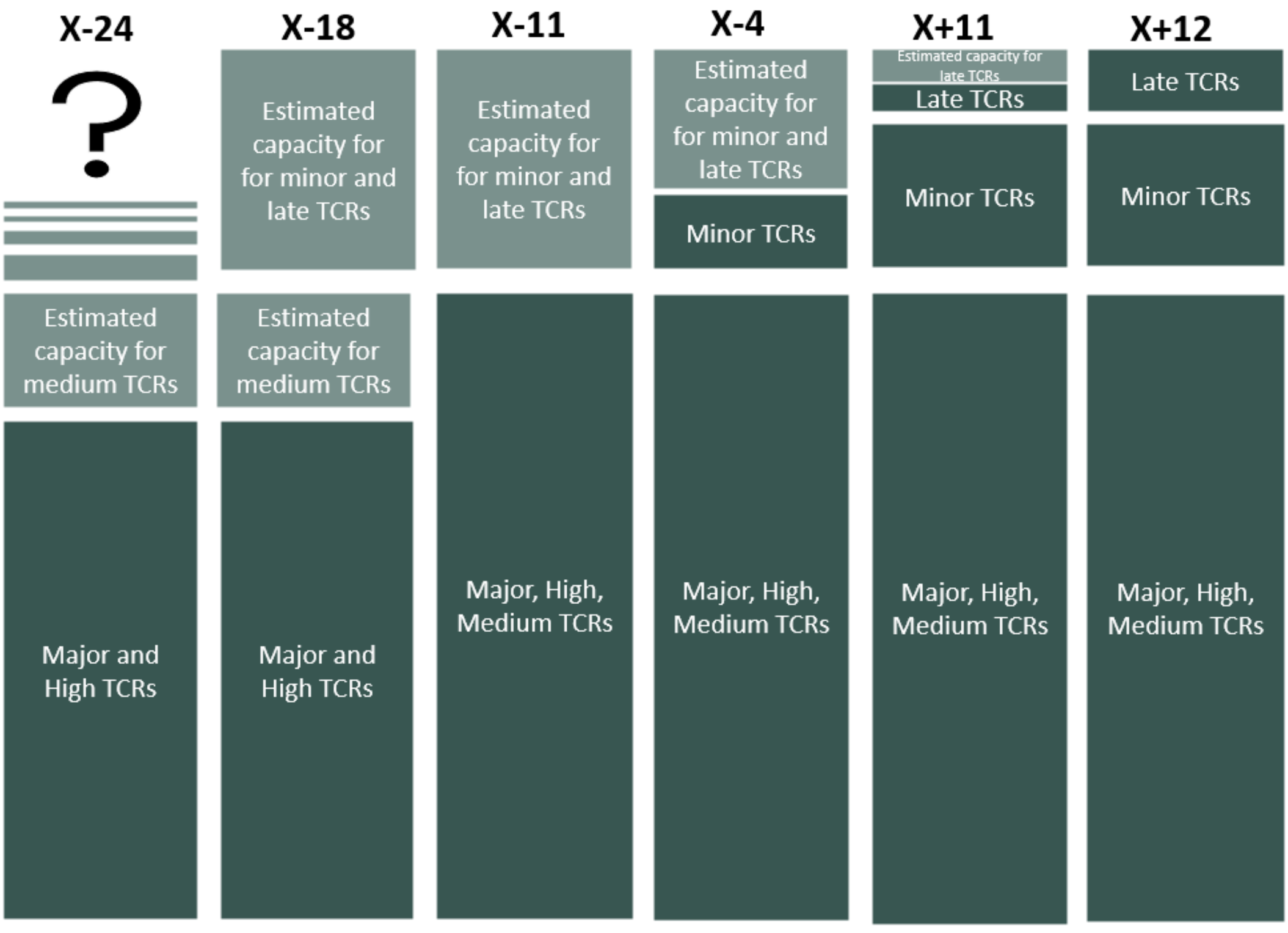
This annexe describes how to distinguish between major and minor changes to the path requests (before allocation) and major and minor path modifications (after allocation).

Change of the Request / Modification to Allocated Path	Major	Minor
Times		
Departure at origin	Y	
Arrival at destination	Y	
Stop times	Y, (impact on other paths) *	Y, (no impact on other paths)
	* decision to be taken by IM	
Number of stops		
Fewer	Y, impact on other paths	Y, no impact and required stopping time may be used as buffer time
More	Y	
Journey		
Route deviation (national)	Y	
Route deviation (internat.: border point change)	Y	
Train parameters		
Length	Y: if it has an impact on own and/or another path	Y: if it has no impact and/or shorter than requested
Weight	Y: if it has an impact on own and/or another path	Y: if it has no impact and/or lighter than requested
Speed	Y: (e.g. slower, faster) if it has an impact on own and/or another path (if applicant wishes to modify times)	Y: if it has no impact on another path
Exceptional Gauge	Y	
Load profile (combined traffic)	Y: if the load profile exceeds the indicated path parameters (leads probably to a rerouting/exc. transport)	Y: smaller or if it is bigger but still complies with the path parameters
Traction type	Y: if it has an impact on the original path	Y: performance improvement
Number of traction units	Y: influences max. length and performance	Y: if fewer units – but only if performance is unchanged

Number of days of operation (calendar)		
More	No modification to allocated path, but new request needed	
Fewer		No modification, just partial cancellation
Change of operating partner RU	Y: if it has an impact on own or another path (new RU has different needs)	Y: only if the parameters are complied with
Any other changes		
Replace scheduled rolling stock	Y, if it has an impact on own and/or another path (e.g. if parameters (tech. equipment) are not identical with originally scheduled rolling stock)	Y, complies with originally scheduled rolling stock
Rerouting in station (e.g. another platform for short connection)	Y, if it has an impact on own and/or another path	Y, if no influence on path

Annex 1.6: Connection Between TCRs and TTR Elements

TCR type	Capacity Strategy X-36	Capacity Model X-18	Capacity Supply X-11	Capacity Supply X-4	Capacity Supply latest at M-5	Capacity Supply latest at M-2	Capacity Supply M-14d
Major/high impact TCR	Can provide some information on future TCRs. No exact details, only principles for the TCR planning.	Volumes needed for these TCRs and their expected timings. IMs can publish the traffic part of the model for the particular TCR period.	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).
Medium impact TCR	No information, only principles for the TCR planning (including maintenance windows).	Volumes needed for these TCRs and their expected timings. IMs can publish the traffic part of the model for the particular TCR period.	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).	Fixed negative capacity in the diagram, marked if it is total closure or partial (requesting through allowed).
Minor impact TCR	No information, only principles for the TCR planning (including maintenance windows).	Estimated volumes needed for these TCRs and rough expected periods when these TCRs might be executed.	Maintenance windows in the capacity diagrams as a possibility when the minor impact TCRs can be executed once the details are known.	If the exact timing is known, maintenance windows should be used to accommodate these TCRs if possible (no coordination and consultation needed). Otherwise, coordination, consultation and alteration follow.	Fixed negative capacity in the diagram (result of coordination, consultation). Path alteration process for passenger trains starts.	Fixed negative capacity in the diagram. Path alteration process for freight trains starts.	Fixed negative capacity in the diagram.
Late TCR	No information, only principles for the TCR planning (including maintenance windows).	Estimated volumes needed for these TCRs.	Maintenance windows in the capacity diagrams as a possibility when the late TCRs should be executed once the details are known.	If the exact timing is known, maintenance windows should be used to accommodate these TCRs if possible (no coordination and consultation needed). Otherwise, coordination, consultation and alteration follow.	If the exact timing is known, maintenance windows should be used to accommodate these TCRs if possible (no coordination and consultation needed). Otherwise, coordination, consultation and alteration follow.	If the exact timing is known, maintenance windows should be used to accommodate these TCRs if possible (no coordination and consultation needed). Otherwise, coordination, consultation and alteration follow.	Latest deadline when the unused maintenance windows for late TCRs are released for short-term ad hoc requests.


X-24
?
Estimated capacity for medium TCRs
Major and High TCRs
X-18
Estimated capacity for for minor and late TCRs
Estimated capacity for medium TCRs
Major and High TCRs
X-11
Estimated capacity for for minor and late TCRs
Major, High, Medium TCRs
X-4
Estimated capacity for for minor and late TCRs
Minor TCRs
Major, High, Medium TCRs
X+11
Estimated capacity for late TCRs
Late TCRs
Minor TCRs
Major, High, Medium TCRs
X+12
Late TCRs
Minor TCRs
Major, High, Medium TCRs

Annex 2: Definition of Roles (Including Responsibilities and Tasks of Leading Entities), v1.3

Stakeholder	Capacity Strategy	Capacity Model (including partitioning)	Capacity Planning	Publication	Capacity Request	Path elaboration/ allocation and post-processing	Applicant cancellation (C) modification (M)	IM cancellation (C) alteration (A)	Various
"Leading international entity for capacity planning and management" [a]	Coordinates the exchange of information and international harmonisation of axis capacity strategies. Organises meetings and communicates information to stakeholders. Monitors that the agreed capacity strategies are respected. **CST-LE**	Coordinates the exchange of information and analysis on capacity needs announcements. Ensures international harmonisation of Capacity Models. Organises meetings and communicates information to stakeholders. **CMO-LE**	Coordinates construction of products. Ensures international harmonisation of products. **CPN-LE**	Ensures timely and correct publication. **PUB-LE**		Administratively coordinates path construction, harmonisation and post-processing. [b] Acts as a 1st level escalation platform/entity and issues decisions. **PEA-LE**	M: acts as a 1st level escalation platform/entity and issues decisions **ACM-LE**	C: monitors path withdrawals. A: acts as 1st level escalation platform/entity and issues decisions. **ICA-LE**	Monitors compliance with deadlines and processes **VAR-LE**
IM [c]	Creates, updates, consults with stakeholders, meets with relevant IMs for harmonisation, signs the final strategy. **CST-IM**	Constructs, updates, gathers capacity needs announcements, meets with relevant IMs for harmonisation, conducts partitioning, publishes model. **CMO-IM**	Constructs products, harmonises borders with neighbouring IMs. **CPN-IM**	Publishes. **PUB-IM**	Receives requests. Available for applicants for advice. **CPR-IM**	Constructs paths (including coordination of conflicting requests), harmonises borders, allocates paths. **PEA-IM**	M: in case a modification request is placed in its network, performs the role of the coordinating IM. If is affected by the modification, follows the instructions from the coordinating IM. **ACM-IM**	C: withdraws paths and informs all involved stakeholders. A: when triggers, performs the role of the coordinating IM. If is affected by the modification, follows the instructions from the coordinating IM. **ICA-IM**	Maintains national OSS for advisory in national particularities. **VAR-IM**
Leading IM [d]					Available for leading applicants for general advice. Monitors that appropriate product is selected by applicants and the request is formally correct. **CPR-LM**	Coordinates path construction, harmonisation and post-processing. Initiates all possible steps to ensure harmonised offers. **PEA-LM**		C: monitors path withdrawals. **ICA-LM**	Interacts and actively communicates with all involved IMs and leading applicant. Acts as an information turntable for involved IMs. **VAR-LM**
Coordinating IM							M: evaluates international impact, actively coordinates construction of modified path offer, monitors compliance with deadlines and initiates all possible steps to ensure compliance. **ACM-CM**		
Initiating IM								A: evaluates international impact, actively coordinates construction of altered path offer, monitors compliance with deadlines and initiates all possible steps to ensure compliance. **ICA-II**	
Leading applicant					Coordinates the requests, ensures compliance with the deadlines, is the primary communication point for the leading entities. **CPR-LA**	Ensures compliance with the deadlines, especially, where an active response from applicants is needed. **PEA-LA**	C: can trigger cancellation of the entire dossier. **ACM-LA**	Supervises compliance with the deadlines. **ICA-LA**	
RU applicant	Consulted. **CST-RU**	Consulted (actively approached to provide capacity needs announcements and information provided in Network Statement for potential applicants) **CMO-RU**			Responsible for proper and timely requests **CPR-RU**	Places observations, accepts/refuses offers on time. Involved in coordination, if required. **PEA-RU**	C: cancels paths. M: triggers the process; performs obligations of initiating applicant. **ACM-RU**	A: responsible for response to alternatives on time. **ICA-RU**	

Non-RU applicant	Consulted. **CST-NR**	Consulted (actively approached to provide capacity needs announcements by information provided in Network Statement) **CMO-NR**			Responsible for proper and timely requests. **CPR-NR**	Places observations, accepts/refuses offers on time. Involved in coordination, if required. **PEA-NR**	C: cancels paths. M: triggers the process; performs the role of initiating applicant. **ACM--NR**	A: responsible for response to alternatives on time. **ICA-NR**	Has obligation to appoint an RU to use the path at latest 30 days prior to the particular day of operation. Has possibility to authorise an RU to perform tasks in path modification and cancellation and also withdraw the authorisation. **VAR-NR**
MoT [g]	Consulted, provides statements to the expected capacity availability (expected positive capacity - investments and negative capacity – track discontinuations). **CST-MT**	Consulted. **CMO-MT**							Coordinates legal and technical framework with neighbouring countries (e.g. EU law, TSIs). **VAR-MT**
RB				Monitors timely and correct publication. **PUB-RB**		Escalation entity, entity for appeals. [h] **PEA-RB**	Escalation entity, entity for appeals. [h] **ACM-RB**	Escalation entity, entity for appeals. [h] **ICA-RB**	Ensures non-discriminatory treatment of all applicants during all phases. **VAR-RB**
Region, local government, transport association, industry	Consulted. **CST-RE**	Consulted (actively approached to provide capacity needs announcements). **CMO-RE**							
Terminal and service facility [g]	Consulted. **CST-TS**	Consulted (actively approached to provide capacity needs announcements). **CMO-TS**	Cooperates with IMs to ensure consistency of offered services with IMs' products. **CPN-TS**			If involved, cooperate with IMs to ensure consistent allocation decisions **PEA-TS**	M: If affected, cooperates with IMs to ensure consistent allocation decisions. **ACM-TS**	A: If affected, cooperates with IMs to ensure consistent allocation decisions. **ICA-TS**	Always seek consistency in capacity allocation with IMs (where necessary). **VAR-TS**

Footnotes:

[a]) This role cannot be performed as a "one-man-show". Also, this entity has to have a legal mandate to perform the task.

[b]) Organises meetings, ensures invitations of all relevant participants, ensures that the output from the meetings is finished and communicated.

[c]) In some countries, the capacity management-related tasks of an IM are executed by an allocation body as a separate entity.

[d]) The IM/AB is initially selected by the leading applicant before the request is submitted. The involved IMs/ABs have the possibility to take over the role of the leading IM, but the initially selected IM/AB has the obligation to perform and start the conduction of the tasks without undue delay.

[f]) If these entities act as non-RU applicants, their tasks and responsibilities are summoned in the row for non-RU applicants.

[g]) This does not mean that there have to be more requests for a single traffic.

[h]) Where matters concerning an international service require decisions of two or more regulatory bodies, the regulatory bodies concerned shall cooperate in order to bring about a resolution of the matter and to align the impact of their decisions.

Code of the changed cell	Previous Text	New Text	Date, Meeting

Annex 3.1: Roadmap to Capacity Strategy (Including Basic Requirements)

Stakeholder	X-60[14]	X-60 > X-54	X-54 > X-36	X-36[15]
"Leading (international)[16] entity for capacity planning and management"	Is informed about the geographical partitioning to individual capacity strategies. Notifies the IM in case of detected inconsistencies and omitted concerned IMs. **CST-LE-010**		Serves as the platform for escalation. Ensures that capacity strategies exist. **CST-LE-030**	Ensures timely and correct publication of all strategies. **CST-LE-040**
IM	Defines all connected geographical areas for each individual Capacity Strategy, including detection of other concerned IMs. **CST-IM-010**	Elaborates the strategy by focusing on: • demand forecast (incl. own requirements for maintenance/known works); • assignment of the demand on lines, part of the network, or the entire network; • capacity analysis; • capacity investment scenarios, in case the above analysis has revealed any bottlenecks. OR Analyses with other stakeholders what was subject to change if the Capacity Strategy in the same scope already exists from previous timetable. **CST-IM-020**	Actively approaches the other concerned IMs. Starts the harmonisation of the Capacity Strategy by sharing the draft strategy including: Chapter 1: Expected capacity of infrastructure Chapter 2: TCR principles Chapter 3: Traffic flows **CST-IM-030**	Publishes all capacity strategies at X-36. Each of the strategies is signed by higher-level representatives of the IM and also all other concerned IMs. **CST-IM-040**
Other concerned IMs			Give their view on the shared Capacity Strategy and seek with the IM for the best solutions and compromises. **CST-OI-030**	
RU applicants			Informed about the state of the document and content between X-54 and X-36 and before the final publication. **CST-RU-030**	
Non-RU applicants			Informed about the state of the document and content between X-54 and X-36 and before the final publication. **CST-NR-030**	
MoT		Provides input to the strategy: • political requirements on future positive and negative changes in the available capacity • Intended future development in the PSO transport • available financial resources for future investments and maintenance **CST-MT-020**		
RB	Based on the country. **CST-RB-010**			
Regions, local governments, transport associations, industries		Provides input to the strategy, including Intended future development in the PSO transport. **CST-MT-020**		
Terminals and service facilities		Provide an overview of future capacity needs to satisfy the projected demand of its customers. **CST-TS-020**		
IT				
Legal framework				

[14] Note that while the fully implemented TTR assumes this milestone at X-60, for TT2025 it is set as X-41 (July 2021).

[15] Note that while the fully implemented TTR assumes this milestone at X-36, for TT2025 it is set as X-30 (June 2022).

[16] Note that for sole national lines and or lines not connected to the main international network the role of the leading interanational entity will be negligible.

Basic requirements for a published Capacity Strategy (applicable for TT2025, for full rollout see the main document):

Chapter 0: Description of the geographical area for which the strategy is applicable

Chapter 1: Expected capacity of infrastructure: describes the expected available positive (additional) capacity and also the expected negative non-TCR related capacity (for instance track removal).

Chapter 2: TCRs: describes the principles for the planning of TCRs and principles for capacity allocation for regular maintenance windows.

Chapter 3: Traffic flows: describes main principles to be used in the planning of elements in the Capacity Models (for instance long-distance passenger train paths, regional passenger paths, bandwidths)

Signatures: signatures of the higher-level representatives of the IM and all other concerned IMs.

Code of the changed cell	Previous Text	New Text	Date, Meeting
CST-RE-020	none	Provides input to the strategy, including Intended future development in the PSO transport.	29 March 2021, TTR Process TF
CST-MT-020	Provides input to the strategy: • political requirements on future positive and negative changes in the available capacity • available financial resources for future investments and maintenance	Provides input to the strategy: • political requirements on future positive and negative changes in the available capacity • Intended future development in the PSO transport • available financial resources for future investments and maintenance	29 March 2021, TTR Process TF

Annex 3.2: Roadmap to Capacity Model (Including Basic Requirements)

Stakeholder	X-36[17]	X-36 > X-24	X-24 > X-21	X-21 > X-18
"Leading international entity for capacity planning and management"	Get access to the Capacity Models of the IM in elaboration. CMO-LE-040	Coordinates the exchange of information and analysis on capacity needs announcements. Ensures international harmonisation of Capacity Models. Administratively organises meetings and communicates information to stakeholders. Monitors that the draft Capacity Model is according to the agreed capacity strategy. CMO-LE-050	Coordinates the exchange of information and analysis on capacity needs announcements. Ensures international harmonisation of Capacity Models. Administratively organises meetings and communicates information to stakeholders. Monitors that the draft Capacity Model is according to the agreed Capacity Strategy. CMO-LE-060	Ensures timely and correct publication of all Capacity Models. CMO-LE-070
IM	Copies the previous Capacity Models and starts the model update. CMO-IM-040	Analyses upcoming capacity needs announcements, updates the Capacity Models also with the expected capacity consumed by all TCRs. Meets regularly with other concerned IMs to exchange information and agree on the intended volume (including quality) to be offered to international traffic. CMO-IM-050	Draft internationally harmonised Capacity Models are finished. Consults the applicants of which capacity needs cannot be fully considered in the models. Fine-tunes the models. CMO-IM-060	Performs the final capacity partitioning and publishes all Capacity Models. CMO-IM-070
Other concerned IMs	Get access to the Capacity Models of the IM in elaboration. CMO-OI-040	Provide information on capacity needs, which might affect the work on the model of the IM. Agree with the IM on the intended volume (including quality) to be offered to international traffic. CMO-OI-050		
RU applicants		Provide capacity needs announcements. CMO-RU-050	Answers to the IM if it is called for a consultation. CMO-RU-060	Answers to the IM if it is called for a consultation. Gets access to the draft Capacity Models. CMO-RU-070
Non-RU applicants		Provide capacity needs announcements. CMO-NR-050	Answers to the IM if it is called for a consultation. CMO-NR-060	Answers to the IM if it is called for a consultation. Gets access to the draft Capacity Models. CMO-NR-070
MoT		Is actively consulted, especially for Capacity Models in bottle-neck segments. CMO-MT-050		Gets access to the Capacity Models. CMO-MT-070
RB				Gets access to the Capacity Models. CMO-RB-070
Regions, local governments, transport associations, industries		Provide capacity needs announcements. CMO-RE-050	Answers to the IM if it is called for a consultation. Gets access to the draft Capacity Models. CMO-RE-060	
Terminals and service facilities	Gets access to the Capacity Models. CMO-TS-040		Answers to the IM if it is called for a consultation. CMO-TS-060	
IT	Capacity Hub allows carry forward of the previous model and desired access rights. Geography from CRD is imported to the hub. CMO-IT-040	Capacity Hub supports all necessary capacity elements, allows coordination via commenting functions and tracks versioning. Capacity Hub allows submitting capacity needs announcements via upload to the Capacity Hub (via the standardised template). CMO-IT-050	Transfers and visualises the TCRs published at X-24 from TCR Tool. CMO-IT-060	Capacity Hub supports publication of Capacity Models and possibility to display models for different levels of granularity. CMO-IT-070
Legal framework				Law empowers IMs to make a binding capacity partitioning. CMO-LF-070

[17] Note that while the fully implemented TTR assumes this milestone at X-36, for TT2025 it is set as X-30 (June 2022).

Basic requirements for a published Capacity Model (applicable for TT2025, for full rollout see the main document):

- » Scope-geography: the models are published at least for the lines with the international relevance.
- » Scope-unit: the models are published per train-path-line section and direction.
- » Scope-time: the capacity the partitioning shall be done at least for a timetabling year.
- » Publication tool: the publication shall be done via the Capacity Hub (ECMT), unless the IM already has an existing tool for Capacity Models, in that case, it can be done also via national tool and the interface has to be developed as soon as possible.
- » Content-TCRs: Major and High impact TCRs (as published at X-24), estimated of capacity and approximate placement of medium TCRs, minor TCRs, maintenance windows.
- » Content-ATT-passenger: expected number of slots for passenger regional trains and passenger long-distance trains on a standard weekday.
- » Content-ATT-freight: expected number of slots for freight trains on a standard weekday.
- » Content-RP: expected number of slots for Rolling Planning on a standard weekday.
- » Content-ad hoc: expected number of slots for ad hoc on a standard weekday.
- » Slots: to provide the stability, the expected number of slots should be added to the model not only separately for a train path line section but form the real origins to destinations.

Code of the changed cell	Previous Text	New Text	Date, Meeting
CMO-LE-060	Monitors that the draft Capacity Model is according to the agreed Capacity Strategy.	Coordinates the exchange of information and analysis on capacity needs announcements. Ensures international harmonisation of Capacity Models. Administratively organises meetings and communicates information to stakeholders. Monitors that the draft Capacity Model is according to the agreed Capacity Strategy.	29 March 2021, TTR Process TF
CMO-RU-070, CMO-NR-070	Gets access to the draft Capacity Models.	Answers to the IM if it is called for a consultation. Gets access to the draft Capacity Models.	29 March 2021, TTR Process TF

Annex 3.3: Roadmap to Capacity Supply (Including Basic Requirements)

Stakeholder	X-18 > X-11	from X-13 at the latest	X-11	X-10.5	X-5	Comments
"Leading (international) entity for capacity planning and management"	Get access to the Capacity Supply. CSU-LE-070	Coordinates construction of products. Ensures international harmonisation of products. CSU-LE-080	Ensures timely and correct publication of all capacity supplies. CSU-LE-090	Ensures timely and proper correction of all reported inconsistencies in the Capacity Supply. CSU-LE-100		Acts as a 1st level escalation platform/entity and issues decisions. CSU-LE-990
IM	Based on the Capacity Model, constructs the capacity products. CSU-IM-070	Actively comes with the proposals of the Capacity Supply to the other concerned IMs to coordinate and harmonise border times and other parameters. CSU-IM-080	Publishes the Capacity Supply. Without undue delay, corrects all notified inconsistencies. CSU-IM-090	Last day to correct any inconsistency. CSU-IM-100	Updates the Capacity Supply in regards of RP, includes minor TCRs. Coordinates the update with other concerned IMs. CSU-IM-110	Is in charge of coordinated capacity diagrams updates, for instance, if any object shifts, is allocated etc. CSU-IM-990
Other concerned IMs	Get access to the Capacity Models of the IM in elaboration. CSU-OI-070	Actively collaborate with the IM to come with a high-quality harmonised Capacity Supply. CSU-OI-080	Are given the possibility to notify of inconsistencies in IM's Capacity Supply. Without undue delay, corrects all notified inconsistencies on their side**.** CSU-OI-090	Last day to correct any inconsistency. CSU-OI-100	Actively support the IM. CSU-OI-110	Is in charge of coordinated capacity diagrams updates, for instance, if any object shifts, is allocated etc. CSU-OI-990
RU applicants	Available to the IMs for consultation on particular parts of the Capacity Supply. CSU-RU-070	Available to the IMs for consultation on particular parts of the Capacity Supply. CSU-RU-080	Gets access to the Capacity Supply. Is given the possibility to notify of inconsistencies. CSU-RU-090		Last day to acknowledge the content of their initial path requests for the upcoming timetable period. CSU-RU-110	
Non-RU applicants	Available to the IMs for consultation on particular parts of the Capacity Supply. CSU-NR-080	Available to the IMs for consultation on particular parts of the Capacity Supply. CSU-NR-080	Gets access to the Capacity Supply. Is given the possibility to notify of inconsistencies CSU-NR-090		Last day to acknowledge the content of their initial path requests for the upcoming timetable period. CSU-NR-110	
MoT						
RB			Gets access to the Capacity Supply. CSU-RB-090			
Regions, local governments, transport associations, industries						
Terminals and service facilities	Get access to the Capacity Supply. CSU-TS-070	Cooperate with IMs to ensure consistency of offered services with IMs' products. CSU-TS-080				
IT	Capacity Hub supports visualisation and coordination of all objects in the Capacity Supply. CSU-IT-070		Capacity Hub archives the version of Capacity Supply published at X-11. CSU-IT-090	Capacity Hub archives the version of Capacity Supply updated at X-10.5. CSU-IT-100	Capacity Hub archives the version of Capacity Supply updated at X-5. CSU-IT-110	Capacity Hub updates the capacity diagrams in real-time. The updates continue from X-8.5 to X+12. CSU-IT-990
Legal framework			2012/34/EC, Annex VII CSU-LF-090			

Basic requirements for a published Capacity Supply (applicable for TT2025, for full rollout see the main document):

- » Scope-time: 365-days overview in capacity diagrams.
- » Scope-unit: Capacity Supply published per train-path-line section (with a possibility to zoom out to a line and corridor) and direction.
- » Scope-geography: Complete network.
- » Content-TCRs: Major, High, Medium impact TCRs (as published at X-12), maintenance windows.
- » Content-ATT: Any of these products can be used: pre-planned paths, bandwidths, empty space for tailor-made requests. The cross-border capacity shall be harmonised – in case the neighbouring IMs use different product publication for the same capacity, the times and volumes in the handover point shall be agreed and part of the publication.
- » Content-RP: Safeguarded pre-planned paths and or bandwidths (with a set number of available slots). The cross-border capacity shall be harmonised – in case the neighbouring IMs use one pre-planned paths and other bandwidths – the times and volumes in the handover point shall be agreed and part of the publication.
- » Content-ad hoc/short-term path request: Safeguarded pre-planned paths and or bandwidths (with a set number of available slots). Also, empty space can be used for ad hoc requests, but in case the capacity is also safeguarded, this information should be part of the publication (preferably, as a wide bandwidth product).

Note: It is not assumed that IMs and other stakeholders always see the same version of capacity diagrams. For instance, between X-8.5 and X-6.5 the applicants should not see the capacity diagrams in elaboration for confidentiality reasons.

Code of the changed cell	Previous Text	New Text	Date, Meeting
CSU-RU-070, CSU-RU-080, CSU-NR-070, CSU-NR-080	none	Available to the IMs for consultation on particular parts of the Capacity Supply.	29 March 2021, TTR Process TF
CSU-RU-110, CSU-NR-110	Last day to confirm RP request validity for the upcoming timetable period.	Last day to acknowledge the content of their initial path requests for the upcoming timetable period.	29 March 2021, TTR Process TF

Annex 3.4: Roadmap to ATT: New Path Requests (Including Basic Requirements)

- to be published in May-July 2021 -

Annex 3.5: Roadmap to ATT: Late Path Requests (Including Basic Requirements)

- to be published in May-July 2021 -

Annex 3.6: Roadmap to ATT: Rolling Planning (Including Basic Requirements)

- to be published in May-July 2021 -

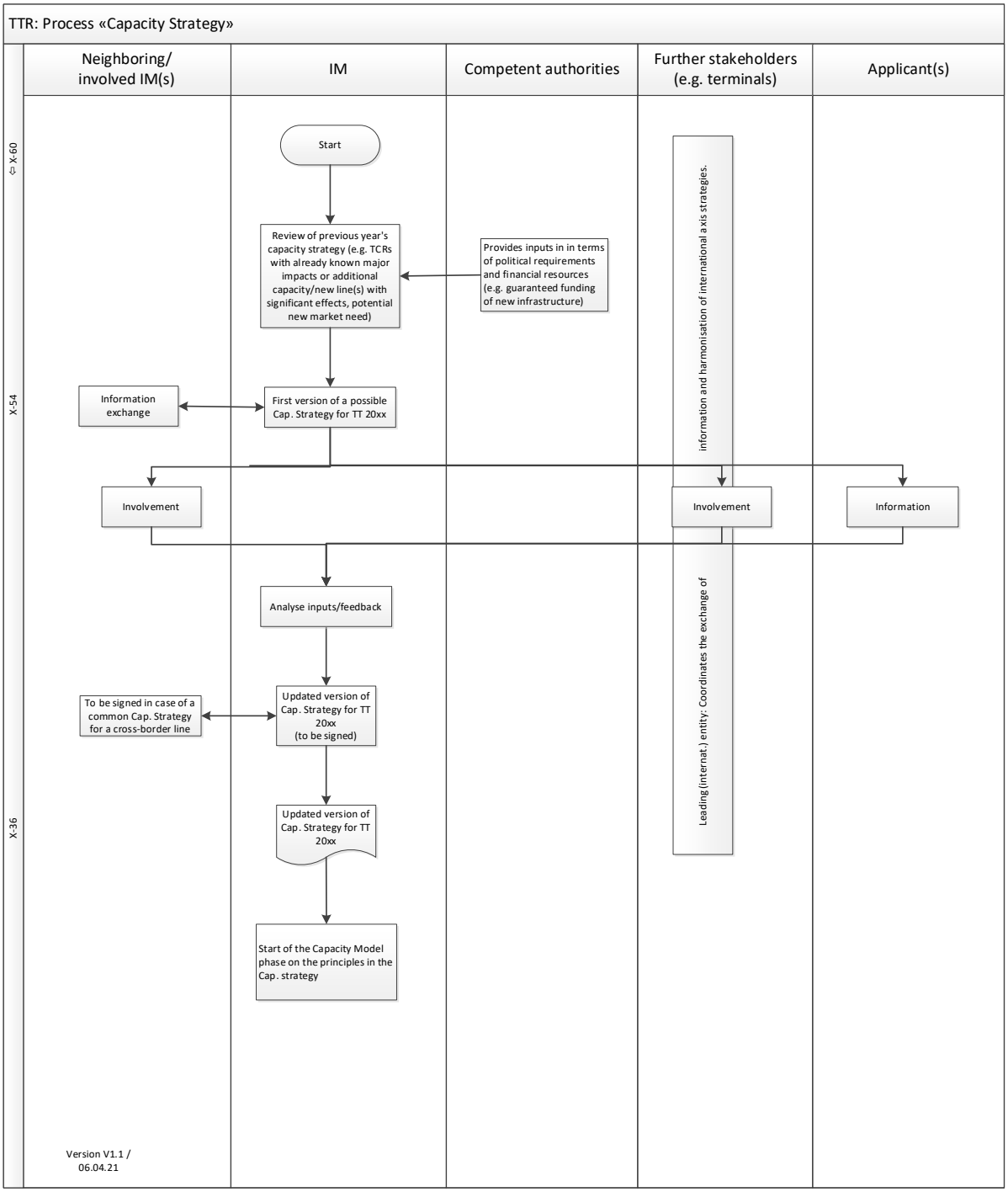
Annex 3.7: Roadmap to ATT: Ad hoc Requests (Including Basic Requirements)

- to be published in May-July 2021 -

Annex 3.8: Roadmap to ATT: Feasibility Studies (Including Basic Requirements)

- to be published in May-July 2021 -

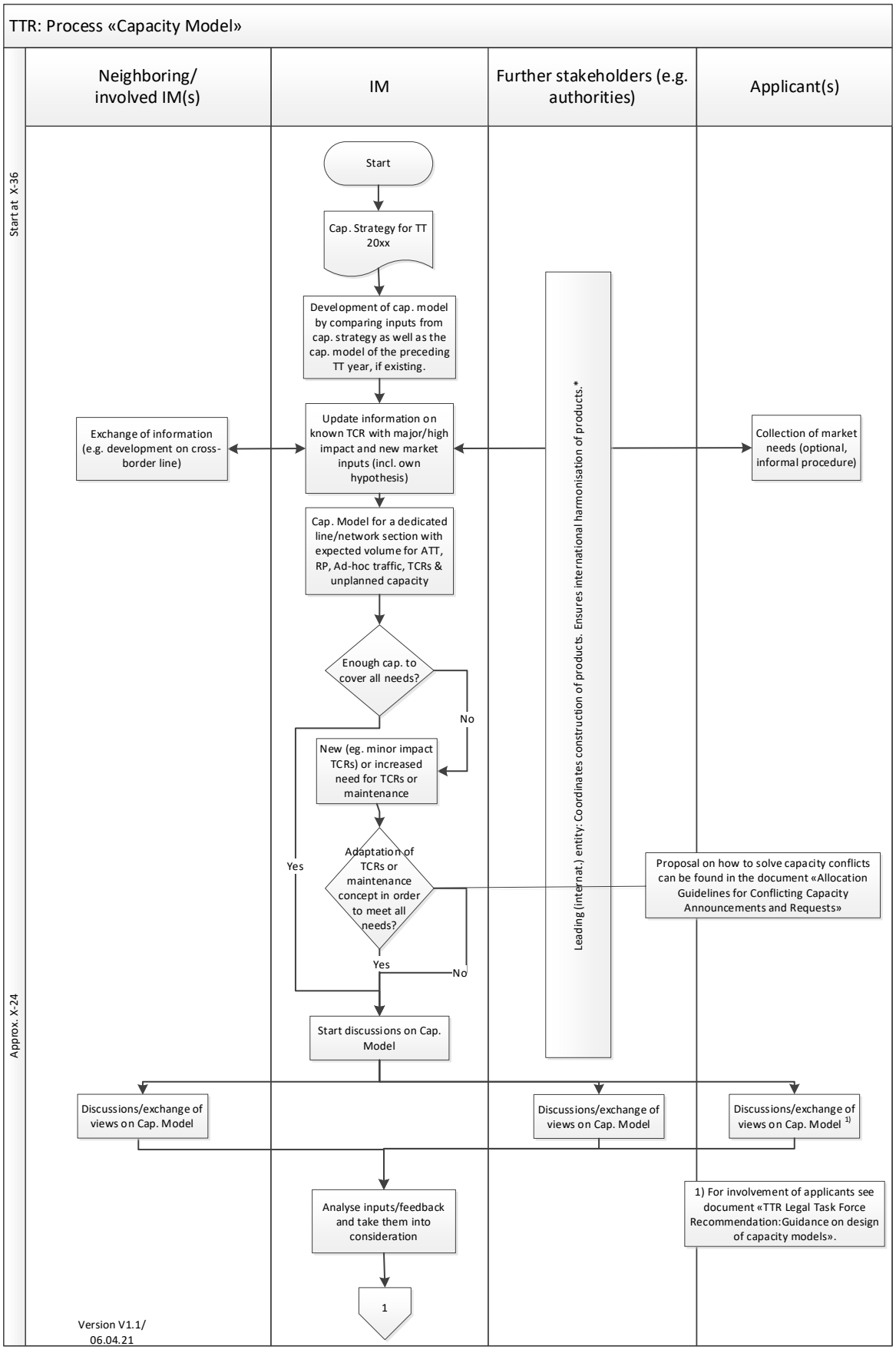
Annex 4.1: Process Diagram: Capacity Strategy

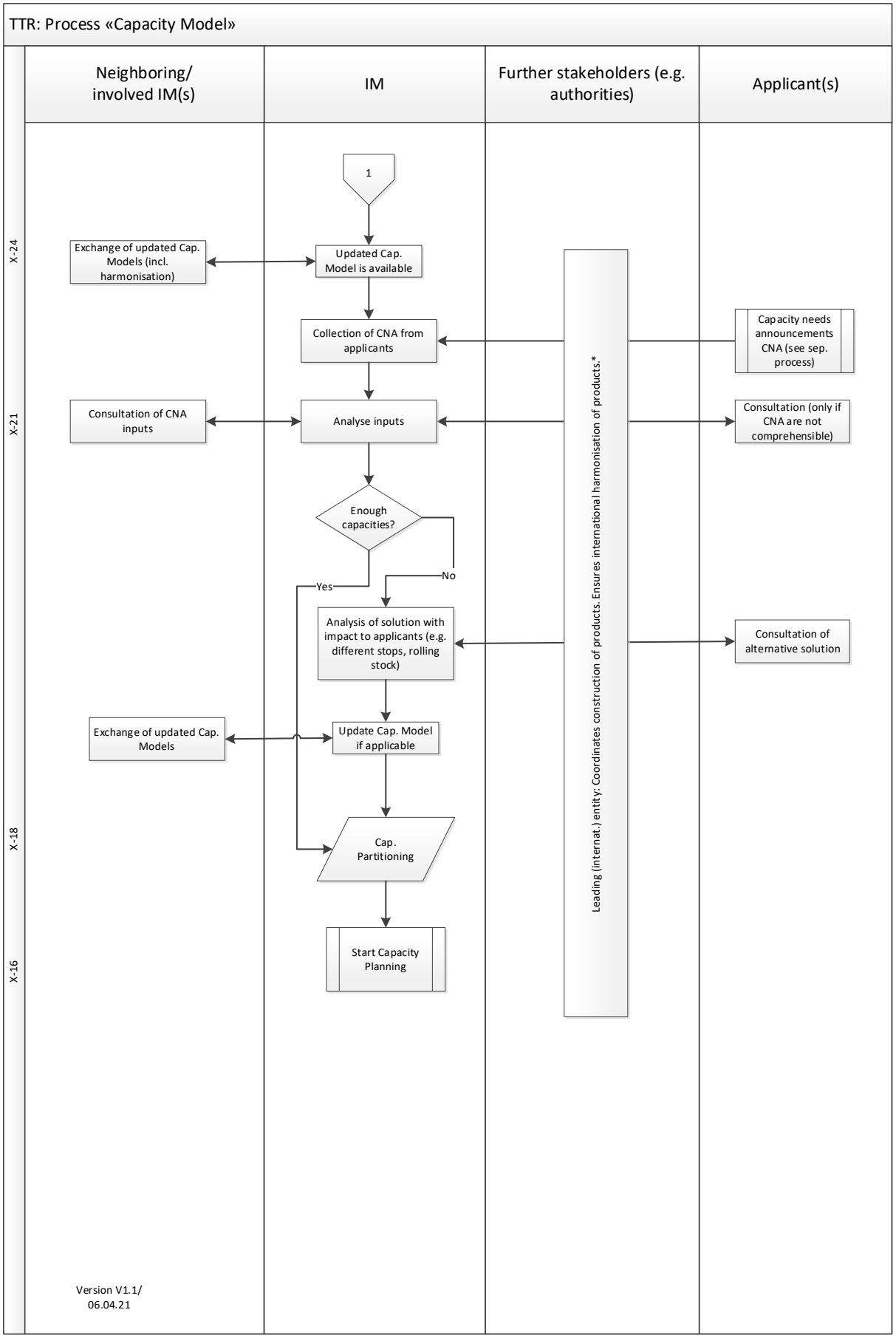


Annex 4.2: Process Diagram: Capacity Needs Announcement

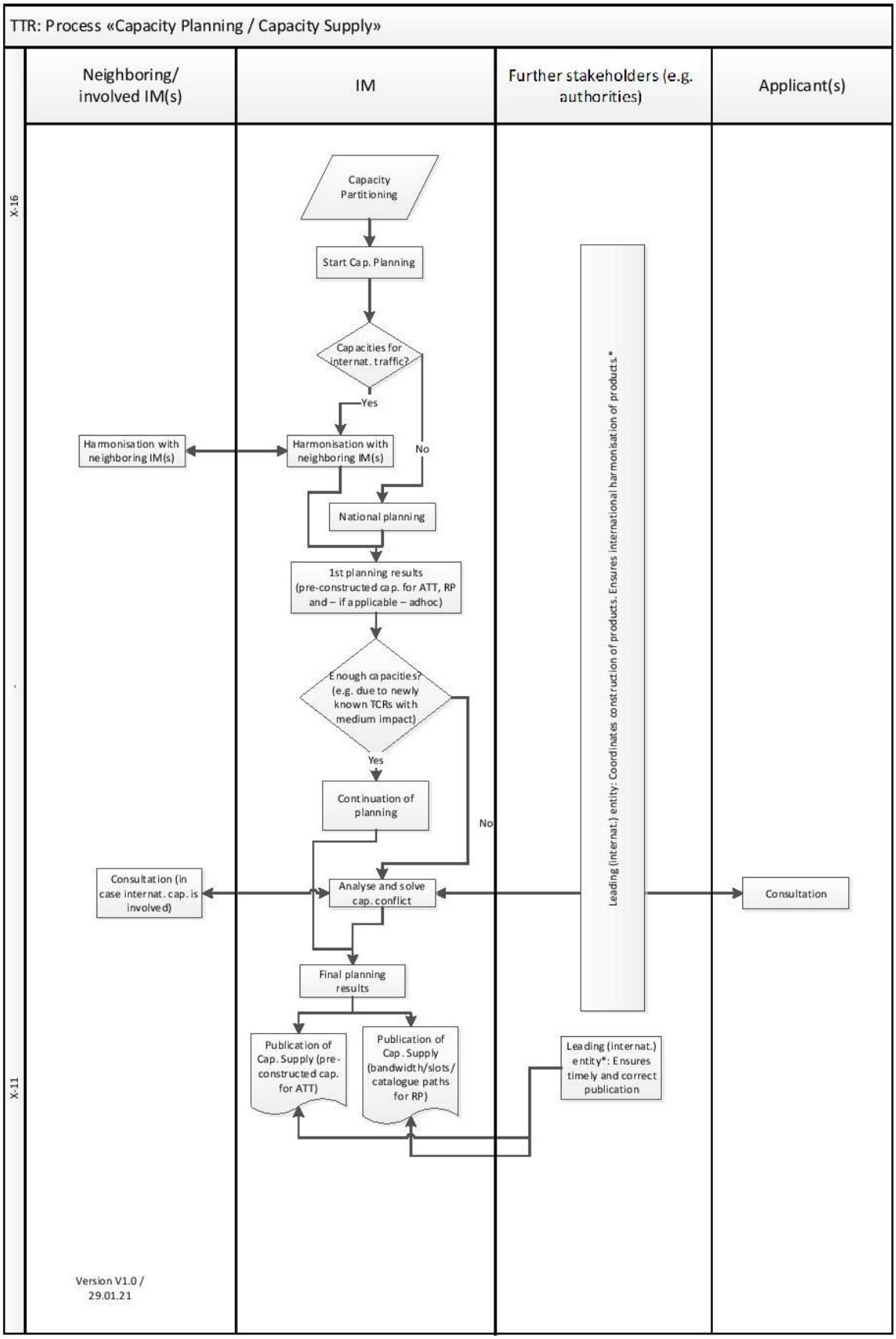
- to be published in May-July 2021 -

Annex 4.3: Process Diagram: Capacity Model




TTR: Process «Capacity Model»
Neighboring/ involved IM(s)
IM
Further stakeholders (e.g. authorities)
Applicant(s)
X-24
X-21
X-18
X-16
1
Exchange of updated Cap. Models (incl. harmonisation)
Updated Cap. Model is available
Collection of CNA from applicants
Capacity needs announcements CNA (see sep. process)
Consultation of CNA inputs
Analyse inputs
Consultation (only if CNA are not comprehensible)
Enough capacities?
Yes
No
Analysis of solution with impact to applicants (e.g. different stops, rolling stock)
Consultation of alternative solution
Exchange of updated Cap. Models
Update Cap. Model if applicable
Cap. Partitioning
Start Capacity Planning
Leading (internat.) entity: Coordinates construction of products. Ensures international harmonisation of products.*
Version V1.1/ 06.04.21

Annex 4.4: Process Diagram: Capacity Supply



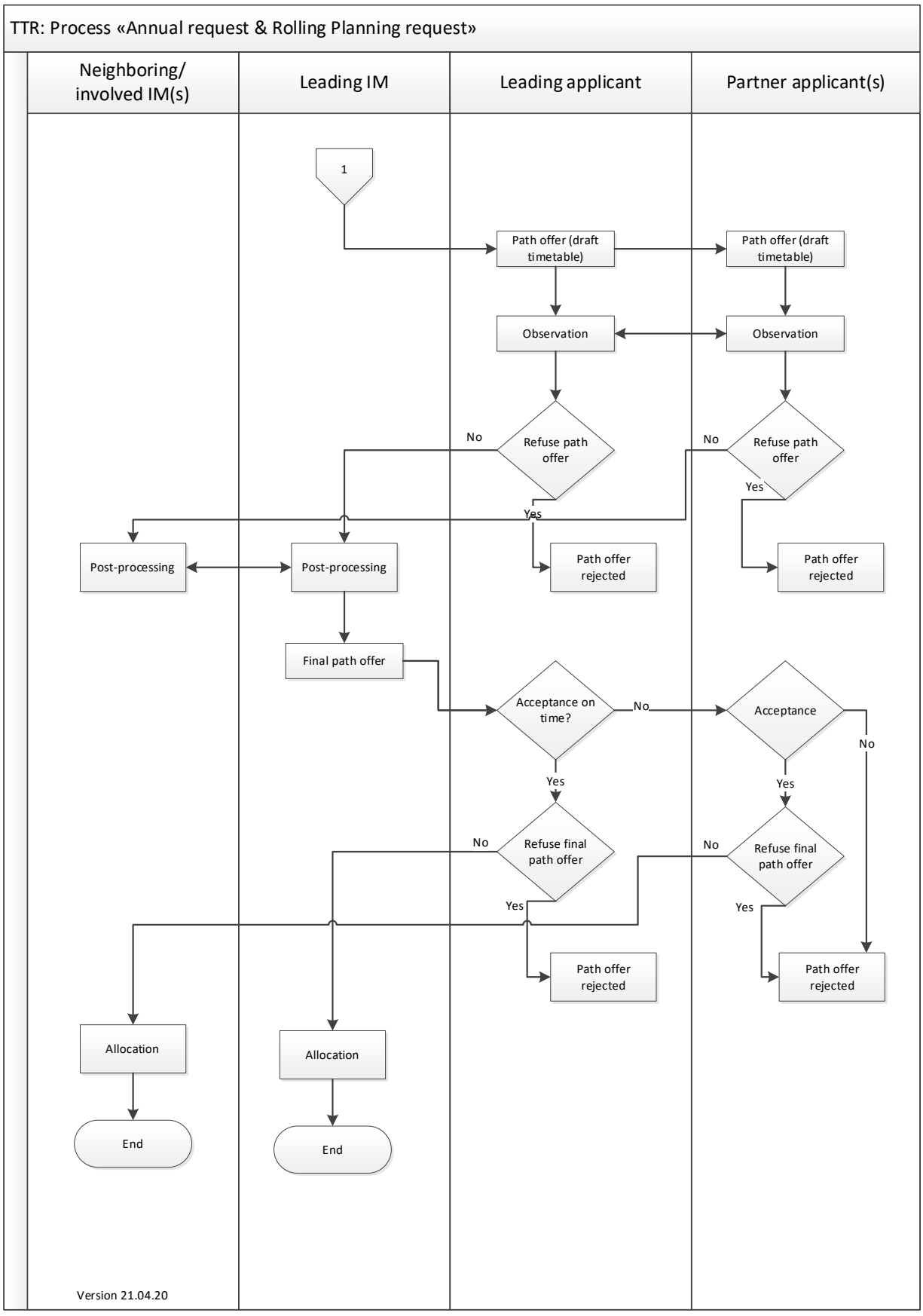
Annex 4.5: Process Diagram: TCRs

- to be published in December 2021 -

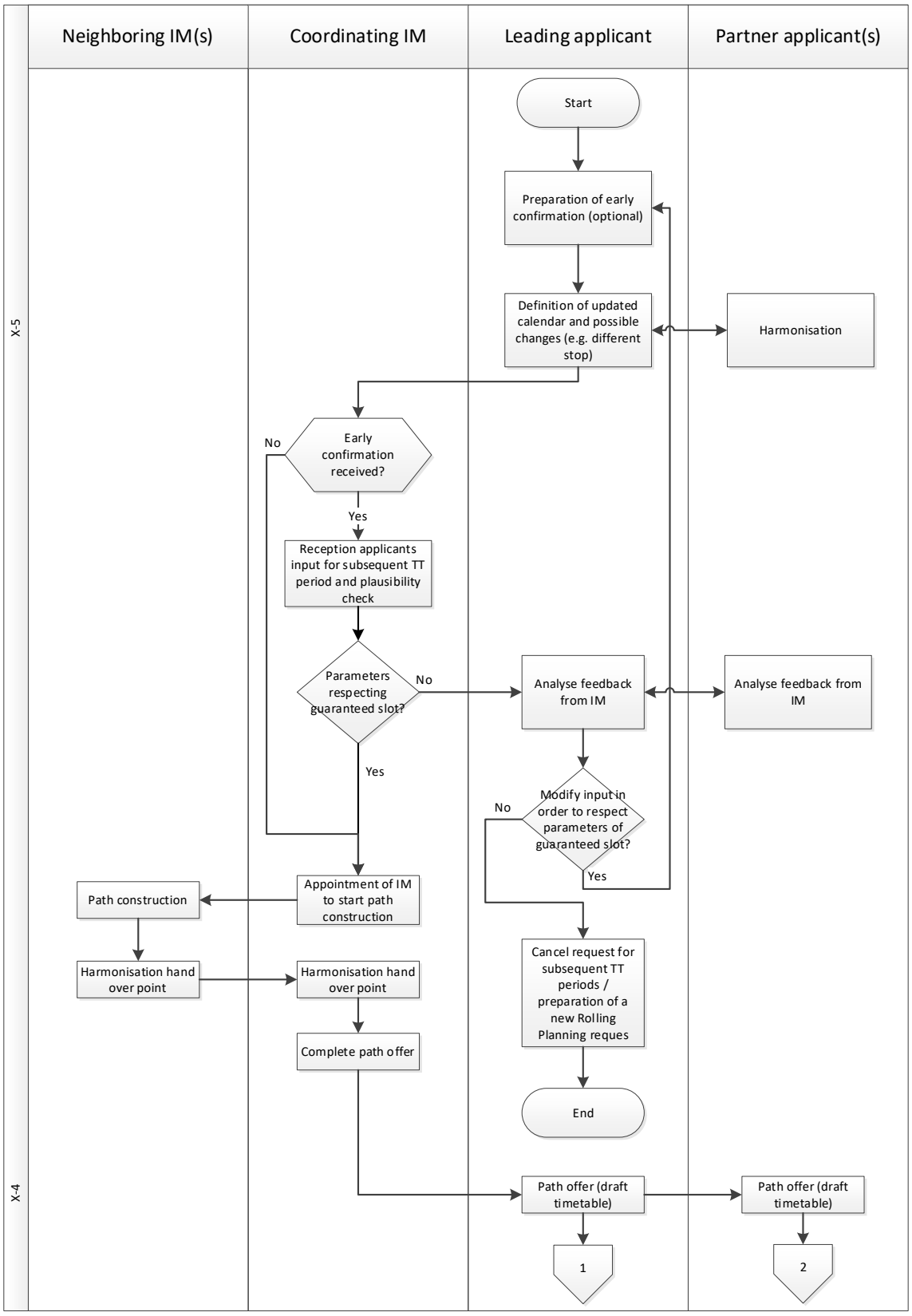
Annex 4.6: Process Diagram: Feasibility Studies

- to be published in May-July 2021 -

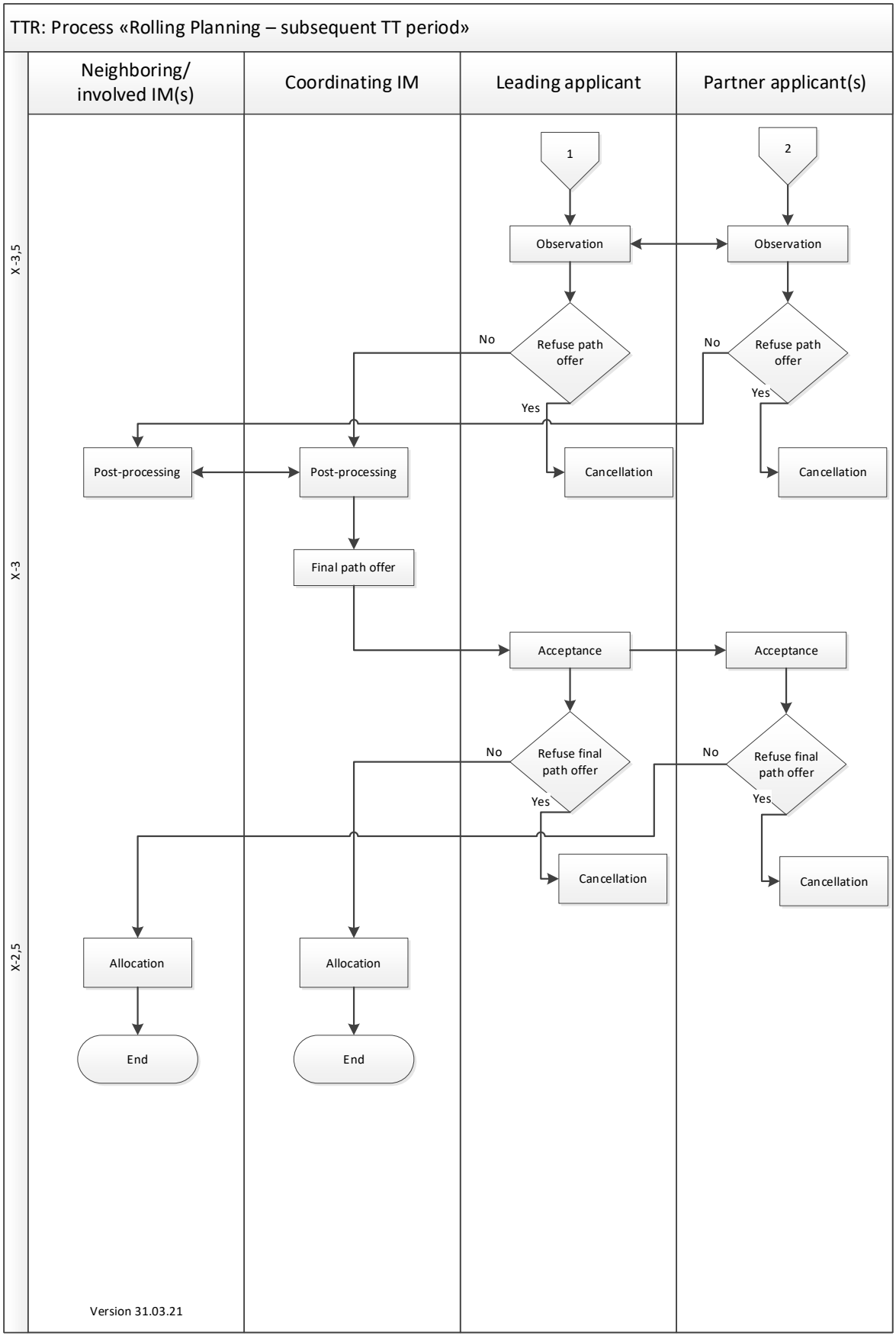
Annex 4.7: Process Diagram: Path Request



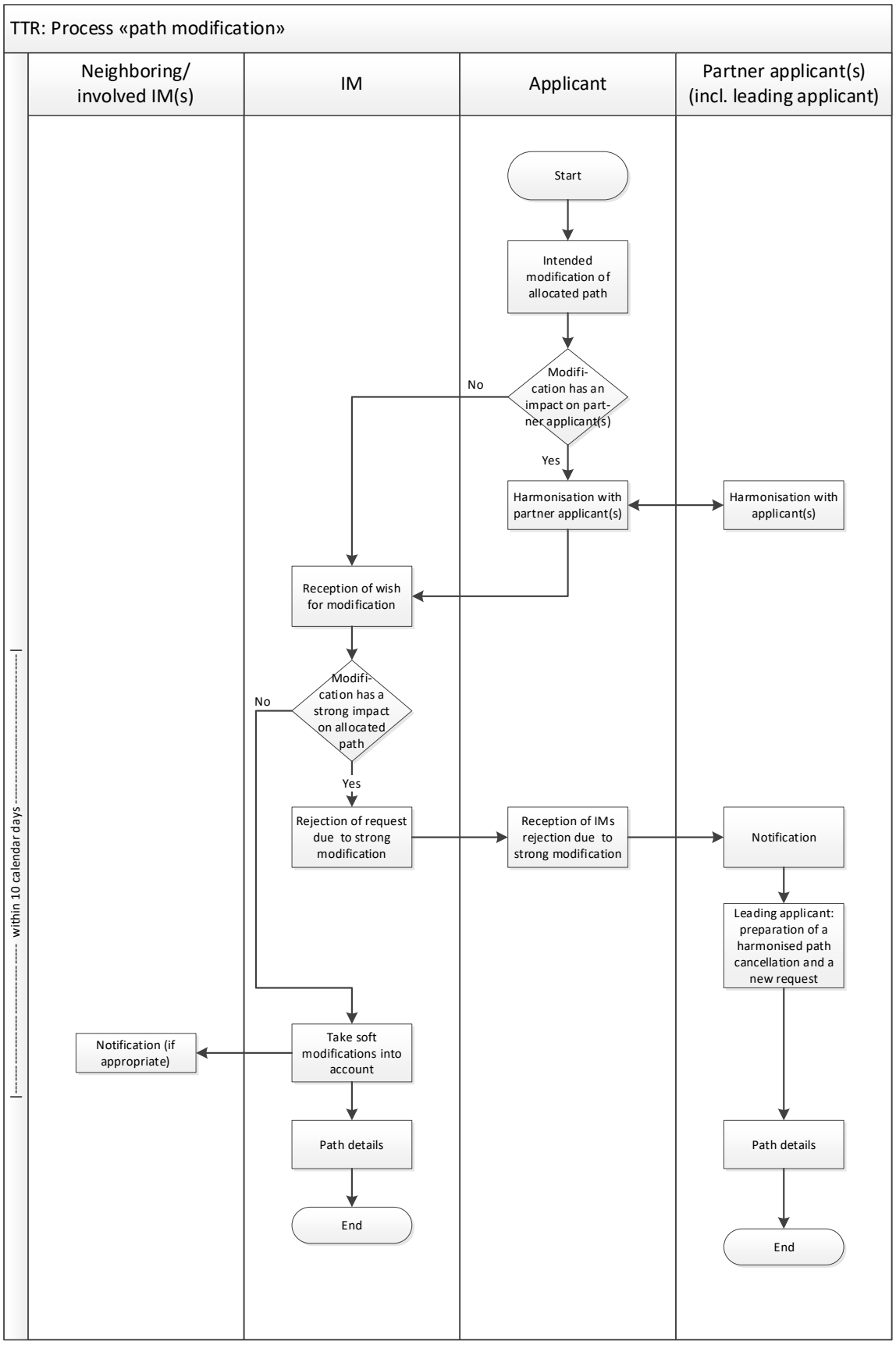
Annex 4.8: Process Diagram: Rolling Planning – Multiannual Aspect



Version 31.03.21

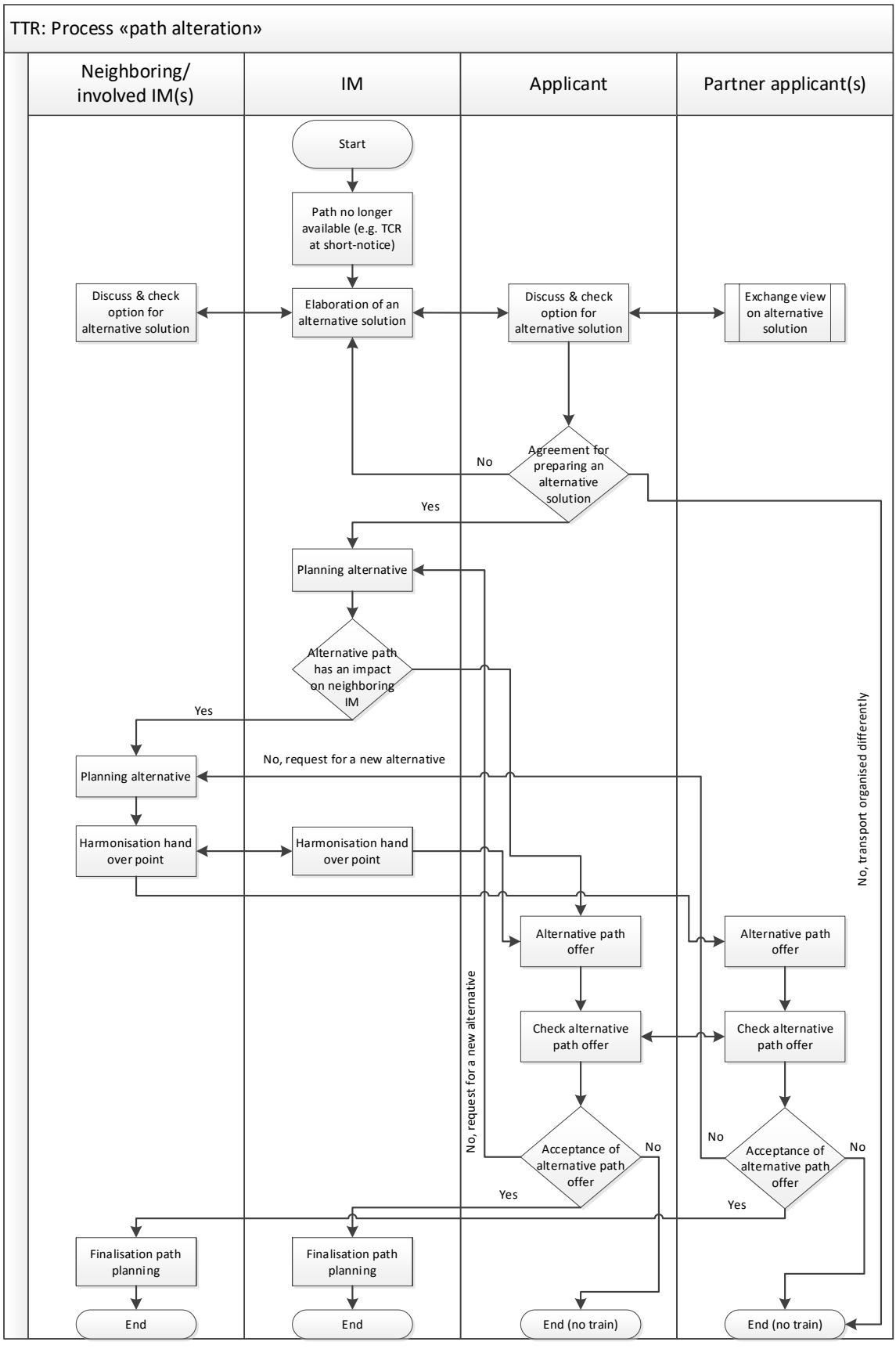

TTR: Process «Rolling Planning – subsequent TT period»
Neighboring/ involved IM(s)
Coordinating IM
Leading applicant
Partner applicant(s)
X-3,5
X-3
X-2,5
1
2
Observation
Observation
Refuse path offer
No
Yes
Refuse path offer
No
Yes
Post-processing
Post-processing
Cancellation
Cancellation
Final path offer
Acceptance
Acceptance
Refuse final path offer
No
Yes
Refuse final path offer
No
Yes
Cancellation
Cancellation
Allocation
Allocation
End
End
Version 31.03.21

Annex 4.9: Process Diagram: Path Modification



Version 19.01.17

Annex 4.10: Process Diagram: Path Alteration



Version 23.08.16

Annex 4.11: Process Diagram: Path Optimisation

- to be published in May-July 2021 -

Annex 5: Practice-Related Use Cases

About this Annex

In this annex, many possible use cases are listed. These use cases refer either to Annual Timetable or Rolling Planning traffic, and deal with the various process steps: from requests to withdrawals, cancellations, modifications, or inclusion of TCRs.

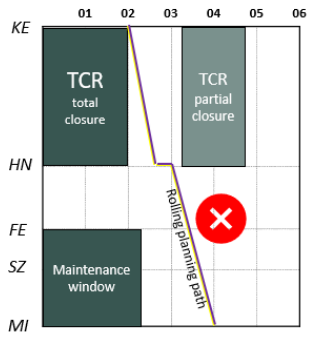
Annex 5.1: Use Cases Related to Capacity Request Methods

- to be published in May-July 2021 -

Annex 5.2: Use Cases Related to TCRs

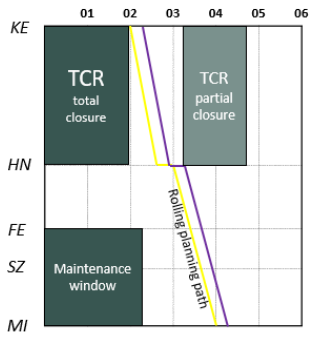
No	Initiator	Type of traffic	Use Case description	Point in time of request (in relation of X or M)	Request method		Capacity product (to be requested)	Priority handling	Draft offer timeline	Observation timeline	Acceptance timeline	Final offer timeline	Feedback/remarks from IMs
22	Fret SNCF, Madid	impact on national traffic only	Case of a rock unstable with risk of detachment on the tracks, requires the laying of nets: Work proposed in July 2016, concerns the circulation of October 2016 works of 8h during the day on a month, 50 circulations day to shift, (20 freight, 30 passenger)	M-2 (After assignment of annual request and Rolling Planning)									This is a kind of 'force majeure', further delay of the works will damage the tracks. So it's an unplanned TCR. If it was a planned TCR the IM should have proposed a timeframe to the RUs with inclusion of detailed impact.
23	Fret SNCF, Madid	Impact on international traffic	"Major" works presented validated at X-12, planned during the day Choice of the company carrying out the work at X-12, information at X-6 of the shift of the work site at night because the company cannot realize it otherwise.	X-6									This should not happen after the implementation of TTR. IMs are obliged to fix and publish their works at x-12. This obligation has consequences for the way of contracting the works. This has to be done in an earlier stage as well to avoid troubles like you described.
24	Fret SNCF, Madid	Impact on international traffic	On the Bayonne - Hendaye route, set up speed limit, with an additional 20-minute delay for all trains. Announcement to the EFS on 15 November 2016 for the upcoming SA which begins in December 2016	X-1									It depends on the definition of major, medium or minor impact when the IM has to announce the need of the speed limit and of course the reason of the speed limit. Let's assume it is due to works in line with TTR the IM has to respect the timeline. In case of 'minor impact' he has to announce and consult the RUs earlier anyway.

Annex 5.3: Use Cases Related to Tailor-Made Capacity



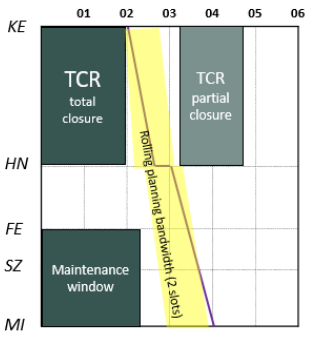
Use case 1

applicant requests in ATT capacity protected for rolling planning



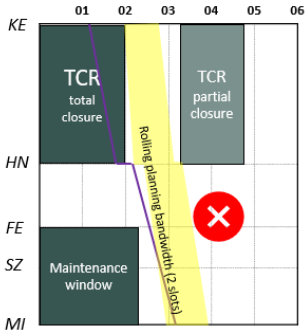
Use case 2

an applicant requests a tailor-made path respecting all rules above



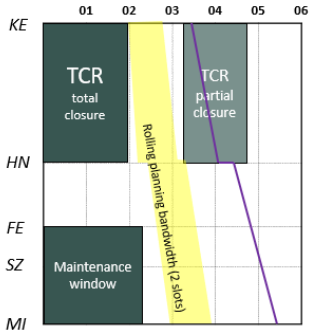
Use case 3

an applicant requests a tailor-made path respecting all rules above



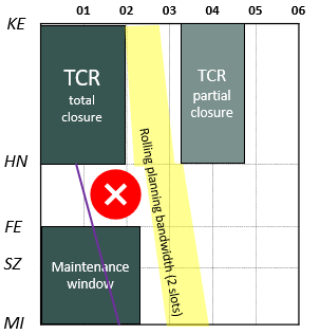
Use case 4

applicant requests a path through closed tracks



Use case 5

an applicant requests a path through a TCR, for which the IM allows requests



Use case 6

an applicant requests a path through a maintenance window, for which the IM does not allow requests

The accompanying picture shows five use cases, where an applicant places a request (blue object). In use cases 1, 4 and 6 the request is not respecting the IM indication, the operation day in conflict will be rejected and not answer by any of the involved IMs.

The pre-requisite of this is the implementation of the future Capacity Broker, which will support applicants in the process of request creation. They will be notified about the conflicts with blocked capacity (not requestable), and they will be asked to create for these days a subsidiary timetable, which is not in conflict.

Annex 5.4: Use Cases Related to Path Modifications

Need for changes by the RU: example

Path request & allocation
A to Z, ① - ⑤

Need for a change by the RU:
final destination C instead of Z,
17th Nov. 20..

RU activity:
- partial cancellation
  B to Z, 17th Nov. 20..
- New path request B to C, 17th Nov. 20..
  with run through time in B as reference

Conclusion: this example is not a modification, it is a partial cancellation and a new request

1/2 December 2016

Need for changes by the RU: example

Path request & allocation
B to Z, ① - ⑤

Need for a change by the RU:
train starts in A instead of B,
for one, some or all days

RU activity:
- New request from A to B
  B to Z, for one, some or all days

Conclusion: this example is not a modification, it is just a new request

17 November 2016

Need for changes by the RU: example

Path request & allocation
B to Z, ① - ⑤

Need for a change by the RU:
train run also on ⑥

RU activity:
- New request B to Z for ⑥

Conclusion: this example is not a modification, it is just a new request

Need for changes by the RU: example

Path request & allocation
A to Z, ① - ⑦

Need for a change by the RU:
train starts in B instead of A,
for one, some or all days

RU activity:
- partial cancellation from A to B
for one, some or all days

Conclusion: this example is not a modification, it is just a partial cancellation

Need for changes by the RU: example

Path request & allocation
A to Z, ① - ⑦

Need for a change by the RU:
train needs to be rerouted between
B and C for one, some or all days

RU activity:
- partial cancellation from B to C
for one, some or all days
- New request from B to C for one,
some or all days

* In case the new (rerouted) path arrives in C later than the times of the initially allocated path A-B-C-Z, IM may ask the RU to cancel C to Z and to place a new request for the section C to Z.

Conclusion: this example is not a modification, it is just a partial cancellation and a new request

Need for changes by the RU: example

Path request & allocation
A to Z, ① - ⑦

Need for a change by the RU:
different parameter (e.g. train length +50m for one, some or all days)

RU activity:
- Inform IM about modification of parameter

IM:
- If longer train has no influence on path, modification will be taken into account
- If longer train has an influence on path (e.g. different overtaking location, new path times), RU will be asked to cancel path and place a new request

17 November 2016

Need for changes by the RU: example

Path request & allocation
A to Z, ① - ⑦

Need for a change by the RU:
add. stop of x' in B for one, some or all days

RU activity:
- partial cancellation from B to Z for one, some or all days
- new request from B to Z with new departure time for one, some or all days

Conclusion: this example is not a modification, it is just a partial cancellation and a new request

17 November 2016

Annex 6: Allocation Guidelines for Conflicting Capacity Announcements and Requests

- to be prepared in 2021-