SOLVING TOUGH PARKING MANAGEMENT CHALLENGES USING TECHNOLOGY, DATA AND IOT
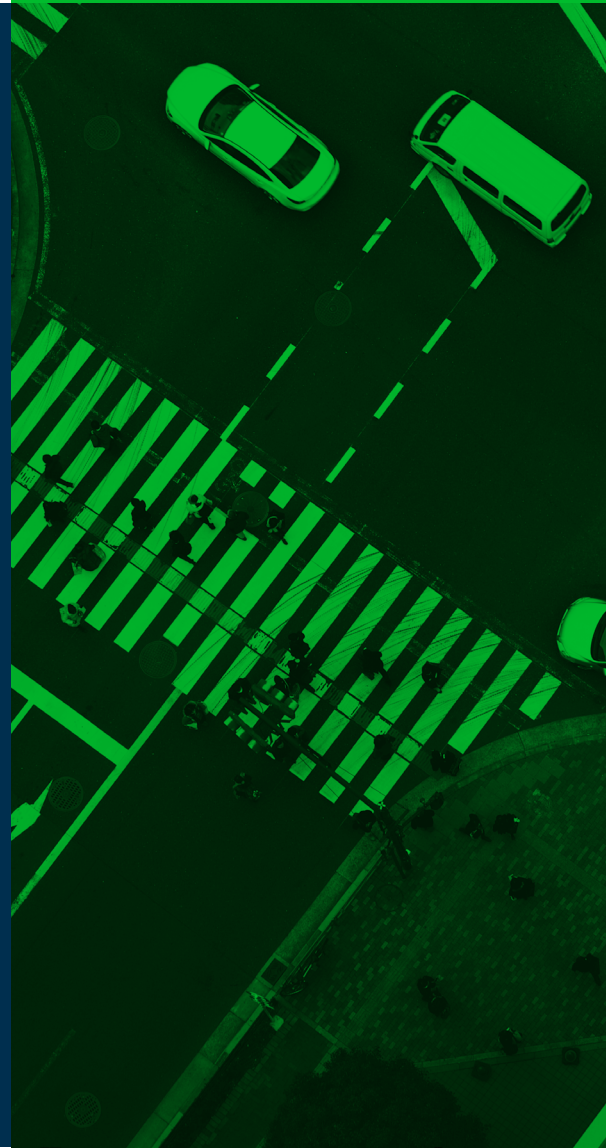
AllTrafficSolutions.com

ALL TRAFFIC
SOLUTIONS

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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.

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.

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Introduction

Parking facilities management is becoming more and more difficult. As urban areas become more populated, the number of vehicles on the road increases, and drivers become more aggressive, providing safe, ample parking has become a major challenge. In addition, with so much new technology out there, each claiming to be "the solution you've been looking for," it can be overwhelming for municipalities and parking facilities managers to know just what to do.

In this informative white paper, we will discuss solutions that really work. We'll take an in-depth look at how cloud-based software, along with sensor technology and web-based signs, is enabling parking facilities to optimize parking operations, specifically by communicating timely information to drivers. We will discuss, in plain English, new technologies and how they are solving today's toughest parking challenges. We'll examine how these new advances in tech fit together with data analytics and the Internet of Things (IoT) to make parking facilities management easier while helping organizations achieve greater parking efficiency, improve safety outcomes, and provide a better overall parking experience. And finally, we'll explore how parking facilities managers can leverage data for better decision making in the future and provide a list of actionable tactics that organizations can implement immediately for measurable results.

The Situation

For the longest time in parking facilities management, hardware was the main focus of the operation. Slowly, over time, the focus shifted to include more flexible software and mobile solutions that are accessible anytime and anywhere. While the new software was and is an improvement, much of that old hardware is still in place. So, what does this look like? What's the current landscape in the parking world?

A BIG MESS.

Technology Overload

Municipalities, universities, airports, hospitals, private operators and other organizations are attempting to manage their parking facilities with all kinds of different hardware—signs, meters, revenue control equipment, handheld devices and a whole lot more—that, in many cases, are made by different manufacturers. Couple this with new software platforms to manage the back end, and it can seem like technology overload.

For example, consider the vast array of parking and traffic technologies used by one of All Traffic Solutions' clients, a small county in mid-America: parking meters from CALE; back-end operations by T2 Systems; Parkmobile gates in a city garage; street light sensors made by another company; traffic signs by All Traffic Solutions; communication methods by a number of different providers; GPS systems by Google Maps or Waze... It's a very long list.

> **Research shows that 30 percent of city traffic is made up of people looking for a place to park...**

IoT

The major issue is how well all of this technology works together. This is where the Internet of Things, or IoT, comes into play. The IoT simply means devices that can connect to the Internet, allowing them to send and receive data. That data is used for transportation, law enforcement, public works, traffic safety and, as this paper will explain, parking. But the IoT can actually introduce a whole other set of parking challenges, as well.

For example, the IoT includes things like autonomous cars. Experts predict that by 2020 there are going to be over 10 million self-driving cars on the road. Not only are organizations wondering how they are going to deal with these autonomous cars in general, but they're also asking, *Where are they going to park?*

**That's just one of the issues on the horizon. Other parking challenges are already here.**

Circling for Parking

Research shows that 30 percent of city traffic is made up of people looking for a place to park, and most urban areas are facing this issue today. Drivers continue to circle around looking for available parking. This causes congestion, traffic accidents and frustration among everyone involved—drivers, pedestrians, workers, commuters, law enforcement, even parking enforcement officers. As the number of people and vehicles rises, the parking issues will increase as well.
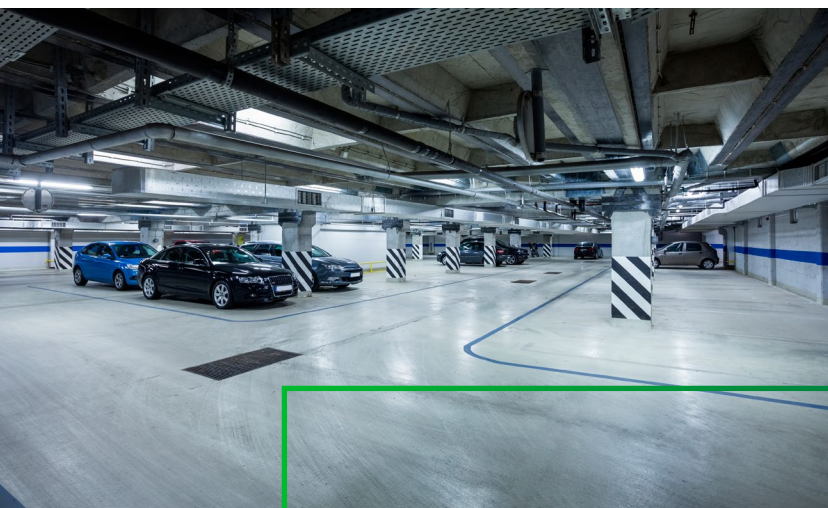
> "
> ...one out of every five motor vehicle accidents in the US occurs in a parking facility.
> "

Need for Timely Information

As people spend more time circling for available parking spaces, customer and employee satisfaction takes a hit. Part of the issue with congestion is that there isn't enough signage or information for drivers and parkers. Parkers simply don't know where to go. Even when they're getting information from a sign on the road, a travel app, their GPS or their phone, they don't have real-time parking information. This often results in futile attempts to park in a lot that is already full. Once the drivers realize it, it's already too late. They're frustrated, and now they're stuck in a queue that's blocking the lot entrance, jamming traffic along the road and endangering pedestrians all the while. All of this could be avoided if the parkers just had the right information.

Safety Concerns

Another thing that parking facilities managers and law enforcement have been reporting over the past couple of years is an increase in aggressive driving. This obviously leads to unsafe parking environments, which impacts the well-being of other drivers and pedestrians. In fact, statistics show that one out of every five motor vehicle accidents in the US occurs in a parking facility. That doesn't even include the nicks and dents that happen in parking garages or surface lots. Fourteen percent of all auto insurance claims involve collisions in a parking facility, and these numbers are increasing year over year.

Parking Expansion - Not Always an Option

When asked how to solve parking challenges, unfortunately, the first answer is usually, "We'll just add more parking spaces." Almost 99 percent of the time, however, additional parking isn't an option due to space and/or budget restrictions.

For example, in commercial real estate prices are steadily increasing. Business and property owners are dealing with less and less square footage. It's becoming more cost prohibitive to build their facilities, not to mention expand available parking, while still achieving their overarching goals of minimizing operating costs and maximizing profits.

Greater Demand

Business operations are also becoming more encompassing. Ten to 20 years ago, not much parking occurred on the weekends. When people left work to go home on Friday, they didn't come back to the city until Monday. After 7 p.m. in the retail districts, everyone went home; there were no parking issues. Today, that's all changed. People are living in urban communities, staying there all weekend. Many businesses have expanded operations to include weekends, evenings, and sometimes even 24-hour service. This often translates to 24/7 parking issues. With facilities open around the clock, decision makers need to be able to manage information and react accordingly around the clock. But how?

With the confluence of factors that impede parking, what is one to do? How can parking facilities managers address all of these issues?

Solution: "Smart Cities" Approach

The answer lies in adopting a "smart cities" approach to parking. A smart approach involves using existing hardware and software, together with data analytics, to accomplish more while spending less. A smart approach allows organizations to get the most use of their current technology by collecting valuable data and then using it to make the most cost-effective and impactful decisions. What does a "smart cities" approach look like, in terms of parking facilities management?

Here's an example: A municipality really wants to install new technology like parking sensors. Before purchasing a whole new system, however, the city can use its existing tech, like parking meters, to track data. Even if those meters are the old single-head models the technology can be upgraded to provide valuable data. For example, by adding a credit card payment feature, the meters can now collect data on parking trends. That information can be stored in the Cloud which the municipality can now access and leverage. In this example, the city can track how many people are parking and where, as well as what times and days are busiest, even using their old hardware. Data can even point to where there's a potential enforcement issue so plans can be implemented to address hot spots, either through enforcement or additional parking.

A smart approach to parking management means there is no need to go out and completely upgrade operations. There are ways to simply tweak the existing infrastructure and then, as that equipment reaches its end of life, upgrade it to the full suite of technology.

There are other ways to implement a smart approach to parking through new technology. Parking apps are now providing a lot of valuable, real-time information that, until recently, they just couldn't provide. Some apps can actually show users the actual occupancy of a parking facility and whether or not those spaces are currently available. In-ground sensors, camera-based parking solutions that monitor parking availability and smart meters are all capturing great data.

All Traffic Solutions helps organizations to leverage the IoT so that data from all of these different sources is merged and at the user's fingertips for optimal response and decision making.

Laser-driven Sensor Technology

Sometimes it becomes evident that current parking technology, or lack thereof, just won't cut it any longer. For example, at a 10-floor parking garage in Reston, Virginia, shoppers were dismayed when the signage indicated 300 available spaces but, after circling through 10 floors, not a single open space could be found. Clearly, the current monitoring system was not accurate or sufficient.

Thankfully, technology exists today that provides much higher accuracy rates and can be integrated with other systems so users can collect and analyze the data. For example, the ParkTrak parking counting system from All Traffic Solutions uses laser technology and directional logic for vehicle detection. It is easy to install (essentially plug-and-play), is much more accurate at tracking available parking than cameras or loops, integrates with other systems, and, perhaps most importantly, captures data and stores it in the Cloud. Used in surface lots or multi-level garages, the ParkTrak system is over 98 percent accurate at identifying available parking and can notify parkers via sign messages that can be updated in real time. In the past, this information was incredibly difficult to monitor and often required multiple parking attendants running up and down rows with handheld radios attempting to update availability and relay that information to drivers. Now, ParkTrak can monitor that information, and it can be fully automated. The ability to communicate availability to parkers and manage and measure data in a meaningful way is here.

What does *meaningful way* mean, though? Well, frankly data is useless if it cannot be analyzed.

Analytics

In order to use it, data must be seen from a reporting perspective. For example, parking managers need to see occupancy over time. Whether it's using heat maps to see what the busiest time of the day is or bar graphs and charts, having data in a meaningful format is crucial to analyzing it and then providing it to constituents, bosses, board members, business owners—whomever the decision makers may be. If they can see it in a format that's easy to understand and interpret, then they'll be able to act or react accordingly. Following are some examples of what parking data reports can look like.

With the ability to count and track parking, it's much easier to determine:

- True occupancy
- If building more facilities is necessary
- If there is a need for increased safety initiatives
- And more

So, what does all this information lead to? Following are five data-driven recommendations, or best practices, organizations should implement now to improve parking facilities management.

Five Best Practices

#1 Automate Using the Cloud

As mentioned earlier, the needs of parking operators have become much more sophisticated in terms of monitoring and reporting. The good news is the Cloud can simplify things. Using the IoT, all parking-related devices can be connected and can essentially "talk" to one another so that parking managers can monitor systems, alarms, occupancy, automatic license plate recognition (ALPR) systems, video streams, intercoms, and even geolocation. This not only makes the network of systems easier to manage, but it increases safety and efficiency for both parkers and pedestrians.

> " There are many companies that supply data, but there's a big difference between supplying data and actually supplying data analytics. "

#2 Leverage Data

It seems everybody these days likes to throw around the phrase *data analytics*. What does it really mean, though? There are many companies that supply data, but there's a big difference between supplying data and actually supplying data analytics. The latter refers to data that can be used in a meaningful way. To achieve this, it's important to have a system with open architecture, which just means it can send and receive information. Open architecture allows users to take data from one place and send it somewhere else and vice versa, which is essential for Intelligent Transportation Systems (ITS). Without open architecture, there are a lot of different, disparate systems that have to each be managed separately.

As an example, All Traffic Solutions worked with a major city a few years ago that had 10 different, disparate systems on which they were collecting data. It was nearly impossible to manage all of it. The staff would literally spend at least one full week every month collecting data from each of those systems and then compiling it into one report so that it could be presented to superiors. That really goes against the whole concept of IoT.

Open architecture, however, allows for easy integration and easy viewing and analysis of data all in one place, no week-long process required.

Once the data is all in one place, the key—what makes the data analytic—is the ability to analyze it. For example, in order for law enforcement to plan and react appropriately, they must be able to analyze current enforcement, such as where the most tickets are being written, and then react accordingly. The technology exists today that allows law enforcement to create a prioritization list that essentially maps out where officers should go on their routes for optimal enforcement.

That same, or similar, technology is being used for parking management. For example, parking managers can now examine parking occupancy in both real time and over periods of time; meter companies have the ability to automatically zero out a meter once someone leaves; and garage attendants can determine how many drivers who enter a garage or surface lot leave but don't pay to park. With this type of data, parking facilities managers can react and plan accordingly.

#3 Use Real-time Occupancy Data

Real-time occupancy data is one of the most powerful tools parking managers have today. Providing real-time occupancy information to parkers reduces congestion, gets people to open spaces faster, and allows them to go about their business of either working or spending money, which, candidly, makes everyone happier. Not only that, but real-time occupancy data reduces overall frustration and improves safety in and around parking facilities.

Additionally, using the same real-time occupancy data, parking managers can respond faster to issues and better plan for the future. If they can see where people are parking as part of their overall facility management or facility map, they can see where it may be beneficial to add another garage. When it's time to make the recommendation, the data provides the ammunition to back up claims and even provides insight on how to fund development projects. For example, regression analysis can be used to determine the effects of changing parking rates. This info, coupled with occupancy data, can justify funding.

#4 Calm Speeding Drivers

Drivers are becoming more aggressive, so organizations need to plan accordingly. Whether that involves placing traffic calming signs for speeders in a garage, sending messages to a sign or an app letting drivers know there's been an accident, or using radar-enabled signs that automatically alert speeding drivers to slow down, the technology now exists for organizations to be proactive in communicating with parkers. Providing timely information helps calm drivers and reduces frustration, which in turn has a positive effect on the safety outcomes in and around parking facilities.

#5 On-site Messaging to Communicate with Parkers

Finally, using on-site and, specifically, real-time messaging to communicate vital information to parkers is an essential best practice in parking facilities management. From Time to Destination sign messaging displayed at garage exits or Virtual Drive Times with Waze or Google Maps, All Traffic Solutions provides ways for organizations to reach parkers with meaningful, useful information.

A simple message like, "Accident: Take Alternate Route," along with a system that re-routes accordingly can be a great way to ease congestion and enhance overall customer, employee and commuter satisfaction.

Not only does this type of messaging serve the parkers and impact safety in a positive way, but the data that's being captured in the process is useful in parking facilities management. For example, a push notification through a mobile device can be sent to a customer or anyone who enters a particular area, letting them know of local events or special promotions. Parking rates can be changed in an instant using real-time occupancy data. Today, parking facilities are using demand-based pricing for parking spaces.

On top of all of that, parking data can actually be used to generate revenue through advertising. In retail districts, restaurants and other establishments will pay for advertising within parking facilities. Law enforcement is understanding that generating revenue doesn't always have to be through writing more tickets or increasing rates. Parking meters now have the ability to offer advertising. At pay-on-foot stations, when parkers print their ticket, they can receive a coupon or special offer from a local business. There are many different ways organizations can use data to maximize revenue without having to increase parking fees.

1. A Virtual Drive Times display from All Traffic Solutions helps drivers select the best route before they get on the road.

2. Time to Destination message on an InstAlert 24 web-enabled message sign.

Conclusion

BRINGING IT ALL TOGETHER

So, let's assume you've implemented all five best practices laid out in this paper. What does that really look like?

Now, you've got a centralized cloud-based system that can connect **your organization to**...

- **programmable signs**, that can be connected to...
- your **department of transportation** so...
- your **highway system** can...
- let **commuters** know where there are delays or traffic issues that can be...
- communicated to the **signs on the roads** which...
- let **drivers** know where there are available places to park, and that can be...
- communicated to your **traffic studies** as you...
- collect data for **future planning**, and then...
- you can send that data to **drivers' devices**—in-car gadgets, TomTom, GPS—and...
- those messages can be communicated to parking **garages**, to **on-street meters** and to **private companies**.

Last but not least, you now have the power to take all of this information, from all of those different, disparate sources, **store it in the Cloud** and use it to make smarter, more impactful **decision for the future**.

This is how technology, data and the IoT are redefining parking facilities management. For more information on how All Traffic Solutions can help you with your specific parking management needs, contact us or visit us at AllTrafficSolutions.com.

Ask us for a personal demo of TraffiCloud™, the traffic management solution 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

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