Belgian Rail signals "all aboard" for new digital traffic management system

Client name: Infrabel Railway Company

Location: Brussels, Belgium

Industry: Travel, Transportation & Hospitality

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Challenge

- Prepare the traffic management organization for the future

- Improve customer information and on-time performance

- Expand rail capacity and track utilization

Solutions

- Adapt and productize DXC's Rail Control System, originally built together with Swiss Rail, and create an integration point for the Railways Security Control systems

- Use agile development methods to rapidly build, test and roll out

- Implement workplace virtualization, accelerating change and business performance for complex, mission-critical business applications

- Introduce "Swiss" best practice processes

Results

- Solid foundation for a modern traffic management organization

- Future-proof solution to handle further increases in traffic

- Proactive traffic conflict detection and resolution

- Better on-time performance

- Ability to run more trains on existing rails

- More accurate communication to travelers

Keeping the trains running on time is important to citizens and travelers alike in Belgium, where rail transport offers an important alternative to traffic-clogged streets. For Belgium's rail infrastructure company, Infrabel, managing this task was a challenge that seemed to grow a little larger each day.

As travel volume increased, Infrabel traffic managers found themselves keeping tabs on the day-to-day movement of 4,500 trains from 12 freight lines and three passenger rail services moving 750,000 passengers. Complicating matters was the fact that more than 4,000 kilometers of train tracks criss-cross the country's 11,787 square miles (about the size of the U.S. state of Maryland), resulting in one of the densest rail networks in the world.

Trains were controlled by hundreds of physical switches and managed by a large number of personnel. Lacking the ability to anticipate the impact of schedule changes or to mitigate real-time incidents, traffic managers were limited in their ability to resolve issues that created unexpected delays. No centralized system existed to assess the impact of dispatch decisions or to choose the best way to resolve issues for passengers.

Infrabel decided it was time to take action. To improve on-time performance, increase rail utilization to meet demand and improve worker productivity, the company decided to undertake a massive, multiyear transformation effort to optimize its rail traffic management system. It sought to develop a modern management system that would consolidate 71 signal boxes into 11 traffic control centers, delivering increased service levels with fewer traffic management staff.

Agile development process and workplace virtualization

From the outset, DXC Technology was the strongest contender to help Infrabel solve its rail management issues. Having developed a similar, customized system together with Swiss Federal Railways (SBB), DXC both understood the challenges Infrabel sought to overcome and could also use components of the previous solution for the new project. In 2013, DXC began the project using an approach designed to minimize implementation time and project risk.

First, to prove the value of the solution to users, DXC established Solution Demonstration Labs for traffic managers, offering them a glimpse of what was to come and how it would offer them more tools and control. Moving users from an "adapt" to an "adopt" mindset was an important step that greatly reduced project risk. The process also created a group of highly motivated "ambassadors" for the solution and the associated changes to the organization and employees' way of working.

Solution integration was implemented using an agile approach focused on frequent delivery of working software. In the first months after the Solution Demonstration Labs were set up, DXC developed a proof of concept with the basic integration in the Belgian application landscape, to demonstrate that the Rail Control System (RCS) could work in the Belgian context.

This minimum viable product showed that the Swiss solution could support Infrabel and the specifics of the Belgian network. After this success, DXC delivered new functionalities and more advanced interfacing features in 3-week sprints. Twenty-four releases were pushed to an acceptance environment, where they were extensively tested by users. This process provided valuable feedback and ensured that final acceptance would go smoothly.

From an IT perspective, DXC's solution represents another leap forward. RCS runs on a scalable architecture designed to accommodate the forecast level of growth. Designed for the high performance that befits a busy rail system, RCS is capable of processing up to 240 messages per second.

To maintain momentum, the team set up a DevOps system in the acceptance environment to test releases developed during each 3-week sprint. After every release, testing was performed through a series of automated steps. The results of several sprints were merged into a release and deployed to the acceptance system, which closely resembled the production environment.

DXC's solution included an environment running the new RCS system in parallel with the legacy system. This allowed traffic managers to test the RCS solution next to the existing solution in real-life traffic management operations.

A modern traffic management system

RCS has clearly exceeded Infrabel's expectations. Following thorough testing and integration, the RCS system's final implementation and cutover were completed in November 2016 — as Infrabel turned off its legacy management solution and 400 traffic managers began using RCS to handle train traffic. The transition was seamless, with no disturbance of the traffic whatsoever.

Now, real-time updates report the status and location of trains and thousands of other points of infrastructure. A drag-and-drop feature gives managers the ability to try different routing scenarios to optimize train routes. This, coupled with the ability to see the impact on schedules up to 2 hours in advance, offers managers the ability to detect and resolve conflicts well before they occur, communicating changes and updating timetables instantly for train lines and passengers alike. In addition, the new system is an important component in a larger transformation program that Infrabel estimates will allow it to avoid having to replace the 1,800-plus employees expected to retire over the next decade.

From an IT perspective, DXC's solution also represents another leap forward. RCS runs on a scalable architecture designed to accommodate the forecast level of growth. Designed for the high performance that befits a busy rail system, RCS is capable of processing up to 240 messages per second. In addition, the RCS has no single point of failure and offers a minimum availability of 99.8 percent. If and when a failure occurs or a restart is required, failover occurs within 10 seconds.

Most of what's changed will be invisible to the daily rail passenger. As far as commuters and travelers are concerned, they'll experience a higher degree of on-time performance and more timely notice of schedule changes — simple but important metrics that benefit everyone, every day.

About DXC Technology

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