

# CITIES SERVING CITIZENS

*Technology, data, and business innovation allow cities to become the service organizations that citizens need*

Over the last several decades the number of Americans who suffered from asthma has risen to roughly 13%—a figure that brings with it loss of productivity in the workplace, and, for those who suffer, tremendous limitations in their personal and professional lives. But what if there was a way to get an alert on your mobile phone to avoid a city street because of the composition of particulate matter? What if there was a way to understand which places in a city are the worst for asthmatics? What if city planners had a smart way to alter tree spacing to reduce pollen, or actively redirect traffic to curb exhaust?

Citizens have started asking these types of questions. They want to use technology to receive better services, from easy and smooth commutes to protection from natural disasters. This is causing cities to change the way they collect, use and analyze data. Citizens want useful information in real-time, new models for interaction, and ways to become stakeholders and cities need to deliver.



## RELEVANT, REAL-TIME DATA

Listening to citizens' needs can save lives, save money and make cities more livable. Buenos Aires, for example, regularly suffered from extreme flooding, due to torrential rains and blocked storm drains. In the 2013 floods, 10 people in the greater Buenos Aires area perished. To provide the real-time data its citizens needed to stay safe, Buenos Aires partnered with the software company SAP to collect real-time data from 30,000 storm drain sensors. This allowed the city to understand what storm drains were clogged prior to torrential rainstorms. Over a subsequent period of three days of torrential rains Buenos Aires reported zero flooding. By using real-time data, its streets stayed dry and its citizens stayed safe.

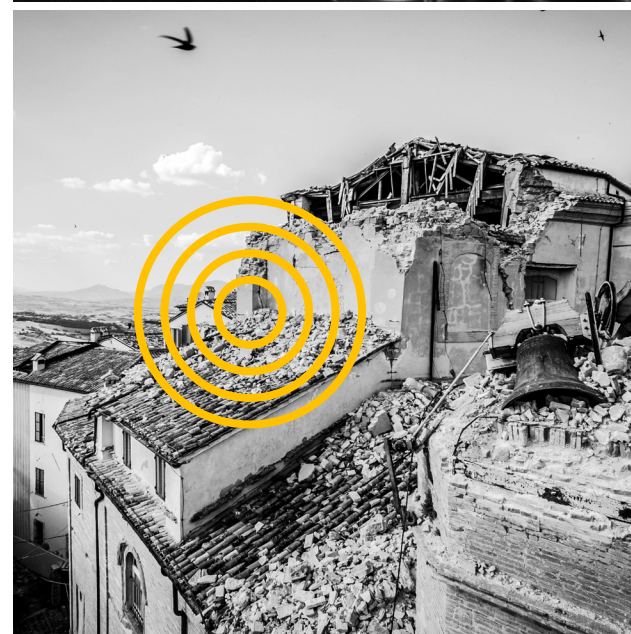
Real-time contextual information isn't just used to save lives. Accurate travel time estimates are one of the most in-demand services, and yet most cities are still without them. For cities, it isn't enough to create a system of sensors that track real-time traffic data, they also need to combine it with historical data such as rush hour patterns.

## NEW MODELS OF INTERACTION

This new demand for greater citizen engagement will require new models for services, which may ultimately mean reaching citizens where it is most convenient for them. Starting with parking apps that let drivers pay for parking with their phones, citizens are increasingly doing business with government using all types of mobile devices. While catching up to the private sector by creating app payment systems, cities have been eclipsed by citizen demand for other new customer service technologies. Using their mobile phones and existing messaging apps, citizens want easier ways to obtain information. New forms of engagement can take the form of chatbots. These computer programs are able to learn from repeated interactions with citizens to answer common questions. These always-available, mobile-first tools provide citizens with a new way to directly engage with their cities, and at the same time provide cities with the data they need to create new services.

The next generation of citizen engagement extends to a new variety of innovative indirect services, the importance of which many citizens are just now fully recognizing. In Japan, for example, SAP partnered with earthquake monitoring device manufacturer Hakusan and helped develop technology to use iPhones as seismometers in order to measure earthquakes. When an earthquake strikes, cities don't know what part of the city was damaged the most and where the most people are in need. SAP's and Hakusan's technology allows citizens to record seismic data using their phones' accelerometer. The data is automatically uploaded to the cloud and analyzed in real-time, which is a feat considering this system can produce three to four terabytes of data in a single year. The real-time analysis provides cities with the information they need to direct first responders to the biggest disaster centers after an earthquake. In addition to earthquake detection, sensors on city streets can be used to detect traffic accidents and alert law enforcement, or to detect weather patterns and decrease the brightness of streetlights to avoid glare in rainy conditions. This sort of technology allows cities to serve citizens in ways it has never been able to before.

These always-available, mobile-first tools provide citizens with a new way to directly engage with their cities, and at the same time provide cities with the data they need to create new services.







—  
Citizens themselves are able to become involved in their cities



## A SEAT AT THE TABLE

One of the most important steps toward the goal of greater citizen engagement is that the citizens themselves are able to become involved in their cities. Citizens want to participate in the process of developing these platforms in order to help guide the city on how best to suit their needs. Depending on the project, citizens can crowdsource information, collect data, help with project design or even physically help build the program. Including citizens in this process not only creates inclusivity, but also removes guesswork that might otherwise be involved in these wide-scale projects.

One city that has been doing this well is Detroit. A pilot program called Sensors in a Shoebox has recruited teens to help come up with the best ways to use sensors, and allows them to control how the data is collected and utilized. The students were provided kits in packages that looked like shoeboxes. The kits used a cellular sensor node to send the data directly to the cloud. This pilot program allows teens to become empowered, giving them the tools to work alongside their cities to create change. Because of personal experience, one team proposed using these sensors to track pollen in the air. This will create localized pollen alerts so people with asthma can avoid those areas. Connecting citizens both to decisions and to data allows them to play a part in serving their communities and makes people feel more invested in the places they call home—a true form of citizen engagement.

## PERSONALIZED AND PREDICTIVE

Giving citizens a seat at the table allows cities to create useful services that combine real-time and historical data with new models of interaction. This yields personalized and predictive services that make a real difference in the lives of citizens. The state of Indiana is providing these personalized predictive services to its citizens. Indiana has a high rate of infant mortality among at-risk mothers due to lack of access to prenatal care. 50% of infant deaths in Indiana are from the high-risk population. In order to address this crisis, the State of Indiana used SAP tools in the State Management and Performance Hub to centralize data collected by various agencies across the state.

They analyzed 17 sets of data from government agencies and public sources to create risk profiles of various populations based on such information as ZIP codes or the number of prenatal doctor visits. Once they knew the populations that were most at-risk, Indiana built long-term policies to solve the problem. One program was a tailored educational campaign to teach the most at-risk mothers about prenatal care. These insights are driving statewide budgetary decisions.

## TRANSFORMING CITY OPERATIONS TO MEET THE NEEDS OF CITIZENS

Cities are being asked to change the way they operate in order to better address the needs of their citizens. But cities don't have the technological capabilities to launch these programs or make the most of the data that they already collect. By partnering with the private sector, cities can transform their business models from agencies working in silos, to a collective customer service provider. Private sector companies, such as SAP, can bridge the gaps between agencies to dramatically cut down the time it takes for cities to scale pilot programs. By working together cities and the private sector can offer highly personalized forms of citizen engagement, tailored not only to the city itself but to each particular citizen.

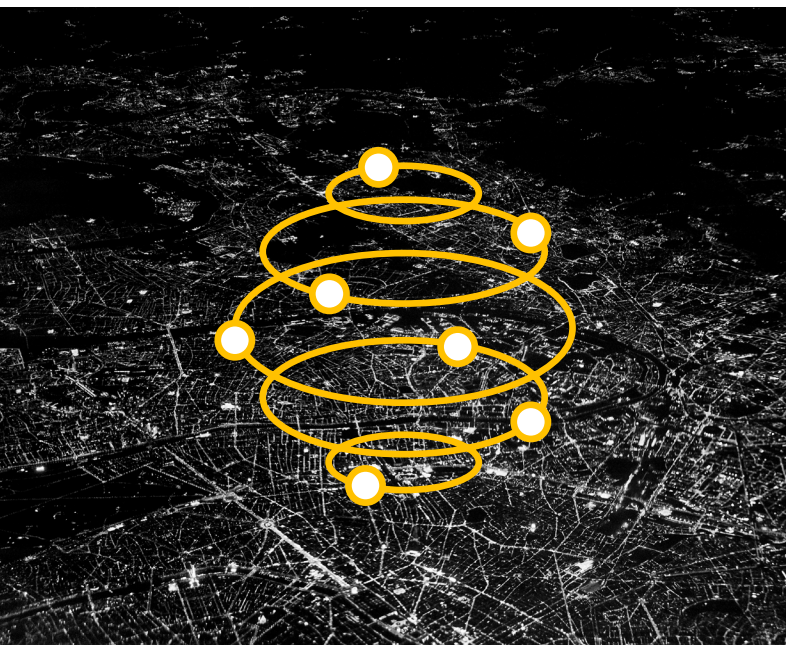
The aim of citizen engagement should not be to simply collect and offer more information, but rather, to collect the right information and deliver it the right way. Cities need to partner with private sector companies to build a data capture system built on Internet of Things connected sensors. It is not enough that these sensors capture the data, they need to be able to transfer that data to a central database in real-time. Either through WiFi, cellular data, or radio frequency identification devices (RFID) tags, sensors transmit key data to a central location. These sensors, placed on storm drains, streets, trash bins, lampposts or even embedded in clothing can track, temperature, humidity, particulate matter, vibrations, water flow or biometric data.

Once cities have the sensor data, they need to combine it with historical data to predict the needs of citizens. This task becomes harder as the amount of data increases. To more easily analyze this data, cities rely on machine learning tools. Machine learning is a type of software that allows it to learn without being explicitly programmed. This helps cities uncover patterns and correlations that humans would not be able to uncover. Machine learning is the backbone of an analytics system that can help cities predict what their citizens want.

The aim of citizen engagement should not be to simply collect and offer more information, but rather, to collect the right information and deliver it the right way.

Digesting and analyzing this data is only part of the solution. Cities also need to display this data in a meaningful way to its citizens and civil servants. City websites can immediately start to feel overwhelming and indecipherable, and the volume of information collected is not easily digestible. Instead of passively presenting information, cities can allow citizens and civil servants to determine what type of information they want to receive, creating personalized hubs that they can access everywhere. This will increase the efficiency of the civil workforce, increase the use of city services and make emergency alert systems more efficient.

The idea of services that personalize information for citizens—such as combining city data with data from tech partners to alert them to street construction, providing localized pollution levels or even maternal education—seems remote for most cities. However, by changing how cities view their citizens, they can use elaborate machine learning platforms and sensor technology, to become the service organizations that they need to be. And as the services offered to citizens change, so too will the way cities operate and what they prioritize. This level of data science creates opportunities in even the most unlikely places; it gives us endless possibilities for adding value to daily life. Storm gutters can go from being garbage traps beside sidewalks to crucial pinpoints for flood maps. The lamppost, acting as antennas across entire city grids, will become one of the most essential pieces of infrastructure of the new service oriented cities. The blueprint for what citizens want is already in place. All that is left to do is bring it to life.







Cities may soon be able to create predictive and personalized services for its citizens

## A SINGLE PLATFORM TECHNOLOGY THAT TRANSFORMS CITIES INTO SERVICE PROVIDERS

A key tool that allows cities to become service providers is a single technology platform, like SAP's Leonardo. The Leonardo platform captures sensor data, analyzes and processes that data and delivers it effectively and efficiently to citizens. Leonardo is not only able to introduce cities to the concept of Internet of Things, which uses sensors to connect everyday activities to the internet, but also integrates machine learning and natural language processing in order to parse through data and offer insights that might have otherwise remained imperceptible. And while this level of data insight might appear overwhelming, Leonardo offers design inputs to help create a service that is easy-to-use and functional. A platform like Leonardo can mean that cities may soon be able to create predictive and personalized services for its citizens.

Learn more about SAP Leonardo at: <http://bit.ly/2uKjXzg>

## LEARN MORE WITH THESE RESOURCES

- Learn how Buenos Aires created and operated their Storm Drain program: <http://bit.ly/2Ap88kW>
- Learn how Hakusan developed a real-time analytics program that can save lives: <http://bit.ly/2hRaSjz>
- Learn how Detroit is building an inclusive smart city: <http://bit.ly/2zpvsAZ>
- Learn how Indiana's Management and Performance Hub uses predictive analysis to save lives: <http://bit.ly/2yDRykd>
- Learn how the SAP Leonardo Platform allows cities to meet the needs of their citizens: <http://bit.ly/2uKjXzg>