When every minute counts.

For millions of commuters, public transit is a blessing and a curse – but not in equal measure. The situation is bound to get worse, too, as passenger numbers are skyrocketing. To keep buses, trains and streetcars running on time and help passengers make their connections, the ITCS-KöR project has built an information and communications system for road and rail transportation based on a predictive analytics solution from T-Systems.

COPY —— Thomas van Zütphen

With its local transportation hubs, the Ruhr region is Germany's largest contiguous commuter region.

Driving isn't really an option when your commute takes you across the Ruhr region twice a day – say, from Oberhausen to Hagen, from Dortmund to Duisburg or from Hamm to Mulheim. Wednesday, May 30, 2018, 4:34 p.m.: "You're listening to WDR 2. And now the traffic reports. Get ready to wait if you're on the road today. Germany currently has 370 miles of traffic jams, but 257 miles – that's nearly 70 percent – of them are in North Rhine-Westphalia. Let's start with the A 1 highway: between the Dortmund/Unna junction and the Hagen-Nord exit…"

No wonder more and more workers are resorting to buses and trains. All told, 2.3 million people commute to work regularly within the Ruhr region, making it the largest contiguous commuter region in Germany by far. While Dusseldorf, Cologne and other metropolitan areas draw commuters from the surrounding towns and communities and experience a mad rush into town in the mornings and a mad rush out in the afternoons, cities in the Ruhr region "swap populations on a grand scale" every day, according to Westdeutsche Allgemeine Zeitung, a daily newspaper.

COMMUTING BETWEEN COMFORT AND CRISIS

Waiting, crowding, jostling and shoving. Shoulder bags, laptop bags, messenger bags. "'Scuse me, would you mind getting your backpack out of my face?" Switching from the "7" to the "44"? Quick, jump out the bus door, sprint across the train station plaza, scurry down the stairs while keeping an eye on the "Next train arrival" sign. Made it! Hey, mind the gap! These days, buses, streetcars and subway trains in the eastern Ruhr region get much better to their destination.

The improvements are the result of a joint project between Dortmunder Stadtwerke AG (DSW21), Bochum-Gelsenkirchener Straßenbahnen stock company (BOGESTRA) and Straßenbahn Herne – Castrop-Rauxel GmbH (HCR). These public transit companies collectively rolled out a computer-powered traffic management system for buses in their operating area and extended it to trains and light rail last year. The cloud-aware Intermodal Transport Control System (ITCS), which is based on TETRA digital radio, represents a new generation of cross-company traffic control system communications. Norbert Grossek, Head of Strategic IT Projects at BOGESTRA, explains what that means: "By integrating light rail into our management system, we can provide better everyday reliability for passengers in the region of BOGESTRA and DSW21, which number 300 million each year. Our customers benefit directly from real-time passenger information and from making more connections when switching between trains, light rail and buses."

PUBLIC TRANSIT UNDER HIGH PRESSURE

In general, public transit systems are under tremendous pressure from three different sources. First, the traffic infrastructures in metropolitan regions and megacities like London, Paris and New York are bursting at the seams. The Ruhr region, with nearly 5.5 million inhabitants, is no exception. Its available capacity is virtually exhausted.

Even the smallest disruptions and unexpected breakdowns cause delays that often affect downstream trains, buses, streetcars and subways for hours to come. There's no relief in sight, either: in the future, public transit authorities will have to transport significantly more passengers with their current rail and road systems. The burgeoning passenger numbers will be next to impossible to handle if there are any interruptions in service.

It doesn't help that customers are getting more demanding, too. They know about real-time planning and communications and so expect trips and commutes to be perfectly coordinated by smart mobility solutions. To complicate matters, passengers move seamlessly from trains and buses to car or bike sharing programs. Deutsche Bahn has responded by becoming Germany's largest car sharing provider (Flinkster), ahead of car2go, DriveNow and other competitors, as well as the nation's most successful bike rental service (Call a Bike). Everything can be planned online or in smartphone apps.

The ITCS communications portal allows to inform drivers and pasengers of buses, suburban railways, and subways about arrival, departure, and connection times with the aid of the "Rbl-Assis!" app.

3.100 miles

of roads and railways is used by the KöR-vehicles connected to the system.

Customers also expect exact, accurate information on bus and rail delays, actual arrival times and alternative transportation and connection options. Transit providers are left with no choice but to accommodate customers with intermodal mobility solutions that make their services simple, reliable, flexible and attractive.

COMPETITION IS HEATING UP

At the same time, however – and this is the third source of pressure – competition in the public transit market is mounting rapidly. More contracts to operate bus and train lines are being put out for tender every year. Competition for each route is fierce. Bidders are expected to present proof of their punctuality and ability to make connections. And to do it all at the lowest possible price. Commuters, after all, care whether their co-payment for corporate transit passes is 65, 80 or 90 euros. These reasons have prompted a growing number of transit providers to establish cost-saving partnerships, subcontract out individual services and optimize internal processes. In the case of KöR in the eastern Ruhr region, T-Systems' ITCS plays a big role in helping participating companies meet all these requirements. "The Deutsche Telekom subsidiary has deep industry expertise, profound knowledge of the applicable technologies and extensive familiarity with our operational processes," explained Franz-Josef Senf, Head of Information Transmission and Process Technology at DSW21. And this combination, "together with its professional, collaborative project development, is what makes T-Systems an ideal partner for us."

As it builds the complete system for the three companies, T-Systems is equipping 550 buses and 200 trains with onboard computers to connect both the vehicles and their passengers to the central traffic management system. That way, even rail passengers can receive the latest real-time information across system lines. That translates into fewer delays, more reliable connections and happier customers. The solution can be optionally supplemented with multimodal ticketing systems that span multiple distribution channels. For the train crew, the "RBL-AssisT" onboard computer application is more or less the solution's centerpiece. It communicates with the central ITCS systems over the cellular network using a standardized user interface, sharing location information, route data and planned vs. actual comparisons of punctuality. Virtually no other modifications to the vehicles are needed, which keeps hardware and installation costs manageable for the transit companies.

REAL TIME EVERYWHERE

An analytics solution in the ITCS core tracks all the movements for each public transit operator in real time. Timetable data is constantly checked against current traffic conditions and the vehicles' regular status reports. The data is used to forecast estimated arrival times and the knock-on effects for possible connections. And that's the first step toward predictive analytics. Passengers can look up all the arrival and departure times that they need in the app or on the displays located along the more than 3,100 miles of roads and railways used by the KöR-vehicles connected to the system.

To ensure this information is available everywhere, the T-Systems experts had to outfit all the tunnels in the railroad system – over ten kilometers in total – with redundant TETRA digital radio communications technology with at least one fallback level. They also had to implement secure, encrypted data communications and link ITCS to the emergency services network used by the police, fire department and rescue services. "This new intermodal, cross-company communications solution that interlinks public rail and road transit systems can do much more than manage everyday traffic flows," explained Thomas Preußner, Head of the Rail & Transport Management Solution Center at T-Systems. "Integrating rail services into the traffic management system also improves overall traffic flows and every passenger's transportation options during trade shows, soccer games or any other of the large-scale events that happen all the time in a densely populated area like the Ruhr region." Not to mention the twice-a-day rush hours that often seem to flow seamlessly into one another.

ITCS's benefits – full multitenancy and rapid integration – haven't been lost on other regional transit companies, either. One has already knocked on the door: Verkehrsgesellschaft Ennepe-Ruhr mbH (VER) recently issued a call for tenders to connect to the system.

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