



## A N A L Y S T   C O N N E C T I O N



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### Transit Technology Trends: Key Opportunities for Local Governments

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*The transit industry is affected by global trends such as changes in the cost of fuel, climate change, and technology developments, as well as by more regional issues such as changing demographics and lifestyles, regulatory requirements, and methods of funding transportation projects. Even more important, urban transit authorities are impacted by the voice of their customers and their customers' changing expectations for consistent services, amid a growing list of options, such as car- and bike-sharing or on-demand services. In an age where many cities are looking to increase transit ridership to reduce traffic congestion and parking congestion as well as the resulting emissions, public transit services must be reliable, safe, and efficient.*

The following questions were posed by Infor to Ruthbea Yesner Clarke, research director of the Smart Cities Strategies service at IDC Government Insights, on behalf of Infor customers.

- Q.     What are the top 3 trends that will impact the transit industry in the coming year?**
- A.     The transit industry is undergoing a profound change. More than ever, transit is becoming tied to quality-of-life issues — from time spent in traffic, to access to different modes of transport, to impact on air quality — and the pressure is mounting to think more holistically about movement in our cities and regions. Three trends that will impact the transit industry in the coming year are:
- **Growth in urban transit options.** As customer demand changes, new modes of transportation are cropping up in cities and towns around the United States and changing the status quo. Beyond traditional types of mass transit such as subways, buses, and light rail, new offerings abound. A range of options, many of them private, are found in most major metro areas. Services such as Bridj, which offers the "world's first pop-up mass transit system" for private, on-demand shared busing in Boston and Washington D.C.; Uber and Lyft, which are replacing taxis as options to get from one place to another; car2go and Zipcar, which provide cars on demand in place of car ownership; and bike lanes and bicycle-sharing services, which let residents choose how they want to navigate an area. These new services, especially in combination, are changing the ecosystem of transit in urban environments. Road safety, pedestrian and bicyclist safety, shifts in traffic patterns, and changes in public transit ridership and expectations will continue to disrupt the discussion about mobility and movement in 2016.

- **Pressure on transportation infrastructure as tied to economic development.**

Regardless of all the new transit options, mass public transit is still key to a region's livability and attractiveness. Residents are now an active part of this discussion as they share commute information via mobile apps such as Waze and use social media to rate and comment on cities. Local businesses and residents will look beyond good school systems and safe streets to air quality and the ability to get to work quickly and on time when considering moving to, investing in, or visiting a location.

- **Digital transformation spurred by new technologies.** Intelligent transportation systems are a thing of the present, and expanding to a world of connected assets — from field workers with mobile devices to sensed roads and pavements as well as connected cars — there are many new types of data to be ingested into transportation management systems as well as new workflows and processes for maintenance, service delivery, and other operations. While the connected transportation ecosystem is just developing, vehicle-to-vehicle, vehicle-to-infrastructure, and connected car technologies are in use today and will continue to be adopted over the next year.

**Q. What kinds of operational challenges are created for transit organizations trying to deal with these trends?**

- A. Transit organizations must deal with customer and stakeholder expectations in light of an ever-expanding set of transit options and in the context of tight budgets. Asset life-cycle and maintenance costs are substantial budgetary expenses, particularly in light of the nation's aging infrastructure, and are also directly tied to good customer service. Assets that need extensive repairs result in reduced service delivery to residents, assets that break down cause frustrating delays and inconveniences for residents, and assets that are improperly maintained also are more costly in terms of fuel consumption and energy efficiency. Therefore, the first operational challenge is to keep all assets, even the many that may be aging and in need of replacement, running smoothly for as long as possible. This means that maintenance must be highly efficient.

A second large operational challenge will be managing the different types of data generated not only by assets, traditional systems, and government workers but also by externally generated citizen data via transport apps such as Waze as well as data collected from private transit companies such as Uber, both of which have some agreements to share data with municipalities. Transit organizations are already reliant on feeds from sensors, video cameras and, increasingly, social media apps to provide situational awareness and rapid response times for services. Drawing on existing services embedded in the smartphone, citizens will increasingly operate like mobile sensors, feeding real-time information back into service delivery organizations. Beyond engaging citizens and enhancing their experience, citizen-generated information provides operation centers with invaluable real-time information and feedback. These new data feeds have the potential to provide new insights into traffic, transit routes, and resident behaviors but also present new challenges in data management, decision-making support, and workflows.

And finally, with the growth in new connected and digital technologies, finding relevant skills sets for future maintenance on transit assets also will be a challenge. Existing staff will need to be trained in new technologies for safe operations, and transit authorities may need to hire people with new skill sets.

**Q. How should MAP-21 legislation and State of Good Repair requirements change how U.S. public transit agencies are operating today?**

A. Moving Ahead for Progress in the 21st Century (MAP-21) is a surface transportation law enacted by Congress in 2012. MAP-21 consolidates 90 highway and transit programs into roughly 30 programs and gives states more control over the use of funds by enabling states to shift funds from different programs and by eliminating some specifically targeted funds, such as those for bridges. In addition, this federal law no longer has minimum spending requirements for repairing roads and bridges, again leaving more to the state to determine what needs to be replaced, repaired, or built. This changes how states and metro areas must look at prioritizing projects and how they will use funds. Because there is more flexibility to transfer funds from programs, there must be more careful strategic planning and an understanding that there may be more competition for budget dollars.

Another change is the requirement that states have a Strategic Highway Safety Plan that considers the safety of all road users, including pedestrians and bicyclists. This will mean a broader look at operations, including signal timing and intersection safety, from the perspective of all road users and not just vehicles on the road or public transit.

Under Map-21, the U.S. Department of Transportation (DOT) must establish a framework for measures for state of transit repair (one of many performance measures) and recipients of funding must set targets for this performance measure as well as others. This means state DOTs and transit agencies will have measured a current baseline of the state of transit repair, set a performance target for the future, and then detailed a long-range plan for how the target will be reached.

State of Good Repair Grants have allocated about \$2.1 billion for maintenance of rail and bus systems, which includes maintenance for fleets, tracks, buildings and structures, and communications. This is good news for agencies because aging infrastructure is one of the biggest challenges they face; in fact, more than \$100 billion in MAP-21 budget extensions has been requested over the next 10 years. While agencies are looking to modernize and innovate, they also need to address the replacement and repair of aging assets to avoid catastrophic failure dangers.

The new State of Good Repair law requires that the Federal Transit Administration (FTA) provide standards for what constitutes a "state of good repair" and the accompanying performance measures. Transit agencies will have to provide data on current conditions and the necessary steps required to keep their vehicles, tracks, and structures in a state of good repair. This will require necessary data collection operations to keep current and ongoing data on assets. This may present another operational challenge as different states track different sets of information and performance measures around transit systems or may have limited format systems to track conditions in place. According to the latest proposed rule from the FTA, transit agencies will have to report information to the National Transit Database, which means specific information will have to be collected and reported.

In addition, the recent FTA proposed rule around public transportation asset management and maintaining the state of good repair would require public transit agencies to develop a Transit Asset Management plan; depending on the size of the operators, an agency can participate in a state plan or develop its own plan. As the DOT press release states, "Insufficient funding combined with inadequate asset management practices have contributed to an estimated \$86 billion transit in state of good repair backlogs nationwide that continues to grow with reduced levels of investment." Improving services, safety, and efficiency, will require a continued national focus on this issue.

**Q. The Internet of Things (IoT) is a hot topic. How will IoT impact public transportation management?**

A. The IoT is certainly a hot topic but not an entirely new concept in public transportation, despite the hype around the term. IDC defines the Internet of Things as "a network of networks of uniquely identifiable endpoints [or 'things'] that communicate bidirectionally and autonomously using IP connectivity." Autonomous connectivity is a key attribute within IDC's definition as IoT devices — such as sensors, RFID tags, transponders, global positioning systems — function without necessarily receiving a discrete command from a user. Bidirectional connectivity is also a critical component of the definition as an IoT device must be able to be reached by a user over an IP network as well as the IoT device communicating on its own to the user or other devices across an IP network.

The IoT will impact public transportation management by enabling operators to have access to new, more granular information at more regular intervals, at a lower cost. Examples include buses that can be tracked by their exact location via GPS; remote video monitoring in which cameras can be accessed and used in transit hubs and stations; sensors within vehicles that can predict and prevent repairs and maintenance needs, and more automatic updates on the status of fleets, locations, routes, traffic flow, and accidents that can provide information quickly back to the operations center.

This detailed information should help transit operators make better and faster decisions from rerouting traffic to updating digital signs to alerting riders via mobile apps. In addition, it can offer more linkages across systems and departments because once this data is digital, it can be shared more easily and be coordinated with other IoT systems, such as connected lighting on street lights.

**Q. How can technology — specifically an asset management solution — support operational success?**

A. As asset management solution is software to help organizations track and manage their assets by helping, for example, schedule maintenance, process warranty claims, track vehicle performance, and support field technicians. These systems can track inventory, work orders, condition data, and a range of other factors. This supports operational success in many ways by making workers more efficient, ensuring regulatory compliance, and supporting better decision making.

IDC describes four technology pillars of digital transformation: mobility, cloud computing, big data and analytics, and social networks. The first two pillars are especially compelling in regard to asset management and supporting the operational success of transit organizations.

Using devices in the field, such as smartphones or tablets, mobile asset management is a key technology to allow workers to do their jobs on location, saving time and money by reducing the need to fill out paperwork after the fact and requiring a return to the office. Given that transportation itself is mobile, bringing workers directly to assets in the field equipped with software to do their jobs onsite provides yet another layer of efficiency. Asset management solutions can support field workers and service technicians with software accessed via mobile devices, which can allow role-based access to various components of the asset management software, including inspections, maintenance, entering work orders, and scheduling.

Cloud-based options also are compelling, especially when combined with mobile access. While it might be hard for an organization to think of its asset management solution, entrusted to manage very costly capital assets, as a cloud solution rather than a large on-premise solution, cloud solutions can be excellent options for smaller authorities, as well as for providing broad access to software to all workers, rather than being limited by the cost of per-seat licenses.

In regard to regulatory compliance, as discussed previously, new regulations will require the tracking of the state of repair of public transportation assets. Asset management software typically has existing requirements embedded in its code to support compliance. However, given the evolving reporting requirements regarding the tracking of state of good repair performance, asset management software can help collect required data that may not currently be collected by a transit agency and make it easy to submit to federal agencies. Overall an asset management solution can help transit agencies comply with these new regulations and make it less burdensome to satisfy reporting requirements.

#### ABOUT THIS ANALYST

*Ruthbea Yesner Clarke is research director of the global Smart Cities Strategies service at IDC. In this service, Ms. Clarke discusses the strategies and execution of relevant Smart City technologies, including nontechnology best practice areas such as governance, innovation, partnerships, and business models essential for Smart City development. Ms. Clarke's research includes the Internet of Things, big data and analytics, cloud computing, mobility and social media in public works, intelligent transportation systems, intelligent public safety, smart water, and citizen engagement and Open Data initiatives. Ms. Clarke contributes to consulting engagements to support state and local governments' Smart City strategies and IT vendors' overall Smart City market strategies.*

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