

Intelligent Parking Management Paves the Way to Better City Living

Siemens and Intel® solution cuts drive time, reduces pollution, and creates revenue opportunities

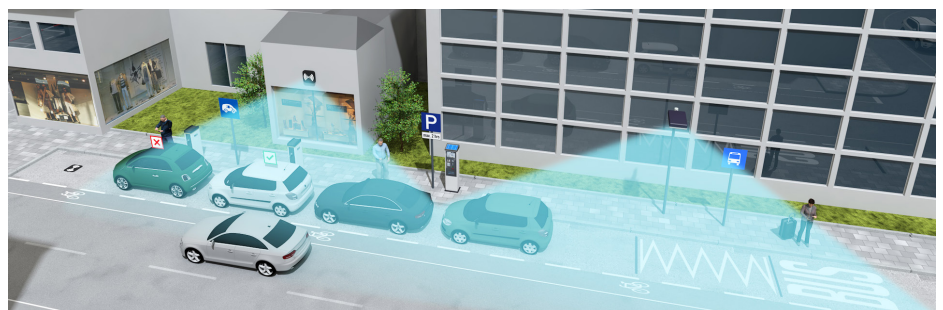
The solution keeps drivers informed and makes it easier for them to plan a trip more intelligently, find a parking space, and commute more efficiently.

Experts project that another 2.5 billion people will be added to urban areas by 2050, roughly 66 percent of the world's population.¹ Throughout the world, leaders are seeking technology-based solutions to make city living healthy, safe, and desirable. Surprisingly, one of the greatest challenges for city administrators and citizens may be the general absence of a strategic approach to parking. Siemens, with support from Intel and other collaborators, is taking the challenge head-on, with the development of the Siemens Intelligent Parking Solution*.

The modular sensor system is powered and secured in part by Intel® architecture—including Intel® IoT Gateways with Wind River Intelligent Device Platform* software and Intel® Security technologies—and supports multiple traffic and city management goals. At its core, the solution allows drivers to more efficiently locate and pay for their parking, increases safety and the use of available resources, reduces congestion and related air pollution, lowers the cost of parking enforcement, and enables third party organizations to create innovative, revenue-producing applications using smart parking data and APIs.

Drivers and City Leaders Seek the Benefits of Real Change

People are drawn to city living for a variety of reasons, including jobs, culture, family, and healthcare services. But as cities get larger and more people have access to cars, the inherent challenges of the urban lifestyle are amplified. If you drive to work or to school or to dinner, you'll have to park. If you can't find a parking space, you'll likely drive around the block several times, wasting time and fuel, polluting the air, and adding to the already-congested streets. Meanwhile, as more people drive and park, city administrators find it increasingly difficult and expensive to monitor parking spaces and enforce parking violations.



Using Data Analytics to Solve the Parking Problem

The Siemens Intelligent Parking Solution was developed to mitigate key parking-related issues and improve city living throughout the world. Designed to integrate seamlessly with the existing Siemens traffic management portfolio, the solution simplifies both city and driver decision making with valuable information on parking availability, ultimately freeing up roads.

In a pilot program in Berlin, early implementations of the solution are focused on helping city leaders reduce congestion, improve the use of available parking resources, increase safety with efficient enforcement of illegal parking activities, and optimize revenue by making real-time information on violations accessible to law enforcement personnel and introducing automated, billing to-the-minute that allows for convenient, cashless pricing.

The Siemens Intelligent Parking Solution: Smart, Secure, Modular, and Scalable

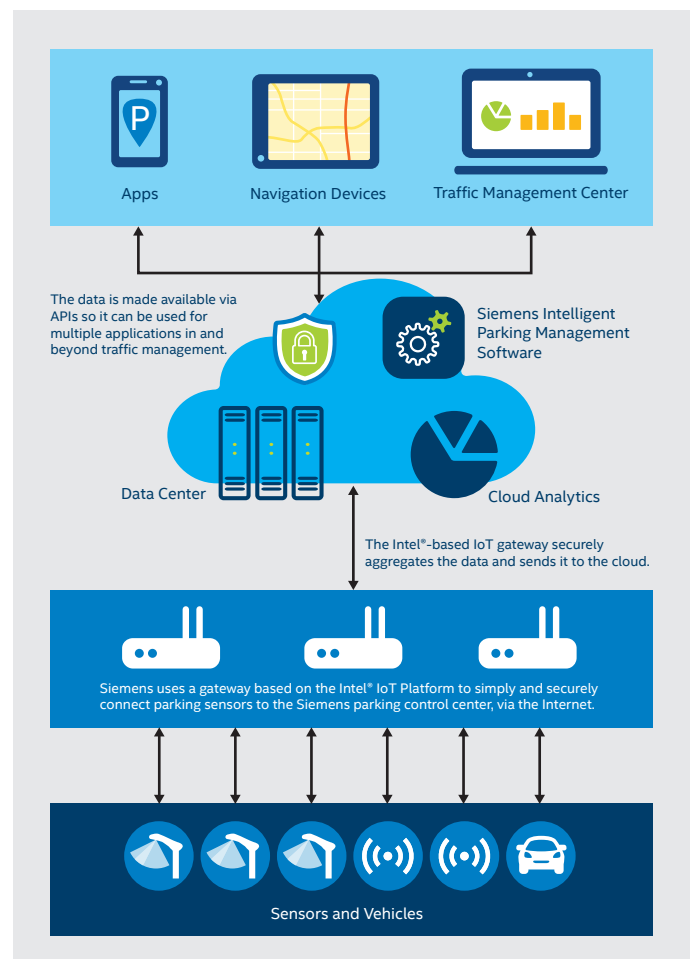
The Siemens Intelligent Parking Solution relies on a modular, infrastructure-based sensor system—constantly gathering data on the parking situation—that keeps drivers informed from their point of origin to their final destination, and makes it easier to plan a trip more intelligently, find a parking space, and commute more efficiently. The system uses a unique combination of ground and overhead sensors to collect real-time parking space availability information, while taking vehicle size requirements into account. The data can be securely aggregated and sent to the cloud via the Intel IoT® Gateway, and then made available via APIs so it can be leveraged for traffic-reducing and revenue-building applications by authorized third party developers. The gateway brings enough compute performance onto the street to analyze the data at the edge of the network.

The overhead sensors can be installed on a stand-alone basis or integrated as an invisible “smart” accessory into surrounding street lights. Additionally, RFID technology is used for recognition, drawing on real-time parking-related licenses or identification data. By combining statistical data on current and time-of-day-based parking availability with user-valuable data—such as time needed to secure a parking space and walking distance to the desired location—the system can help reduce commuter search time, recommend public transportation alternatives, and ease traffic congestion. Drivers can be guided to their final parking destination along the shortest possible route via in-car navigation or with the help of programmable dynamic message signs (giving commuters the current occupancy levels of the surrounding parking zones).

Moreover, intelligent data collection simplifies decision making about parking prices and regulations, making it easier for city managers to strategically set pricing targets, identify trends in parking violations, and plan for and promote a better, more profitable use of resources, including e-parking spaces and electric vehicle charging infrastructures. Plus, data made available via APIs can be used for multiple applications in and beyond traffic management, and the solution is scalable—enabling the integration of air quality, trash can, and other Smart City sensors.

Security is a priority for any Internet of Things solution, but especially so when devices are installed in public places. While other potential smart parking strategies may be vulnerable to physical attacks by hackers—in which a device is stolen, recorded maliciously, and put back online—the Siemens Intelligent Parking Solution is protected by Intel®-based security designed to mitigate risk. With features including McAfee Embedded Control* and Secure Boot* protection of the Linux* system, no hacker can modify or run a new version of code on a device without access to a private key from Siemens.

SMART PARKING IOT ARCHITECTURE



Moving Forward with Promise

Engineered to securely guide drivers, enhance trip planning, and collect and analyze real-time data, the Siemens Intelligent Parking Solution, powered by Intel® architecture, can improve commuters' experiences and help city leaders make intelligent decisions about parking and resources. With valuable outcomes such as reduced congestion and pollution, improved standards of living, and increased revenue, this innovative, developing technology is poised to make an impact in cities throughout the world.

For More Information

Learn more about solutions for smart cities, transportation, and traffic at intel.com/iot and siemens.com.

OPPORTUNITIES TO INNOVATE

As implementations of the Siemens Intelligent Parking Solution* accelerate, many opportunities for value-added elements are anticipated.

Sensing Applications

- Parking space utilization
- Traffic lane utilization
- Traffic lane speed measurements
- Standard environmental sensing (temperature, ambient light, and humidity)
- Extended environmental sensing (gas and fine dust concentrations, vapor, radioactivity, and seismic activity)

Controlling Applications

- Street lighting control
- Traffic light control
- Traffic management
- Car-park routing



1. "World's population increasingly urban with more than half living in urban areas" (United Nations), July 10, 2014: un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html

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