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Photo: Deutsche Bahn AG / Volker Emersleben

The development of an integrated national timetable is expected to improve journey times, offering better connections between inter-city and regional passenger services.

Deutschlandtakt vision shapes capacity planning

Development of a medium-term capacity utilisation strategy is a key building block that meets European requirements whilst supporting the roll-out of Germany's planned national regular-interval timetable over the coming decades, write **Eric Cosandey** and **Frederik Ropelius***

Anouncing a 'new start' for national railway group Deutsche Bahn on September 22 last year, Federal Minister of Transport Patrick Schnieder explained that there would be an increased focus on performance, including both infrastructure modernisation and train punctuality, and greater separation of DB's core train operating businesses from the public service oriented infrastructure manager DB InfraGO.

An important element of this transformation will be comprised of two pivotal initiatives, branded *Deutschlandtakt* and mKoK. Both are aimed at enhancing the efficiency, capacity and reliability of Germany's rail system, addressing the requirements of both passengers and freight operators. However, it is important to understand the relationship between the two initiatives, including their objectives and methodologies.

National timetable vision

A ministry-led project, *Deutschlandtakt* is a comprehensive plan to implement a nationwide integrated regular-interval timetable. This has largely been inspired by Switzerland's successful long-term planning process. This was exemplified by the original Taktfahrplan of 1982, followed three years later by Bahn 2000 and then by subsequent infrastructure enhancement strategies.

Germany's ambition is to synchronise passenger train schedules across the country, including international and long-trains, inter-regional, regional and local services. This would be aimed at ensuring predictable, frequent and seamless connections at major hubs and smaller interchanges. There are three main objectives.

- **Enhancing passenger experience.** *Deutschlandtakt* aims to make rail travel more convenient and appealing by offering consistent and reliable connections. Passengers will benefit from more frequent services, reduced transfer times, and improved accessibility to destinations across the country.
 - **Increasing ridership and freight capacity.** *Deutschlandtakt* aims to attract more people to choose rail over cars or planes by improving the service quality and connectivity. The target is to double passenger numbers on both local and long-distance trains by 2030. The plan must also take into consideration the needs of the freight sector, ensuring that sufficient capacity is available for freight trains to operate without disrupting the passenger services.
 - **Timetable-based infrastructure development.** As with the Swiss model, the 'timetable-first' approach is intended to focus infrastructure investment on those areas where work is needed to facilitate the desired train schedule, as opposed to traditional planning approaches where the infrastructure is designed first and the timetable fitted in afterwards. This ensures that investment is both targeted and aligned with the service plan.
- The planning for *Deutschlandtakt* is based on the principles of an **Integrated Regular-Interval Timetable**. All rail services — long-distance, regional, freight — will operate on harmonised schedules, allowing seamless connectivity. The entire schedule will be based on a systematic timetable for the whole of Germany. This will be built up on the basis of a repeating two-hourly pattern, rather than a 24-hour 'daily' timetable. Half-hourly services will operate on the major routes, with connections timed to minimise waiting periods.

These optimised schedules, and the infrastructure upgrades derived from them, are expected to increase capacity and cut journey times significantly. For example, the typical travel time between Berlin and Stuttgart would be cut by an hour from 5 h 38 min in 2025 to 4 h 34 min.

Planning inputs

Inputs into the timetable planning process include federal forecasts for freight traffic volumes, demand-oriented planning for long-distance passenger demand and the regional transport plans for the different *Länder*. Any additional train paths have to be scheduled to take account of competition in the long-distance passenger market and requests for more flexible path selection from the rail freight operators.

One key factor behind the initial success of the work on the *Deutschlandtakt* target timetable has been the co-operation between the various interest groups, working under the leadership of the Bundesministerium für Verkehr. These include the *Länder* who are looking to ensure balance between regional and national interests, the passenger and freight train operators, the infrastructure manager, industry associations and the regulatory authorities. Close co-ordination was required during the planning process, which has taken several years, particularly in determining the target service volumes and the design and evaluation principles. Several iterations had to be carried out in order to reach an agreement that took into consideration the concerns of everyone involved. However, the process was ultimately successful in terms of achieving acceptance from all stakeholders.

The first target timetable aimed at meeting the forecast needs of 2030 was finalised in 2021, and this has provided a blueprint for future development. An update for the 2040 forecast horizon is being developed.

Implementation of the *Deutschlandtakt* from a project to a recurring timetable process will take place in several stages. Full implementation is expected to take several decades, and some estimates predict that it will not be completed until after 2040 — and even that is dependent on having sufficient funding. The scale of the infrastructure improvements required is immense, and this will necessitate significant financial commitments from both the federal and state governments.



Rail freight operators are keen to ensure flexibility in capacity allocation, so that they can respond rapidly to changing market requirements.

The phased implementation approach means that it is essential to identify and prioritise the most important infrastructure upgrades. The planned phasing of the target timetable is currently nearing completion. However, this more immediate timescale means that stakeholder co-ordination becomes a more complex task.

Capacity planning and allocation

While BMV is responsible for long-term network development as shaped by the Deutschlandtakt strategy, DB InfraGO remains in charge of the short- to medium-term planning and capacity allocation. The infrastructure manager has therefore launched a forward-looking initiative aimed at optimising the allocation and utilisation of railway capacity to accommodate growing demands of both passenger and freight transport. This is officially branded as *Kapazitätsplanung und -zuweisung der Zukunft* (Capacity Planning & Allocation of the Future), but colloquially known as KaZu Novum.

The principal objective is to optimise the utilisation of existing infrastructure capacity by developing medium-term concepts. The initiative seeks to distribute the available network capacities equitably between the different types of traffic, ensuring that passenger and freight services can coexist harmoniously.

A key output from the KaZu programme is the Medium-Term Optimised Capacity Utilisation Concept (mKoK). This has been based on the current timetable, while taking into account the proposed phasing of the *Deutschlandtakt* target timetable. mKoK provides a structured framework for planning capacity allocation in the medium term. This approach enables the early identification of potential conflicts and the development of solutions before they impact on day-to-day operations.

One objective is for mKoK to provide the basis for Germany's input to the Capacity Strategy & Capacity Model in the new TTR Advance Planning process, developed as part of the European TimeTable Redesign Programme led by Rail Net Europe and Forum Train Europe.

Like *Deutschlandtakt*, mKoK is built around the basis of a two-hour systematic timetable. It introduces a pre-structured planning deliverable for optimised capacity utilisation in times of increasingly scarce resources. This is intended to provide transparency regarding available capacity for all types of rail traffic, and thus to give more planning security for all stakeholders in the subsequent allocation process.



As many regional passenger services are provided under tendered contracts, the capacity planning concepts are designed to be operator-neutral.

mKoK is being planned with the use of proven tools, such as SMA & Partners' Viriato Microscopy-on-Demand software. This conceptual architecture has been specified and developed by the Swiss consultancy over the past few years. It makes it possible for planners to switch easily between the macroscopic overview and the highly detailed microscopic model at all stages of the planning process while remaining focused on the outputs required from an efficient capacity plan.

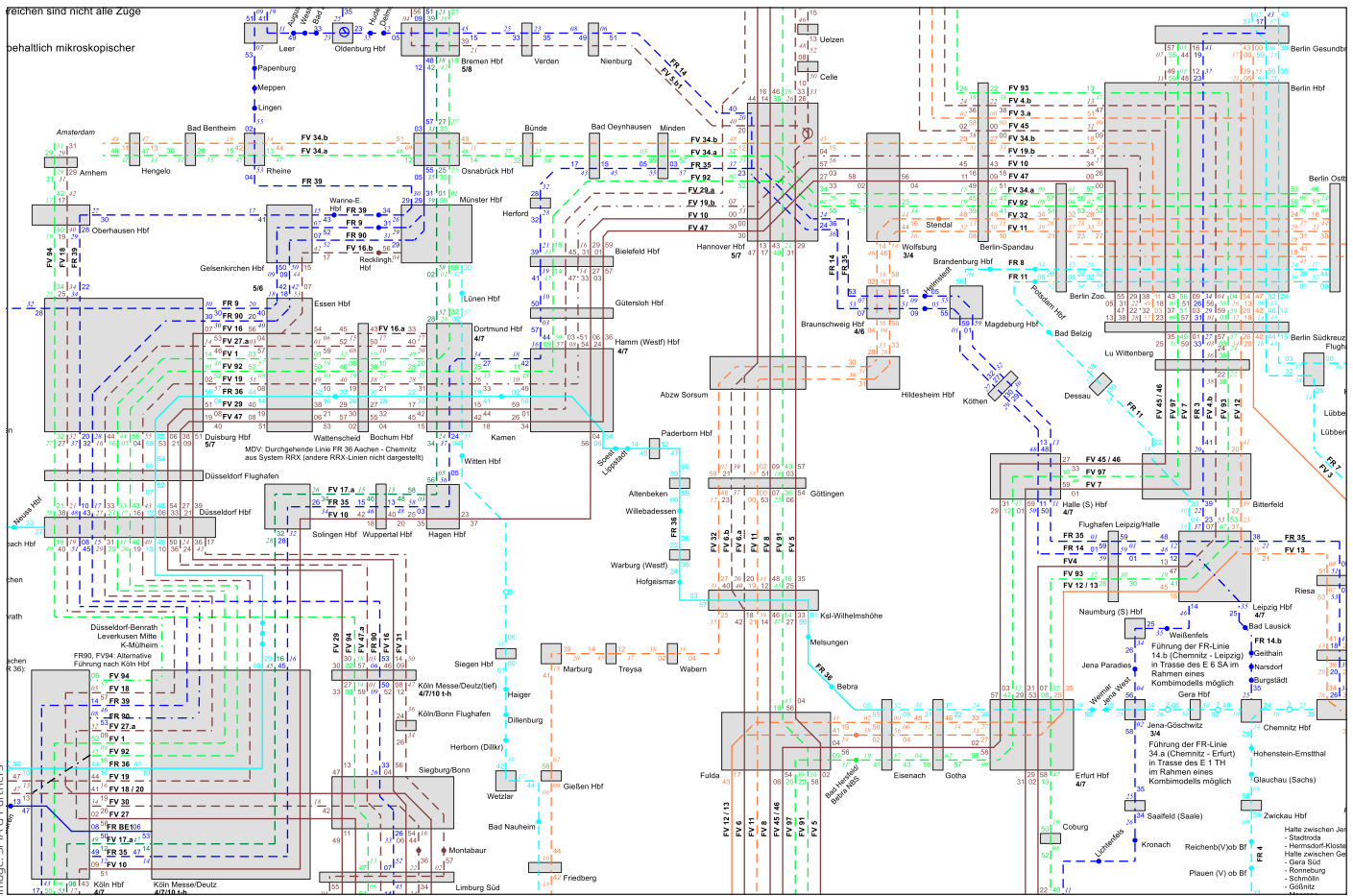
The process encourages the development of capacity plans early in the timetabling cycle, and ensures that infrastructure managers can better predict long-term capacity requirements. This in turn enables better co-ordination with stakeholders, reducing last-minute conflicts and providing a stable basis for financing the rail network and operations.

Retaining flexibility

Despite the clear focus on forward planning and a systematic approach, it is important to recognise that flexibility remains a crucial component of capacity planning. The dynamic nature of the transport market requires processes that can respond to irregular needs, such as seasonal, weekly or even daily changes in both passenger demand and, perhaps more importantly, rail freight. That requires a responsive timetabling planning process able to meet this variable demand.

Systematic capacity planning should be market-oriented, regardless of who may later use the train paths. That is the only way to combine capacity optimisation and unbiased train path allocation with an industrialised planning process.

The pre-planning of capacity in mKoK will also provide the basis for the more detailed planning and management of Temporary Capacity Restrictions (as required for infrastructure maintenance or upgrading works) in accordance with the agreed TTR process.



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As with the *Deutschlandtakt*, mKoK is dependent on close co-operation between industry partners, train operators and other stakeholders to ensure that the capacity planning outputs reflect the real-world requirements. As mKoK is focused on a short-term horizon, it is particularly challenging to bring all the stakeholders together. Achieving consensus among the various stakeholders with differing priorities requires effective negotiation and collaboration. DB InfraGO is currently piloting the mKoK process with a view to optimising the 2028 timetable cycle and subsequent years.

Planning for the future

Deutschlandtakt and mKoK should be transformative for both passengers and freight users as they are phased in over the next few years. Passengers will benefit from improved connectivity, reduced journey times and greater performance reliability. Freight operators will profit from efficient capacity planning and a fair allocation of network resources. Reliable and predictable schedules should make rail freight a more attractive option for shippers, both nationally and internationally.

As already emphasised, the success of both initiatives depends on close co-operation among stakeholders. By fostering a collaborative approach, *Deutschlandtakt* and mKoK should focus everyone's attention on addressing the many challenges more effectively.

The long implementation timescale is a major challenge for both projects, as they involve extensive planning and infrastructure development. This will require sustained political and financial support over several decades. The binding nature of both projects depends heavily on the design of the medium-term capacity planning process in accordance with the TTR principles and the new EU capacity management regulations.

By establishing a continuous planning process, working down from the overall *Deutschlandtakt* target timetable vision through the implementation phasing and the mKoK capacity utilisation strategy, Germany is looking to put in place a sustainable process that ensures consistency and a fair balance between long-, medium- and short-term goals.

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