GETTING CONNECTED

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Connectivity is the exploding technology trend of 2016. Are you on board?
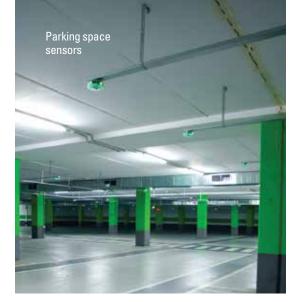
Refrigerators that help you create a shopping list, cars that provide real-time pressure information for each tire, roads that talk to vehicles to inform drivers of current driving conditions, and watches that let you know when you have not reached your target number of daily steps: These are just a few of the advances in technology that create more intelligent devices and enable these devices to connect to each other to share information and drive new applications for consumers.

These advances are allowing us to:
- Connect to devices that tell us about the environment around us.
- Connect to consumers to provide enhanced services.
- Connect to the world to share and gather disparate data and information for our use.

Just as in our daily lives and in many other industries, each of these connections is driving change in our parking operations and service offerings. Understanding the opportunities that exist in each connection will help us continue to evolve the parking services we deliver.

Parking space sensors

Connecting to Devices

The first connection is the one closet to our facilities: the connection to sensor devices that tell us about the environment around us. This connection is often referred to as the Internet of Things (IoT). Parking operations have been connecting to devices for many years—examples include security cameras that deliver video to closed-circuit televisions (CCTV) in an office and loops in parking entrances and exit lanes that identify the presence of a vehicle (or at least a mass of metal). With the explosion of technology, the miniaturization of a variety of sensors, and the reliability of Wi-Fi communication, we have the ability to detect significantly more things and send data to a central site more economically than ever before. We now have sensor devices (cameras, temperature sensors, pressure sensors) around us that measure and monitor a variety of things in real time on our phones, home appliances, and many other places. These sensors enable the machines and equipment to collect and exchange data. Examples in our personal lives include smart watches that measure our heart rate and speed and distance walked/run and then push this data to a mobile application on our smartphones or computers. Businesses are also installing and connecting devices to support applications in environmental monitoring, urban and rural infrastructure control, and manufacturing automation.

Significant investments are being made by many industries in IoT technologies to capitalize on the promise of creating new services for consumers and driving efficiencies with better, real-time information. Disney is one such example; it is estimated to be investing between $800 million and $1 billion on an IoT initiative launched in 2013. This initiative gives every one of its 30 million annual visitors a wristband, called the Magic Band, that's embedded with a chip. The MagicBand serves as a ticket, FastPass reservation, payment device, room key for onsite resort guests, and many other things. As consumers walk around Disney and use their MagicBands, Disney is tracking each person's action and movement. The data are then used to deliver personalized messages to users through Disney's mobile and web-based applications while identifying how guests interact with the park and services. Through these tools, Disney understands how guests move through the park, learns which attractions they like and do not like, and gains the ability to offer promotions to move guests into underused areas of the park throughout the day.

The same connectivity of devices is occurring within our parking infrastructure. Sensors detect vehicles in parking spaces, monitor how our parking equipment is operating, and turn lights on and off based on movement. Fixed cameras also act as a form of sensor by identifying license plates and permit credentials to track payments and drive enforcement activities. These devices then have the potential to connect to each other and share information about their surroundings with the operations management team. This information can be used to deliver improvements in areas such as the proactive response to maintenance conditions before they become a bigger problem and reduce costs for enforcement and operations such as lighting.

Remote management of parking facilities is also made possible through the availability of new technologies such as sensors. Information and control provided by the devices within and outside a facility are delivered to a centralized command center, providing the ability to remotely vend a gate, process payment, push a new rate to the in-lane payment device, support a customer's service needs, and much more.

Connecting to Consumers

The next level of connectivity is the connection to consumers. This is the one that allows us to provide relevant and useful information and services to consumers, in many cases, in a personalized manner. Parking is taking advantage of this connection in many ways: reservations, virtual permitting, mobile payment, and wayfinding are just a few, with many happening before a driver enters a parking facility.

There has been a big shift in the management and distribution of parking permits as a result of this consumer

connectivity. As parking operations connect to consumers via apps and websites, there is a migration from physical to virtual permits. The benefits of this transition include consumers' ability to serve themselves online (when they are available vs. when the garage office is open), the ability to handle payment activities online, the elimination of paper permits, and the potential for more automated enforcement methodologies. One parking operation capitalizing on this trend is the Massachusetts Bay Transportation Authority, which has eliminated payment kiosks and cash honor boxes by moving to virtual permits on a mobile app. The app allows a parker to pay for parking, reserve a spot, or buy a daily pass.

Wayfinding is another consumer application that connects the parking operation to the consumer. By collecting availability data from the parking facility, the parking operation is able to guide parkers to the ideal open parking spots, thereby reducing congestion in the garage and improving the consumer's experience. By collecting data from sensors, the parking operation team is able to connect to consumers by providing real-time information on available spaces through an app or website. The City of Santa Monica, Calif., created such an integrated wayfinding and real-time data program for its downtown district. Wayfinding signage was installed throughout the downtown, directing visitors and residents to various amenities and motorists to various parking garages.

Prepaid parking is also a hot trend based on the increased percentage of transactions completed (electronically/online/mobile) during the past 18 months. Prepaid parking allows a parking operation to connect to consumers and offer them different services at different price points. Consumers who want a guaranteed, reserved parking space are able to purchase in advance of their arrival, while other customers looking for discounted parking can find operations that are willing to reserve parking in advance at a lower price, but without the guarantee for a specific space. In addition to delivering a parking space in advance of arrival, prepaid parking applications provide information about additional services that are available at a facility, such as car washes.

With the growth in mobile apps, no single app will be the most useful for consumers. Consumers will want to see all of their parking options, whether the spaces are on- or off-street. In addition, people park their vehicles to do other things, such as go to work, school, dinner, an event, or the doctor. This means there is a need for parking operations to increase partnerships

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with businesses, municipalities, and other organizations to aggregate all of this information and to connect to consumesr to help them do the other things.

Connecting to the World

The final pillar of the connectivity trend is how a parking infrastructure connects to the larger world, sharing information the parking facility is collecting with other entities that can use it to provide services to their customers. The other entities interacting with the parking data can be associated industries, such as transit operations, or fit into the broader evolution of the Smart Cities concept.

Connections between devices, consumers, and city infrastructure are being developed to provide a better experience for parkers, city visitors, and residents as well as a more efficient, responsive range of services and functions within the city itself. Connected cities use data collected from parking and transit operations via sensors, cameras, and the voluntary participation of customers to provide information (parking rates or customer satisfaction, for example). Cities are then using this aggregated data to make smart decisions. These decisions may concern frequency of trash pickup, regulation of street lights, or deployment of parking enforcement officers.

Of course, Smart Cities depend to a great extent on the existence of the IoT—the connection to devices that are in the infrastructure. For example, traffic sensors and cameras allow the city to provide real-time traffic light response so that when cars are going in one predominant direction, lights can switch to have longer green phases for those in rush hour and shorter for the more sparsely traveled direction. Cities often provide the communication infrastructure for these services with municipal Wi-Fi and other communication methodologies that can extend to the automobile itself through infrastructure-to-vehicle (I2V) communications.

Car manufacturers are also getting involved with vehicle-to-vehicle (V2V) communication systems, but these are more focused on road safety than the support of new services. Finally, mobile phone providers are

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contributing to these trends with the development of near-field communication (NFC). NFC can be used for payment, access as a credential, and other services linked to an individual based on his or her specific identity.

Parking is an intersection in the Smart City concept where transit, merchants, and sustainability meet. These meeting points open up more opportunities for parking professionals to serve customers by acting as a liaison between parking motorists and their next stop—a merchant, a theater, a bike-share program, a walk down the street, or the bus stop to create what is being called a frictionless experience. The concept of friction reduction is essentially taking the pain out city life by making everything easier, as recently demonstrated by disruptive applications, such as Uber for ride sharing. Imagine a garage that alerts a local traffic signal that a large number of cars are exiting, nudging the traffic signal to adjust its timing to allow the cars to exit the garage quickly, reducing congestion in the road and in the garage. This is possible because of the connection-to-the-world trend.

Navigating Technology Change

As exciting and readily available as these three trends are to the parking industry, there are changes that we need to consider in our operations to take full advantage of them. Traditional parking operations have largely focused on in-the-garage operations, or specifically, what happens within the facility when the gate is opened and the car enters and eventually leaves a facility. This typically includes activities such as checking if the garage is clean, lights are working, and if ticket spitters and receipt paper are full. Historically, consumer communication or marketing was also managed with an in-the-garage focus: signs at the entrance ramp showing promotion rates, signage hanging on the garage wall detailing hourly and monthly parking rates and vehicle restrictions, all viewable to the consumer once he or she was in the facility.

This approach has worked well for decades, but the three connectivity trends are changing that focus. Consumers no longer wait to make their decisions until they are driving around the block looking for a convenient place to park. As a result, garage operations need to be more effective and able to address changing needs and consumer expectations. These changes include being able to price parking based on local area activity or operationally supporting a surge in parking activity in the lanes due to local event or failure of lane equipment. Consumers are more sophisticated, with greater access to information and tools to make decisions in advance of even getting in their car.

This shift has a created a resource gap between the traditional mechanical world within a garage to the digital world that exists outside the garage, but it is quickly becoming a part of the inside of the garage. The skills we need to manage a parking operation are evolving, and the resource gap we need to fill should consider our new business strategies and the new technologies we will deploy. All of this leads to acquiring new people and/or skills to support the future operations.

People with parking experience and knowledge will always be a critical foundation to make the right decisions for our operations, but emerging technologies are becoming more sophisticated to evaluate, implement, and support, so a broader skill set in your team is needed.

New positions in your organization to support these changes might include dedicated parking-specific IT personnel who support network design and support; technicians to implement and maintain various sensor devices (cameras, space detection, equipment sensors, light sensors); database administrators to build data warehouses to store the collected data; data analysts to dig into the information with new software tools; and Internet marketing specialists to create social media outreach programs so customers don't just find out about you when they get to your parking facility.

In some organizations, it may be appropriate to elevate a technically savvy manager to a leadership position to help guide the operations to take advantage of these three trends. We see this occurring in more and more parking organizations utilizing a range of technologies. In one major North American municipality, the parking department has its own chief technology officer and team that includes a dedicated IT manager and 15 technical staff, all dedicated to parking.

The explosion of connectivity with devices, consumers, and the larger world is pushing our industry in new ways that can only be expected to accelerate. These trends are leading to an expanded view of what parking can and should be to better integrate with intermodal transportation options and cities as a whole while also capitalizing on consumer expectations for Internet-based services, improved choice, and better customer service. If we all take leadership in these areas, parking will provide broader and better solutions for our customers while being well-prepared for the changes going on around us. ℗