

Annex to Position Paper

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Annex to Position Paper on Rail Freight Corridors & TTR for Smart Capacity Management including Digital Capacity Management (DCM)

Annex to CER Position Paper on Rail Freight Corridors & TTR for Smart Capacity Management / Digital Capacity Management (DCM)

Together with DCM can **TTR** be successfully implemented. This requires the digitalisation of all parts of the capacity provision process, i.e. Capacity Strategy, Capacity Model, Capacity Planning, TCR Allocation, Annual Requests, Rolling Planning and Ad-hoc and Short-term Request. A digital construction can provide train paths for occasional traffic (also automated), path orders during the timetable (Rolling Planning) and the (in TTR) shortened phase of annual timetabling in time and coordinate them internationally. This applies in particular to routes with high utilisation, anywhere on the network.. Of course, also national pre-arranged path catalogues can be fed into the path construction process, common for national and international traffic.

TTR including DCM will bring decisive **advantages** to Applicants, IMs and governments:

Customer responsiveness

RUs will be able to request ad hoc paths, national and international, shortly before the departure of the train. RUs will be able to request and follow up all paths (long term, short term) within one common IT landscape.

Punctuality

Since customers request paths when they know what they need or even when they are ready to depart, punctuality might increase.

Harmonization of paths at borders

The harmonization of paths at borders will be improved at all stages of the timetabling process, from requests in annual timetable and running timetable incl. rolling planning and ad hoc.

Timeliness

IMs will be able to meet timetable deadlines better than before, notwithstanding increasing numbers of freight path requests and TCRs on their networks.

Capacity

Constructing paths with harmonized demand-oriented parameters for each market segment and packing them into homogenous bundles as an option for highly used lines will increase available capacity.

Speed

As an option for highly used lines, through bundling of homogenous train paths, the average speed of the overall path can be increased.

Lower investments as for infrastructure

DCM supports Ministries of Transport in fulfilling their task of providing infrastructure. It leverages the investment in hardware and can be implemented faster than building new infrastructure, thus buying time in the essential planning of new infrastructure.

Enabler for integrated European Schedule

By increasing the capacity on the highly utilized TEN-T Core Network Corridors and other highly utilized lines DCM is also an enabler for setting up the integrated European Schedule connecting the national integrating timetables.

Cost reduction

DCM reduces the need for rolling stock and loco drivers because of better transport times. Equally, it frees up time of schedulers by automating semi-manual processes of path construction.

Customer commitments beyond one timetable period

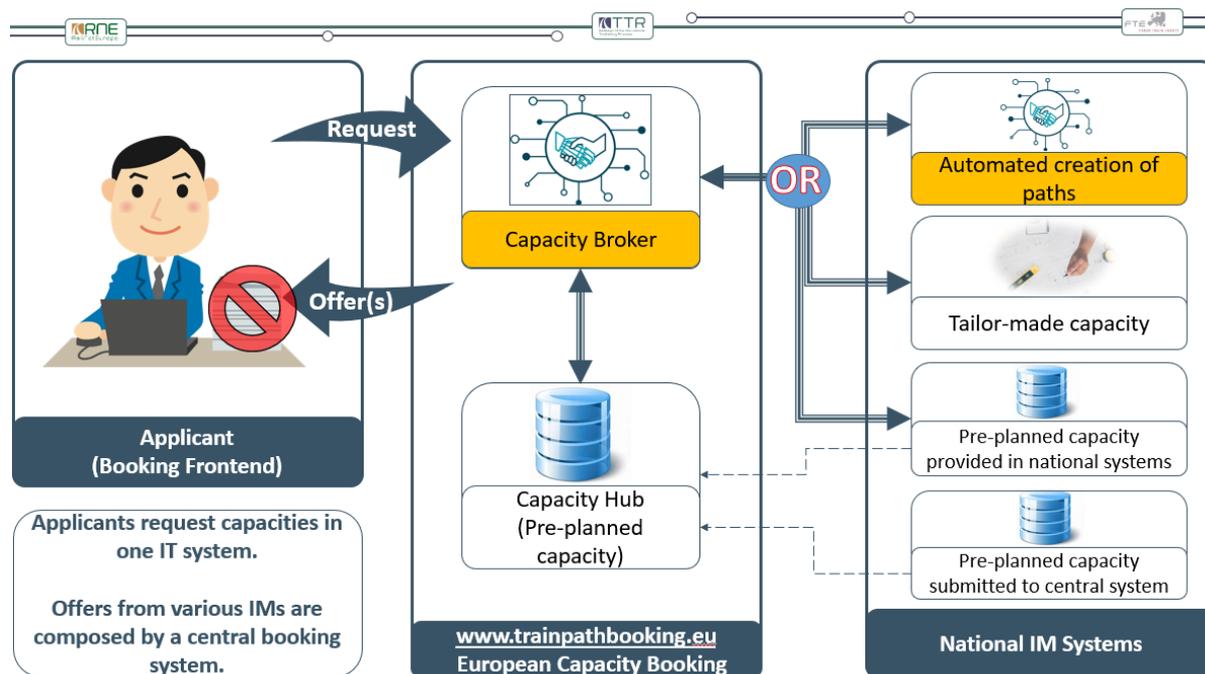
The implementation of TTR allows for multiannual capacity commitments between IMs and RUs. This enables RUs to have customer expectations fulfilled that are not bound to "artificial" timetable periods, currently only known in rail.

Summary

Overall, TTR including DCM increases the competitiveness of rail for freight and for passenger traffic and becomes a key enabler for modal shift to green transportation

The **investments** for the digitalisation of capacity management, in particular for the "First-Wave Implementers of TTR" (SNCF Réseau, RFI, DB Netz, ProRail, Infrabel, SBB Infra, BLS Netz, TVS, ÖBB-INFRA, BaneDanmark, Trafikverket, BaneNor, ACF, CFL, SZCZ) and for the central IM and RU components, were conservatively estimated by RNE on the basis of a survey with the stakeholders at approximately € 675 millions. The Infrastructure Managers, Railway Undertakings and RNE/FTE require extensive funding for this from the EU and national governments (the current draft CEF II "Actions related to smart and interoperable mobility" already provides funds for this).

RNE builds and operates the **Central TTR IT** as part of DCM, which combines the capacity offer for international path requests from the national sections. DCM, combined at European and national IM level, can make a significant contribution to the national IMs with its ability to quickly and, if necessary, automatically construct paths without having to hold all paths in a pre-constructed form, which however can remain the preferred from of providing capacity for some IMs. This ability to construct paths quickly and, if necessary, automatically can reduce the utilisation risk, especially on heavily loaded routes, and avoid inflexibility in the event of path conflicts.



The digitalisation of capacity management requires large efforts and can therefore only be **built up gradually**. This concerns the entire life cycle of a train path. However, a logical **starting point is ad hoc traffic** (short term request):

- The customer benefit is most immediate here. Train paths can be made available in minutes or seconds. Capacity thus becomes easily available.
- The complexity of digitisation is relatively lower than in the automation of the entire annual timetable.
- The ad hoc timetable already contains all relevant business capabilities in IT and could form the basis for the later expansion of automation to other timetable phases with a technical breakthrough.
- An internationally coordinated train path offer will significantly relieve the burden on the border operating lines, which have so far suffered particularly from the fragmented and uncoordinated train paths of international trains in ad hoc traffic.

With **Click & Ride**, DB Netz has already achieved a degree of automation of almost 50 per cent in ad hoc and short-term services and shown that automation in the timetable is possible. The advantages described above have been confirmed. The success has aroused interest throughout Europe and the expectation that C&R can be a first building block for a comprehensive Digital Capacity Management (DCM) and that, together with other components and services, the capacity management of the future can be developed. A high quality of a harmonized infrastructure representation is crucial for every future development Rail Freight Forward actively calls for DCM as a total system and has identified it in its White Paper as a core lever for the modal shift to 30% market share of rail freight.

The development of a comprehensive DCM is already gaining momentum, among others based on several TTR Minimal Viable Products (MVP).

For a **successful implementation** of DCM, both as an overall system and for individual building blocks alike, five points are required:

1. Software solutions for timetable construction and capacity management: "Services that can be used by all instead of proprietary individual solutions"

For the operational management of DCM, standardised, highly automated services for timetable construction and capacity management of European railway infrastructure companies should be made available and generally accessible.

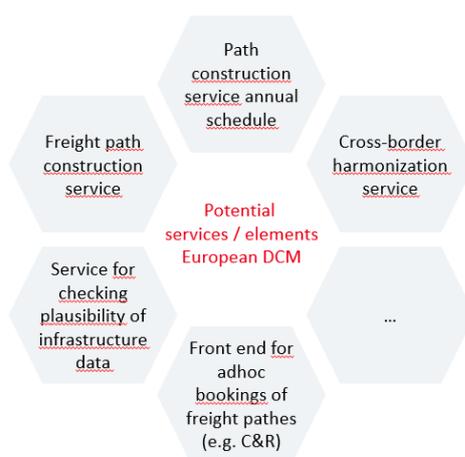
In comparison, this corresponds to the idea and the 'operating model' of Amazon Web Services (AWS). Amazon needed to operate its e-commerce platform itself and also made it available to third parties. The services that are now offered in large numbers offer extensive functions and are used by many companies for their own services (e.g. SNCF Réseau, Siemens, National Rail Enquiries). The use and interconnection of the services are easily possible and ensured by the use of standardised interfaces.

However, the system for DCM differs in two essential points: First, there is no profit motive overall and among the participants in relation to this service use. Secondly, the various services and the provision of connecting and overarching elements are not provided by a single company. The infrastructure managers (IM) contribute

individual services and can use the services of others. The provision of connecting and overarching elements is basically ensured by RNE.

In this way, there are no individual solutions or diverse 'software instances' that have to be maintained in an expensive, individual and time-consuming manner. In this way, development costs are shared and further advantages arise. Both the basic data, e.g. on infrastructures or (occupied) capacities, and also the decision on capacity allocation remain at all times under the sovereignty and sole control of the respective infrastructure managers.

A European comprehensive DCM should digitalise the entire process of capacity provision. Possible further modules could include:



DB Netz is willing to make its train path construction service (= C&R) available for use by other IMs on a non-profit basis and to contribute to such a platform and collection of services.

2. Legacy Integration:

Of particular importance is the question of how the national algorithm and other DCM modules can be combined with the existing IT landscape of the respective infrastructure operators. ProRail prepared a proof of concept with DB Netz. Here too, DB Netz is prepared to share its experience with other infrastructure managers.

3. Infrastructure representation:

A prerequisite for automated path construction is the representation of the actual infrastructure in digital form ("digital twin"). In order to explore all possibilities of fulfilling the customer's wishes in accordance with the rules and regulations and, if necessary, to find solutions by calculating different variants, DCM absolutely needs a complete, up-to-date and correct representation of the actual and future infrastructure. This effort is easily underestimated. All interested infrastructure managers should start here in the short term. A transfer of know-how could also be useful here.

4. Connectivity:

TTR Central IT functions as an intermediary that allows national DCM solutions to communicate with each other. This IT solution is developed within the TTR IT Landscape and TAF/TAP TSI Specifications. By participating (at least as an observer), interested infrastructure managers can understand how they can connect their national timetable constructions via the IT landscape in the future. At

the same time, this offers the opportunity to introduce their own requirements, which will make the IT landscape more universal.

5. Financing:

Experience has shown that the cost of software development, the mapping of the entire infrastructure, the integration into the legacy IT landscape and the question of international connections is initially underestimated. The European Commission already provides the possibility for Co-Funding, which appears a once-in-a-generation possibility to ease the cost burden.

About CER

The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies. The membership is made up of long-established bodies, new entrants and both private and public enterprises, representing 71% of the rail network length, 76% of the rail freight business and about 92% of rail passenger operations in EU, EFTA and EU accession countries. CER represents the interests of its members towards EU policy makers and transport stakeholders, advocating rail as the backbone of a competitive and sustainable transport system in Europe. For more information, visit www.cer.be or follow [@CER_railways](https://twitter.com/CER_railways) on Twitter.

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