



# The connected future of public transportation

New technologies and real-time data are merging with established public transport paradigms. Discover the five capabilities needed to prepare for this future



The world is becoming more urban. Over 54% of the world now live in urban areas and that number will increase to 66% by 2050.<sup>1</sup> As a result, more cities will experience gridlock than ever before. This is bad news for the economy — wasted time on the road will lead to wasted money. Traffic congestion alone will cost the UK economy more than £300 billion (US\$387 billion) by 2030.<sup>2</sup>

The massive population growth over the coming decades means more and more people are moving out from the countryside and into the cities. While this exodus puts great strain on the public transport system, people working in the city are also responsible for a disproportionately large chunk

of the global GDP. Their contribution is estimated to climb up to 86% by 2025.<sup>3</sup> The need for public transportation that's faster, more efficient and more in tune with the needs of commuters has never been more urgent.

As it is, rapidly growing cities are already struggling to meet the demands of its citizens for efficient public transport. New projects or expansions to existing infrastructure are prohibitively expensive and can take years. Even more challenging, there's no clear way of accurately forecasting whether public demand will still be the same after these projects are completed.

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## The rise of shared mobility — and how it's great for public transportation

Over the last few years, the growth of mobility — the shared use of a vehicle — has multiplied transportation options. It has created new business opportunities and changed the daily commute of passengers in an unprecedented way. These services have also greatly influenced the last-mile dilemma — getting passengers from a transportation hub to their final destination.

Shared mobility complements public transportation and enhances urban mobility.<sup>4</sup> Instead of adding bus routes or building additional train tracks (top line investments that can end up significantly increasing operational costs), shared mobility absorbs some of the burden borne by public transport providers.

Public transportation and ridesharing services complement one another by serving different trip types.<sup>5</sup> Ridesharing is more prevalent when it comes to recreational or social trips, but when it comes to commuting for work and commerce — or just about any sort of travelling that has an economic impact — many people still depend on established public transit options.<sup>6</sup>



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## A fully connected commuter experience

Real-time services depend on real-time transit data shared by public transport providers to make predictions on arrival and departure times, as well as alerts due to emergencies or accidents. Even private ridesharing services are beginning to share anonymized transit data to help commuters plan their trip better.<sup>7</sup>

Opening up transit data can greatly benefit both passengers and the economy. People using real-time services experience shorter wait times and greater trip satisfaction.<sup>8</sup> Bus riders with no access to real-time information feel less satisfied with both their wait times and bus arrival times, while those using real-time services feel satisfied on both accounts. People who use real-time services take significantly more trips per month than they did before.

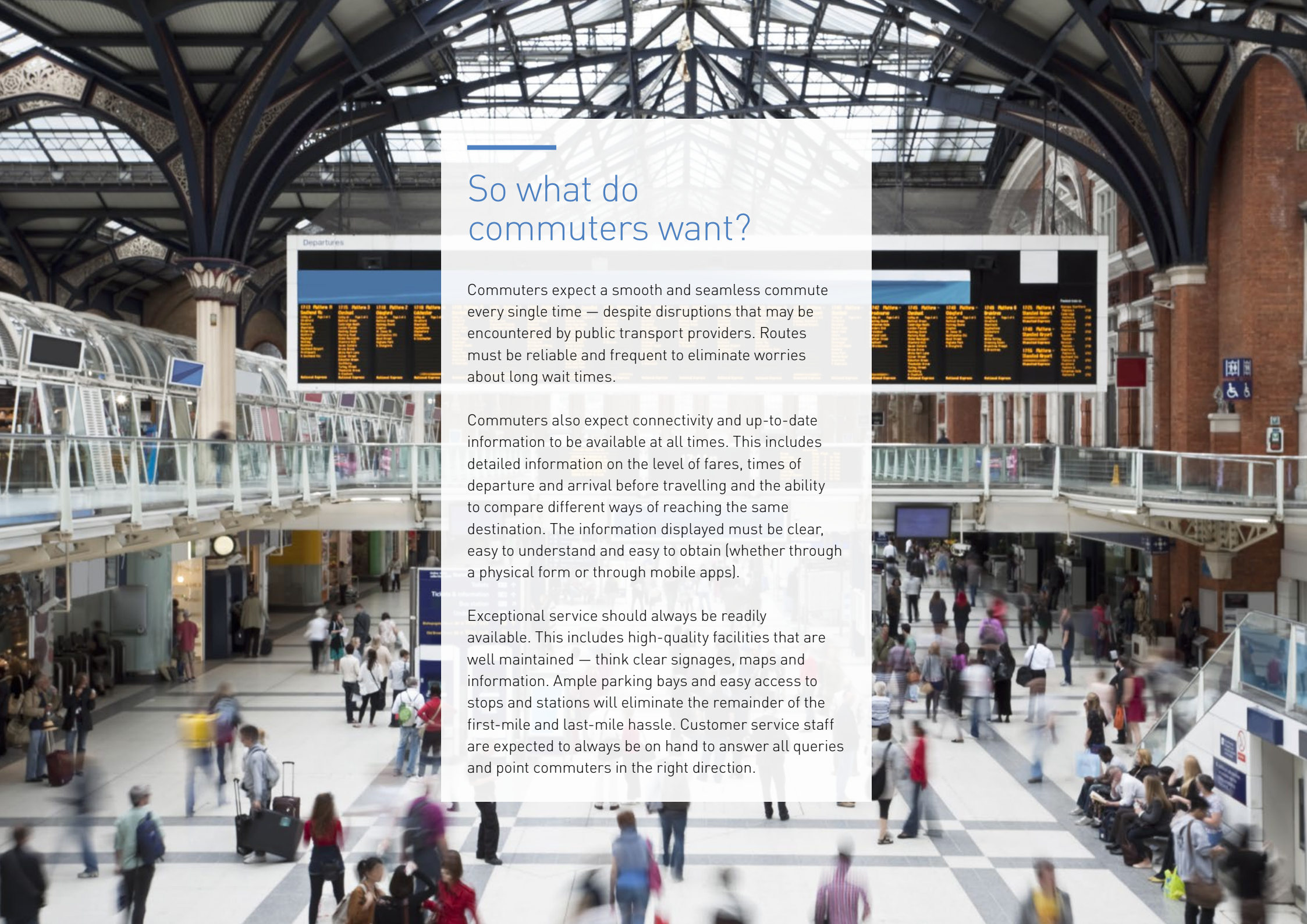


## So what do commuters want?

Commuters expect a smooth and seamless commute every single time — despite disruptions that may be encountered by public transport providers. Routes must be reliable and frequent to eliminate worries about long wait times.

Commuters also expect connectivity and up-to-date information to be available at all times. This includes detailed information on the level of fares, times of departure and arrival before travelling and the ability to compare different ways of reaching the same destination. The information displayed must be clear, easy to understand and easy to obtain (whether through a physical form or through mobile apps).

Exceptional service should always be readily available. This includes high-quality facilities that are well maintained — think clear signages, maps and information. Ample parking bays and easy access to stops and stations will eliminate the remainder of the first-mile and last-mile hassle. Customer service staff are expected to always be on hand to answer all queries and point commuters in the right direction.



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## The five capabilities critical to an integrated transport future

The public transportation of tomorrow will be built around commuters who expect little to no waiting time, smart ticketing, real-time information, travel comfort and personal security. As a public transport provider, are you prepared not only to adapt to the demands of this future, but also to capitalize on the opportunities this future will inevitably bring?

Taking advantage of these opportunities will require a planning solution that allows you to integrate all your available assets and resources — and gain full operational visibility across all time horizons. Here are five core capabilities that are fundamental to achieving that goal.



### Integration

An integrated planning and scheduling platform is more than just a closed loop of systems sending data back and forth. Integration ensures consistency among data sources, business rules, and the underlying optimization that drives efficiency in your decisions. It allows for scalability in all processes, flexibility to adapt to the changing nature of transit operations, and improved efficiency and response across all planning horizons. This is integral — your fleet and crew are always on the move, and you need to be agile enough to begin the problem-solving from where they are.

An integrated platform is the key to breaking down silos and enabling effective communication between your different departments, planning teams and employees. This technology enables your organization to respond better to changing passenger demands. Decision-makers can receive up-to-the-minute feedback and make decisions that also account for trickle-down effects.

Nowhere else is integration more critical than in resolving disruptions on the day of operations. It supports your decision-makers in examining all possible solutions from a holistic standpoint and fully accounting for the domino effects on crew, fleet and passenger journeys. It enables you to get service back on track quickly while keeping costs for labor and assets low and delays at a minimum. Best of all, your passengers have a smooth journey.

## Optimization

Planning public transportation operations involves sorting through an overwhelming amount of information and constraints in a complex web of options, rules and conflicting business goals. There is only one way to establish order in this chaos — optimization.

Optimization slices through the complexity to present the best solution from an infinite number of options — in a matter of seconds. This is especially critical in disruption management, where optimization helps your planners quickly identify the best resolution and put that resolution into action immediately. It propagates the necessary changes to existing schedules and timetables throughout the system, thereby effectively containing the negative impact of the disruption.

Optimization, however, goes beyond the algorithms at work in the background. Optimization is most effective when combined with the soft knowledge of your most experienced planners. Your planning team knows how to prioritize the KPIs that directly contribute to your company's goals — the most important part of optimization. Your people are an integral part of this process. They have a wealth of information, gained through years of field experience that can help make a good plan great. It's important that your planners are able to interact with the system and make changes to any plan at any time, based on their knowledge of the crews, vehicles and infrastructure.

## Prediction

When it comes to expanding the size of your fleet, what will be the impact of purchasing 15 new units instead of 16? How will the efficiency of your network be affected by purchasing six single-carriage cars instead of two triple-carriage cars? What will the returns be like if a decision were made to invest in an eight-story carpark?

The prediction capability allows you to simulate changes to your network and assets, and evaluate the effect of those changes in real time. This ability to compare 'what-if' scenarios is critical to understanding the long-term effects of investments or changes at the strategic level to public transport operations. The consequences of planned changes can be made immediately apparent — whether analyzing effects on direct costs like labor or evaluating service level metrics like on-time performance.

Detailed alternative scenarios that answer these questions as well as the ability to see the effects of special events on future operations allow you, the public transport operator, to be more confident in making long-term business decisions.





### Advanced analytics

Many transit agencies are able to capture data about their passengers, vehicles and infrastructure. However, they struggle with using the data to improve operations. Big data alone is of little value unless it is harnessed for actionable insights that support decision-making. Advanced analytics empowers your planners to learn from historical and current data to better prepare for the future. By creating a feedback loop using actuals from previous plans, you can actually use past performance to improve future results. This is useful in scenarios such as analyzing historical dwell times to optimize service schedules or further improving maintenance window durations.

Advanced analytics also enables insights into historical performance over a longer timeframe. By looking at the effects of factors such as crowding and special events on passenger behavior, planners can connect the data with passenger wait times and trip satisfaction, and improve plans for the next time. By looking at ticket sales and passenger numbers throughout the year, planners can determine demand peaks and allocate the appropriate resources to meet that demand. They can look for seasonal trends in passenger demand and other patterns of behavior, and be better informed when fine-tuning service offerings to meet expected changes in demand.

### Employee mobility

Mobile solutions are becoming an indispensable tool for employees of all industries worldwide. Increasingly, mobile solutions are also a common tool for relaying changes in schedules or assignments to onboard crew and maintenance teams. Having this information available in a mobile application helps resolve disruptions on the day of operations without interfering with your passengers' experience.

Mobility is allowing innovative public transport operators to utilize staff exactly where they are needed the most. For example, moving staff from ticket offices into station concourses and platforms allows them to assist passengers, direct large crowds and manage traffic in a more proactive way. Mobile technologies ensure that your staff are kept connected and informed at all times. Core functionalities can be accessed through an easy-to-use interface that scales to whatever device is being used — smartphones, tablets or laptops — without any loss in usability.

[1] World's population increasingly urban with more than half living in urban areas (United Nations Department of Economic and Social Affairs)

[2] Traffic congestion to cost the UK economy more than £300 billion over the next 16 years (Inrix)

[3] The future of mobility (Arthur D. Little)

[4, 5, 6] Shared mobility and the transformation of public transit (American Public Transportation Association)

[7] Finally, Uber releases data to help cities with transit planning (Citylab)

[8] Evaluating the impacts of real-time transit information in Tampa and Atlanta (Center for Urban Transportation Research)

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# Build tomorrow's public transport network today

The public transport network of tomorrow will become more complex. It's time you prepared for the future. Continue your journey with these guides.



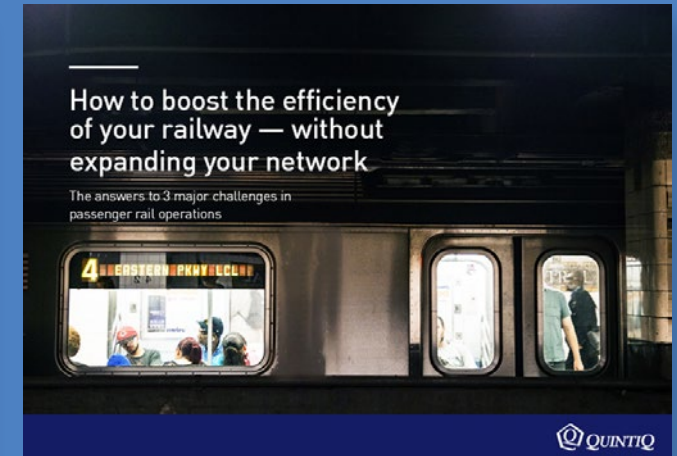
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