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48 Risk Factors
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A More Agile Future

Able to move quickly and easily; quick, light and clever. The definition of “agile” might not easily connect to government projects, but if you’re talking about IT, maybe it should. Government Technology visited the NASCIO Midyear Conference in Baltimore last month, and talked to state CIOs about whether more iterative deployments for major systems make sense for them.

It’s a worthwhile conversation. The arguments against traditional waterfall methods are familiar: Technology can be obsolete by the time a project is finished, thoughtful analysis at critical milestones can be overlooked and business users are often left on the outside looking in.

“To be honest, when people start talking to me about projects that are going to take four years, I just doze off. I just can’t even process that,” said Delaware CIO James Collins. “We work in technology, so everything is moving exponentially faster all the time.”

Collins enlists a hybrid process that combines the big-bang approach with more agile development, where appropriate, breaking projects up into modular pieces that can be turned around in a year or less.

Ohio CIO Stu Davis echoed these sentiments, pointing to the adoption of agile development methods in the state’s Department of Taxation. “The old days of having four years to complete a project are long gone,” he said, adding that agile involves the business side from the beginning. “They’re engaged through that process.”

A more iterative approach is central to Illinois CIO Hardik Bhatt’s plans to transform IT and make the state smarter, as he discussed in our A Place for States feature (page 44) that explores how states are positioning themselves within the smarter government conversation.

Bhatt is at the helm of a huge consolidation effort to transform Illinois’ technology across the board — a daunting task, to be sure, in a state with continuing budget uncertainty and many overlapping core systems, including ERP and inventory management. Bhatt has his sights set on reclaiming IT leadership by improving both the business of IT and the customer experience by hitting 75-day milestones, an agile strategy that mirrors private-sector standards.

These examples represent a conscious — and encouraging — shift to embrace more flexible deployment models that ultimately deliver more efficient government and improved services to citizens.

I also wanted to take a moment (and a paragraph) to say how fortunate I feel to work with such a talented group of writers, editors and designers on this magazine. Government Technology was named the best publication in its category this past month by the Western Publishing Association. They are your stories that we devote ourselves to telling, in the hopes of advancing best practices in public-sector technology innovation. It’s our privilege, so we share this honor with you.
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The movement to come up with an alternative to the gas tax has become $16 million bigger. That’s how much the Federal Highway Administration is offering to states in grant money, which will be available to state agencies or groups of state agencies that are proposing user-based systems for collecting revenue that can bolster transportation budgets. Some states, such as California and Oregon, have already begun experimenting with “road use charge” programs. Though there are different approaches to figuring out how far participants drive, a common method is to have volunteers plug devices into their car’s standard computer ports. Those then report mileage back to the state so it can learn how to best design a program to charge people for how much they use the roads.

WHO SAYS?

“The genie is out of the bottle. ... Digital government is here to stay, it is what people expect. They want to be able to get their visa as easily as they can buy a book from Amazon.”

We need a system that enables individual voters to verify that their votes have been counted accurately. The voter needs an option to print a record of their vote at the time they vote. This record would have a unique transaction number and proprietary 3-D barcode. The 3-D barcode would also contain a record of whom the voter voted for, which could not be read or counterfeit by any devices available to the general public. At any time after the vote is counted, the voter would be able to go online and verify, using the unique transaction number on the receipt, that he or her vote was counted correctly.

“Dismissing the current generation as expendable is a tragic mistake of epic proportions that is already underway in many organizations. The result has been crashing infrastructure, massive security breaches, failed projects, unmet client needs, and a total loss of confidence in IT both as a profession and as a legitimate function of any business. As noted, most of these organizations end up training the older workers back as contract workers. What this article leaves out is that these contract workers come back at 4-5 times the cost that would have been incurred had they remained on the payroll.”

BCW in response to 

“Older Millennials in response to 
Workforce Disrupted: Major Changes Ahead for Public-Sector IT Workforces

A good backup is vital, but please do not forget about educating the end users. We must be vigilant in training and users to think before clicking. They must be aware of social engineering to prevent phish, which could bring down hospitals or possibly [wipe] out their business because they do not have a backup. Typically I see this virus disguised as [a] UPS or DHL email with an attachment. Train them to not randomly open emails and especially to not open attachments.”

Jeremiah Penn in response to 
Ransomware Emergency: What Can You Do?

“Digital Done Right

As social media use shifts from simply tallying likes and views and dives into measuring more meaningful engagement, Wichita, Kan., is perfecting the use of popular social tools to better its budgeting process. For its annual budget meeting, the city pulled back from time-consuming, in-person meetings with low constituent turnout and opted to engage its public online — with impressive results. Since the program’s early days, staff members have honed their approach from all-day events to tailored live sessions where they can interact directly with constituents through popular social channels. A series of five to seven questions posted to the city’s social pages allows participants to give feedback on pertinent topics without having to drill down into the 500-page budget. Interaction through the city’s Facebook page jumped from 671 comments in 2013 to 1,074 in 2015.

WHAT CAN YOU DO?

Ransomware Emergency: What Can You Do?

Jeremiah Penn in response to 

A good backup is vital, but please do not forget about educating the end users. We must be vigilant in training and users to think before clicking. They must be aware of social engineering to prevent phish, which could bring down hospitals or possibly [wipe] out their business because they do not have a backup. Typically I see this virus disguised as [a] UPS or DHL email with an attachment. Train them to not randomly open emails and especially to not open attachments.”

Jeremiah Penn in response to 
Ransomware Emergency: What Can You Do?
Hitting the road to drive innovation

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BECOMING DATA SMART

By Stephen Goldsmith

Data collected from the Internet of Things must be integrated into existing strategies while keeping new challenges in mind.

**Scendly cities are deploying sensors in streetlights, in water and waste systems, and to measure air quality and manage mobility. These very real breakthroughs provide tangible examples of the more foreboding-sounding Internet of Things (IoT). These IoT initiatives can produce vast quantities of data to help city governments manage infrastructure and improve operations.**

Increasingly, though, governments are pondering how to pull all this information together, wrestling with the platform they need for this data. However, is that really the right question? Officials should consider how IoT data needs to be integrated into a broader citywide data plan focused on solving priority problems and producing responsive services. As with all data sources, merely collecting the information won’t create public value. Rather, IoT should be approached as a rich data source that can feed analysis and insights when analyzed and incorporated into broader efforts. Here are five key themes to consider when implementing IoT initiatives.

**Leverage existing physical assets.** Infrastructure upgrades are an opportunity time to add IoT data collection capabilities. When upgrading parking meters to accept credit cards, cities can look for solutions to add space occupancy detection to those meters. When rolling out new streetlights, various sensors can be added that control the lights, as well as cameras or gunshot-detecting sensors. When incorporating the sensors in capital improvements, cities can procure the service of installing and maintaining IoT sensors, while adhering to data standards.

**Engage the local data ecosystem.** Partnerships with research groups, local nonprofits or corporations can help cities manage the technical complexity as well as the funding and analysis needs of IoT. For example, Chicago’s expansive Array of Things network of environmental sensors is being developed through a partnership with Argonne National Laboratory and the University of Chicago and funding from the National Science Foundation. These sensors will collect data citywide, including air quality, noise, weather and traffic information. This data will then be published on Chicago’s open data portal, which helps ensure that the initiative will be integrated and available along with the city’s other data work.

**Employ a clear data management strategy.** To maximize data, cities must be able to analyze it collectively with similar data sets, often from other departments or sources. When agencies independently collect data with no overarching guidelines, it can become siloed or incompatible with other data sets, blocking collaboration and cross-department insights. Data compatibility is an issue cities have struggled with for years, but can worsen when IoT solutions generate multitudes of new information without a plan for its use. Developing clear standards for how data is collected, stored and shared can prevent this fragmentation by creating a template that encourages collaboration and growth.

**Address security and privacy concerns with transparency.** Because expansive IoT solutions collect massive amounts of data, security and privacy issues are critical for cities to address. Governments must take the necessary precautions to ensure data is stored properly and securely, and that the understanding with any involved private companies is clear. This is particularly important to consider with IoT initiatives, as off-the-shelf products may not have adequate security for government needs. Transparency on how a city is using IoT data, who can access what degree of data and the measures taken to protect sensitive data is essential to show citizens their information is being properly handled.

**Turn collected data into action.** IoT is a tool to enable better governance and not the end goal. Operational implementation is crucial — IoT data must be analyzed and visualized to allow for better decisions in city operations or for research purposes to improve the quality of life. Having constant, real-time information is useful only if a city can keep up on the analysis end and use the flow of information to pre-empt problems. IoT can help governments foster innovation, promote information sharing, engage the public and understand their cities like never before. But to fully take advantage of IoT, cities must integrate it into existing data strategies while addressing new challenges and continually refining their procedures as they grow these new projects. ☑
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The Denmark city of Aalborg is considering the use of driverless, electric buses as part of its public transportation offerings. Designed by the French company Navya, the autonomous vehicle, called Arma, can reach a maximum speed of nearly 28 mph and carry up to 15 people. The steering system uses lidar sensors, GPS navigation, stereovision cameras and an odometer, which work to analyze the vehicle’s surroundings and track its position. If the testing goes according to plan, Aalborg will use the autonomous buses on a 1-mile route by 2018.

Arma hit the open road for the first time last year, shuttling more than 1,500 passengers during the Intelligent Transport Systems World Congress in Bordeaux, France.
FOUR QUESTIONS

Through the creation of a new role early this year, Seattle took a step toward maximizing the talent of the tech community while working to improve IT’s integration across city departments. In January, Candace Faber became the city’s first civic technology advocate — a position that she said is “not terribly different” from diplomacy, having started her career in the U.S. Foreign Service. Soon after moving to Seattle in 2013, she became involved in the civic tech and startup scene. Now Faber reports directly to Seattle’s CTO, but works most closely with the city’s digital engagement team, where initiatives like the open data program are housed.

Open Seattle community, for example, grow significantly in just the last five months since I took the job. I don’t organize that community, it’s volunteer driven, but it is sort of the main gathering space for people interested in civic hacking. I see a lot of that as a result of doing outreach to groups that maybe haven’t been included before. There’s been a strong response from our local tech industry and the people who work in it who really want to help us solve some of our major challenges. And I’ve also had a good response from the code schools and other education institutions, and people who are looking to build even basic applications that serve a social good purpose.

3 How does the role fit into the internal structure of the city?

It’s a brand-new role, and so I’m still defining it and trying to be responsive to the needs within the city. It’s challenging anytime you come into an institution that works well and has people who are very dedicated to their work with an approach that could be perceived as disruptive. We really like to use the word “innovation,” but it’s only fun if you’re the innovator. It’s not so much fun to be a person who’s being innovated upon. So I’m working to create more of a community of practice around the city where I’m trying to help people see the potential for data and technology and then give them ways to access it on a voluntary basis.

4 Is a government setting conducive to innovation?

Innovation in government is tricky. It takes time for a reason and that’s something that I’ve learned since joining the city. It’s actually quite good that we move slowly because when government makes a change, it has to last for a very long time. People rightfully want to be thoughtful about how we implement things. … With civic tech in particular it’s important to think about things like, “What is the equity impact of this tool?” If we switch to using a new technology, whose voices are we privileging in that conversation? There’s tremendous potential in tech to improve outcomes, engage more people and serve more people’s needs, but we need to be really deliberate about what choices we make with the data stance and the technology side.

— Elaine Pittman, Managing Editor

This is a new position for government — how are you approaching it?

Many cities have made investments in their open data program or data analytics or digital equity. I am connected to those efforts, but also the position is new and different from anything I’ve seen elsewhere, which is a bit of a challenge in that I need to figure out how to create real space for more innovative thinking about how we use technology to solve civic problems.

With the title of “advocate,” I’m a team of one, so I don’t actually do data analytics or build applications. I am instead in this two-way advocacy role where I am advocating for tech innovation within the city and for civic engagement out in the tech community — and then trying to create spaces where both cultures can come together and solve problems.

How has your role been received by the community?

It’s been largely positive. I’ve seen the
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THE BEST WAYS TO DEPLOY INTELLIGENT TRANSPORTATION.

BEN MILLER/STAFF WRITER
The end of congestion brings many tantalizing promises: safer roads, less pollution, a better life for people in low-income neighborhoods. The technology to make that happen — intelligent transportation — always seemed to be just around the corner. Until now.

The effort to build a smarter transportation network, which could put a big dent in congestion, is taking a step forward in the form of one gigantic carrot the U.S. Department of Transportation (DOT) is dangling in front of America’s cities.

The DOT will award one city a single big prize of $50 million along with a conglomeration of services and products from tech companies that have scrambled to attach their names to the project. While only one city is getting that prize, its very availability has helped fuel a movement that may well set the tone for smart transportation projects for a long time to come. That’s because the finalists in its Smart City Challenge are proposing projects involving technology that’s only just now beginning to emerge — things like self-driving cars, vehicle-to-infrastructure connections and wireless electric vehicle charging.

The DOT granted seven finalists in the challenge — San Francisco, Portland, Ore.; Denver; Austin, Texas; Kansas City, Mo.; Columbus, Ohio; and Pittsburgh — $100,000 to build partnerships and develop proposals to deploy that technology. Representatives of those cities say they want to pass along the lessons they learn during the process to others that will help them complete connectivity projects of their own.

Kansas City will inevitably stretch into the rest of the country.

In the world of transportation, there’s constant chatter about emerging technology that could upend the status quo, redefining even basic concepts like the need for personal vehicle ownership. But some of that technology has been “on the horizon” for a long time. For example, in 2004, the Federal Communications Commission set aside a band of radio frequency exclusively for connected cars. And yet little has been done to take advantage of it beyond making it available to a small sliver of the automobile market.

But the ability of cars to connect with networks could be hugely important. It could save lives, reduce congestion, speed emergency vehicles to their destinations and pave the way for self-driving cars. It could make it easier for people to find the most efficient means of transportation, and give engineers the insights needed to make the best decisions about building infrastructure.

The DOT’s challenge will be getting one city to build up its transportation connectivity capabilities in ways as of yet largely unexplored at scale. That city will have plenty of lessons to give to others that will help them complete connectivity projects of their own.

“We can show them, here’s what we did well and here are the mistakes we made,” said Bob Bennett, chief innovation officer of Kansas City.

The DOT's challenge will be getting one city to build up its transportation connectivity capabilities. Engineers can look to limit unpredictable circumstances. In addition, some might only travel at low speeds.

Regardless, the technology fits in well with other components of the challenge. For example, vehicle-to-vehicle and vehicle-to-infrastructure connectivity could help autonomous vehicles navigate and adapt to situations. And because the conceptual autonomous vehicles being tested today are largely electric, they also fit in with plans to encourage electric vehicles and charging infrastructure in the winning city.

Many of the cities marked as finalists are already in a good place to be able to do that. Kansas City is one of five worldwide municipalities in the Institute of Electrical and Electronics Engineers’ smart cities technology sharing program. Pittsburgh tours its participation in the U.S. Conference of Mayors and the National League of Cities. And then there’s the simple geographical reality that none of the cities involved in the contest exist separately from the others. Major transportation work in Kansas City will inevitably stretch into the rest of the country.
the auspices of state government in both Missouri and Kansas. San Francisco sits in a unique, sprawling urban area dependent on commuting and spread out across multiple counties. The lead officials behind Columbus’ proposal point out that they’re within a short day trip of other major transportation hubs such as Detroit, Cleveland, Pittsburgh, Indianapolis and Louisville.

“That adds to our ability to quickly transfer information and project ideas and successes to these other cities so that they can implement them too,” said Randy Bowman, assistant director of the Columbus Department of Development.

The Smart City Challenge finalists have focused on project proposals they hope will influence the future of smart transportation.

In Kansas City, that would mean automated vehicles shuttling people to the airport and possibly the downtown core. Kiosks, which the city is already installing along its 2.2-mile streetcar line, would be deployed in more areas to give citizens without Internet access the ability to find their best options for getting around. Sensors would tell drivers about pedestrians entering crosswalks, and traffic signals would give priority to certain vehicles. Smart streetlights and cameras would improve safety, and gunshot detection systems would feed directly into police patrol cars. The scheduling of the city’s transit options would be coordinated, and the bike-share program — now with more stations — would offer better information about how many bicycles were available and where.

As one of the busiest freight hubs in the country, Kansas City would work to make conditions better for truck drivers. Trucks coming to pick up freight from trains might connect to traffic sensors to keep them from piling into rush-hour traffic. Vehicle-to-vehicle connections could enable them to drive in platoons, giving them better gas mileage.

“They’re able to follow each other, about half a car length from each other,” Bennett said. “And they can draft off each other.”

Columbus has a slightly different idea for its freight operations. That city wants to develop an application that will combine real-time information about traffic conditions, height and weight restrictions and other factors important for heavy vehicles and use all of it to guide drivers to the best route.

“You’ve got the 30-year veteran looking for a trucking job, they probably know where things are,” Bowman said. “But the newer driver who’s on a tight deadline, they don’t know where things are.”

Meanwhile, the city would look to connect specific underserved neighborhoods to education, job centers and all Columbus has to offer. A particular area of emphasis would be South Linden, a neighborhood north of downtown with high incarceration rates, low education levels and an average lifespan about eight years shorter than the rest of the county.

“We have a lot of residents in the neighborhood that may not have...
CLOUD SUPPORT FOR SMART TRANSPORTATION

Since many — if not most — of the proposed projects involve gathering data or mining existing data, it makes sense that cloud technology plays a big role in the Smart City Challenge. In some plans it’s more central than in others, but the basic idea is that establishing a cloud infrastructure for the transportation operations of the winning city will both allow easy access to data and enable all sorts of new mobility projects.

For example, the cloud might be the infrastructure through which kiosks in low-income neighborhoods connect people with bus rapid transit and other out-of-reach transportation options. The cloud could enable systems to handle fare payment, and it could help connect autonomous vehicles with the infrastructure that supports their movement.

And perhaps most importantly, the cloud could serve as an open data source providing unparalleled insights to planners, engineers and entrepreneurs. By making it easy to collect and analyze transportation data, the winning city could be giving itself a resource that allows it to better plan infrastructure funding choices, target programs and develop mobility strategies.

ready access, that may have challenges on a daily basis in gaining access to transportation,” Bowman said.

Part of the plan is to put a smart corridor right through South Linden that would connect it directly with major employment centers. The corridor would include bus rapid transit, traffic signal prioritization to support the BRT line, and a program targeted at people who use cash instead of electronic payment.

Because many people in South Linden rely on physical money (cash, checks), it can be tough for them to access services that are on electroninc payment. San Francisco might use the money to help address mobility challenges in low-income neighborhoods before they even develop. With a massive project promising to bring a couple thousand units of affordable housing to nearby Treasure Island, which is located in San Francisco Bay and isolated from the city’s main transit services, San Francisco County Transit Authority Executive Director Tilly Chang said she wants to have plenty of transportation options in place for future residents.

“We want to have what we call a car-light lifestyle on the island in the future,” Chang said.

Pittsburgh wants to leverage its existing data network to support the development of “smart spines,” or major non-highway traffic corridors in the city outfitted with sensors and controls. The idea would be to use the systems to improve traffic while also tackling other city priorities such as stormwater management and the development of a smarter power grid.

The city would then open that data to the public so its citizens could help the system adapt to changing technology.

“We don’t necessarily know the direction that the technology is moving,” said Alex Panaschkin, a policy adviser in the Pittsburgh mayor’s office. “It certainly helps to have Carnegie Mellon [University] involved as one of the leading [players] in that field, but we don’t necessarily know that what’s on the table today is going to be top-of-the-line five years from now:”

In an ironic twist, the selection of one winner might not even matter in the long run. Regardless of which city actually wins, each finalist got to where they were because they already had many of the pieces in place to achieve the plans they were talking about: scores of local and national partners interested in high-tech transportation solutions, relationships with innovators in other cities, existing pilot projects, research centers and more.

What the challenge did was prompt leaders to pool all those resources and come up with a plan. “I think in both cases, just the exercise of going through this process, and being able to go through this process as a finalist — we’ve already making progress,” Panaschkin said.

And then there’s the fact that the DOT gave each of the finalists $100,000 early in the year to refine their proposals. That means the DOT has effectively pushed all the finalists into getting the ball rolling.

The only difference between the winner and the rest of the finalists might be timeline.

“We need to be doing this stuff, with or without a grant,” Bowman said. “So [if we don’t win the challenge], we would expect to continue making Columbus a smart city.”

Many of the other finalists feel the same way. Whether they become technology pioneers or learn from the winning city, the wheels are already in motion to start deploying the sort of smart governance they hope will make their cities more equitable and easier to navigate.

“(It’s) going to come regardless of the grand prize,” Panaschkin said.

The winner of the DOT’s Smart City Challenge is expected to be announced this summer.

smitty@pitt.edu.com
The Ideal Digital City

June 2016
Ask someone to describe a digital city and they may mention Songdo, South Korea, a sustainable city built from scratch more than a dozen years ago.

Or, they may reference Rio de Janeiro, Brazil, with its Centro de Operacoes, a high-tech control center run by the city government that can monitor everything from crime to traffic congestion to water levels on streets after rainstorms. Similarly, they might suggest Santander, Spain, where thousands of sensors do everything from counting the number of cars in parking garages to deciding when to turn on sprinklers in parks to brightening streetlights when they sense a car driving down a street late at night.

Those, of course, are the eye-catching, headline-grabbing examples of smart cities. But for most cities and the public officials who run them, a digital city is something more mundane: an open data platform; an enterprise geographic information system; a multi-channel customer relationship management platform for customer service; analytics tools to digest large streams of data. And while these technologies may seem routine — GIS has been around for nearly 30 years — they have been evolving to where they have become integral and essential in fulfilling the goal of digital cities, which is to improve the lives of their citizens.

With urban areas continuing to grow at a substantial rate — from 30 percent of the world’s population in 1930 to a projected 66 percent by 2050, according to the United Nations — getting the urban experience right has become paramount. To help understand the building blocks to a successful digital city, this report looks at five key technologies — broadband, open data, GIS, CRM and analytics — and provides a window into how they are helping city governments cope with economic, educational and societal demands.

The good news is that these essential technologies are getting cheaper, faster and better all the time. But technologies like these still cost money, need talent to run them and are dependent on the right policies if they are going to succeed. In other words, digital cities need smart thinking in order to work.
Education is another big reason why broadband infrastructure is critical for the ideal digital city. A growing number of studies point to the fact that cities that lack wide adoption of broadband will struggle when it comes to educating and graduating students with the skills needed to advance in college or for sustaining an economy that is increasingly tech-driven. Local governments also have an opportunity to cut costs by creating more online services, but only if there’s close to universal adoption of broadband in the community. And that’s where the problem lies with urban broadband infrastructure. Nationally, 75 percent of Americans had a connection to broadband in 2014, according to Brookings. But there’s a great variation in connectivity across demographic groups and between metropolitan areas. While the San Jose-Sunnyvale-Santa Clara (Silicon Valley) area has the nation’s highest rate of adoption at more than 88 percent, cities like Laredo, Texas, have adoption rates of less than 58 percent. For decades, when it came to infrastructure and potential, the cities with a well developed network of roads, bridges, rail and subway lines, as well as good electrical and water utilities, were considered world leaders. Now, local governments are expected to have a digital infrastructure consisting of cable and fiber with deep penetration into every neighborhood, if they are to compete regionally, nationally and even globally. Broadband is now essential for 21st-century communications and commerce. Take jobs. Broadband is the catalyst for economically competitive cities. America’s 50 most research- and technology-intensive industries have added 1 million jobs since 2010, and these industries are disproportionately based in cities, Bruce Katz, a researcher with Brookings, told The Economist. Broadband is a necessity, not a choice, in municipalities like Iowa City, Iowa. Iowa City, Iowa, is a modest-sized city, with a population of just over 73,000. But what makes it stand out is the fact that it ranks fifth in the nation overall when it comes to the percentage of households that subscribe to broadband. With 86 percent of its homes connected to high-speed Internet, Iowa City outranks San Diego, Seattle and Washington, D.C., to name just a few of the best-connected cities in the country, according to a survey by the Brookings Institution. Cities that have high levels of fast Internet connectivity to households reap more economic and educational benefits, according to Brookings: “There is no question that the Internet is a huge boon to the economy and society, but maximizing its potential is only possible if all individuals are online.” What makes Iowa City so special? It has an educated workforce that has a relatively high average household income and large numbers of technology workers, as well as people who work from home, it’s also a university town (University of Iowa), and it has fewer senior citizens compared to other cities of its size. Most importantly, it’s a city where broadband is seen as a necessity, not a choice. For decades, when it came to infrastructure and potential, the cities with a well-developed network of roads, bridges, rail and subway lines, as well as good electrical and water utilities, were considered world leaders. Now, local governments are expected to have a digital infrastructure consisting of cable and fiber with deep penetration into every neighborhood, if they are to compete regionally, nationally and even globally. Broadband is now essential for 21st-century communications and commerce. Take jobs. Broadband is the catalyst for economically competitive cities. America’s 50 most research- and technology-intensive industries have added 1 million jobs since 2010, and these industries are disproportionately based in cities, Bruce Katz, a researcher with Brookings, told The Economist. Broadband is a necessity, not a choice, in municipalities like Iowa City, Iowa. Education is another big reason why broadband infrastructure is critical for the ideal digital city. A growing number of studies point to the fact that cities that lack wide adoption of broadband will struggle when it comes to educating and graduating students with the skills needed to advance in college or for sustaining an economy that is increasingly tech-driven. Local governments also have an opportunity to cut costs by creating more online services, but only if there’s close to universal adoption of broadband in the community. And that’s where the problem lies with urban broadband infrastructure. Nationally, 75 percent of Americans had a connection to broadband in 2014, according to Brookings. But there’s a great variation in connectivity across demographic groups and between metropolitan areas. While the San Jose-Sunnyvale-Santa Clara (Silicon Valley) area has the nation’s highest rate of adoption at more than 88 percent, cities like Laredo, Texas, have adoption rates of less than 58 percent.
Then there’s the speed factor. The Federal Communications Commission defines minimum broadband speeds as 25 Mbps for downloads and 3 Mbps for uploads, but 44 million Americans are more likely to experience download speeds of 4 Mbps or less. Meanwhile, closure of the availability gap between those who have broadband and those who don’t appears to be slowing, according to the FCC. In other words, broadband progress has stalled.

To become the ideal digital city, urban areas realize their broadband infrastructure has to reach near-universal availability at speeds ranging from 100 Mbps up to 1 gigabit per second. Seattle commissioned a study on what it would take to implement a municipal broadband service for universal adoption, but halted at the $480 million to $685 million price tag. Still, other major cities continue to explore the idea of municipal broadband to make the Internet as universally available as water and electricity. Boston is considering the idea and, most recently, San Francisco studied what it would take to create gigabit Internet service for the entire city. While San Francisco may be the largest city to contemplate this, it’s not the only one. At least 48 cities have some kind of gigabit service available at residential rates, according to Highspeed.ie. Chattanooga, Tenn., is perhaps the most famous and largest of the cities offering gigabit broadband as a municipal service, but others provide very fast Internet service either as a municipal service, but others provide very fast Internet service either as a municipal service, or through a provider.

For a long time, the major broadband providers have downplayed the need for gigabit Internet service in cities. But Google Fiber has begun to change the equation. The service, launched in 2012, has brought gigabit service to a handful of cities, including Kansas City, Mo.; Provo, Utah; Austin, Texas; and Atlanta, with plans to add service in San Antonio, Nashville, Tenn.; and Charlotte, N.C. As a result, cable providers that dominate the existing broadband infrastructure have begun to actively market their plans to provide gigabit service.

In February, a municipally owned electric utility in Huntsville, Ala., announced that it would lease its fiber lines to Google Fiber, which would deliver gigabit service to residents and businesses starting in 2017. Some see the partnership as a game-changer in how municipalities provide broadband. “The Huntsville model changes Google’s path to scale as it potentially decentralizes construction efforts to multiple cities,” according to Brookings. The partnership will “decouple” ownership of the fiber network from providing Internet service, speeding up the delivery of fast Internet service. It’s also expected to bring more municipalities into the world of gigabit service, as incumbent cable and telecom companies will compete to provide a similar service.

That’s good news for cities, big and small, that need abundant, affordable broadband for the next generation of economic growth and education.

Open Data & APIs: Collecting and Consuming What Cities Produce

Nobody likes to see their streets dug up for some utility project. Worse, nobody likes to discover a new street project is slowing them down during a morning commute. In Los Angeles, where just about everybody drives, street projects are a nuisance, and when the work isn’t well coordinated and timed it can be a major headache. That’s why the city government launched Street Wise. It uses open data so that city employees can see whether the road they want repaired is also scheduled for utility repair. Residents can also look up the same information and find out in advance whether a street they commute on is going to be partially shut down for a sewer repair.

Information like this has always existed in local governments, but there have rarely been attempts to open up the data and publish it in a way that people, whether they are city employees or residents, can understand. But attitudes on making city data publicly available have undergone a sea change in recent years. Starting with calls to make government more transparent and information easier to disseminate, the idea has spread throughout the public sector. But its biggest impact, arguably, has been at the local level, where citizens interact with government most frequently.

1 / It has improved government primarily by increasing transparency and tackling corruption, but also by improving public services in new and innovative ways.

2 / It has empowered citizens by giving them information to make more informed decisions and to make it easier to mobilize socially, aided by new ways of communicating and accessing information.

3 / Unlocking data has fostered innovation and, more importantly, economic growth and job creation.

4 / It is playing an increasingly important role in giving citizens and policymakers new ways to assess problems while enabling civic engagement that has produced targeted interventions and enhanced collaboration.

Governments began making data openly available to the public through Web portals. These somewhat ad hoc efforts often brought mixed results when it came to the usefulness of open data. In some cases the data was still locked because of the format used (often PDF files). More importantly, cities failed to develop the proper application programming interfaces (APIs) that
Local governments are charged with maintaining safe, prosperous and healthy communities. Chief information officers (CIOs) play an important role in achieving these goals by implementing technology to improve service delivery and enhance the overall citizen engagement experience.

The Accela Civic Platform provides public CIOs with technology solutions that meet their goals by modernizing and transforming civic processes. Whether it’s making it easier for entrepreneurs to start and run a business, reducing the time needed to review and approve building permit applications or plans, or reaching more people by posting government agendas and meetings online, the Civic Platform connects local government directly to its community.

ACCELA PROVIDES THE PLATFORM TO SUPPORT THE MODERN-DAY CIO AND COMMUNITY.

Using Accela’s mobile apps and automated notifications enables government employees and citizens to quickly and easily access real-time information, resulting in a breakdown of silos, improved coordination among departments and increased community engagement.
America’s broadband infrastructure is considered to be overpriced and slow when compared to Internet speeds in other countries. Worse, it’s far from universal. Nationally, 75 percent of households have broadband, and 53 percent of rural Americans lack access to even moderate-speed service. Critics of the country’s broadband infrastructure say the lack of universal access to high-speed broadband is a drag on education and the economy.

“Think if we were at 75 percent for electricity or running water,” Adie Tomer, a research analyst with Brookings, told Governing earlier this year. “With 25 percent of the population without broadband, it has ramifications for students who don’t have access, for job seekers,” he said.

Laying cable or fiber in the ground or on poles and connecting homes to the Internet backbone is an expensive proposition, holding back the goal of low-cost, universal adoption. But high-speed wireless might be the answer. Already a small but growing number of households rely entirely on 4G mobile networks to provide not just phone service, but data needs as well. The network has been around since 2010, and it adopted IP technology in a way that significantly boosted broadband access to mobile devices with higher speeds and an emphasis on streaming data rather than just transmitting voice communications.

Now, the wireless industry is stirring interest in 5G networks. While far from being a global standard, there’s already growing excitement that it could take wireless broadband to a new level with speeds reaching 1 gigabit per second (and perhaps reaching 10 Gbps as the technology matures) and a latency of no more than 1 millisecond versus today’s 4G latency of about 50 milliseconds, according to The Economist.

But it could take years before standards emerge. There’s also a question of where the spectrum for 5G might come from, since today’s wireless devices operate in a crowded part of the radio frequency, leaving little room for 5G.

Stay tuned.
developers can use to consume the data and create value through new services.

Initial efforts at creating APIs for open data were informal, often done as part of a hackathon. But as cities recognize how they can spur new forms of service delivery either at the desktop or, more significantly, on a mobile device, the pressure to formalize how APIs are developed has increased. And for good reason. APIs combined with open data have led to the creation of apps that put the “smart” in smart cities.

For example, a growing number of cities have launched bike-share programs. But savvy cities have supported software developers to create mobile apps that help guide bike riders in choosing the best routes to reach their destination. Well-developed APIs allow a user to query data to find an answer.

But APIs are more than just a way to connect a user with data in an innovative way. They’re also about functionality, empowering citizens to do new things more efficiently. One of the leading cities in API development is overseas. Barcelona, Spain, has developed a global reputation for publishing APIs across government departments that include transit, environment, land use and business data. The city also has an open source infrastructure platform that uses APIs to access sensor data that monitors temperature and air quality, garbage collection, parking and pedestrian flows.

The development of APIs for digital cities has become so important that the European Union launched an initiative known as the City Service Development Kit that fosters development of interoperable and uniform APIs for cities that can turn data from 311 systems into new types of services, and link transportation and geographical data for mobility solutions, as well as APIs that can provide location-based services for tourists.

In the U.S., several cities — including Boston, New York City, San Francisco and Seattle — have been aggressive about opening up their data and developing APIs. Philadelphia has led with its open data as well, becoming one of the largest government users of GISHub, a hosting service for open source code management that has boosted collaboration and faster development of new software services that use the city’s open data.

The importance of open data and APIs doesn’t stop at the public good they create. Open data is increasingly seen as a powerful economic development tool. The consulting firm McKinsey estimates open data’s economic potential at more than $3 trillion in added value to the world’s economy. GovLab’s Open Data 500 is a list of firms that benefit from information published by the federal government.

But economic development doesn’t start to flow when a city publishes data. The information has to be in a standardized format that companies can use, and it must be kept fresh. Cities also need to decide which data to publish. There are hidden costs to publishing open data and expenses can rise quickly if a city isn’t smart about which data to make publicly available. Governments that pay attention to these best practices will find their open data initiatives are not only more cost-effective, but also deliver more value for the public overall.

GIS: An Established Technology Finds New Purpose

It was a mild winter for most parts of the country. But don’t tell that to residents in the Washington, D.C., region, which got clobbered by a 30-inch snowstorm in January. As government workers sent plows out into the streets, residents were able to do something rather unique: enter their address on the city’s website and find out when the snowplows would be nearby. The map also showed where the city received 311 requests for snow removal and gave users a chance to look at recent photos from road cameras showing driving conditions.

The secret sauce behind this application and others like it is location-based data, digital maps and software known as a geographic information system. GIS has been one of the longest running success stories in government technology. Throughout the 1980s and ’90s, GIS was a godsend to city operations, helping plot development plans, track road and sewer repairs, and manage natural resources and other assets.

But with the rise of the Internet and now open data and mobile technology, GIS has been transformed from a technology to aid internal government operations into one that supports a new generation of customer services. Traditionally, only the biggest cities with the biggest IT budgets could afford GIS and have been the leaders in terms of new location-based services that use the wealth of geo-coded data in public-sector servers.

However, GIS has become cheaper and faster, opening up opportunities for smaller jurisdictions, while providing new options for cloud-based solutions that can be accessed by smartphones and tablets in real time. Open data has also helped expand the way the public can access and use geographic information. A key reason GIS has become so embedded in local government is that, by some estimates, nearly 80 percent
Public utilities are undergoing major change as new technologies such as automated meters and smart grids help deliver better service, conserve energy and cut costs. To get the most out of these innovations, in 2014, officials at the Kansas City Board of Public Utilities (KCBPU) decided they also needed the most up-to-date financial management tools. "Our chief financial officer wanted a system that could support industry best practices, regulations and system capabilities," said Paul Pauesick, the public utility's director of information technology.

"We wanted a financial system that would evolve with us and not get stagnant."

The 90s Called, They Want Their Hardware Back
KCBPU had been using the same enterprise resource planning (ERP) system for financials and human resources (HR) since 2005. "It was a great system, but it was born in the late 1990s," Pauesick said. "We wanted a financial system that would evolve with us and not get stagnant."

Running on servers in KCBPU's data center, the financial system had not been upgraded since 2008. Updating the existing system would have required several months and thousands of dollars in license fees and new hardware, not to mention additional labor to maintain the system. "And we would have been stuck with the effort and expense of doing a "forklift" upgrade every three years," Pauesick said.

Instead, KCBPU replaced its old system with Oracle Fusion Financials. Implementation was swift and future updates promised to be painless.
In fact, KCBPU upgraded to Version 10 of Fusion Financials only six weeks after going live with Version 9. “We did that upgrade in about four weeks,” Pauesick said. “Typically, that would have taken six months or so.”

To purchase Oracle Fusion, KCBPU took advantage of a U.S. Communities contract offered by DLT Solutions. This cooperative contract gives public agencies a price advantage while eliminating the effort attached to a traditional procurement.

“The RFP [request for proposals] process and review could have consumed the better part of a year,” Pauesick said. And the work involved carries a cost of its own. “I saved a lot of money by using an existing co-op contract,” he said. With a shorter procurement cycle, KCBPU could get the Oracle system up and running quickly and start enjoying its benefits.

Numbers Don’t Lie

By moving to a cloud-based system, KCBPU saw immediate savings to the tune of $375,000. Including the cost of software, it’s estimated the agency’s net 5-year benefit will be $1.8 million.

KCBPU reaped “soft savings” as well, such as ensuring uptime in the case of a regional disaster and increasing security without hiring additional staff.

“The Oracle cloud provides security through encryption. The data is encrypted in motion and at rest. And we do that across a spread of IP addresses, which improves my security posture. It also offers business continuity through a dual-site approach, with a primary cloud in Chicago and a backup cloud in Austin,” Pauesick said. “I could not provide that locally without spending millions of dollars, and it still wouldn’t be secure against a regional disaster.”

Same Staff, More Time

An added benefit of moving to the cloud is that Oracle handles the day-to-day operations for the finance system. “In the cloud, you don’t have to upgrade your operating system, servers or firmware, and you don’t have to devote staff to maintaining hardware,” said Pauesick.

Pauesick’s staff now attends to higher-end work, such as integrating Fusion Financials with tools for business planning and budgeting and asset management.

Looking Ahead

KCBPU has plans to move more systems to the cloud. In 2017, it will migrate from its old HR system to Oracle Fusion Human Capital Management. Now that the agency has experience in the cloud, Pauesick anticipates an even faster implementation than the Fusion Financials project. “I expect we’ll be able to move HR to the cloud in less than half that time.”

Including the cost of software, it’s estimated the agency’s net 5-year benefit will be $1.8 million.
of all city information is address-based, making the technology extremely useful. GIS has gone from being a niche system to one that's used by everyone, including police departments.

The result? A growing number of interactive public services have emerged in cities. Besides weather-based apps for snow-filled streets (Los Angeles has developed a map to help residents navigate the city during downpours from the recent El Niño), there is a map for pinpointing where and when the worst outbreaks of smog are occurring, and apps that tell residents when their trash and recycling will be picked up based on address information.

Chicago recently launched a map that lets users search for certain data like food inspection reports, street closures and pot holes. Users can narrow searches by zip code, or use a tool to select areas on a map they want information on. Cities have always used GIS to plan development. But now, some have opened up their GIS assets so that the public can use location data to help new businesses get started or expand existing ones. One example is a mapping tool created by Rasheq Cucumoqra, Calif., that lets users search and browse available buildings for business needs. They can narrow choices based on square footage, zoning and building type. Users can also find businesses by name or address, and look at property exteriors via an embedded connection with Google Street View.

GIS is still a powerful tool for internal operations, but now it can incorporate some of the latest tech trends. For example, In Huntington Beach, Calif., the police department has started to monitor real-time social media activity using software for analyzing location data from social media. The police can monitor live social media activity, target key words like "gun," "fight," and then identify where trouble might start. The same technology can be used to monitor social media activity in specific locations. Other cities have developed similar ways to link location to social media activity to spot trends or issues it might have to deal with.

Cities have also turned to GIS to passively engage citizens in terms of improving services and infrastructure. Boston developed Street Bump, an app that residents can install on their smartphones. The app records vibrations as the user travels over city streets and sends geo-tagged information back to the city that would indicate the location of a pothole or other street surface issue.

For digital cities, collecting location information about everything from parking lots to pollution hot spots or rat infestations has become a standard operating procedure. And GIS makes that happen. At the same time, when location data is analyzed by adding the right questions, it provides public officials and policymakers with insights for better decision-making. The wealth of geo-data has really empowered cities, and when used strategically, it can help cities make better decisions while reducing costs.

If there's a concern with GIS, it's around privacy. Cities need to have proper policies in place if they want to leverage the power of location without violating citizens' privacy. GIS also has a lingering reputation as a hard technology to use, according to Enrico Leidbeater. But when done correctly — and city governments have had years of experience learning how to use GIS — it's a powerful platform for improving how cities can work, both internally and externally.

Customer Relationship Management: Diversity in Service

People like service that's good and speedy, all at a low price. While parts of the private sector have excelled at providing all three, few local governments are able to be so consistent. But customer relationship management (CRM) software could be just the answer to that conundrum. Cities have been using CRM for years, primarily as the back end to 311 hotlines, in which callers talk to operators to get answers or to request services that were non-emergency in nature. The first 311 operations began in Baltimore in 1996 and has been growing across the country ever since. But running a call center is costly, and few cities can afford to staff them adequately, given the surging demand.

That's where the next generation of CRM technology comes into the picture. Customers — as they are called by city call center managers — now have a choice to call an operator, submit a query online, access information over their smartphones, lodge a complaint via interactive voice response, text or use live chat. They can get answers to many of their questions — some managers say they can post answers online to 85 percent of the questions they receive — by looking them up on the city's website.

Core Fleming, 311/CRM program director for the International City/County Management Association, has pointed out that governments now recognize that city services must be 24/7 and that residents expect the level of customer service in their city or town to match what they get in the private sector. And CRM can help make that happen without blowing a big hole in the budget.

Having multiple channels doesn't mean citizens will stop calling a city's hotline number — local governments have rarely seen more than 20 percent of CRM interactions that are classified as self-serve — but it reflects the diverse ways that people want to interact. As one 311 call center manager put it, “Some people will also want to talk with an operator, and there are others who only want to use the Web or chat.”

When it comes to CRM's impact on the digital city, there are a number of factors to watch:

✓ First, CRM is moving to the cloud, making it possible to implement
CRM is moving to the cloud, making it possible to implement customer service without all the IT infrastructure traditionally needed for an enterprise application.
extremely important in local government, thanks, in part, to the merging of CRM, social media, mobile technologies and customer service. An excellent example of the interconnection between engagement and CRM can be found in Boston’s Citizens Connect mobile 311 app, which allows users not only to report problems, but also to provide feedback on community issues. Social media is beginning to play an important role in CRM services.

Initially cities used Twitter, Facebook and other social platforms as a means to send outbound marketing and service-related messages. However, as residents have turned to social media to solve customer service issues, 311 service centers have responded and are beginning to use the tools as a way to interact, engage and help constituents.

Finally, CRM collects so much data about citizen complaints, queries and requests that it only makes sense to use analytics to try and measure gaps in service performance and to even predict what services might need more funding (and which ones need less) before the next budget cycle begins. New York City, with the largest 311 service in the country, has been running CRM analytics for years to measure performance to improve internal processes and services. City managers like CRM because it generates a complete audit trail, which can help them understand a variety of factors, such as where there might be staffing needs, or it can help them spot deficiencies in certain operations.

CRM continues to evolve. One trend is known as “omni-channel” CRM, in which users can connect with the city through one channel and then reconnect through another, but have the same user experience. Another trend is to personalize each contact between citizen and city, so that call takers have a profile of a user’s past queries and service requests. And another trend is to allow for a single sign-on to reduce the number of accounts a citizen might have with the city to just one that’s accessed through CRM.

“The goal is to make citizen interaction more retail-like,” said Stern. “This dovetails with how smart cities want to simplify the user experience.”

CRM does face some challenges, however. Despite lower technology costs, call centers and the labor needed to run them can be expensive. Some cities, especially smaller jurisdictions, that have launched 311 systems in recent years have seen demand surge, putting a strain on budgets. Training is another concern. Teaching call takers to be knowledgeable about city operations takes time and effort.

But there’s no mistaking the fact that what started out as a solution to the problem of too many people dialing 911 with non-emergency requests has been transformed into an interactive, multi-channel strategy to make customer service a top priority.

Analytics: Making Sense of City Data

The New York City Fire Department (FDNY) has gone from reacting to fires to anticipating them. No, it doesn’t have a crystal ball, but it does have data, algorithms and predictive analytics on its side. The FDNY has taken paper-based information from building inspections and built a database that can be analyzed based on a risk-scoring algorithm to help anticipate a potential building fire. The predictive tool works because the data is clean and the system shares information from other departments.

City fire departments aren’t the only agencies taking advantage of analytics. The technology can be found in police departments, economic development efforts, public works, permitting, utilities and public transit, to name a few.

Fueling the growth is the explosion in data collection taking place in cities, whether it’s data from sensors or from unstructured sources, such as Web forms and video. At the same time, cities are under pressure to release the data and make it available to the public, creating new opportunities to analyze what was once hidden from view. Just as important, analytics technology is becoming cheaper to own, faster to use and better at complex problem solving, making it more valuable.
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"If you are talking about being a smart city, you are talking about information technology, which is about data," said Jennifer Robinson, director of local government solutions at SAS. "And data only becomes information when it can be digested. That’s why analytics is the backbone of any smart city solution."

So far, many cities are pilot testing analytics to tackle discrete problems. But the goal is for cities to use analytics across the government enterprise. That requires a data center that can pull information from many different sources, similar to how the FDNY is using data from the city’s building department to predict potential fire hot spots. In Chicago, data sharing is helping the city predict rodent infestation and food safety. In the case of the latter, the city prioritizes food safety inspections by statistically classifying food establishments with respect to the probability of a possible violation.

But these cities are the exception when it comes to enterprise analytics. Most entities struggle with getting an analytics project off the ground. According to Gartner, more than half of analytics projects either fail or don’t deliver the expected results. Part of the problem is bad or unclean data, which produces poor results. Also, the data needs to be integrated. Despite years of discussion around the value of data sharing, many public-sector agencies are still unwilling to share with other departments.

But the good news is that analytics is getting better. New advances allow data to be analyzed prior to it being stored. Given how much data government is collecting and how much more it will have to handle as the Internet of Things matures, this could be a game-changer for analytics. "This technology is going to help make sure the right data is collected and analyzed appropriately, so that the non-relevant data is dumped," said Robinson. The process is known as "analytics at the edge," she said. "It’s a way to make sure data collection doesn’t become overwhelming."

Getting It Right

When the President’s Council of Advisors on Science and Technology released its 2016 report, Technology and the Future of Cities, it made an important point regarding the role of IT: "The urban ecosystem can benefit from the integration of a wide array of technologies that have been evolving rapidly, including systems to increase energy efficiency, renewable energy technologies, connected and autonomous vehicles, water and wastewater management systems, communications technologies to enhance connectivity, and new ways to do farming and manufacturing."

The report looks at the entire urban ecosystem and presents a variety of ways that the federal government can help cities collaborate when it comes to advancing technology in a cost-effective way. Similarly, this report looks at five key technologies that every city government should have if it’s to become a so-called smart city: On their own, each of the technologies — broadband, GIS, CRM, open data, analytics — provides a benefit to city operations and services. But the true impact comes when they are treated as part of an integrated system, rather than as singular solutions.

Along with having an enterprise vision when it comes to technology, government needs to have a coherent and sensible set of strategies and policies if it wants to maximize the smart city impact. That means having effective policies around privacy, security and open data sharing. Governments will need to craft creative initiatives to attract the talent needed to develop and run smart city solutions. And they will have to be willing to invest in the core technologies described in this report, but in a way that’s strategic and has enterprise objectives. In other words, the days of siloed solutions need to end.

For decades, cities have faced a host of challenges that have tested their ability to function. Today, new ideas and answers are emerging that have the potential to help them cope with growth and also to transform into sustainable and resilient places to live and work. At the core of this transformation will be information technology. Best to get it right.
Despite the nation’s recovery from the recession, state and local governments can still find themselves in financial straits. A March 2015 Rockefeller Institute report notes that tax revenue is slowing and even declining in most states, leading to budget shortfalls. At the same time, many organizations are losing manpower and expertise to retirement. In some state agencies, 40 percent of the workforce will be eligible for retirement by 2017.1

How are state and local governments addressing these challenges? According to CDG’s 2015 Digital Counties Survey, 47 percent of counties are implementing enterprise content management (ECM) systems — it was counties’ most popular technology investment after security. It’s no surprise government agencies are turning to ECM — automating paper- and labor-intensive processes allows them to cut costs by freeing up valuable staff time and streamlining services for citizens.

Laserfiche can help agencies automate complex, multi-departmental processes, including permitting, case management, contract management, HR onboarding and more. By deploying Laserfiche’s ECM system, which acts as a central repository for electronic documents and tools, agencies can automate workflows and manage content throughout its life cycle.

The impact of automation is far reaching. For example, Boca Raton, Fla., implemented Laserfiche’s ECM solutions as part of its accounts payable redesign. The city eliminated paper forms for vendor setup, and now routes documents and invoices electronically for approval and processing. Accounts payable can easily access information in the ECM system to print checks.2

As governments implement new technologies to meet citizen demands, the need for automated processes will increase. Laserfiche offers experts to help agencies go paperless, manage digital content, automate business processes and implement ECM.

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Manual and Paper-Based?
Nothing in Government Has Time for That

Despite the nation’s recovery from the recession, state and local governments can still find themselves in financial straits. A March 2015 Rockefeller Institute report notes that tax revenue is slowing and even declining in most states, leading to budget shortfalls. At the same time, many organizations are losing manpower and expertise to retirement. In some state agencies, 40 percent of the workforce will be eligible for retirement by 2017.

How are state and local governments addressing these challenges? According to CDG’s 2015 Digital Counties Survey, 47 percent of counties are implementing enterprise content management (ECM) systems — it was counties’ most popular technology investment after security. It’s no surprise government agencies are turning to ECM — automating paper- and labor-intensive processes allows them to cut costs by freeing up valuable staff time and streamlining services for citizens.

Laserfiche can help agencies automate complex, multi-departmental processes, including permitting, case management, contract management, HR onboarding and more. By deploying Laserfiche’s ECM system, which acts as a central repository for electronic documents and tools, agencies can automate workflows and manage content throughout its life cycle.

The impact of automation is far reaching. For example, Boca Raton, Fla., implemented Laserfiche’s ECM solutions as part of its accounts payable redesign. The city eliminated paper forms for vendor setup, and now routes documents and invoices electronically for approval and processing. Accounts payable can easily access information in the ECM system to print checks.

As governments implement new technologies to meet citizen demands, the need for automated processes will increase. Laserfiche offers experts to help agencies go paperless, manage digital content, automate business processes and implement ECM.

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Endnotes:
Digital Communities are real places that understand and value the transformative power of broadband connectivity, core computing technologies and interoperable applications to improve the way government conducts business and interacts with citizens. The Digital Communities Program showcases solutions from leading technology companies that are specifically designed for communities and local governments that want to exceed the expectations of their citizens. In addition, the program provides a collaboration forum where community officials discover and share emerging best practices and innovative community technology deployments.
Experts estimate that 20 to 50 billion devices and systems will comprise the Internet of Things (IoT) by the year 2020. As this number grows, so will citizens’ expectations of more efficient interactions with their state governments.

At its 39th Annual Conference and Technology Showcase, the National Association of State Technology Directors (NASTD) will explore how state governments are adapting their IT environments to embrace the opportunities and challenges created by the IoT.

The event will feature IT practitioners and thought leaders from government, industry, media and professional associations. NASTD encourages you to join us in the nation’s capital for this timely discussion.

Visit www.nastd.org or contact Pam Johnson at 859-244-8184 for more information.
BY ADAM STONE

FINDING IT
BIGGER THAN A ONE-OFF BUT MORE MANAGEABLE THAN A GRAND SWEEP, A NEW SMART CITY MODEL IS STARTING TO EMERGE.
EVERYONE BOUGHT INTO THIS BIG-BANG VI SION THEY DISCOVERED THE SOLUTIONS WERE NOT RADICAL BEGINNINGS

city managers had good reason to believe they could radically reshape their processes. Resources had emerged in the IT world unlike any seen before. “The assumption when we started out was that, with unlimited compute and storage and bandwidth — would you run a city the same way? Would you run education and water and waste management the same? No you wouldn’t,” said Anil Menon, president of the Cisco Smart+Connected Communities program. It was all going to happen at once. Parking management, highway traffic flow, water management. Toxicity sensors would alert for water gone bad. Capacity sensors would tell us when it was time to empty the trash. It is perhaps not difficult to understand why city managers would have been drawn to a smart city program that offered sweeping changes. We had advanced analytics available as needed, enough to reroute traffic on the fly or to guide emergency response. We had the tools to achieve a new level of collaborative decision-making. At the same time, changes in the social fabric were pushing city leaders to take action on a big scale, with a growing demand for transparency and account- ability. Citizens meanwhile were tapping into a rich vein of technology in their own lives, as they came to understand the potential of the new tools. As they began to see what the technologies could do, they started to expect improvements in the way the urban ecosystem was run. Some IT vendors were ready and willing to encourage what has been called the “boil the ocean” approach. “We already had expertise in our organiza- tion around government administration solutions, around public safety solutions, health care and education,” said Kathryn Willison, program director for the Micro- soft CityNext initiative. While technical people across departments were still seeking stovepipe solutions, Microsoft encouraged them to seek bigger things. When Microsoft launched CityNext on a modest scale in 2013, the press was still predicting big things. “This sort of efficiency could not only save lives during an emergency but also drive day-to-day savings that total millions, and perhaps even billions, of dollars over time,” read one news report. Today few cities are talking about savings in the billions. Projects have been scaled back. The scope of potential change no longer sprawls across the urban landscape, but rather is limited to more targeted ambitions. What has changed?

SCALING BACK

The scaling back of the grand vision began, as so often happens, with money. “With the financial crisis, we were seeing businesses closing, we were seeing foreclosures, and for most municipalities that meant a sharp reduction in the budget,” Belissent said. The capital-intensive IT infras- tructure projects needed to launch smart city initiatives suddenly seemed less viable. At the same time, city managers discovered that their big ambitions were being rapidly thwarted by the nature of their own institutions. Stovepipes and silos were going to be stumbling blocks to across-the-board change. “You’ve got organizations that each have their own different priorities. One might be looking at public safety while another looks at energy efficiency,” said Toni Oubari. As Verizon’s manager of Smart Communi- ties, she has talked to over 300 mayors and 100 county representatives in researching smart city initiatives. “Sometimes it comes down to who has the most power, when the better way to do it is to look at program management first. What are the top priori- ties and objectives? That is your frame- work and you can work from there.” Finally, local governments have narrowed the scope of their smart city ambitions in response to public demand. “Money helps in the beginning, but there are still people in the mix,” Oubari said. Constituents want to see improve- ments in specific services, even when a city’s overarching plan may not be moving in those particular directions. “Maybe there is a chronic drought and you are running out of water,” said Michael Dixon, general manager of IBM Smarter Cities. “The best, most exciting
leaps often come from crises. People don’t make the big leaps sitting around the table with nice linen napkins.”

In addition to these varied pressures, city managers slowly came to discover that the new technologies, while promising, were not always ready for prime time. Tools that worked on the lab bench didn’t always deliver when deployed in real-life situations. “Everyone bought into this big-bang vision, but when they started to deploy they discovered the solutions were not fully developed and ruggedized. People couldn’t have known that: These things cannot be tested in the lab. They have to be tested in a living context,” Cisco’s Menon said.

Even when the technology could deliver, other pieces of the puzzle had yet to fall into place. Few technical standards existed that might define best practices or even measure success. That made it hard to deploy at scale, Menon said. Finally, a big plan needs a big ambition is going to revolutionize urban management, but it’s going to happen incrementally. What does this mean, in practical terms? Forrester’s Belsen laid out a likely roundup of the low-hanging fruit that will make up initial smart steps in most cities. In fact, many such deployments are already up and running.

LIGHTING

There’s an immediate cost savings in going to LED, but the possibilities go further. Light posts become real estate to host Wi-Fi, a place to mount air quality sensors, and stations for attaching cameras that can manage security, traffic or pedestrian activity. All that data can drive economic development and help to determine real estate values. Not bad, for just a lamppost.

TRANSPORTATION

Data-driven decision-making can help improve not only commuter traffic management but also the scheduling and routing of public transportation, not to mention optimizing pedestrian and bicycle paths.

ROOM FOR ALL

As municipalities have scaled back their smart city ambitions — from grand plans to more modest projects — a space has opened up for niche vendors. No longer the sole realm of big-name corporations, smart city technologies are increasingly being pursued by niche suppliers. One such vendor is AutoGrid Systems of Redwood Shores, Calif., whose products analyze energy data generated by smart meters, building management systems, voltage regulators, thermostats and other equipment.

The niche play fits into local governments’ overall plans. “The smart city evolution is happening alongside the evolution in the electric grid. So cities view our technology as a tool to integrate all of these sources of energy,” said Oluweke Schwarz, vice president of products and analytics at the 50-person firm. “As niche players, firms like AutoGrid promise to deliver a level of specific expertise a bigger provider might not possess. ‘We work with just this problem, so we are able to suggest best practices that we see globally,’” Schwarz said.

AutoGrid is hardly alone in its efforts to carve out a space in the shadow of the giants. Consider the recent Smart City Expo World Congress in Barcelona, which drew some 450 exhibitors, many of them niche companies like BreezoMeter (air pollution), Abova Worldgrid (energy management), Dementiq (GIS solutions); and Black and Watch (engineering, procurement and construction services). “There is this fascinating, complicated ecosystem developing, and it is the perfect time for these niche players to have a place at the table,” said IDC analyst Ruthbea Yesner Clarke. “The big vendors have the technology in general, but they may not have the specific expertise.”

There is “a lot of jockeying right now,” as smaller players look to forge alliances and stake out their positions. But many of those players won’t stay small for long. “We will start to see some interesting acquisitions happening as soon as these markets get more mature, once the cities start getting specific budgeting for this,” she said.
When we talk about smart cities, the cloud is what gives us the scale and the computational horsepower to do it.

“Most cities so far have been trying to figure out how to squeeze efficiencies out of the systems they have,” said Microsoft’s Willson. For more mature IT organizations, the implementation of smart tools will have to come hand in hand with a smart-ening of IT’s underlying bone structure. “Now they are trying to figure out: What is the platform position they need to take to move forward? They are trying to understand the Internet of Things, to understand big data, in order to understand how all of these things are going to fit together.”

Decisions regarding platform will be a key element moving forward, said Joel Cherkis, global vice president at Oracle. “Platform doesn’t necessarily mean the ‘platform as a service,’ although that is its own component. It also points to their underlying infrastructure,” he said. “How is information managed within the city from a security perspective? It’s also about interoperability from the data perspective.”

Asset management tools helped Miami-Dade assess and remediate shortcomings in the system. Officials then realized they could apply these same tools to optimize public transportation routes, overhauling a bus scheduling system built 50 years ago. That transportation data in turn helped to show where people congregate, which then led to the implementation of tools in public safety, from criminal activity data collection to electronic casebooks for police officers. Lesson learned? “You’ve got to start somewhere,” Dixon said.

Within the city’s IT leadership, “somewhere” may begin not with lampposts or water meters, but rather with an internal infrastructure in need of modernization. Platform decisions made up front could determine the success of later efforts. Smart initiatives are more likely to succeed if elements such as education management, transportation and public safety all share a common core of technology, Cherkis said.

For many the key here will lie in a systems-wide migration to the cloud. “When we talk about smart cities, the cloud is what gives us the scale and the computational horsepower to do it.” Willson said. In addition to enabling sheer volume, the cloud also can offer a shared workspace, one that finally breaks down the silos that have long hindered interdepartmental collaboration.

In the smart city trajectory, sweeping ambition has given way to more modest goals. We’ve gone from the City of Tomorrow to an improved parking system. Maybe there is a third way, an approach to smart cities that fits like Baby Bear’s chair just right.

AT&T envisions such an approach with its Smart Cities Framework. In this model, AT&T teams with a range of partners — Cisco, Deloitte, Ericsson, GE, IBM, Intel and Qualcomm Technologies — to strategize with a city and pull together three to five manageable projects, which are then deployed in a limited geography: 10 blocks on a college campus, or the west end of Dallas. It’s bigger than a one-off but still more manageable than a grand sweep.

“If we can prove it can be done over a narrowly defined area, that gives the city the ammunition to go to their key stakeholders and show that three to five solutions do add more value than siloed point solutions deployed departmentally,” said Mike Zeto, AT&T’s Smart Cities general manager. “You show that a holistic strategy can be deployed and proven. Then you can raise the funds you need to take the key learnings from that framework and deploy them across the city.”

Even as the scope of the smart city ambition has been scaled back, IT managers have more finely honed their ultimate ambition: to make life better. “Today it’s not just about servers and routers,” said Menon. “Now the city managers and deputy mayors are talking about outcomes. How can I decrease congestion? How can I create a better tourist experience? This is a very different conversation than we’ve seen in the past.”

smartCities@erepublic.com
With cloud deployments on the rise, this issue of Converge explores how K-20 institutions are adopting innovative solutions to improve student services, deliver rich content and enable blended learning.

To download a free copy, visit: www.centerdigitaled.com/Converge/Q12016
there is another actor waiting in the wings, watching as the smart city struts around on the stage, bathed in a national spotlight. Such is the existence of the smart state: following the smart city movement, helping where it can and all the while working to build itself an identity. Smart states today seem to have a dual role. They are the setting for smart cities, and might well become an important driver behind the creation of the smart city in America. And though the idea of the “smart state” might not have as much buzz around it, state governments are starting to take up the idea of pursuing more data-driven approaches to their work, separate from local government operations.

THE REALITY OF TODAY

Much of government IT work, especially at the state level, doesn’t revolve around headline-grabbing, cutting-edge projects. No, public IT professionals will alternately describe their day-to-day operations as “keeping the lights on” and “putting out fires.” “The larger, broader policy discussions sometimes get put on the back burner,” said Amy Glasscock, a senior policy analyst at the National Association of State Chief Information Officers (NASCIO).

Glasscock’s work as of late has been devoted to understanding the role of concepts like smart government and the Internet of Things (IoT) at the state level. So far, it seems those concepts aren’t too prevalent on states’ radar. NASCIO’s most recent survey of IT professionals from 47 states and territories found that 76 percent of respondents were not having formal discussions about IoT applications, data collection and security. Of those who did say they were having state-level conversations, about 25 percent said their IT plan referenced IoT.

Nobody participating said they’d formally adopted IoT policies. Glasscock sees a couple possible reasons for that. One is simply the nature of IoT as an emerging field—one in which the return on investment might not be totally clear. “When it comes to big initiatives, everyone wants to know: How much is it going to cost?” Glasscock said.

Another reason might have to do with the ways IoT is used. Cities are finding myriad useful applications of ubiquitous connectivity, things that fall very much within the scope of municipal work. In the San Francisco Bay Area, city CIOs are beginning to install sensors in parking spots that can feed information into a platform telling citizens when and where parking is available. In Chicago, the researchers behind the Array of Things project are hoping to use sensors for tasks like identifying flooding in real time.

“The services that cities provide might lend themselves well to IoT applications,” said Glasscock.

STATES AS CITY COORDINATORS

But that doesn’t mean states won’t touch IoT. Indeed, many think that states can act as a nexus point for local government to make “smart” projects better. Take roads, for example. “We have state roads [and] we have city roads, but they all cross and connect with each other,” said David Fletcher, chief technology officer for the Utah Department of Technology Services. Whenever Utah digs up a road, Fletcher wants to seize the opportunity to lay down fiber. That will support connectivity in the long run—a central component of the Internet of Things—and provide a possible resource for cities in the future.

By Ben Miller
FOR STATES
Another example is water. Utah might get a lot of its water from snowpack that falls in the mountains, but then it flows down to cities, towns and farms where humans and animals use it. There are many different government entities involved in managing water, and Fletcher sees the state as a natural point to coordinate those efforts. “We have sensors throughout the state that track snow levels, and they report on those snow levels in real time,” he said. “And then we also have sensors that track stream flows so we know how much water is coming down, how much is going to be available. The state and federal government manage reservoirs that become water resources for cities and localities, and so we all work cooperatively to track the availability of the water — how much is used by agriculture versus urban use so that we know there’s enough for various uses.”

Cities help with those efforts by giving the state local water data, and the state handles the dissemination of that information to other government entities that can use it. And as more and more sensors are added to the network, the insights the state can glean from it will only improve. Helping to coordinate regional efforts between cities has another advantage, according to Illinois CIO Haridik Bhatt. “We can bring a few municipalities in the state together and provide their services from a single operation center so they can reduce overhead,” he said. It goes back to Fletcher’s point about roads being connected across government jurisdictions: Transportation is one area where it makes sense for cities to work together.

Call that doubly true in Chicago-land, a conglomeration of municipalities that can extend all the way into Wisconsin and Indiana depending on your preferred definition. One of Bhatt’s ideas leading state IT efforts is to consolidate city traffic signal centers together to help create optimal traffic flow. “If we can start pooling the services together, bringing them closer together to where they can be managed easily and centrally, you can ... keep an eye toward efficiency,” he said.

**STATES AS SMART CITY ENABLERS**

An adjacent role states play is in enabling cities to undertake “smart” projects. California’s Department of Technology has made that a central mission by treating itself as a business. To Chris Cruz, chief of operations for the department, cities and counties are clients who buy services, and the department spends much of its time and resources on customer service to make sure its products are working for those customers. “We go out and compete for that business just like some of the other private data centers would,” Cruz said.

One of the department’s big pushes is called CalCloud. Through the service, local government entities in California can buy cloud hosting on state-controlled servers, which allows them to cut costs while relying on the state for security. Launched in 2014, that part of CalCloud appears to be catching on. Cruz said the number of customers with hosting agreements doubled from 14 to 28 between 2014 and 2015.

“We’re driving more adoption every day,” he said, “and there’s more service requests coming in each week.” Another 40 are using CalCloud’s vendor hosting services. Through that program, the department takes on the responsibility of approaching a vendor, negotiating prices and buying services or licenses from that company. Because so many local government entities participate in the program, the department can negotiate volume pricing—which it has already done with Salesforce.

The department also has worked to help cities build themselves smarter. That’s through a cooperation with the Governor’s Office of Planning and Research. According to Scott Gregory, the department’s geographic information officer, the initiative is meant to provide guidance to cities developing general plans. “Local government can access authoritative data content from the state, for example: Where are the known flood plains in the state? Where are the known earthquake faults?” Gregory said.

Cities can then submit their general plans back to the state for help and guidance, which can encourage smart growth in areas ranging from energy consumption to water management.

In addition, the department has an open data platform to make useful information available to local government entities within California, which Gregory said will support smart city projects. “[That helps] these smart city initiatives move toward modernizing design, modernizing their approach to initiatives that then touch the IT ... sectors,” Gregory said. “So for example, things like sensor networks, sensors that help us understand traffic throughout the region, things like energy usage and smart grid, being able to understand what our energy consumption is throughout buildings and then conversely what happens with greenhouse gases after that.”

**SMART STATES**

Aside from helping cities get smart, states are beginning to craft strategies to become “smart” themselves. In fact, that’s a big goal for Bhatt—one of the few state CIOs working on an official smart state strategy, supported by Illinois Gov. Bruce Rauner.

“The idea is over the next three years we want to be not only the smartest state in the U.S., but our competition is Singapore, Dubai and others,” said Bhatt. “And I think we can do that.”

Part of that is consolidating operations. Much like bringing cities together to achieve efficiency, Bhatt said breaking down silos between departments can help state government run smoother. After taking the role of CIO, he identified 62 data silos in Illinois state government. “If you think about creating a department out of 62 existing silos, it’s kind of like mergers and acquisitions,” Bhatt said. “So you’re working on streamlining.”

There are also services that states tend to handle more than cities—transportation, health and human services and water management. While states work with local government on all those services, they are also the places where public-sector IT thought leaders see opportunity for smart states to carve out an identity.

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As part of that work, states need to collaborate with other states. Bhatt said he is looking at Singapore, Dubai and others as examples of what Illinois can do. “We go out and compete for that business just like some of the other private data centers would,” Cruz said. Another 40 are using CalCloud’s vendor hosting services. Through that program, the department takes on the responsibility of approaching a vendor, negotiating prices and buying services or licenses from that company. Because so many local government entities participate in the program, the department can negotiate volume pricing—which it has already done with Salesforce.

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like connected vehicles and self-driving cars. The U.S. Department of Transportation is moving full steam ahead on those efforts, having put up millions of dollars in funding for government entities to test vehicle-to-vehicle and vehicle-to-infrastructure connections. The agency has also started the rulemaking process to require new cars to support those capabilities. So in the future, states might be using various technologies to coordinate traffic flow, optimize snow removal and build infrastructure smarter. There’s also a need for states to get smart about how they fund their transportation efforts. Because government on all levels in the U.S. is pushing for alternative fuel vehicles, it will eventually need to find a substitute for the gasoline tax that funds road work today. States such as Oregon and California are testing systems that tax people based on how much gas they buy. Though these projects are only in the pilot phases, one approach to measuring miles is plugging in connected devices to car ports. Since car ports have been standardized since 1990s, most passenger vehicles can accommodate the devices. And those devices can do more than just report miles traveled — they can provide information about the health of the car. Smart state-type water management projects are beginning to materialize too. Aside from Utah’s coordination of data from various water managers, California has used technology in recent years to help its statewide water conservation efforts amid a historically bad drought. The Department of Technology launched an application for citizens to report the overuse of water toward the end of 2015. Since then, it’s received more than 10,000 reports through the app. “The idea is this: You have neighbors, businesses or parks who are over-watering. We have a modal application now that allows citizens to take a picture of that, provide a description and then send it to the state,” said Gregory. The state then finds the water entity responsible for that user and lets them know about the potential problem in their system. “The key here … is that these decisions are data-driven,” Gregory said. “It’s not broad-swept here, it’s more surgical.” That’s a common refrain in any kind of “smart government” project, and part of why Bhatt said that analytics is probably the single most important piece of technology on his radar today. In the future, he hopes to apply that model of surgical intervention to health and human services in Illinois. Bhatt believes that data can help the state identify people who use a lot of government services, which can then help agencies intervene earlier to help those people before their problems worsen. “It’s very tough to know — who are those 20 percent of Illinois citizens who are using 80 percent of our health and human services … and how can we serve them more efficiently?” Bhatt said.

**WHAT DOES IT MEAN TO BE SMART?**

With both the federal government and cities pushing for “smart” projects, it might be inevitable that states eventually get smart too.

“I think it’s coming, but I think it’s something that cities [are ahead of states on], being smaller and having the kind of services that lend themselves to this,” NASCIO’s Glasscock said.

**AT THE END OF THE DAY, IT’S HOW ... YOU USE TECHNOLOGY TO IMPROVE GOVERNMENT EFFICIENCY AND KEEP AN EYE TOWARD ECONOMIC GOALS.”**

What direction the smart state movement goes in is a different matter, and might depend on how states set their priorities. CIOs like Bhatt see some commonalities between “smart” government projects that should serve as guideposts. “At the end of the day, it’s how … you use technology to improve government efficiency and keep an eye toward economic goals,” he said.

For Fletcher, that means automation. “You remove a lot of the human intervention so that ultimately a lot of this is machine-to-machine, so that the data drives control systems whether that’s in fire detection and response, or humidity in buildings or smart power systems,” he said. “And then it impacts individuals, getting the information to individuals and their systems.” And ultimately, the focus areas of smart states are unclear. They might lean more toward helping cities or they might sway toward state operations. So is one approach more important or prevalent than the other? “I don’t know that the state CIOs would have an overwhelming answer on that, one way or the other,” Glasscock said.
Risk Factors: Concerns grow about security, privacy, reliability and governance in smart city technologies.

By Tod Newcombe / Senior Editor

The demand for smart city technologies shows little sign of slowing down, which comes as no surprise. Cities are growing in size and population, and the need for digital tools and systems to help manage everything from traffic and public safety to garbage and parking meters continues unabated.

Technology spending for the global smart city market is expected to reach $27.5 billion by 2023, according to market research company Navigant Research.

But as urban centers expand their reliance on automated sensors and algorithms that improve productivity, sustainability and engagement, they increase risks of data security breaches, vulnerabilities to invasions of privacy and concerns about software reliability. And as cities rely more on data to drive their decision-making, it raises the concern that technocratic governance could begin to replace the traditional political process that’s more deliberative and citizen-centered.

So far, problems with smart city technologies have happened at a slow pace, but some of the incidents have been alarming. A software bug closed down San Francisco’s subway system three years ago, temporarily trapping some riders underground. In 2008, during a labor strike, two Los Angeles traffic engineers were accused of hacking smart traffic light systems that created gridlock that lasted for several days. In 2012, the traffic management system for a major artery in the port city of Haifa, Israel, was also hacked. And two years ago, a researcher at a security firm blogged about how easy it was to hack into Washington, D.C.’s traffic signals, which lacked any security controls.

Security, Reliability, Behavior and Privacy

Smart city technology relies largely on wireless IP networks, which have become increasingly vulnerable to hackers. These networks interconnect for greater performance, like electrical grids to reduce power waste, traffic management systems to reduce congestion across a city’s road and highway grid, and smart water systems that are designed to improve utility efficiency.

The U.S. Department of Homeland Security last year released a study that looked at the cybersecurity risks of smart cities. The Future of Smart Cities: Cyber-Physical Infrastructure Risk divided the problem into three themes that cut across security considerations for smart infrastructure. First, the “seams” that have existed between rural and urban, and legacy and new infrastructure components are moving or disappearing. As a result, the sectors that make up transportation, electrical and water systems are becoming more permeable and remotely accessible. While this increases connectivity and speeds up data flows, it also stretches the borders that cities must secure.

Second, the report raised concerns about “inconsistent adoption” of smart technologies because of limited resources or consumer willingness to use the technology, such as autonomous vehicles. An uneven transition to these technologies raises issues about security vulnerabilities, like “blind spots” where old and new technologies haven’t fully merged and are able to report problems that have occurred. There’s also the cost issue for utilities that must pay for a smart grid solution while maintaining a manual backup system in case things go wrong.

Third, smart city systems reduce human interaction in order to maximize computer efficiency. As cities shift to data-driven, sensor-based solutions, the number of security access points will only increase while manual override systems are reduced and human skills to run the systems atrophy.

There’s another consideration with over-reliance on smart systems to run critical pieces of infrastructure or to increase the efficiency of city services. Something could go wrong. Just think of the assumptions that were built into HealthCare.gov that resulted in it crashing when too many people logged on. Similarly, Y2K is a classic example of a software bug that was buried deep in just about every mainframe in the world, a flaw that cost companies and governments more than $300 billion to fix.

These are the sorts of problems that can occur when software programs are deployed.
with “potentially buggy, brittle and hackable urban systems, which create systemic vulnerabilities across critical infrastructure,” wrote Rob Kitchin, a professor at Maynooth University in Ireland who specializes in smart city and urban infrastructure issues.

Then there’s the concern about using technology to squeeze maximum efficiency from infrastructure that might be decades old. If a problem occurs, can a sensor-based water system shut down properly or does it fail catastrophically? The primary cause of the 2003 Northeast blackout was a software bug in the alarm system in an energy company’s control room that led to a catastrophic shutdown of the electrical grid, affecting 55 million people.

“Large sections of America’s infrastructure are already crumbling. When you take something so fragile and add another level of complexity to it, such as smart technology, it’s going to be even harder to maintain,” said Kevin Desouza, associate dean of research at the College of Public Service and Community Solutions at Arizona State University. The best solution to making old infrastructure smart is to completely rebuild it. “But I don’t see that happening, given the fiscal resources in our government,” he said.

One objective of smart city technologies is to gather data that can measure the real-time awareness of people and activities and then feed information about the impact of those activities back to decision-makers. Using what’s known as “behavior economics,” public officials can initiate policies that will hopefully modify behavior for the common good. Predictive policing is one example. Another involves speed monitoring devices to encourage people to drive more slowly in residential neighborhoods. But used the wrong way, these intelligent systems can lead to bad policies.

“It’s one thing to gather data and use analytics that lead to more intelligence to nudge a person’s behavior in an ethical way, but it’s something else when you force someone to do something that constrains their behavior,” Desouza said. He cited policies that might discriminate against a certain class of people based on data gathered about their profile, forcing them to pay more for services or receive fewer public benefits.

Privacy is the other major concern with smart city technologies, many of which can capture personally identifiable information and household-level data about citizens, and link the information together to create profiles of people and places in order to make decisions about them, wrote Kitchin, in his 2016 report, Getting Smarter About Smart Cities. One major risk factor are the smartphone apps, upon which many smart city services rely on to work.

“One smartphone has unique identifiers that can be accessed and shared by apps, some of which can be captured externally via Wi-Fi or Bluetooth signal. These identifiers can be used to track the phone and, by association, its owner. Although the IDs are pseudonyms, they act as very clear personal markers that have a range of other information attached to them, such as phone numbers, email accounts, messaging apps, address books, social media accounts, credit card details, etc., as well as inferred information such as home and work addresses,” Kitchin pointed out.

Technocratic Governance

Perhaps the least understood, but potentially most worrisome risk with smart city technology is the need for analytical software to interpret the vast flows of information from sensors and other data collecting systems. As the reliance on data analytics grows, there are concerns that technology could measure and monitor all aspects of city life, implying that cities are rational machines rather than a complex system full of problems and competing interests. Such a viewpoint “promotes a strong emphasis on creating technical solutions and overly promotes a top-down technocratic form of governance, rather than political and social solutions and citizen-centered deliberative democracy,” wrote Kitchin. The worst fear is that smart city solutions could be turned against citizens should the political landscape shift from a benign democratic form of government to an autocratic one. Imagine a scenario in which a smart city in the hands of a repressive regime turns public safety and transportation monitoring sensors into surveillance tools.

Dialing Down Risk

Given the broad range of risks, it’s easy to become an alarmist about the future of smart cities and to throttle back some of the initiatives that are underway or planned. But the opportunities for benefits from the tech are too strong to ignore. Instead, public officials, cities and technology partners need to take a more comprehensive approach to reducing the potential for risk, while continuing to move forward.

Cesar Cerrudo, chief technology officer with security firm IOActive, recommends cities test systems and devices for security flaws before activating them. “A simple checklist for encryption, authorization and authentication as well as software updates will make a big difference,” he said at the 2015 RSA Conference. He also recommends that cities pressure technology vendors to provide comprehensive and timely security documentation and response.

While states and cities should try to ensure the digital systems that manage water, power and transportation infrastructure are secure, the DHS acknowledged in its study on smart city vulnerabilities that it must play a key role too. “The DHS can assist in the development of standards and regulations, helping to ensure consistency across sectors and geographic areas. Strategic communication and engagement may influence a more secure evolution of cyberphysical infrastructure as smart cities adopt technologies at varying rates. DHS can also facilitate or direct federal assistance to state and local governments.”

Anticipating the need for a more robust response to risk factors, a number of researchers from some of the leading IT security firms have created the Securing Smart Cities initiative to act as a consulting service to local governments that are looking to improve their infrastructure with technology. The nonprofit, founded last year, acts as a communication hub between government officials, companies and media outlets, with the goal of educating and spreading information pertaining to city cybersecurity. At the same time, officials must start thinking about what truly makes a smart city work for the good of its citizens. “Ignoring or deliberately avoiding smart city technologies is not a viable approach; nor is developing smart cities that create a range of harms and reinforce power imbalances,” wrote Kitchin. “Rather, we need to create a particular kind of smart city that has a set of ethical principles and values at its heart.”

www.cert.csa.gov/mltech.com
A team of University of Washington computer scientists and electrical engineers has created a passive Wi-Fi system that consumes 10,000 times less power than conventional methods. This development could help enable the Internet of Things — as traditionally “dumb” devices become connected, they can communicate using Wi-Fi without consuming much more power.

In response to findings that nearly one-third of patients in low-resource settings, like rural areas and small cities in developing countries, suffer from surgical-site infections, researchers at Rice University developed a way to bring off-grid sterilization to those in need. Called Sterile Box, a sterilization station is built into a standard shipping container and contains all the equipment required to prepare surgical instruments for safe reuse including a water system for decontamination and a solar-powered autoclave for steam sterilization. The box will be tested in a clinical setting next year in Malawi, Africa. SOURCE: TREEHUGGER

Safer Surgeries

Batter Up

One of America’s most beloved pastimes has received a high-tech upgrade. Starting this season, baseball players can don wearable devices during games to monitor their heart and breathing rate as well as track elbow stress. The devices approved by Major League Baseball, the Zephyr BioHarness and Motus Baseball Sleeve, track a player’s habits to provide early detection of potential injuries.

A VOTE FOR BLOCKCHAIN?

The problems plaguing voting machines have been widely reported as the 2016 General Election nears. A majority of the country’s current machines are outdated and potentially insecure. A possible solution lies within the technology powering the digital currency Bitcoin — blockchain — and one company is taking steps to see that become a reality. Blockchain Technologies Corp. says its blockchain voting machine is secure and transparent. Ballots are scanned by the company’s software and results are uploaded to the blockchain as they’re tabulated, creating an audit trail to back up paper records. While the tech isn’t in use by a government agency yet, the Libertarian Party of Texas State Convention used the system to track its elections in early April. SOURCE: ECONOTIMES
Beyond the Sound Bite
Ten steps to successful podcasting on the cheap.

All those earbud-wearing commuters, exercisers and cubic dwellers are listening in increasing numbers to podcasts. Pew Research reports a quarter million podcasts netted 1 billion downloads in 2015, making them legitimate rivals to terrestrial radio. The intriguing possibility is that they could be listening to you — if only you had a podcast.

One of the surprises of producing the GovTech Social podcast for the last year is the question we hear from public officials and PIOs: How do you do one? There are books and blogs and, yes, podcasts about podcasting. But the folks who contacted us wanted a cheat sheet. Here it is, presented as a Letterman-esque Top 10 list.

1 Be About Something, Not Everything
People may or may not be interested in how the city is doing in general, but they will be much likelier to listen and subscribe to podcasts that are focused on things they care about. Podcasting is not necessarily narrowcasting but it is focused-casting.

2 Listen Before You Speak
Your podcast may not be the next Serial or RadioLab, but you can learn much from both of their styles as well as those of others, including ELGL’s GovLove and civic-minded or specific subject-matter podcasts. Decide what you like, what you don’t like, and then brainstorm around how you can do more of one and less of the other.

3 Starting Cheap = No Harm, No Foul!
Launch and learn sounds a lot like crash and burn. But that can be OK as long as you fail early and inexpensively. There are plenty of no- or low-cost tools for recording and editing audio. (Audacity is free; Rogue Amoeba is cheap and easy, and Hindenburg is way too good to cost as little as it does.)

4 Sound Quality Matters
Having guests on the phone is fine; having all the hosts on the phone makes it sound like a party line. Skype, Google Hangouts or Zoom all sound different than phone lines — each has its benefits and limitations. Experiment until you find a combination that sounds right to you. Avoid cellphones if possible. Get a decent microphone for the host — $99 can get you a lot — and a telephone intercept for recording phone calls.

5 Your Cover Image Is Your First Impression
It can be simple, but you need a podcast cover image. The city seal if necessary; the agency logo if you must, but would you listen to something that looks like your water bill? Plus, iTunes and Stitcher both require cover art, with a minimum size of 1500x1500, be in place when you submit your podcast for inclusion on their indexes.

6 Tap Your Hive Mind
On the content side, be on the lookout for people who do interesting things in interesting ways. They may be two cubicles down from you or on your newsfeed. The first rule of interviewing still stands: Ask people only about what they know. Better still, ask them only about what they love. On the distribution side, share news of a new episode with the word “listen” in the slug, a catchy headline, and extend your reach by lighting other people’s social graphs through use of @ mentions and hashtags. Give back by providing show notes with links so your hive can follow up on something interesting without having to look for a pencil to make a frantic note.

7 Extend the Story
A podcast is not the audio version of a press release or newsletter. Avoid scripting interviews but know where the story is and allow guests to tell it. When you review headlines, bring a point of view that extends the story, provides analysis and explains how and why it matters.

8 Podcasts Only Need to Be as Long as They Need to Be
You don’t have to stretch to hit a particular time mark. Few things are as annoying as a podcast that struggles and stretches just to get to a preordained time mark. It’s always quality over quantity. If a question or segment doesn’t work, cut it.

9 Be Yourself or Somebody Else Will
You are not going to be Terry Gross, Luke Burbank, Megyn Kelly or Farnoosh Torabi. Be yourself. Get comfortable with your subject matter, your co-hosts (if you have them) and yourself. Be authentic (because they know when you’re faking it), be smart (but don’t try to prove it), be brave (by asking that uncomfortable question) and be funny when you can (but don’t force it). Oh yeah, you are going to hate the way your voice sounds. Everybody does.

10 Get on Your Listener’s Player
By itself, posting an audio file on a server is not podcasting. There needs to be an automated way for subscribers to get it on their phones or media player. Stitcher and ITunes are great and there are free ways to syndicate them, but they only work with properly configured RSS feeds. A service called clyp.it lets you record and share audio all from one place for free. Libsyn is the gold standard — robust, flexible and affordable.
Intelligent Recording

Speech Processing Solutions introduces the WiFi SpeechAir smart voice recorder, which is designed for ease of use with a touchscreen and slide switch, as well as an integrated camera that can scan barcodes (making it suited for health care). It has three precision microphones for high recording quality, ergonomic single-handed slide-switch control operation, remote administration, long-lasting rechargeable batteries and data security through real-time encryption. Its 360-degree microphone is ideal for recording meetings and dictations; the directional microphone helps cancel noise and is specifically designed for ambient-sound environments, while a third microphone allows VoIP phone calls. The recorder’s antimicrobial and shock-proof housing with Gorilla Glass make it appropriate for tough environments. www.dictation.philips.com

Small but Mighty

The WEY Group’s UltraFlex Mini PC is a minicomputer with the size of a graphics card and the performance of a full-sized desktop PC. It is available with Intel i3, i5 or i7 CPUs. The solid-state drive storage ranges from 30 to 980 GB, and memory ranges from 4 to 16 GB. The tiny, efficient PC is suitable for use in demanding work environments where space is limited, such as airport towers, trading floors, broadcast trucks and most kinds of vehicles. The PC interfaces include two SATA II/III, a PCI Express x16, three to seven Mini DisplayPorts, two USB 3.0 SuperSpeed, and two RJ45 for dual Gigabit Ethernet network connections, as well as a 16-bit stereo audio-out and a microphone or jumper controlled line-in. www.weytec.com

Boardroom Share

Light Blue Optics’ Kaptivo is designed to turn any whiteboard into an online sharing tool. The Kaptivo accessory gives clean, sharp images that are ready to share or stream wirelessly, or share as a PDF. The device’s digital CMOS camera eliminates other images such as shadows, hands and reflections. Using a secure invitation, anyone can access the user’s whiteboard via their Web browser or mobile device with the Kaptivo companion app. Participants can view the whiteboard evolving in real time and rewind to any point of the whiteboard’s timeline using the history feature. www.lightblueoptics.com

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Overcoming the Privacy Panic Cycle

State legislators step back from the brink on a bill that would limit facial recognition technology.

Earlier this year, the Connecticut General Assembly was considering a bill that would prohibit the use of facial recognition technology for commercial applications unless companies got prior consent from consumers to gather that information—a move that would have severely curtailed the deployment of the technology. Fortunately, state lawmakers listened to reason and revised the bill so that it now simply requires retailers to display signs indicating that their establishments use facial recognition. This type of reasonable approach to regulating new technology should serve as a model for state legislators considering regulation for other emerging technologies.

Facial recognition is a form of automated image recognition that uses computer algorithms to uniquely identify an individual in a database based on a photo. Concerned with the growing accuracy of the technology, some privacy advocates have argued that facial recognition is a threat to privacy and public anonymity and have recommended the government impose restrictions on both public- and private-sector uses of it. However, broad restrictions on using facial recognition could chill innovation and prevent uses that benefit consumers and society alike. Most people are willing to accept limitations on anonymity and privacy in exchange for security and convenience. For example, few people mind that a grocery store uses cameras to prevent shoplifting, since this helps prevent theft and thereby lowers prices. Similarly, facial recognition technology can help drive down prices by making repeat shoplifters easier to spot.

Well meaning laws can often have unintended effects. For example, some organizations are beginning to use facial recognition to combat human trafficking. Undoubtedly, it would be nearly impossible to obtain consent from the subjects of the millions of photographs that would need to be analyzed to find the victims.

Moreover, the concern about new technology is often inflated. For example, retailers already know who their customers are if the person is using a credit card or loyalty card to complete the transaction. There’s little real impact to consumer privacy if these same retailers also use facial recognition technology.

Technology is just a tool, and it can be used for both good or ill. The goal of legislation should be to protect people from harms that result from the abuse of the technology, not to stop its use overall. By that metric, the original bill was an overreaction and would have effectively prevented Connecticut businesses from using facial recognition technology in public by requiring them to obtain prior consent from every customer entering their stores. The new bill scraps that approach and instead requires retailers and other businesses to display a sign so that shoppers are aware that facial recognition is being used on the premises.

To be clear, the new bill is still not ideal. While transparency in business practices is generally good, by requiring retailers to post warning signs, there’s an implicit assumption that using facial recognition technology is something potentially harmful that requires consumer notification. Instead, states should abide by technology-neutral policies. If they want to require retailers to post a sign, they should do so for all surveillance video recordings, not just those using facial recognition. Even if legislators simply want to ban retailers from tracking the movement of customers in their stores, then it should prohibit that practice across all technologies, including other forms of biometrics. But it should not play favorites.

A better approach would have been for lawmakers to look at what specific harms they were actually trying to address, such as harassment or defamation, and make laws prohibiting those uses. Still, Connecticut lawmakers deserve credit for not letting those peddling fear run the show and focusing on the issue most salient to them.

As my colleague ITIF Research Assistant Alan McQuinn and I have written before, the privacy panic cycle—a term used to describe the increasingly alarmist rhetoric around new technologies—often dominates the politics of emerging technologies and causes lawmakers to overreact to perceived fears. Overcoming this cycle of fear requires policymakers to act thoughtfully, without passion or prejudice. Other states would be wise to follow Connecticut’s path.
Lighten Up

It's OK to have a little fun online. Social media messages don't always need to sound like they come from government.

One of the lessons I like to teach is that it's OK to have fun on government social media. However, some social media managers aren't given the leeway to try new things. Sometimes, the best way to get your elected officials or management to allow you to embrace a particular approach is to show them solid examples of agencies that are rocking it. While it's best to have an eye for knowing when levity is appropriate, some risk-takers have landed on their feet with even risqué posts.

Get Your Head Out of Your Apps

Transportation took a gamble on a tweet and it paid off. In a plug against distracted driving, the agency tweeted a photo of an electronic freeway sign that read, "Get your head out of your apps!"

Although this word play is something I've seen before, it's bold for a government agency. The department admitted that it edited this image for Twitter, but expressed that this was indeed a message placed on digital signs along the interstates.

I like when agencies use humor for more than just belly laughs — as the attention-getter to drive home a message. In this case, the state wanted to get the word out that distracted driving is one of the leading causes of crashes in Missouri.

No Video Footage? No Problem

The Washington State Department of Transportation is known for its sense of humor on Twitter. In fact, its efforts earned two Golden Post Awards in spring 2016, honoring the clever use of social media by a government agency.

Two springs earlier, WSDOT tweeted one of my favorite lighthearted posts. Just because the agency didn't have any video footage showing a black bear that was sighted on the freeway doesn't mean it couldn't have fun with the concept. In a particularly creative tweet, the agency noted, “Can’t see that black bear in I-90 median on camera, but here’s what it may look like.”

Then they proceeded to share a hand-drawn stick picture illustrating a bear-like figure waving “Hi” from the center of the busy freeway. Funny? Check. Hundred of retweets and favorites? Mission accomplished.

Lost Teddy Bear Showcases City

Sometimes, being creative on social media gives a government agency the ability to showcase its community. The Missouri Department of Transportation took a gamble on a tweet and it paid off. In a plug against distracted driving, the agency tweeted a photo of an electronic freeway sign that read, "Get your head out of your apps!"

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Hundreds of retweets and favorites? Check. Growing their audience with humor so they have their ear when WSDOT needs to share important messages? Mission accomplished.

Downtown Round Rock, Texas, Facebook page received thousands of likes and shares when it posted about a teddy bear that was found at an outdoor community event.

The agency issued a Lost Teddy Alert that mimicked an official bulletin. The creative post is that it also used the teddy bear as an opportunity to creatively showcase the community using images. Pictures were posted of Teddy hanging out at popular downtown locations, all the while missing his human. Eventually the owner was found and the bear was publicly reunited with the little girl who lost him by the local police and fire departments.

I asked Round Rock’s social media coordinator, Austin Ellington, to share some insight on his approach. He explained, “It wasn’t complicated and didn’t take hours of planning, but instead was an off-the-cuff, spur-of-the-moment idea that was born out of an overall social media strategy grounded in being creative, keeping things lighthearted and most importantly … being social in our approach to connecting with constituents.”

Was all of this branded as a waste of taxpayer dollars? No. The response was overwhelmingly positive, and rightly so.

Economic development and community branding bring both industry and dollars to cities. Ultimately the teddy bear campaign received more than 3,000 likes and shares, citizens were happy about belonging to the community, and a little girl felt special. Pretty impressive results if you ask me.
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