THE DIGITAL RAILWAY: AN INTEGRATED WORKFLOW FOR EFFICIENT PLANNING AND DISPATCH

IVU TRAFFIC TECHNOLOGIES AG

DIGITALISATION IS RAPIDLY TRANSFORMING THE RAIL INDUSTRY. ALL OVER THE WORLD, RAILWAY OPERATORS ARE INVESTING IN THEIR IT IN ORDER TO LEVERAGE THE BENEFITS AND OPPORTUNITIES OF THE DIGITAL TRANSFORMATION AND MAKE THEMSELVES MORE COMPETITIVE. THEY ARE USING SOPHISTICATED IT SYSTEMS SUCH AS IVU.RAIL FROM BERLIN-BASED IT SPECIALIST IVU TRAFFIC TECHNOLOGIES TO EVALUATE THEIR COMPREHENSIVE DATA, SIMPLIFY PROCESSES AND BOOST THEIR EFFICIENCY.

Until a few years ago, the tasks at most rail companies were largely separate: the paths of planners, personnel dispatchers, vehicle dispatchers, operations managers and drivers rarely crossed. Each task had its own systems and workflows that were often vastly different. Although IT systems were used in many places, the operational view of the processes remained analogue and geared towards conventional roles.

This is now changing: "With the rise in digitalisation, the previous limited understanding of roles is increasingly being replaced by a holistic system view," explains Martin Müller-Elschner, CEO of IVU Traffic Technologies. "Individual departments operating solely for themselves are disappearing fast. Instead, tasks and roles are converging, in some cases overlapping and influencing each other." What once seemed impossible due to the manual processes involved is now being performed by IT systems that simplify the complex interactions between timetables, runs and duties.

Continuous workflow

The basis for this is shared digital data storage. It eliminates redundancies and inconsistencies and enables a continuous workflow from planning through to settlement. This calls for optimum interaction of all components. tIntegrated systems are required – systems such as IVU.rail. In this case, all units work with the same data pool. Consequently, changes in one place reach all other relevant departments immediately. Besides speeding up workflows, this also ensures more efficient planning outcomes.

"If the software knows all the runs and shifts, it can plan them in an integrated way and use intelligent algorithms to coordinate them in order to produce an optimum outcome that meets operational requirements as well as deploying all resources as cost-effectively as possible," says Martin Müller-Elschner.

Optimisation

Planners and personnel dispatchers have to contend with huge complexity – working-time restrictions, breaks, travel and preparation times, qualifications, opening hours of break rooms and deployment locations must all be taken into account. At the same time, compliance with laws, working arrangements and union agreements is also required. In addition, holidays, days off and employee shift preferences must also be taken into consideration. These can be weighted in different ways, adding yet another level of complexity.

In IVU.rail, highly advanced optimisation algorithms assist planners and dispatch managers in their complex work. They take on the detailed calculation of duties and runs, allowing each train and each employee to be optimally deployed. To facilitate this, IVU works in close collaboration with mathematicians at LBW Optimization GmbH, a spin-off of the renowned Zuse

Institute in Berlin, in a partnership existing for nearly 20 years. The algorithms developed form the centrepiece of IVU.rail's optimisation cores. The IVU software is therefore one of very few solutions worldwide that can optimise train runs automatically.

Detect damage to vehicles in good time and schedule the required maintenance – IVU.rail, IVU's standard system for railways, uses condition-based maintenance (CBM) in planning and in dispatching. The software evaluates data from CBM systems, issues warnings when critical thresholds are reached, and automatically determines the optional maintenance period. Thanks to seamless connections with maintenance workshop systems, IVU.rail also books the vehicle into the correct workshop.

The drivers and mobile employees are also involved in the digital planning and dispatch process. Via app or web client, they enter their holiday and duty requests in the system, record their times and read instructions. In the event of changes at short notice or operational disruptions, the dispatchers, drivers and payroll accounting are notified immediately. This saves time and ensures consistency.

One standard for all

IVU's standard system is now firmly established as the reference in Europe. Numerous state and private rail companies rely on IVU.rail to put their vehicles and employees on the track in the best possible way. One of the first companies to set up centralised and integrated planning and dispatch was the Italian state railway operator Trenitalia. Since 2009, the company has been planning and dispatching around 8,000 trains per day and 14,000 employees with IVU.rail. With IVU.cloud, IVU has now taken on overall technical operations management of the system and provides it entirely as a software-as-a-service solution.

The state railways in Sweden (SJ), Finland (VR) and Hungary (MÁV-START) also use IVU.rail for efficient planning and dispatch of trains and personnel, as does SBB Cargo, the freight transport subsidiary of Swiss Federal Railways. At international level, the likes of VIA Rail Canada, the Vietnamese state railway company VNR and the operator of the Bangkok metro BEM have opted for the integrated solution.

Abellio, National Express and Transdev use the IVU solution in Germany. In 2017, DB Regio, Germany's leading local public transport provider and one of Europe's largest rail companies, also concluded a framework agreement on the deployment of IVU.rail in all German transport networks.

Digital transformation

When the contract was signed in March 2017, Frank Scholz, then CIO of DB Regio, said: "We were especially convinced by the scope of performance and the usability of IVU.rail." DB Regio chiefly benefits from the continuous process chain and uniform data storage for planning and dispatch in IVU.rail. For the group, the software is a key component within a wide-ranging digital transformation process.

DB Regio has recognised that digitalisation is radically changing the role of IT within a rail company. Rather than merely ensuring provision of operations as in the past, it is becoming a driving factor for enhancement of business models. This is because undoing the traditional separation of roles in the operations area and the growing importance of technical solutions are giving rise to a continuous exchange between specialist departments and IT, resulting in new impetus for business. For instance, IT can perform a targeted analysis of the data obtained, evaluate it on the basis of specialised criteria and use it with the customers in mind.

In this way, the integration of the system landscape and the creation of entirely digital workflows are driving forward the evolution of railways into a modern, competitive form of transport for the 21st century.

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