

HOW AGENCIES CAN EASILY AUTOMATE TRAFFIC MANAGEMENT USING THE IoT AND CLOUD TECHNOLOGY



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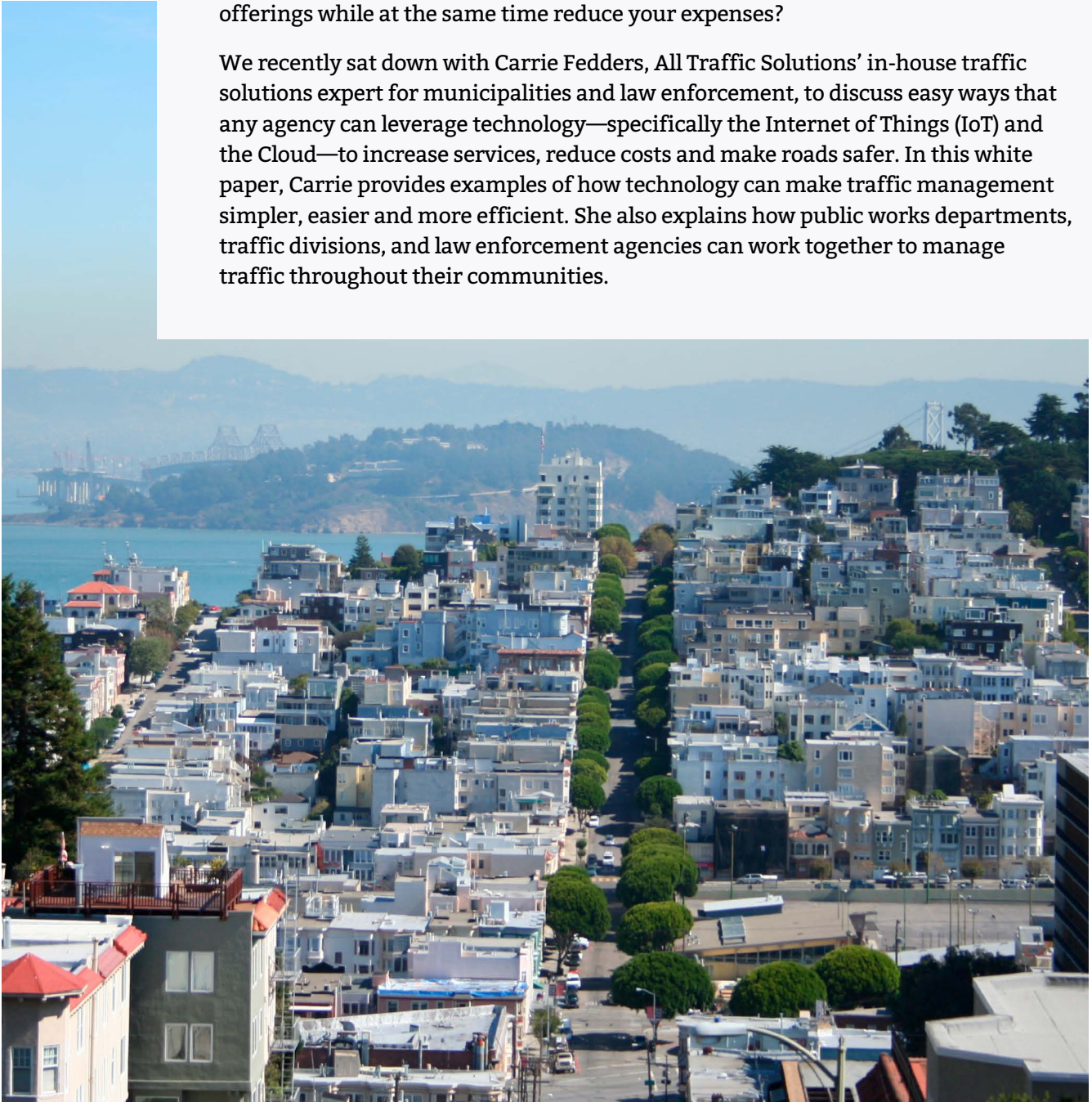


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How Agencies Can Easily Automate Traffic Management Using the IoT and Cloud Technology

As budgets tighten and needs expand, more and more communities are feeling the pressure of managing more traffic with fewer resources. Safety, congestion, special events and unforeseen circumstances—all of these coalesce into more needs, expanded requirements and a broader range of challenges to resolve. What are some strategic ways that a municipality or agency can address these needs while at the same time optimize resources? How can technology allow your agency to increase your service offerings while at the same time reduce your expenses?

We recently sat down with Carrie Fedders, All Traffic Solutions' in-house traffic solutions expert for municipalities and law enforcement, to discuss easy ways that any agency can leverage technology—specifically the Internet of Things (IoT) and the Cloud—to increase services, reduce costs and make roads safer. In this white paper, Carrie provides examples of how technology can make traffic management simpler, easier and more efficient. She also explains how public works departments, traffic divisions, and law enforcement agencies can work together to manage traffic throughout their communities.





Carrie, you work with municipalities of all sizes, helping them solve issues related to traffic. Say someone calls you and says, “I’m from XYZ Township Department of Public Works. My community is growing. My resources are shrinking. Can you show me how I can use technology and automation to increase safety on my roads and reduce the number of resources required to direct and manage traffic?”

Carrie: Public works departments often recognize that they have safety or traffic congestions issues, but they don’t know how best to address them. A smart way to begin is by coordinating across functions with key stakeholders in Law Enforcement, Engineering, Road Maintenance, Parking Operations and others to learn what other departments have done to define the issues, what they have tried in order to

address the problems, and how well it worked. This is the perfect time to see how technology could be added to existing solutions to increase effectiveness and reduce costs. If agencies haven’t had the success they’re looking for, it could be time for a whole new approach that leverages their existing technology and also layers in new ones, including the IoT and the Cloud.

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As Head of Public Works, I may not know what I'm looking for yet because I don't understand what technology can do to help me. For example, I've heard the term "conditional messaging." What is it, and how can it help my community?

Carrie: Sensor messaging is a key component of any successful traffic management program. Conditional messaging leverages different types of sensor inputs like speed, traffic conditions, weather, or other special conditions like events, to output dynamic messaging on variable message signs, apps,

texts or websites so that drivers can take immediate action. For example, messaging can be output to variable message displays placed on roadways as drivers approach an area to let them know about adverse road or weather conditions.

How can technology help me to be more efficient if my crew has to drive around and manually change the sign messages?

Carrie: Good point. You're already trying to maintain infrastructure on a budget that doesn't cover everything. If you want to save on personnel costs, you need to have automated conditional messaging that's connected to the Cloud in real time. It may sound counter-intuitive, but technology can save you money because there are intelligent sensors that can communicate even more effectively than a person to relay accurate temperature and other conditions.

For example, you can link temperature sensors to your traffic signs so that when road temperatures drop below a certain threshold, the sensors "tell" the sign to display a message alerting drivers that roads are icy. You can also set up a communication between flooding sensors or congested roads that will automatically, based on rules that you set up, change the message on your variable message signs under these specific conditions. All this can be accomplished in real time, as conditions change. That's very important because the information you provide has to be up to the minute or else it could be too late, or drivers may not trust what the sign is telling them because they are accustomed to receiving delayed information.

Another good way to use conditional messaging to save time and increase road safety is when there are flood conditions present. A sensor not only tells you that water is present in a particular area, but it tells you what the water level is. Regular alerts can also tell you whether that water is rising or falling, and if you're getting real-time photos of that location, you can monitor the water level without being there. Feedback from the sensors is sent immediately to the message signs to advise the driving public to avoid this hazard situation. Far better for drivers to see a sign that says "FLOODING AHEAD: TURN AROUND" than to drive further where there could be immediate peril.



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How does real-time information help to increase safety, exactly?

You increase safety because drivers have the information they need to drive safer.

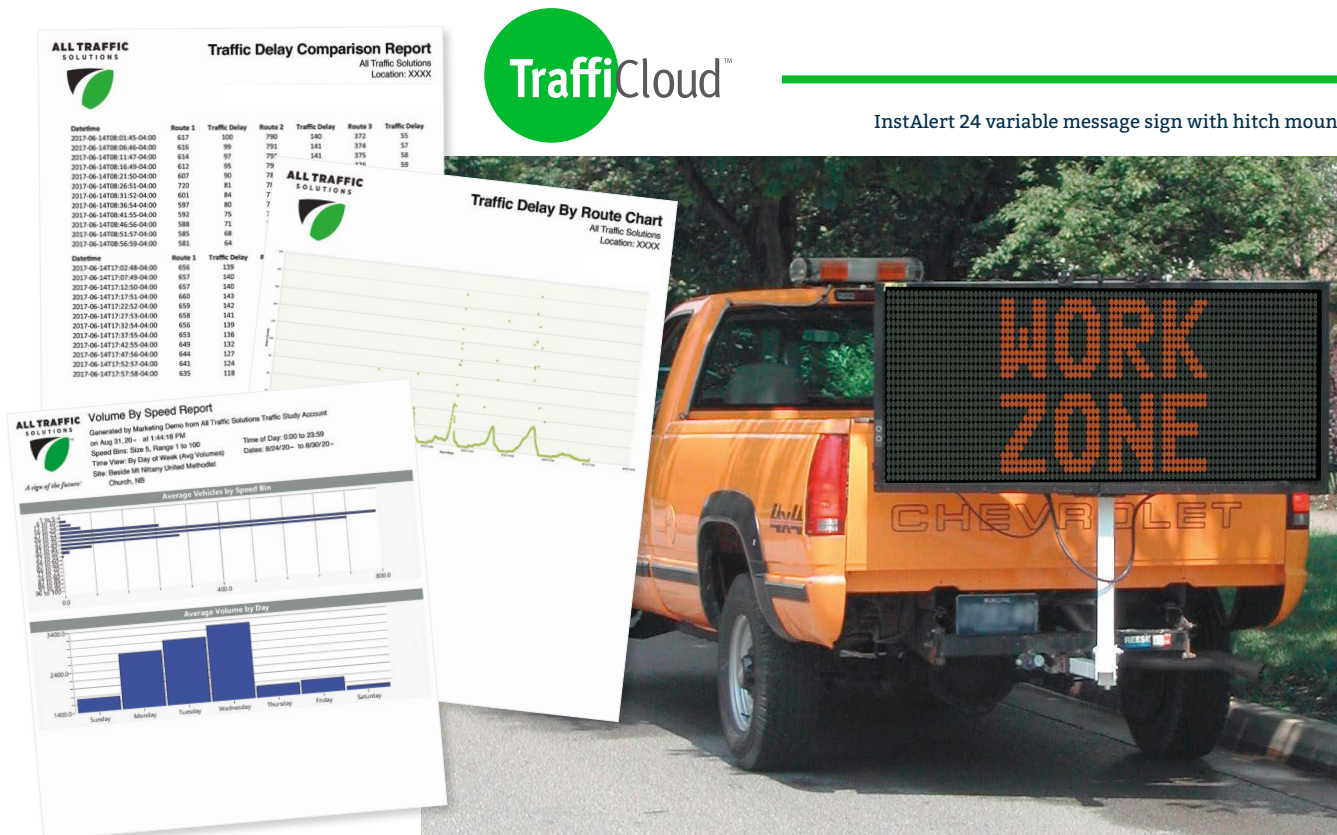
You reduce traffic congestion because drivers can be proactive, such as by taking the less congested route.

You eliminate the need to assign resources to drive around and change messages, which means sign information is current and your resources can be deployed elsewhere.

You save money on fuel, vehicle use and resource hours.

You don't have to dispatch a crew to travel to each sign to change messages.

They can manage each sign from their traffic management system or by using **TraffiCloud**, either automatically or after someone verifies the conditions. Regardless of where you are located, your community probably experiences some kind of unexpected environmental incidents. Having that real-time connection allows you to remotely manage your messages to drivers as incidents occur. You may have flooding roads in summers; you may have wildfires, but by leveraging some pretty simple sensors that are connected in real time to dynamic message boards, you can make roads safer, offer more services AND reduce the costs to provide them.



Some of the reports that can be run in seconds with TraffiCloud

How would I use conditional messaging in a work zone?

Carrie: The challenge with work zones is the presence of traffic where workers and equipment are also present, which can cause injury, crashes and fatalities.

Depending on the volume of vehicles and the speed limit, a municipality may not want to incur the expense of police enforcement at that site. By deploying web-enabled radar speed displays in work zones, you not only add that enforcement layer by reminding drivers to slow down, but you can also track volume and speed for benchmarking purposes and monitor in real time for ongoing tracking.

The data gathered by the radar speed displays is uploaded automatically to TraffCloud where you can generate speed and volume reports in seconds for any date and/or time range. These reports may show you that your heaviest volume and highest percentage of speeding occurs Monday through Friday between 8 and 10 AM and Monday through Wednesday between 5 and 7 PM, demonstrating with real data that police presence is needed during those times only. You can't gain this

kind of immediate insight if you have to go out to the equipment and download data constantly, then manage your data files and plug information into a spreadsheet.

The same process applies to vehicle queuing. If you have real-time queuing data, you can change your work zone intervals for allowing traffic through. You can view this information in real time, which allows you to create optimal traffic flow through the work zone or use conditional messaging to route vehicles to alternate routes. All this is in real time, adaptive to current traffic conditions.



InstAlert 48 Large Format Variable Message Board

How can I use technology to control traffic flow? Let's say I've got one intersection that, between 7 and 9 in the morning is awful, but only on some days. How can I reroute traffic away from there when it gets to a certain point?

Carrie: Congestion could be caused by the way the lights are timed at that intersection. It could be a choke point. It could be an event-driven occurrence like a confluence of school buses. Without collecting data and analyzing it we don't have any means of knowing, so I would just say to treat it as a segment of road. For example, if you are able to do a historical analysis of speed and volumes in an area, you can identify those pinch points and when they occur and reroute traffic away from the area using conditional messaging.

A job I am working on at the moment is for a city that is about to undertake a bridge replacement and they need to do two things: communicate to the public in advance about the bridge closure and/or imminent delays and then, while it's happening, let drivers know what and how long the delay is. They need to advise drivers of the time required to cross the bridge versus taking an alternate route and give them the choice beforehand, based on current congestion.

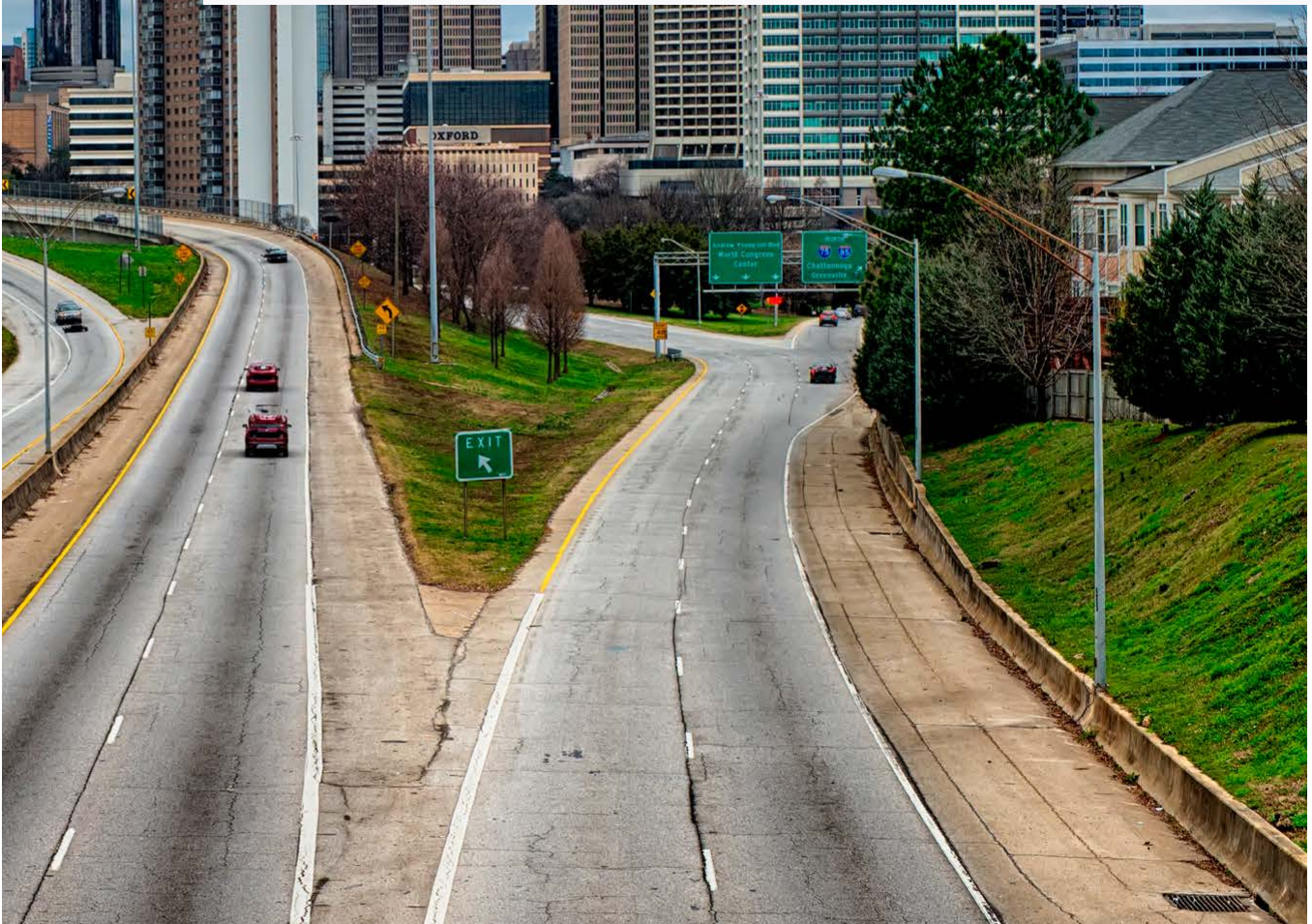
If they close all lanes except for one and they alternate traffic back and forth utilizing the one lane in timed intervals based on volume, that's something that can be communicated in real time. Since they won't know if the westbound traffic is heavier than the eastbound or how it's queuing up based on the work they're doing, they need to perform a pre-engineering study. This can be easily accomplished with radar speed displays or count and classification devices. What I would do is put out a [SpeedLane Pro](#) counter classifier alongside a multilane road and for a month, collect a baseline for that area so I'd know exactly when those volumes are heaviest, the percentage of cars on the road versus commercial vehicle traffic, how much of that is commuter traffic, and what the peak hours and days are. This information may really alter the course of how that project is conducted.



SpeedLane Pro Off-road Bidirectional Counter Classifier

They might determine that nighttime is the most opportune time to do their roadwork because the impact to that commute is just too significant, or that they have to create additional shoulder lanes to move traffic through the area in a different way. If they are changing an intersection or a series of intersections, they may do a temporary roundabout. I'm working with another county who did that. They created a roundabout while designing an intersection so that traffic would flow well through that area. It has actually worked so well that they are going to keep and expand it.

Having easy access to traffic data allows you to make better engineering choices and use your resources more widely. You can anticipate projected growth as well. If a housing development is being built and you know that X number of vehicles drive through that area currently, you need to accommodate the eventual increase. Measuring current volumes, you can anticipate and prepare for those changes ahead of time.



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So, having real-time traffic data enables a municipality to minimize congestion AND do it at a lower cost?

Yes. So many road projects were planned using traffic data from as much as three years ago or more. Population, roadways and conditions all change in that time, so doing real-time studies before, during and after construction ensures that you're

prepared and addressing current, as well as future, needs. If you post that SpeedLane Pro counter classifier for the pre-study and you leave it up, you can see and measure the impact as you're moving forward with your project.



You can infer from the trend that if it continues to increase at X percent, this is what it's going to be like in a year?

Carrie: Absolutely! That's traffic engineering. Universally, municipalities are doing this on a per-project basis, but if they have the technology at their disposal they can do multiple studies throughout the year very cost effectively and easily. I have another project going with a couple of engineers that don't know how the project will proceed yet, but they want to know what their options are down the road. They know that the duration of the project is six months and that there might be a pause. The great part about this is if they own the technology, the gap doesn't matter because they can adjust for it.

This county also is going to operate rolling work zones where the actual work is being conducted as they move. It could be shoulder work; it could be striping. To be able to advise

and understand potential queuing volume enables two things. Number one, it makes it safer for the workers ahead. Because they are constantly moving, there is no way to use barricades or lane delineations. Second, this active work zone may be confusing for a lot of drivers, but by utilizing a variable message board like InstAlert 24 in front of the work zone, they can reroute traffic with the least amount of confusion as the work zone changes from one lane, to two lanes, to shoulder work.

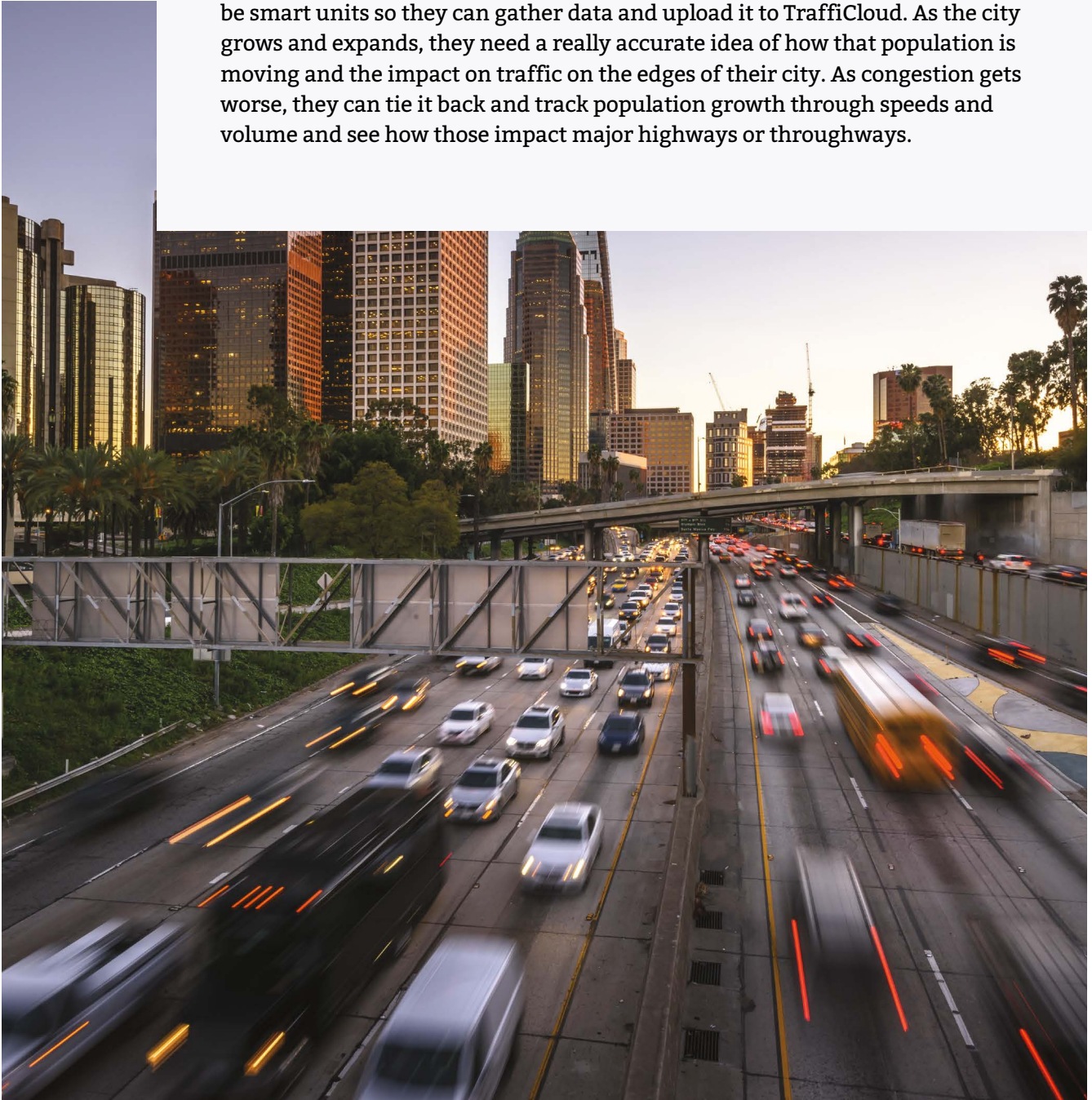
Without this advanced notification, what happens is the vehicle in front sees the work, but three or five cars back don't, causing a major backup, jamming brakes and unsafe conditions for the workers.



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What about using technology for traffic calming, setting speed limits, working with the community and traffic studies?

Carrie Most traffic complaints or speed studies get routed to the police department. Many times it's the Public Works department that will conduct that study. One city I'm working with is going to upgrade their 40 unconnected signs to be smart units so they can gather data and upload it to TraffiCloud. As the city grows and expands, they need a really accurate idea of how that population is moving and the impact on traffic on the edges of their city. As congestion gets worse, they can tie it back and track population growth through speeds and volume and see how those impact major highways or throughways.



What other technology-driven traffic tools do you want departments of transportation, public works or traffic safety to know about?

Carrie: One big thing is pre-emption devices. An aspect that I've been studying in a lot of different cities is the impact of commercial vehicle traffic on congested inner-city roads or municipalities. They are trying to deliver goods, but they can cause severe congestion. They need to make wide turns; they're slow to move; they're slow to stop, and they potentially trigger unsafe traffic conditions. By combining our counter classifiers with ATS tools like Virtual DriveTimes or Time to Destination, cities can route trucks onto designated roads, rather than allowing them to trudge through a downtown area.

For example, by having a business route or a ring road for commercial rigs and letting them know in advance that there is a commercial vehicle route that favors them by holding the green longer for that direction of traffic, you'll keep lots of trucks from the inner city while doing something positive for commercial drivers. You'll be giving that segment of the traffic population benefits: they can get through, making their deliveries without the frustrations of inner-city traffic and congestion, and you're giving them a favored route. Usually, it's all about "no commercial rigs," "wrong way" signs,

"do not enter," high restrictions, or weight restriction. By giving them alternate routes that favor them, though, they feel rewarded instead of punished.

One of my major metropolitan clients is using a SpeedAlert 18 radar speed display, integrated with our SpeedLane Pro counter classifier, to classify each vehicle before it enters the road to the bridge. If the vehicle is commercial it immediately triggers the sign to say, "No commercial vehicles." Then they can direct each driver to either not go through or give them an alternate route.

All these way-finding apps don't distinguish commercial rigs from private vehicles. A commercial driver who is unfamiliar with an area, as many are, gets there with Waze or Google Maps, which directs them to go through an area that's a hazard, but it also causes tremendous angst for that city. I'm working on a different project that redirects drivers, compelling them to ignore their GPS and take the route the city wants them to take. The city is communicating with them, telling them, "Ignore your app. This is our city. We need you to comply with our directions through it."

Conclusion



We hope you found this white paper helpful and that it gets you thinking about your own traffic challenges in a whole new way. If you would like to learn more about All Traffic Solutions' connected products and solutions for improving traffic flow and safety, please contact us today. Call 866 366 6602 or email us at sales@alltrafficsolutions.com.



All Traffic Solutions 12950 Worldgate Drive, Suite 310, Herndon, VA 20170 ©All Traffic Solutions. TraffiCloud leverages our patented technology (US Patents 8,417,442; 8,755,990; 9,070,287; 9,411,893) to deliver unique cloud-based management, features and functionality.

All Traffic Solutions (ATS) is a leader in cloud-based, open-platform IoT intelligent transportation and smart parking technology. Our innovative SaaS solutions and connected devices are changing the way forward-thinking communities solve their most complex traffic, transportation and parking challenges. ATS' TraffiCloud platform allows them to remotely manage all their traffic and parking devices and aggregate disparate sensor data into a central hub in real time. Over 5000 organizations use ATS technologies to increase traffic safety, speed and improve the parking experience, maximize budgets, analyze historical traffic and parking patterns, increase operational efficiencies and plan for the future. For more information, visit AllTrafficSolutions.com.

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