

SMARTER CITIES: FIVE WAYS TO SEE RESULTS NOW



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Introduction

With traffic and transportation initiatives at the top of many cities', towns' and municipalities' priority lists, the real benefits of smart cities appear closer than ever—from relieving traffic congestion and emissions, to making neighborhoods safer and relieving stress on infrastructure. But making decisions about the RIGHT projects that will produce results is the key. Balancing short-term gains with long-term improvements can be difficult, but by investing wisely in both, the impact to your citizens' lives can be significant today and into the future.

Understanding how to best leverage innovation and technology to make lives better for your citizens is critical to the success of your efforts. With so many available options, how can small and mid-sized municipalities identify traffic and transportation enhancements that both make a difference in 2017 and pave the way for the future?

Rapid advancements in secure information and communication technology (ICT), along with the Internet of Things (IoT) solutions, have popularized the vision of smart cities—municipalities that can efficiently manage their assets, including transportation, law enforcement and public works, as well as government services and utilities. Communities across the country are quickly recognizing the enormous benefits associated with becoming a smart city, including more efficient processes, better response times and a more proactive approach to planning for the future of all their citizens.

Smart transportation and traffic management systems are central components of any intelligent city network, thanks to technologies and tools that have made it possible to improve traffic flows, increase road safety, maximize parking availability, reduce gas consumption and emissions, and strengthen communication with constituents.

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But too often, when municipalities hear “Smart Cities Transportation Initiative,” the first things that come to mind are multi-year, enterprise scale projects like smart grids or light rail. These ideas are daunting for small and mid-sized cities to be sure, who oftentimes face increased pressures due to swift growth and reduced resources as they try to spread limited resources to positively impact the most people.

Regardless of the population or size of your municipality, there are still considerable advantages to adopting a smart cities mindset and approach to planning, management and growth, and steps you can take today to realize that vision. By using data and analytics to identify trouble spots, by creating solutions based on data and the use of conditional responses, and by implementing in an agile, results-driven framework, any municipality can leverage the IoT to build smarter approaches today.

This paper explores five ways your municipality, regardless of size, can leverage the best of the new technologies and implement the right systems, right now, so you can become a smarter city both for today and into the future.

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At its 85th Winter Meeting today, the U.S. Conference of Mayors (USCM) released a new survey, jointly developed and conducted with IHS Markit, that shows cities of all sizes are developing and implementing “smart city” projects.

Of the 335 implemented projects, 69 are taking place in large cities, 168 in mid-sized cities and 98 in small cities; of the 459 planned projects, 103 are in large cities, 225 in mid-sized cities and 131 in small cities.” — U.S. Conference of Mayors/IHS Markit Release Inaugural Survey on Smart Cities, Jan 2017.

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Half of urban city-dwellers will benefit from smart city programs by 2019, according to market research firm Gartner*.

**Predicts 2017: Government CIOs Are Caught Between Adversity and Opportunity, November 10, 2016*

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1. LEVERAGE DATA IN DECISION MAKING

Leverage up-to-the-minute data to manage your ever-changing traffic landscape.

The ability to leverage data is the cornerstone of any smart city initiative. Having access to analytics that allow you to understand traffic flows, patterns, safety and trouble spots—quickly and easily in real time—makes it possible to effectively and proactively both manage for today and plan for tomorrow, based on quantifiable information. Data allows you to understand your current situation, identify trends, quickly see opportunities for improvement, create innovative programs and engage stakeholders. Data is the multiplier, letting you undertake more projects with precision, better results, and more predictable outcomes.

Providing real-time information access to citizens is important as well. “Developing ‘smartness’ in the eye of the citizen means developing contextual applications for them,” said Bettina Tratz-Ryan, research vice president at *Gartner*. For example, a smartphone parking app can direct commuters and shoppers to the closest available parking spots—reducing traffic congestion, maximizing facility revenue, getting people to work on time and fueling commerce. But don’t forget to plan for the fact that not everyone is going to be using an app, much less your app; having alternative methods, such as roadside signage with real-time parking availability or integrations with commercial apps, is important.

Critical to achieving beneficial outcomes is the ability to implement, utilize and manage your traffic data platforms. For small and mid-sized municipalities—which oftentimes have limited resources, budgets and in-house big data capabilities—turnkey solutions are required in order to successfully derive the benefits sought in implementing smart transportation projects.

A cloud-based solution, such as *TraffiCloud™* from All Traffic Solutions, is ideal to securely collect and store consolidated data from a wide variety of traffic devices into one platform, making it possible for municipalities, law enforcement and enterprise companies to download and share data reports remotely from any Internet-ready device. With immediate access to complete and actionable traffic and parking data, these entities can prioritize issues, utilize resources more effectively, and do a better job of calming traffic all while reducing congestion and emissions, controlling costs and generating analyses for long-term planning. A cloud-based solution also simplifies the deployment and management of the platform, ensuring that costs are contained, complexity is minimized and resources are optimized.

Five Key Drivers of Smart City Success

- Data-Driven Decision Making
- Smart Traffic
Congestion Management
- Smart Safety Initiatives
- Smart Parking
- Remote Cloud Management

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Every month, your traffic division is faced with complaints from citizens concerned with speeding drivers in their neighborhoods.

You quickly deploy radar speed signs that allow you to, in real time, remotely monitor the problem, run reports that let you determine the right time to enforce, and assess and report on program success back to the complainants with the click of a button and clear your cases.

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In the longer term, the data gathered by sensors from bridges, roadways and traffic devices (to name a few) will work together to form an infrastructure of “continuous improvement through analytics,” making automatic adjustments as needed for traffic calming, smart safety initiatives, roadside messaging and more—based on what they have been programmed to do previously. For example, each time the bridge ice sensors detect frozen conditions, they send messages to variable speed limit signs on incoming roads to slow traffic by a specific percentage.

Putting the building blocks in place now to leverage data for your municipality will enable you to make that leap to continuous improvement as more sophisticated technology becomes available.

2. SMART TRAFFIC CONGESTION MANAGEMENT

As a city grows and thrives, traffic congestion is an inevitable problem that must be addressed on an ongoing basis. Backups can cause road incidents and adversely affect commerce, work zone efficiency, emissions levels, fuel consumption (which drives gas prices up) and even event attendance, weakening the ability to attract businesses as well as a host of other negative outcomes.

The degree to which a city can proactively address traffic congestion over the long term is key to its capacity to support business, serve its citizens, and maintain a higher quality of life. Fortunately, there are intelligent traffic applications thanks to the IoT that are highly effective for communicating with drivers and keeping traffic flowing, as well as identifying high-risk locations for road incidents involving vehicles, pedestrians or road crews.

Virtual Drive Times

Anyone who’s ever contemplated which route to take home, only to find themselves parked on the freeway minutes later, has experienced high levels of frustration. If only they had known about that accident ahead they could have chosen another option; now they can do nothing but wait.

Providing commuters with updated virtual drive times before they hit the road gives them the information they need to steer clear of congested roadways and other high problem areas. Many municipal, corporate and campus parking garages are now equipped with virtual drive time signage that displays a map of the surrounding area with current travel times to main roads, bridges and tollways. Monitors like these are also popping up in hotel lobbies, airport car rental lobbies and public elevators.



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A busy university utilizes reports that assess capacity at each of their campus parking lots to determine space availability at different times and days—to better manage class schedules, event planning and security requirements.

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The monitors are populated with real-time data on traffic conditions and display this information on the map, allowing drivers to plan ahead before they get to their vehicles. Dynamic recommendations of alternate routes are based on travel time thresholds. There is no need for the customer to provide any speed sensing infrastructure, and the signs can be programmed to display specific travel routes with the associated travel times.

Time to Destination

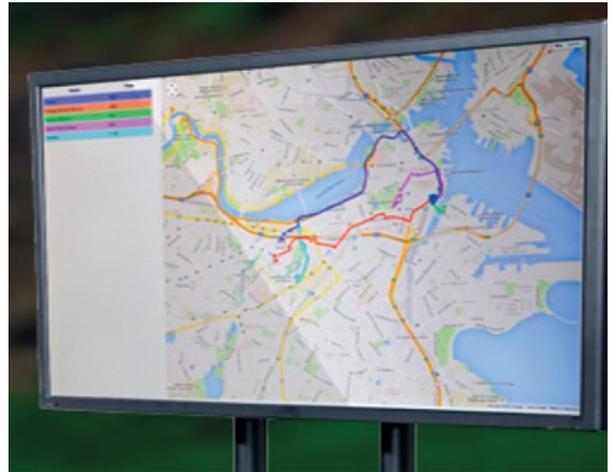
Like virtual drive time monitors, time-to-destination messages alert drivers to up-to-the-minute travel times which are updated constantly on a connected, changeable message board. They can be used to convey information for frequently travelled destinations such as the business district, main highway, or airport. These messages allow drivers to make more informed travel decisions and to experience a higher comfort level while on the road as overall traffic is distributed over a larger perimeter. Messages can be dynamically changed automatically, based upon multiple route times and thresholds to balance traffic between multiple routes.

Event Traffic Management

Stadiums, convention centers, festivals and concert venues attract tourists, sports enthusiasts, business professionals and others to visit your city and make it a more desirable place to relocate. These attractions are also prime locations for traffic jams and bottlenecks, as cars pack the freeway and nearby roads to access the facility only to circle and re-circle the area in search of a place to park.

Your city needs to have a well-executed, integrated approach to manage the onslaught of vehicles traveling to and from large events to keep traffic flowing and to keep both drivers and pedestrians safe from harm. Fortunately, there are devices available that can help you accomplish this easily.

Portable variable message signs installed at strategic locations on posts or trailers can direct drivers to event locations, available parking or back to main thoroughfares. These signs have the advantage of being programmed remotely, so authorized personnel do not have to physically travel to each sign to change the message or just check the sign's operation. Connected to space availability sensors in each of your parking facilities, they can direct drivers to lots and garages with spaces well in advance of their arrival, reducing congestion, emissions and driver frustration.



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At a confusing intersection under construction, a driver mistakenly enters the controlled access road going the wrong way. Within 50 feet, he's alerted via a roadside message sign that he's going the "WRONG WAY TURN AROUND."

Law enforcement is also alerted, as are message signs for oncoming traffic. The driver pulls over, turns around, and tragedy is averted.

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Approximately 30 percent of city traffic is made up of drivers looking for a place to park.

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3. SMART SAFETY INITIATIVES

Technology has brought rapid advancements in the evolution of today's smart cities and with it, new ways to manage complex traffic safety challenges. New technology-driven tools and devices are more versatile, affordable and compact, with many options available.

Radar speed displays alert drivers to their own speed so they can slow down accordingly; some are equipped with strobe lights that flash when drivers exceed the speed limit by a preprogrammed amount. Connected displays can also alert law enforcement to how many drivers are speeding at what times of day to direct enforcement efforts precisely, optimizing resources.

Variable message signs dynamically display important information on anything from traffic delays and construction to updates on parking availability and inclement weather. Some can alternate between multiple messages and can display images as well as text.

Conditional sensor messaging incorporates sensor or network data into messages on variable message signs and displays. Built-in sensors collect and transmit traffic or parking data in real time for safety management, information-sharing, analysis, and resource optimization. Data values can be incorporated into any position in a pre-established message. For example, a work-zone sign that reads "Time to end of work zone is X" will include the current travel time as it changes during the day or night, to help drivers make travel route decisions. You can integrate flood sensors with dynamic messaging signs to warn and divert drivers automatically in the event of high water. Sensors can let drivers know there is a train approaching and recommend alternative routes. Temperature sensors can alert to freezing conditions and dynamically slow the speed for incoming traffic with variable speed limit signs.

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Your town has five different parking facilities, and drivers often travel from one lot to the next to find spaces.

You implement a parking availability notification system on key roadways into town that lets them know how many spaces are available in each garage — including handicapped and reserved — and updated in real time.

The result is less circling for parking, reduced road congestion and emissions, and happier citizens and visitors.

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4. SMART PARKING

By now you've heard about autonomous cars, self-driving vehicles capable of sensing their environments and navigating without human input. According to CB Insights, 33 major corporations, from Apple and Microsoft, to Tesla and Mercedes Benz are working on their own driverless or semi-driverless vehicles. Business Insider predicts that by 2020 there will be over 10 million autonomous cars on the road. To urban planners, the introduction of autonomous transportation begs the question, "Where will all these self-driving vehicles actually park?"

As cities continue to grow, parking is always a top issue to urban planners and departments of transportation. Of all the newer technology solutions available to cities, perhaps none is more welcomed than smart parking initiatives. In fact, approximately 30 percent of city traffic is made up of drivers looking for a place to park—spilling out of packed parking areas, clogging up roads, increasing emissions, causing fender benders and generally agitating everyone involved.

Many cities now employ sensor technology on busy streets, parking lots and public garages. These sensors identify parking availability, and notify parkers of open spaces via message display, LCD indicators at the end of each aisle, or floor counts that turn green for available parking, red for full. The sensors can integrate with apps and other systems that notify drivers where available spaces are located. Mapping software aggregates sensor data and calculates availability at row, section and facility levels for on-premises display and remote site management. Indicators can even help clear backups at busy logistics centers and loading docks, and when combined with apps or remote and radial indicators throughout your municipality, can help to alleviate traffic associated with idling trucks.

Smart parking systems collect and aggregate historical data on capacity and availability to drive proactive planning for new parking facilities. They make it possible to manage premium spots for expectant mothers, the handicapped, and locations equipped with electric vehicle charging stations by tracking occupancy and factoring them in to the number of total open spots. Parking solutions can also utilize sensor-driven gate management to count vehicles as they enter and exit for tighter access control and notify parkers of restrictions and availability.

The ability to automatically count and track parking availability (or lack thereof) makes it possible for urban planners to anticipate future parking needs so they can create workable plans for parking expansion or optimization in highly populated or growing sections of the city.

5. REMOTE CLOUD MANAGEMENT

With all this innovation comes new levels of complexity, as it takes considerable resources to manage, track and police your streets and highways as well as manage your parking facilities, including municipal lots, gated spaces at hospitals and airports, and privately-owned parking garages.

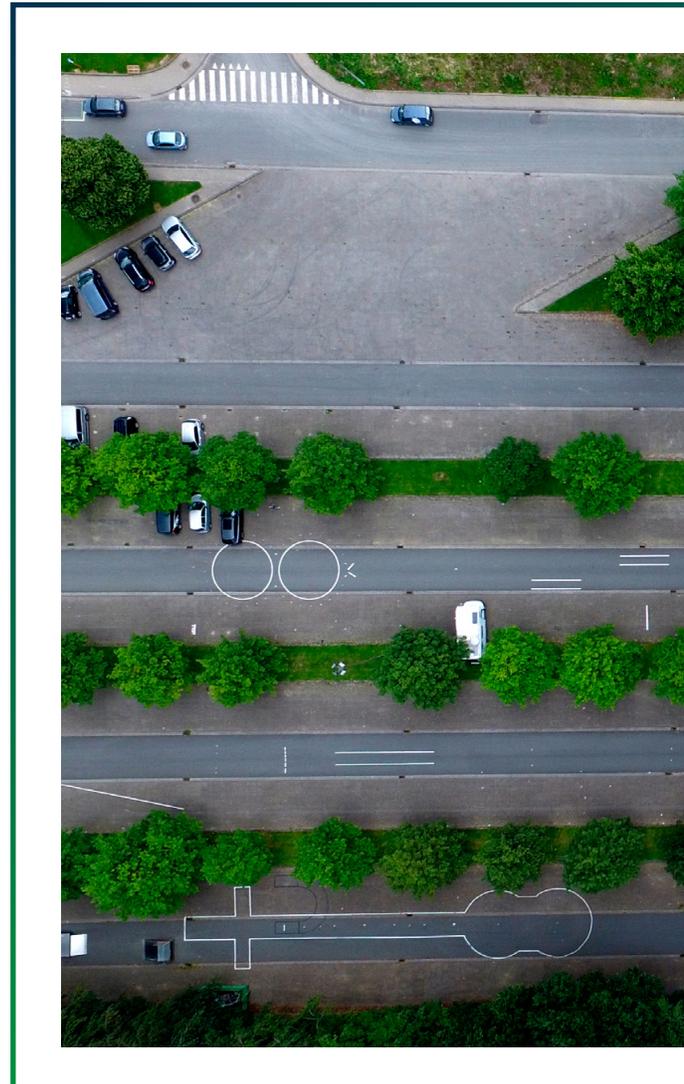
The smart city vision involves enriching the quality of life by gaining data insight from interconnected sensors, devices and people. Smart cities will leverage the Cloud to securely manage all their traffic and parking sensors and devices—as well as the continuous flow of data and images they transmit. These cities are investing now in cloud-based intelligent transportation systems to manage all their devices as well as collect, manage and distribute actionable traffic, safety and parking data.

Cloud solutions make it possible for devices to “talk” to each other, working in tandem to solve transportation-related issues in real time. The ideal solution is a single centralized, IoT-enabled ecosystem that allows multiple access levels, encrypted data stores and is accessible 24/7 from any Internet-ready device, regardless of its physical location.

Cloud-based intelligent transportation systems should be able to accommodate all devices, regardless of the manufacturer. For example, speed sensors manufactured by Company A should work with counters and message signs built by Company B, so they can “communicate” back and forth to exchange information and function as a unit.

Examples of how remote cloud management can be applied for intelligent transportation initiatives include:

- A wrong way detection and alert system utilizes traffic sensors to detect vehicles traveling the wrong way down highway entrance and exit ramps. The sensors transmit a signal to a message sign that alerts the driver with a flashing “Wrong Way” message as it simultaneously triggers text and email alerts to law enforcement for immediate action, as well as to upstream changeable message signs to warn approaching drivers. The system sends this information via secure connection to log the date, time and location for reference and reporting.
- A parking notification system uses LED indicator bollards at the end of each row of a parking lot that turn green or red, depending on availability, and send information to parking signs at lot entrances to notify vehicles where to find parking. Data is gathered by sensors and is used in the algorithms to determine the bollard color. Collected data then integrates with a mapping tool to generate a dynamic color-coded map displaying the entire location for monitoring and tracking.
- Cloud-based traffic and parking devices interface directly with automated cars so these vehicles “know” the speed limit, what route to take, whether the light is red or green, who is turning in front of them, and where to find parking.



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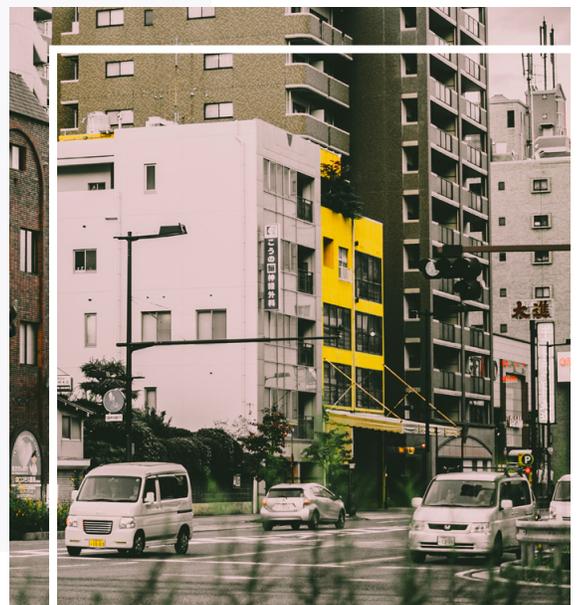
- High water sensors track the presence of water on a roadway, transmitting that information back to the Cloud, which sends a notice to a roadside message sign at the previous intersection directing traffic to another route and letting drivers know how long the detour will take.
- A particular intersection in your town seems to always be backed up. It's dangerous as well, with multiple traffic incidents over the past year. You deploy a remote count-and-classify device, connected to the Cloud, that lets you see how many and what types of vehicles are passing, as well as their speeds. Within two weeks, you see an increase in speeding trucks on the roadway that were not there when you had your last traffic study, and you're able to make modifications to the traffic flow to accommodate them.

A smart city could design and build a custom cloud-based intelligent transportation management system itself by employing a team of specialized IT professionals, but that would take valuable resources away from their main mission. Departments should focus on the solution for the citizens, not on the technology to make it happen. It's a wise approach to start small, then expand and iterate from there, rather than try to change all your systems overnight.

A hosted system solves the problem and requires less investment because its developer, not the city, would be responsible for keeping the system operating, rolling out new versions of the software and updating hardware as necessary.

All Traffic Solutions leads the market in hosted intelligent transportation solutions with TrafficCloud™, a cloud-based ecosystem that helps smart cities achieve total transportation safety management by linking together:

- Traffic sensors
- Mapping
- Reporting and analytics
- Enforcement
- Roadside messaging – dynamic, variable, conditional
- Traffic data
- Imaging
- Alerts
- Parking availability



Conclusion

There are many compelling reasons why municipalities, regardless of size, should adopt a “smart cities” approach by investing in a flexible, scalable intelligent transportation system that encompasses their safety, transportation and parking needs, bearing fruit today and long into the future.

By adopting the five strategies and tactics in this paper, your municipality can take advantage of the best of the new technologies and innovative systems today so you can become a smarter city tomorrow, improving quality of life for all your citizens.



Ask us for a personal demo of TraffiCloud™, the open, flexible and extensible traffic management ecosystem that lets you control your traffic devices and data from any Internet-ready device 24/7, providing a new level of awareness while reducing the amount of time needed to manage your traffic devices and information.

Call 866 366 6602 or email us at sales@alltrafficsolutions.com



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 delivers cloud-based traffic management solutions, including radar speed and variable message displays, imaging products and intelligent transportation systems for law enforcement, transportation and communities.

Our innovative TraffiCloud™ traffic management platform is changing the way communities solve their most complex traffic, transportation and parking challenges by allowing them to manage all their traffic equipment remotely, as well as leverage data to increase traffic safety, streamline their operations and achieve lasting results.

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