THE PATH CATALOGUE IN THE CAPACITY PLANNING PROCESS

THE INSTITUTIONAL PROCESS AND STAKEHOLDERS NEEDS

The relationship between the Infrastructure Manager (IM), Train Operating Companies (TOCs) and other stakeholders who require capacity on the network starts during the capacity planning process. This process provides a framework of timescales, rules and regulations that allows the IM to efficiently and fairly allocate the capacity, while allowing the other actors in the process to plan for their specific business and market needs. In this paper we investigate how the current capacity planning process answers the needs of TOC’s and IM’s, and on the basis of these findings question what principles should be modified to achieve a more efficient and satisfactory capacity planning process.

The path request period, as defined in the relevant EU regulations should start no earlier than 12 months before the annual timetable in December and typically ends in April, 8 months before the entry into service of the new timetable. Freight operators need greater flexibility than this in order to manage the inherent market volatility of their businesses. One of the major challenges for them is to anticipate their commercial requirements, as planning one year ahead is far too early for them. Typically they submit their capacity requests through the “last minute” process for allocating the residual capacity, as this is more aligned with the reality of the freight transport market. The “last minute” allocation process usually starts several days prior to the specific operating day, and offers paths from the remaining unplanned capacity. Although this practice gives them the operational flexibility needed, the lack of certainty and associated business risks make this market difficult, especially for smaller freight Operators.

This period is obviously too late for passenger TOC’s, regardless of the degree of market liberalisation, and the contractual framework for providing their services (such as franchise commitments or open access operations). Indeed passenger TOC’s need far greater visibility and security of allocation, especially when the service requires procurement of new rolling stock, recruitment and training of staff and the certification and regulatory requirements when commencing new services under contract with a public transport authority or similar agency.

We should now consider what are the limits of such a planning calendar from the IM’s point of view? The main tasks of an IM can be considered as infrastructure maintenance, line upgrades and the management of capacity (for both train paths and engineering access). The development of infrastructure capability should be determined by the predicted demand, and later refined by the timetable. This includes features such as the enhancement of line capacity, enabling services to overtake another through additional passing loops, etc. IM’s do not have the needed quantity and quality of information early enough to plan their infrastructure works if the timetable is fixed only a few months before it enters into service.

For the capacity management task the IM needs to balance the requirement to begin planning early enough to provide clarity to all actors in the process, while maintaining the flexibility to adjust the capacity allocation between services and other activities. The IM needs to respond to both passenger and freight TOC requests and their differing operational needs, and to anticipate conflicts between these requests. At the same time they need to find a balance between access for engineering work and train paths.

Generally speaking the process should provide solutions for the following requirements:

- greater flexibility and consistency for freight TOC’s in the short term process
- early path allocations for passenger TOC’s allowing them to make the business and operational decisions required for them to plan and manage their rail services
- The ability for IM’s to flexibly manage capacity allocation while supporting the decision making process for infrastructure development and maintenance

We will now describe the components forming this process, starting with those beginning several years in advance of operations and working towards the introduction date of the annual timetable.

THE FRAMEWORK AGREEMENTS AND THE MEMORANDUM OF UNDERSTANDING

The first component in this process is the framework agreement. European Directive 2012/34/UE specifies that this framework agreement defines the characteristics, including both the required and offered capacity, of the infrastructure over a period of time, in principle up to 5 years. This obviously exceeds a single working timetable period of 1 year. The framework agreement does not normally specify train paths in detail, but should meet the legitimate commercial needs of the applicant. Although it does not aim to
specify each train path in detail, it is possible to define some key functions it has to fulfill. For example it can include connections between services, frequencies, quality of train paths, etc. It is important to note that these key parameters are indicative only, and the Directive allows them to be used in detail only in the limited case of services which use certain defined infrastructures which require substantial and long-term investment. The framework agreement provides benefits to both parties, as it enables the TOC’s to prepare for the operation of their services (including any required investments) and to plan their core economic services, while helping the IM in its capacity planning and infrastructure works processes. The frequent use of these framework agreements, especially by public transport authorities in Germany and Italy, demonstrates the relevance of such a tool to long-term planning processes.

Nevertheless, because it does not precisely define a path the framework agreement cannot provide sufficient reassurance for the TOC’s. There is a step missing between this agreement and the current path request period that allows more precise capacity planning. Additionally, for international path planning, with the exception of RNE corridor paths, the framework agreement does not fully solve the problem since they have to be contracted individually with the IM of each national network.

The second component is the Memorandum of Understanding (MoU). This common business agreement formalises the relationship and intentions between parties. In the case of capacity planning it could take the form of a pre-contractual agreement for path allocation. An example of this currently in use by HS1 Ltd in Great Britain concluded 2 years in advance of the annual timetable, about one year before the current path request period. Ideally the IM should develop a path catalogue that is published sufficiently in advance of operations. The MoU meets the same high level requirements as the framework agreement, namely preparing the services and to support the planning process, but over a different timescale. They enable TOC’s to invest in assets such as rolling stock procurement (noting that 2 years is not normally sufficient for new rolling stock acquisition), preparing their human resources and to generally plan for the operation of their services. For the IM the MoU allows them to anticipate the capacity allocation decisions between paths and engineering works. In some cases it also helps them to identify and plan minor infrastructure investments. The MoU process is especially suited to new private TOC’s entering the market, typically in smaller networks with public tenders for local services, who are often not able to plan their services 5 years in advance, but need greater certainty than can be achieved through planning within the time frames of the current allocation process (i.e. one year before the timetable change). An additional function of an MoU is to be used as a legal formalisation of the contents of a framework agreement. A problem with the use of an MoU concerns its legal form and status which varies between countries. The issue of applicable law and jurisdiction should be resolved carefully when drafting an MoU, taking into account the situation of a state holding company that is by definition geographically restricted. In common with the framework agreement, an MoU does not solve the problem of international path planning since it has to be contracted with the IM of each concerned network, but again this does not include RNE corridor paths which are controlled by different rules.

RETHINK THE PROCESS, INDUSTRIALISE TIMETABLING

Even though the tools presented above help to structure the interactions before the annual capacity planning and path allocation process, the current process itself does not fully support the requirements of the TOC’s because it comes too late for the passenger operators and too early for freight business. This article takes a step further to rethink the capacity planning process to fill in the gaps in the current methodology. The solution appears to be a capacity planning process comprising a separate passenger path allocation sub-process, followed at a later stage by a related freight path allocation sub-process.

An anticipated passenger path allocation sub-process, beginning perhaps 2 years before the commencement date of the timetable, would bring the same advantages for passenger TOC’s and IM’s as the MoU does, plus it would standardise the whole process with each requestor of passenger paths working simultaneously with the same rules. Of course, as the two sub-processes (passenger and freight path allocation) are dealing with the same total capacity they cannot be totally disconnected. The link between the two sub-processes should be fixed through the creation of a single passenger and freight path catalogue. This path catalogue should be planned far enough in advance to allow the passenger path allocation sub-process to proceed, but should contain enough remaining capacity for freight services that...
will be allocated later according to the freight TOC’s requirements for flexibility.

This is the key question for ensuring the success of this new process: how to integrate the freight capacity planning into a previously planned path catalogue while maintaining the freight operators short term needs? The methodology developed by SMA and partners Ltd together with DB Netz in the “neXt” project is a dynamic path allocation process based on a pre-constructed passenger and freight path catalogue. In this path catalogue the capacity available for freight services is reserved by multiple short sub-paths which can be assembled later into full freight paths according to the demand.

To describe this methodology in more detail, the dynamic freight path allocation process consists of defining in advance specific freight paths within the path catalogue, while simultaneously working on the passenger and engineering work capacity allocation within a separated sub-process. Those freight paths are composed of standardised paths with regular intervals which have been divided into shorter sections. In a later short-term process, the complete freight train paths are constructed from these short sections of path according to the freight TOC’s requests. This path construction is performed using an algorithm which guarantees an optimal use of this capacity. This tool combines the requirements of long and medium-term capacity planning (primarily for passenger TOC’s and the IM’s infrastructure projects) with flexibility for the variable short term freight market.

Within this approach passenger and freight path allocation processes can be performed in different time periods aligned with their specific business needs: passenger TOC’s are able to plan their services, while freight TOC’s have the flexibility demanded by their market. The path catalogue forms the basis of the whole process, forming the link between the sub-processes which occur at different times. The path catalogue brings flexibility for freight traffic through the short term dynamic freight path allocation sub-process, which does not interfere with the longer term passenger path allocation process. The path request period no longer has to be compromised by the conflicting requirements of the passenger and freight planning needs, but it is now separated into a single source of capacity split into two compatible sub-processes using a path catalogue.

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