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Lock the Vote

A look at whether we're prepared for clean elections in 2020.

Containing the Threat

Why are system updates and patches so hard to keep up with?

Smart cities are here. Kicking and screaming is not the way to welcome them.

The point of the smart city concept is to improve quality of life for residents. That's why it's smart to plan and build with Relay. The sensor technology fits invisibly in waste receptacles on every corner, measuring a range of data at the street level — from fill level, weight and rummaging to CO₂ emissions, noise pollution and foot traffic. Actionable data you can use to improve air quality, noise levels, rodent abatement, health issues and, yes, quality of life in every zip code. Measuring success is a challenge. Relay is a powerful solution and competitive edge.



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No Time Like the Future

Technology never fails to offer head-spinning glimpses into what lies around the corner, and increasingly, government is ready to capitalize on it. At our last count, eight states have working groups devoted to looking into government uses for blockchain, and/or how to encourage the growth of blockchain-based companies. Less than two years ago, only one CIO we talked to (out of a substantial field) confessed an unbridled optimism for the technology's potential in the public sector.

That's not unlike the answers to questions posed by *GT* editors to CIOs about artificial intelligence just over three years ago. A couple of technology leaders offered some potential implications, but most felt the gains were still many years away. The Center for Digital Government's* most recent survey, *Digital Counties 2019* (see our infographic, p. 8), shows that most entrants are using AI in one or more areas of the enterprise. These examples are not unique.

In this issue, we explore a few emerging frontiers that have not fully entered the mainstream. On the heels of the 50th anniversary of the Apollo 11 mission to the moon in July, a couple of factors are pointing toward space as a viable platform for government service delivery. Our cover story, *Blasting Off* (p. 12), looks at a few of the early players and examines some real-world implications of innovations in low Earth orbit. Following the trajectory of most emerging technologies, satellites are getting cheaper and smaller, enabling

new capabilities for things like aerial imagery and even Internet connectivity. And that's just the beginning.

Another emerging field on the horizon is quantum computing. In *Quantum's Leap* (p. 32), we break down the concept and its exponential potential. Many leading companies have been investing heavily in research for decades, and some expect that full-scale quantum computers are within reach in the next few years. But what does that mean? "For some problems, a classical computer would require more memory than there are atoms in the universe," said Stewart Allen, CTO of IonQ, "but quantum has the ability to tackle that kind of problem."

A slightly more tangible topic we cover this month is the upcoming Census (*Making It Count*, p. 24). Perhaps government's signature data-gathering endeavor, the 2020 Census will take place against a complicated cultural backdrop. But it will also offer options for online participation for the first time. While the time has certainly come to streamline the Census by adding a digital information-gathering mechanism, communities are working to maximize participation from everyone within their borders — including people on the analog side of the digital divide. The stakes couldn't be higher. As our story indicates, one big-city mayor estimates a cost of \$2,000 for every resident who isn't counted.

Rounding out this issue are some international takes on the drive toward smarter communities. Right past our northern border is a very public debate over what cities will look like in Toronto,

Ontario. Canada's most populous city issued an international RFP that was won by Sidewalk Labs (see p. 38). The company's close ties to Google (it's owned by Google's parent company, Alphabet), coupled with some leading-edge ideas that hinge on the consumption of data on a massive scale, have put the project under a microscope. If the concerns can be resolved to the satisfaction of the local community, the buildout could represent a model for smart cities around the world.

And Dustin Haisler, chief innovation officer of *Government Technology's* parent company, e.Republic, spent a month this summer studying the gov tech community in China as part of a Zhi-Xing Eisenhower Fellowship. Read about his insights into what smart communities look like in China and the path they take to get there on p. 34. There's more in common with U.S. efforts than you might think.

As always, thank you for reading. Don't hesitate to reach out with any feedback or suggestions to nknell@govtech.com. 

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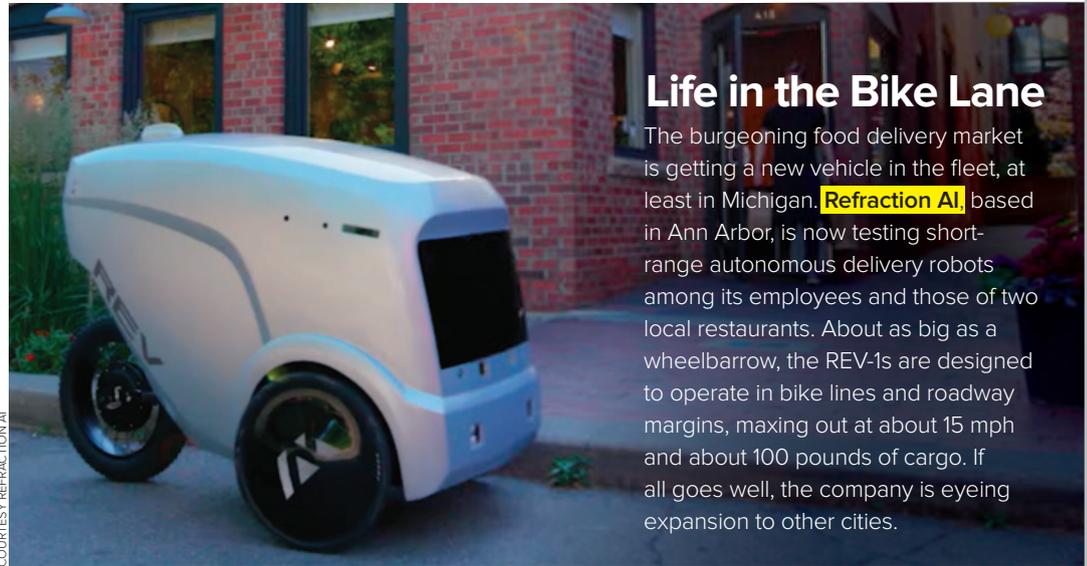
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The number of garbage trucks in Montgomery, Ala., equipped with RUBICONSmartCity sensor tech, helping the city better manage routes and maintenance.



COURTESY/REFRACTION.AI



Life in the Bike Lane

The burgeoning food delivery market is getting a new vehicle in the fleet, at least in Michigan. **Refraction AI**, based in Ann Arbor, is now testing short-range autonomous delivery robots among its employees and those of two local restaurants. About as big as a wheelbarrow, the REV-1s are designed to operate in bike lanes and roadway margins, maxing out at about 15 mph and about 100 pounds of cargo. If all goes well, the company is eyeing expansion to other cities.

118

The average number of days to hire someone in San Francisco city government. A new cloud-based applicant tracking system aims to shorten that time.

N.C. EXPLORES BLOCKCHAIN

Lt. Gov. Dan Forest in July announced the creation of the **North Carolina Blockchain Initiative**, composed of experts from academia and the private sector. The nonpartisan group will develop recommendations for blockchain uses that benefit economic growth, cost efficiencies and position the state as a leader in the technology's deployment.

\$120 MILLION

The amount of a recent investment round raised by The Boring Company, which has proposals to build giant transportation tunnels in Chicago, Las Vegas and San Jose, Calif.

Biz Beat

There are people who still don't use credit cards, some of whom belong to underserved populations, and Mastercard is launching a new card to help cities address this. Part of the **City Possible program** to help cities develop sharable solutions to common problems, **City Key** is an open-standard payment card that governments could give to citizens and then program for uses like paying bills or accessing city services and transit. Mastercard anticipates piloting the program in San Jose, Calif., later this year.



WHO SAYS?

"AI is an exploded term that is way too general, like cloud computing."

govtech.com/quoteSeptember2019

4 YRS.

The length of the Federal Aviation Administration waiver granted to the North Dakota Department of Transportation to allow drones to be flown over people.

MOST READ STORIES ONLINE:

- Digital Counties 2019: Winners Push Shared, Citizen Services
- Motorola Solutions Buys Body Cam Maker, Consolidating Market
- NY's Data Privacy Bill Failed; Is There Hope Next Session?

- Louisiana Declares State Emergency After Malware Attack
- Georgia Public Safety Agency Hit with Ransomware Attack
- Tyler Technologies Signs \$85 Million North Carolina Contract

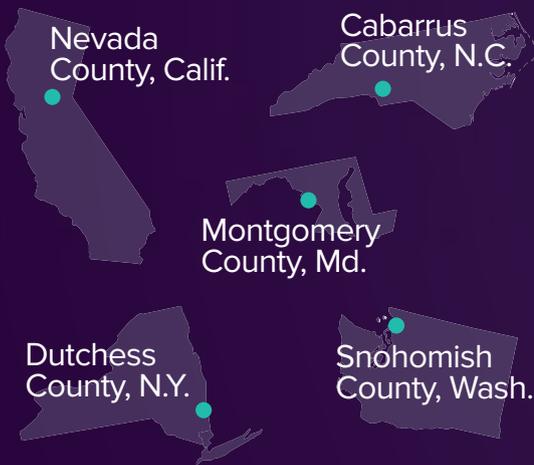
Digital Data on America's Counties

Highlights from the 2019 Digital Counties Survey

The annual Digital Counties survey from the Center for Digital Government* assesses where the nation's counties are in terms of tech. What are the biggest technology priorities on county chief information officers' agendas? What kinds of emerging technologies are gaining traction? Where do counties predict talent shortfalls?

In this infographic, we pulled together some of the most interesting takeaways from this year's survey. To read the full story with analysis on nearly 60 ranked winners in five population categories, visit govtech.com/DigitalCounties2019.

And the Winners Are:



Job Forecast

Counties identify the following as their greatest staffing needs in coming years:



Cybersecurity



Business intelligence and data analytics



Innovative tech

On Emerging Tech

Here's how many counties are using these new technologies:

68%



Drones

38%



AI/Machine Learning

11%



Augmented/Virtual Reality

6%



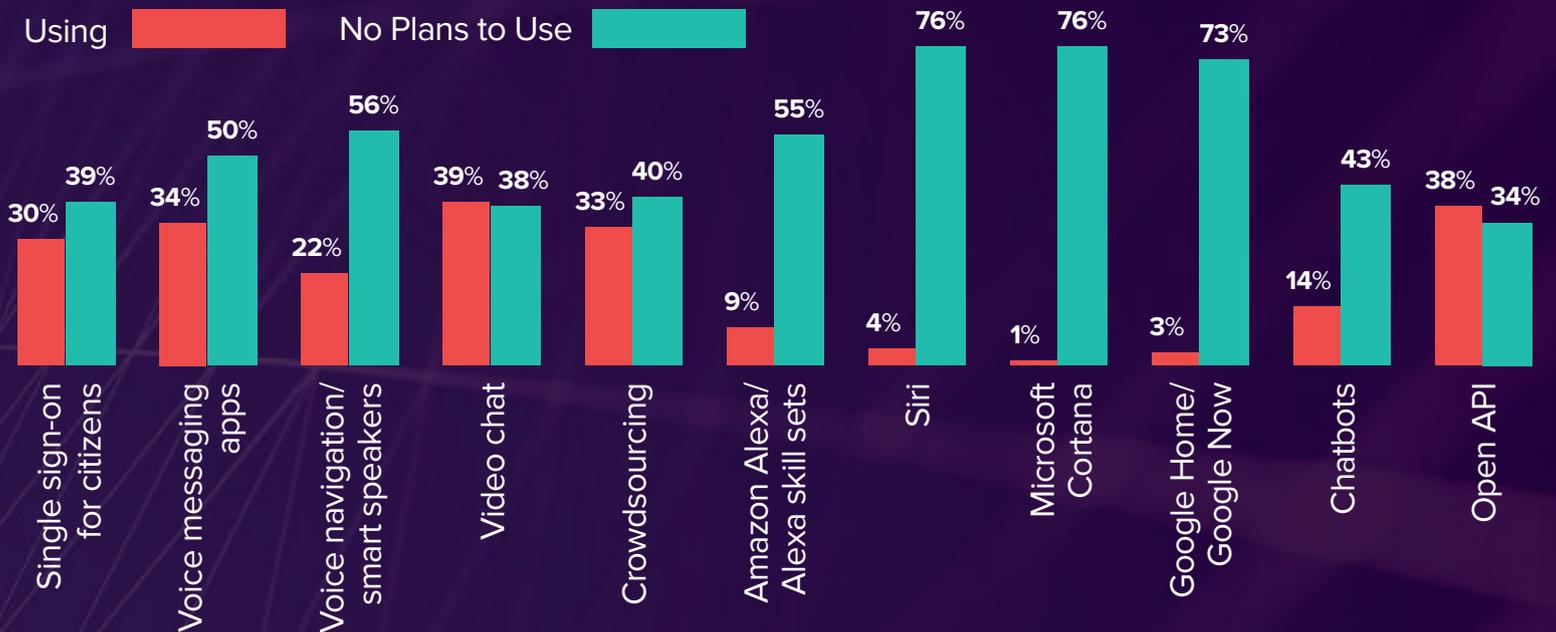
Blockchain

CIO Priorities

1. Cybersecurity
2. Citizen Experience
3. IT Staffing
4. Business Intelligence/Analytics
5. Disaster Recovery/Continuity of Operations

Citizen-Focused

Counties report on adoption of these tech tools and techniques to reach citizens:



Putting AI to Work



69% of counties are using artificial intelligence in their cybersecurity programs. Other common places to use AI are in predictive analytics (**33%**), infrastructure inspections (**29%**), speech recognition (**24%**) and fraud detection (**24%**).



of counties report having a cyberinsurance policy. Another **8%** say they're planning to get one.



of counties say their strategic planning reflects the potential of the Internet of Things. In 2018, the figure was **62%**.

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Don't Pay the Ransom

Ransomware attacks are on the rise — and to benefit everyone, no government should pay.

This has been the year of the ransomware attack. Compared to the same time last year, ransomware attacks were up 500 percent in the first quarter of 2019, according to Malwarebytes Labs. While all organizations can fall victim to this threat, a recent series of incidents shows that state and local governments are particularly lucrative targets.

The first high-profile incidents of ransomware hit in 2017, most notably when a global outbreak of a variant named WannaCry took down nearly a quarter of a million computer systems in 150 countries, costing around \$4 billion in financial losses.

But while WannaCry wreaked havoc across the globe, few organizations actually paid the ransom. Indeed, 72 hours after the attack began, hackers had only been paid about \$50,000, and even months later, they appeared to have netted less than \$150,000. One reason few paid is that those who did pay did not get their data back, so word quickly spread that paying the ransom was futile.

But attackers have gotten more sophisticated. Instead of randomly targeting victims, as they did with WannaCry, they are now directing their efforts at entities with the resources to pay a hefty ransom. And cities are attractive targets.

In the first half of 2019, there have been at least 22 ransomware attacks against U.S. cities. In Baltimore, for

example, the attacks shut down most of the city's servers, and the attackers demanded 3 bitcoins (about \$18,000) to restore each affected system or 13 bitcoins (about \$76,000) to restore all the city's systems. The FBI advised against paying, and the city ultimately decided not to, but the recovery was expensive. The city's director of finance estimates the attack will cost Baltimore at least \$10 million, in addition to another \$8 million in lost revenue.

While Baltimore did not pay their ransom, other jurisdictions have — and they have paid a steep price. In March, Jackson County, Ga., paid hackers \$400,000 to recover access to its systems after it fell victim to a ransomware attack. In June, Riviera Beach, Fla., paid \$600,000 to hackers after a similar attack, and weeks later, Lake City, Fla., paid nearly \$500,000 after an attack shut down its phone lines, email system and online payment portal.

Collectively, state and local governments would be better off if none of them ever paid a ransom because attackers would eventually stop engaging in these types of attacks if there was no payoff. Individually, however, they might be better off paying the ransom because it is their systems and data on the line.

Obviously, the best way to address this problem is to avoid getting attacked in the first place. Many of these attacks are caused by the same things: open ports, phishing emails and software vulnerabilities. Properly limiting system and network access, securing accounts

with multi-factor authentication, training employees on phishing attacks, and keeping systems updated with the latest patches are the best ways to keep systems secure.

The second-best option is to have a solid disaster recovery plan in place. Backups are essential for restoring data, but unless the recovery plan has been thoroughly tested, the actual process of recovering systems rarely goes as smoothly as hoped, especially when bringing live systems back online.

Finally, governments can use cyberinsurance to reduce recovery costs. When hackers attacked the Georgia Department of Agriculture in late 2017, the state used its \$100 million cyberinsurance policy to hire technicians and investigators to wipe and reload its systems. But it did not pay the ransom.

But even with these measures, some governments will still fall prey. And the only way to stop these attacks is if governments make a firm commitment to not pay ransoms. In July, the U.S. Conference of Mayors passed a resolution opposing paying ransoms for IT security breaches, but this pledge has not yet stopped local officials from continuing these payments. It is time for state legislatures to step in and pass laws to tie the hands of city and county officials. Attackers will then turn their attention to more vulnerable and lucrative targets. 

Daniel Castro is the vice president of the Information Technology and Innovation Foundation (ITIF) and director of the Center for Data Innovation. Before joining ITIF, he worked at the Government Accountability Office where he audited IT security and management controls.

ADVERTISEMENT



Low-Code: The Fast Track to Modernization

State and local governments are focusing significant resources on modernizing legacy applications and systems.¹ A recent Center for Digital Government (CDG) survey of 190 state and local decision-makers found 43 percent of jurisdictions spend more than a quarter of their budgets on modernizing legacy software and systems. The National Association of State Chief Information Officers (NASCIO) ranked legacy application modernization/renovation third on its list of state CIO priorities in 2019.² As organizations move ahead with these initiatives they need easier, more agile ways to accomplish modernization; however, agile alone doesn't always meet expectations. Many jurisdictions are finding that low-code — an application development approach that primarily uses visual, declarative techniques instead of programming code — is the key to modernizing their application portfolio more quickly, efficiently and successfully.

Modern-Day Modernization Drivers

Today's organizations are tasked with meeting citizens' and workers' expectations for innovative services; adopting emerging technologies such as artificial intelligence, the internet of things (IoT) and cloud; securing data across an increasingly borderless enterprise and more. The use of legacy IT can impede innovation — making it more difficult to meet these expectations — and create risks and drain resources. By contrast, modernization spurs engagement and innovation, strengthens security and allows agencies to utilize resources more effectively. Top benefits of modernization according to CDG survey respondents are:

- Increased efficiency
- Reduced costs
- Shorter delivery times
- Improved services

To modernize their systems, many state and local governments are turning to agile project management. Agile methodologies focus on early delivery of software, iterative development and collaboration between business and IT groups. In the CDG survey, 56 percent of respondents said agile project management is crucial to replacing legacy systems — mainly because of the speed, flexibility and cost savings it offers. Despite its appeal, however, many public sector organizations have been slow to fully embrace agile. In a NASCIO survey, 51 percent of respondents said they were still in early stages of adoption (i.e., pilot trials or limited use).³ These figures suggest that public agencies lag behind the commercial sector on agile and may need help to propel and scale modernization

Development Challenges Hinder Modernization

In spite of the drive to modernize, state and local governments face significant development challenges.

Demand for New Services

Citizens and government employees expect agencies to provide the same level of innovation and customer service the private sector delivers — at the same pace and volume.



49% of local governments say the average time to deliver a web or mobile application is five months or longer.⁴

Legacy Systems

Modernizing legacy systems and replacing large application portfolios using traditional development approaches often involves complex customizations that take years and are very expensive.



43% of respondents in the CDG survey are spending more than a quarter of their IT budgets on legacy systems.

Security

Protecting data and infrastructure becomes more complex as organizations extend their systems to enable everything from cloud services, IoT and machine learning to mobile applications and citizen-facing web portals.



61% of agencies have skills gaps in their cybersecurity staff.⁵

Developer Shortages

Due to a shortage of developers and the private sector's financial advantage in attracting talent, government organizations must find other ways to meet demand for new services and applications.

1 million

computer programming jobs in the United States are expected to go unfilled in 2020.⁶

efforts. Forward-thinking government leaders recognize this and are adopting low-code platforms and tools to support agile culture and digital transformation. In doing so, they are reaping significant rewards. Take Las Vegas, for example. The city is on a path to replace siloed, outdated applications with a variety of feature-rich, cross-departmental applications that reside on its new service-oriented architecture. To meet its objectives, the city adopted a low-code platform. The city's first low-code project was developing a Mobile Inspector App that integrates seamlessly with back-end systems so inspectors can get real-time information. Two developers completed the Mobile Inspector App in just three months, less than half the time the city had originally estimated. Even better, the application has already reduced building inspection times by 25 percent and cut hardware costs by 50 percent.⁷

Oakland, Calif., has experienced similar benefits. Using a low-code platform and a lean team of only five in-house developers, the city quickly delivered eight applications that transformed service delivery to its residents and saved \$1 million within one year of platform deployment.⁸ The savings came, in part, from doing more development work in-house and canceling costly third-party subscriptions required to support legacy applications. The centerpiece of Oakland's effort is an application that gives residents single sign-on access to new and future citizen-facing applications.

This capability not only streamlines service delivery, but also helps meet the city's goals related to providing convenient, equitable access to services. In the past, Oakland's antiquated systems required residents to complete forms manually and in person. This deterred people without transportation, time or other resources from taking advantage of the services. Today, services are immediately available online to all residents, including underserved communities. What's more, re-usable components and frameworks, native mobile capabilities and other features of the low-code platform let developers quickly and easily add cutting-edge applications to the city's citizen service portfolio as needs arise.

Using Low-Code to Bring Organizations into the Future

Low-code uses visual, declarative techniques to define data, logic, workflows, security and other application details. The visual development environment — along with re-usable components and frameworks, built-in support for mobile-specific capabilities, automatic translation of visual models into secure code patterns and other features of leading low-code platforms — simplifies and speeds

How Low-Code Powers Agile

A low-code development platform improves agile adoption and makes modernization easier, faster, more affordable and more innovative by:

- Accelerating delivery cycles
- Enabling staff to greatly multiply output of new applications
- Compensating for staffing and skills shortages
- Enabling integration with large, interconnected legacy systems
- Automating the coding of security policies
- Extending the life of legacy systems
- Supporting stronger collaboration between business users and IT

development dramatically. It also helps agencies unlock the power of agile and makes it easy to extend or replace legacy systems that are otherwise difficult to change.

Another important benefit of low-code platforms is their ability to help close the skills gap that many organizations face. As noted in a Forrester Wave™ report about mobile-specific low-code development platforms, the market is growing “because more aspiring, semi-professional and professional developers use them to close the gap between demand for mobile apps and the talent available to create them.”⁹ Visual tools and prototyping help developers get up to speed on the new development environment in weeks rather than months. They also enable business stakeholders and development teams to work together more closely to refine applications, test new ideas, get immediate feedback and minimize rework at later stages of development.

Getting Started

Agile and low-code development approaches entail a completely different way of building software and structuring teams. For example, instead of having multiple departments that independently develop applications for permits and licensing (e.g., the Department of Public Works and the Department of Fish and Wildlife), a jurisdiction may integrate systems of record and technology so similar core components can be re-used and shared across departments and job functions. While this approach reduces development time and simplifies changes or updates once software is released, it also requires cultural changes. For example, developers and business teams may have to collaborate more tightly, soften role boundaries

and more. The following steps will help organizations navigate low-code adoption and system modernization.

Identify use cases. Low-code addresses three distinct use cases: streamlining internal operations, delivering innovative user experiences (including mobile apps and portals) and replacing/modernizing legacy systems. Leading low-code platform vendors also address subsets within these use cases, including artificial intelligence, IoT and other emerging scenarios. Many organizations start with use cases that improve workflows and other internal operations, for example, by using low-code to replace solutions that cobble together email, spreadsheets and manual processes.

Establish a framework for change. This framework should be designed specifically for low-code development, and it should address organizational structure, talent, ecosystem and process (STEP). Structure includes decisions related to team size, roles, architecture, governance and testing. Talent refers to the approach used to identify and recruit the personnel and roles needed for low-code development. The ecosystem component provides guidance on integrating low-code systems and applications with existing systems of record, data services, cloud services and other resources. Process informs the way organizations establish, modify, or support low-code and other new ways of doing things.

Evolve in stages. Create a foundation for adoption and progress by assembling a motivated project team and successfully delivering the first project. Start simply and look for quick wins. From there, scale out to other teams and projects and begin to integrate low-code with other systems. Governance is critical at this stage and will help establish a self-sustaining low-code capability. Finally, begin to embrace low-code for additional use cases and across multiple departments.

Beyond Low-Code's Immediate Value

Low-code addresses important modernization challenges related to development costs, long delivery times, legacy integration, security and staffing. The overall effect of a low-code platform is that organizations can deliver more services quickly, cost-effectively and innovatively. In doing so, they can create applications and services that provide even greater value for their citizens and employees, sustain enterprise-wide digital transformation efforts and meet their mission objectives in ways that weren't even imaginable a short time ago.

For recent research on legacy modernization and more information about how to take a low-code approach, check out these resources:
www.govtech.com/modernization-report
www.govtech.com/modernization-webinar

Endnotes:

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Nicole Raimundo

CIO, Cary, N.C.

ALISON BOYER/RODEALCAT PHOTOGRAPHY

Nicole Raimundo, CIO of Cary, N.C., prefers not to use the term “smart city” because it implies the municipality wasn’t smart in its previous endeavors. She prefers to call it a “connected community.” Since assuming her role in 2015, Raimundo has focused on deploying connected technologies to better the lives of residents. Through the city’s “living lab,” a test bed consisting of city-owned buildings created in 2017, Cary has partnered with companies to assess connected solutions, gather data and install systems citywide.

1 How have you used Cary’s living lab to change the business of government? We started with building a lab, using our City Hall campus to test technologies and letting some businesses use it as a showcase and for us to learn, everything from “Is that the right sensor in the ground that we would use?” all the way through to maturity. In terms of building out the lab, we’ve been able to learn a lot of lessons and also do our due diligence from a citizen perspective. Since

smart cities use taxpayer dollars, we want to make sure that we’re testing things out first and understanding how they work because when we started this a few years ago, it was really new. It’s come a long way, but it still is new and always evolving.

2 What have you learned from the living lab so far? We really have learned how to put in a platform strategy. At the end of the day, the last thing we want to do with any of our solutions is to

have one more thing that our staff needs to manage. We made sure that standardized applications have open APIs so we can get data out or in easily. We can then aggregate it, and it helps us with our security to look across multiple applications and make better decisions. We don’t want another dashboard. So we’re working with startup companies to make them understand that we’re not always going to use their dashboard, but as long as it has an open API, we will use it so we can pull the data. That’s really important because you don’t want to be managing hundreds of new applications with all these endpoints and all this data. It’s critical as people think about how they’re going to roll out IoT technology to make sure that it has an enterprisewide strategy, as opposed to implementing a whole bunch of siloed applications.

3 How do you secure the data from citywide programs and the living lab? This goes back to that platform strategy so you don’t have siloed applications all over the place. It’s much easier to manage when you can bring it all into one place and understand the layers of security you need. The key is to look at what data you need and what you’re collecting because there’s no sense to pull and store unnecessary data. It may allow you to capture all sorts of things, but if you don’t need it, then don’t capture it and don’t store it.

4 What is your vision for Cary from your standpoint as CIO? The simplest way to put it is that it’s just going to be the continuation of implementing technology and utilizing data to better serve our community. How we get there will be the technical strategy of looking at how to integrate all these systems, the different ways of taking snapshots of the data sets to make decisions, and how we get it so that it’s eventually real time and predictive. It’s that process of going from something that’s reactive to proactive to predictive so that things are being automated and they’re being done before you know something’s happening. That’s the ultimate goal. [bit](#)

— Patrick Groves, Staff Writer

A dramatic space-themed image showing a rocket launch from Earth's surface, viewed from space. The rocket's bright orange and yellow plume is visible against the dark blue and white atmosphere of the planet. The word "BLASTING" is written in large, white, sans-serif capital letters across the center of the image, with the rocket's plume passing through the letters. The background is the vast, star-filled expanse of space.

BLASTING



NG OFF

Space launches have gotten cheaper and satellites have gotten smaller, ushering in an age where space can factor into government service delivery.

BY DUSTIN HAISLER AND DENNIS McKENNA

“We’re launching our own damn satellite,” said former California Gov. Jerry Brown in September 2018, expressing frustration with what he felt was slow work on climate change research. Brown saw value in space for state government early in his political career, even earning himself the nickname “Gov. Moonbeam” in 1976 from a *Chicago Tribune* columnist. Brown’s views on space may have seemed far-fetched 40 years ago, but a host of new technologies and companies are opening up possibilities and introducing use cases that may make space the next tech frontier for state and local agencies.

FACTORS MAKING SPACE MORE ACCESSIBLE

Space is more attainable than ever, driven by two connected developments:

1 / Reduced Launch Cost

It previously cost more than \$15,000 per kilogram to launch a payload into low Earth orbit, defined as an orbit with an altitude of less than 1,200 miles. This price has been significantly reduced by new launch models and innovations, such as the reusable rocket model pioneered by SpaceX. Currently, the company’s average Falcon

9 launch cost is about \$2,500 per kilogram, and this price will continue to fall.

2 / Rise of Small Satellites

Traditional satellites can be as large as a school bus and cost tens of millions of dollars to build. Enter the CubeSat and smallsat class of satellite. These smaller satellites cost much less to develop (ranging from \$5,000 to \$100,000, depending on complexity) and launch. Like all new technologies, small satellites initially had limited functionality but are becoming more sophisticated. They can now be used for a variety of Earth sensing, imaging and communication applications.

This combination of dramatically more affordable launches and smaller, cheaper satellites is democratizing access to space and ushering in a low Earth orbit space race. And it’s only just beginning.

EARLY PRIVATE-SECTOR SPACE VENTURES

Based on FCC approvals for low Earth orbit launches as reported by *The Economist*, as of 2010, there were more than 6,000 cumulative global satellite launches. But projections for 2027 estimate that number will jump to more than 22,000. Several companies are racing to enable new applications

for satellites in low Earth orbit. Currently, the two use cases driving the market are Earth sensing and Internet connectivity.

Earth Sensing

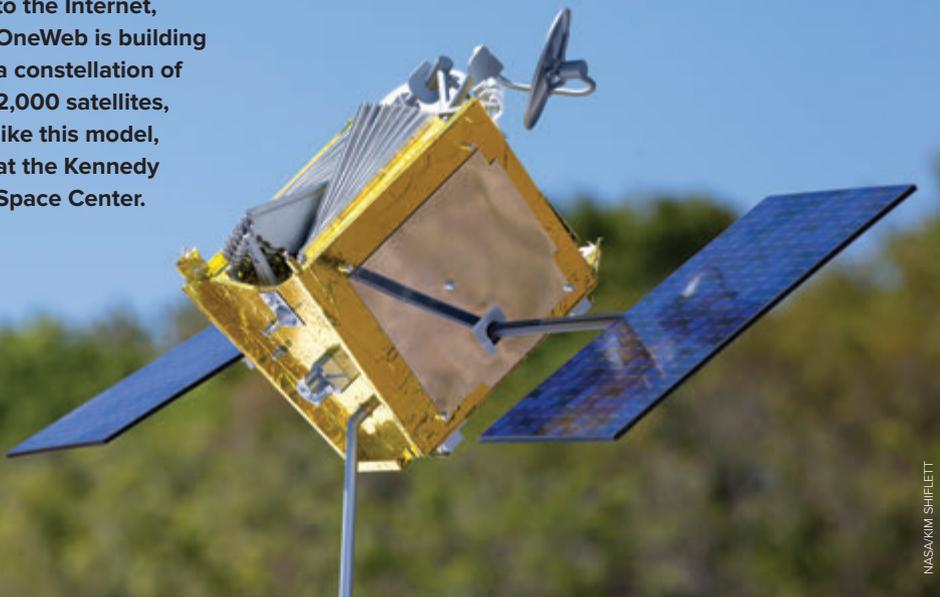
Earth sensing involves using satellites to measure, image or record changes happening on Earth. Companies such as Planet and Swarm have CubeSat arrays that provide imaging and sensing capabilities that can be used for infrastructure planning and analysis, environmental monitoring, emergency management, transportation coordination, and many other things needed by state and local government agencies. There are also a growing number of emerging firms capturing satellite imagery and data for specific applications. For example, Israel-based Uti-lis helps governments and utilities identify and monitor water leakage from space.

Internet Connectivity

Probably one of the most interesting use cases for low Earth orbit satellites is providing Internet connectivity. Almost 44 percent of the world still lacks access to the Internet — this represents more than 3.5 billion people. There is currently a race between two giants — Amazon and SpaceX, one of Elon Musk’s companies — to provide connectivity to the rest of the world, including rural areas in the United States. SpaceX was the first major company to receive regulatory approval for a CubeSat constellation. Called Starlink, it’s essentially an array of thousands of satellites that could be used to provide reliable high-speed Internet anywhere on Earth. SpaceX has already launched a series of test satellites as part of the Starlink project, and as many as 12,000 CubeSats will be in orbit by the 2020s.

Following closely behind is Amazon, who recently announced an initiative, called Project Kuiper, to put 3,236 satellites into space to connect up to 4 billion people to the Internet. Smaller companies like Swarm Technologies are also working on similar deployments of low Earth orbit satellite arrays that can be used for broadband and Internet of Things (IoT) devices in the future. In fact, Swarm is part of an initiative where remote sensors will up-link data to their satellites to monitor groundwater levels in California’s Central Valley.

To expand access to the Internet, OneWeb is building a constellation of 2,000 satellites, like this model, at the Kennedy Space Center.



NASA/KIM SHLETT

STATE AND LOCAL GOVERNMENT IN SPACE

The emerging use cases for gov tech in space are becoming more real for state and local agencies. Every year, state and local governments spend hundreds of millions of dollars licensing high-resolution imagery used in a variety of applications — from floodplain reclamation to understanding transportation patterns — imagery that is vital to decision-making in the public sector. For example, the Maryland Department of Information Technology contracted over \$3.5 million in a multi-year procurement for Digital High Resolution Aerial Photography and Services in October 2018. Previously, the only alternative to licensing high-resolution satellite imagery involved hiring a plane with the right equipment to image it for you. New companies and technologies are reinventing the remote imagery market, drastically lowering costs and creating new types of imagery/data from space.

In addition to imagery, the rise of Internet satellite arrays will also help strengthen connectivity infrastructure and support

THIS EMERGING PLATFORM WILL PROVIDE STATE AND LOCAL AGENCIES A NEW LENS TO DESIGN, MANAGE AND PROTECT OUR COMMUNITIES IN WAYS THAT WERE THE STUFF OF SCIENCE FICTION JUST A DECADE AGO.

rising IoT applications that will continue to emerge in the next few years. In addition, this same infrastructure that connects the rest of the world can also be used as a powerful tool to bring rural America online and bypass the costly installation of fiber in the ground that so many areas of the country are struggling to fund using current methods.

technology innovations and satellite form factors — ushering in a new era where space is a platform. As private-sector companies continue to leverage the democratized nature of space for deploying new satellites with new sensors, we will see a services layer emerge that builds on Earth sensing and Internet connectivity to provide new levels of understanding of the world. This emerging platform will provide state and local agencies a new lens to design, manage and protect our communities in ways that were the stuff of science fiction just a decade ago, but it demands new policies for

THE ADVENT OF SPACE AS A PLATFORM

There is a growing ecosystem forming around space tech — driven by new launch

SPACE AS A PLATFORM



1 “SPACE AS A SERVICE” APPLICATION LAYERS

New as-a-service application and satellite-delivered capabilities that leverage orbiting space infrastructure.

2 SPACE INFRASTRUCTURE

Low Earth orbit satellites and networked orbiting constellations.

3 LAUNCH AND GROUND CONTROL INFRASTRUCTURE

Reusable launch infrastructure and software capabilities that remove friction from accessing space.

data privacy and usage that are currently not in place. Space is no longer something we just look up at. It's now a platform that will provide better insight for solving problems in the world around us.

The modern technology stack is typically described as a pyramid: At the bottom is infrastructure, in the middle is a platform, and on top of it all is software. Each layer supports the next.

The evolving commercial space tech industry can be thought of in much the same way. On the ground, there's launching infrastructure to send hardware into orbit. Circling the Earth are satellites carrying various cameras, sensors and other tools. And through that technology, software is able to deliver data and services.

A growing number of companies are working in each layer of the stack. Perhaps the most visible has been SpaceX, which has earned publicity for itself through its pioneering testing of reusable rockets, as well as headline-grabbing stunts like launching a Tesla car into space.

SpaceX also operates in all three layers of the stack — they launch, they orbit and they provide services, including the planned Starlink satellite constellation slated to bring Internet connectivity to hard-to-reach areas.

Defense contractor Northrop Grumman, which acquired rocket-launched Orbital ATK in 2018, offers a variety of launching and satellite services. Relative newcomer Rocket Lab is working specifically on smaller launches.

Amazon and Amazon Web Services are, perhaps, surprising players in the industry. The diversified tech giant is offering services to satellites, including "Ground Station as a Service" — helping to establish a link between ground and orbit. Like SpaceX, Amazon plans to create a satellite constellation for Internet connectivity purposes.

Companies that focus more on the top service layer include Planet and Swarm, which both own satellites in space and intend to use them to provide imagery and monitoring services to customers in a variety of industries. [gt](#)
Ben Miller contributed to this story.

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WATCH THIS SPACE

In a Q&A with *Government Technology*, Swarm Technologies CTO and co-founder **Benjamin Longmier** talks innovation, use cases and bringing the final frontier to the public sector.

BY ANDREW WESTROPE



If satellites have a future in gov tech, one of the first partners in line could be Swarm Technologies.

Co-founded in 2016 by Benjamin Longmier (pictured above) and Sara Spangelo, and headquartered in Mountain View, Calif., Swarm aims to make satellite data accessible and affordable. The company is approaching this by designing and building communications satellites in-house, contracting with rocket companies to launch them, and then finding partners, public or private, to pay for their data services. So far these partners include agriculture, logistics and shipping companies, and recently Ford Motor Co., which aims to install satellite data modems in every vehicle in the future. Swarm has put seven satellites in low Earth orbit to date, building toward a long-term goal of 150 that will represent its own communications network. Plus, Swarm plans to build private constellations for other agencies, including governments.

Speaking with *Government Technology* about the future of the industry, Longmier, Swarm's chief technology officer, said it was too early to name the company's price point — although he assured us their services are about 1/100th the cost of typical satellite data — but had much to say about why governments should be watching (this) space.

Two of the primary use cases for commercial satellites right now are Earth sensing and Internet connectivity. Do you foresee others?

Earth sensing is pretty broad. You can think of imaging and optical, imaging and IR (infrared), imaging and UV (ultraviolet), multi-spectral, hyper-spectral. People are doing SAR-based (synthetic-aperture radar) imaging now, radar-based imaging, which can see through clouds and precipitation, so I think that's up and coming in the U.S. A couple foreign companies are doing that now already.

Communication is near and dear to our hearts. We're doing two-way communications. There are a few others proposing to do one-way communications, but we think it's pretty important to have that two-way capability, so that not only can you send data from the field, but you can also get back data.

What could state and local governments do with more or better images of their communities from space?

I think there's an angle there for state and local governments. Likely district, zoning and planning committees can use imagery to better identify places for parks, waterways, infrastructure, and plan for how to operate a better city.

Certainly in cases when disaster strikes ... Planet [Labs] likes to say, "No one ever thinks to take a picture of a site the day before the storm hits," so they're collecting imagery at a fairly regular cadence.

Once a day is the goal, and if you can see how the environment looked before and after, that can perhaps help in future planning and with insurance projects.

What about Internet connectivity? How will that impact how governments serve their citizens?

We see a number of aspects ... if you think about smart water management and smart water resources, we're [preparing] a pilot program now with The Freshwater Trust in California. They want to make sure the right amount of water is used in the right places ... to grow crops and have less waste in pesticides and water use. It makes the crop cheaper, as well, and if you think about how that corn is harvested and put onto a truck, Swarm is proposing to work with a number of vehicle logistics companies and monitor the temperature of the truck, its location and the full end-to-end logistics chain. Then when it gets to the grocery store, you want to make sure that product is fresh, and that's the kind of data Swarm can send back as well, right before it enters the store. So that's just one example, but I think it shows the whole logistics chain of how, on an average daily basis, things like IoT in general, but specifically IoT through space, can help the average consumer.

Do you think governments will pay for data services obtained by satellites or own the satellites themselves?

I think for state and local governments, likely that will be using the data, paying for the

services for various IoT points. I think at the larger federal level, like Swarm has been exploring, we're offering these satellites at a price point where, for these federal agencies, it's a drop in the bucket compared to what they pay for existing types of satellite data.

Do you foresee any near-term use cases for a state or even city government owning or contracting satellite data services?

Swarm definitely sees that near-term need. With California, in particular ... we see the near-term need of water management throughout the entire state. Swarm is working with The Freshwater Trust and with a startup company called SweetSense to perform water management throughout the state. We think that the state could ultimately benefit from being able to monitor where the water's going, where it's being used, and how to better manage the ebb and flow of water as a resource. That's being done to some extent now, but some of the sensing technology isn't quite there, and with just a little bit of work, in the very near term, even in 2020, we can be taking and sending satellite data from all of these waterways,

water pumps and reservoirs, and have really accurate knowledge of what those things look like in real time, 10 times a day.

What are the next innovations for satellite technology? Where is the cutting edge now?

Just like cellphones, where every year there's a new chip, new technology, 2G to 3G to 4G on cellphones over that number of years — it's the same way with space. The next things coming for space communications, at least, are higher data rates, higher speed, better coverage, more sensitivity. One can even think about doing positioning and tracking that is like GPS, but entirely separate from GPS — doing tracking from multiple satellites and RF signals, but not using GPS signals. That's one thing we're looking at in the future, where that type of data insurance can be augmented with GPS.

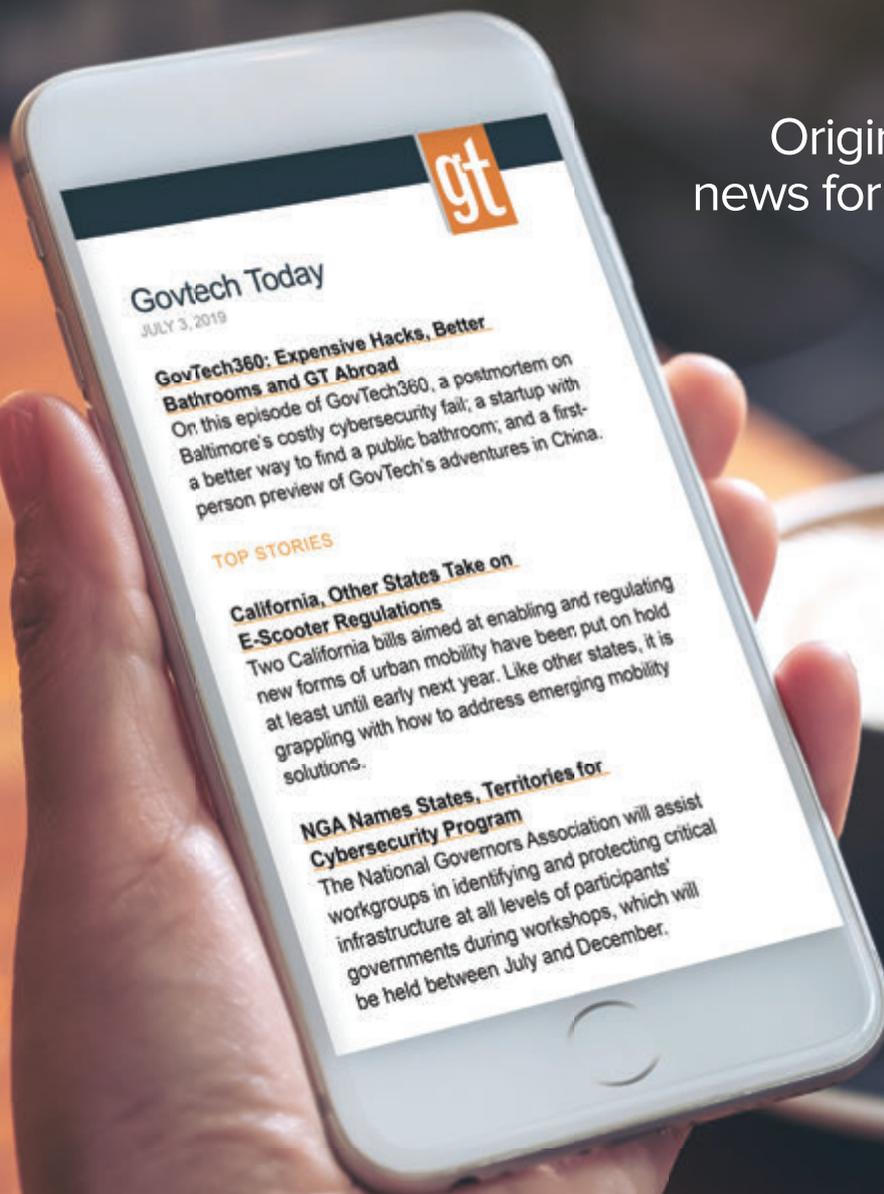
Editor's note: Responses have been edited for length and clarity.

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GovTech360: Expensive Hacks, Better Bathrooms and GT Abroad

On this episode of GovTech360, a postmortem on Baltimore's costly cybersecurity fail; a startup with a better way to find a public bathroom; and a first-person preview of GovTech's adventures in China.

TOP STORIES

California, Other States Take on E-Scooter Regulations

Two California bills aimed at enabling and regulating new forms of urban mobility have been put on hold at least until early next year. Like other states, it is grappling with how to address emerging mobility solutions.

NGA Names States, Territories for Cybersecurity Program

The National Governors Association will assist workgroups in identifying and protecting critical infrastructure at all levels of participants' governments during workshops, which will be held between July and December.



PAVING THE WAY FOR SMART MEDICAID:

How APIs, IoT, the Cloud and Other Innovative Technologies Can Improve Medicaid Programs Systems

Medicaid provides health coverage to 73 million Americans,¹ serving as a critical lifeline to expand access to care. However, these programs, which are administered at the state level, often rely on inefficient processes and systems.

Take for example one large state, which uses 92 separate systems to administer \$98.5 billion in state funds to serve 13 million enrollees² and still relies on paper records for much of its federal reporting. Many states also rely on outdated systems, with recent data suggesting 28 percent of state Medicaid Management Information Systems (MMIS) are legacy.³

In recent years, 90 percent of federal matching funds from the Centers for Medicare & Medicaid Services (CMS) has helped states launch projects to modernize their MMIS.⁴ States now have an opportunity to build a “smart Medicaid” system that is modular, interoperable, and capable of incorporating new and innovative technologies, such as the cloud, open application programming interfaces (APIs), machine learning, Internet of Things (IoT) connected devices and geospatial information systems (GIS). Moving in this direction could enable Medicaid systems to make better use of their data to improve program outcomes and drive better quality care.

MEDICAID’S CURRENT TECHNOLOGY CHALLENGES

Some states still use Medicaid eligibility and enrollment systems that are between 30 to 40 years old.⁵



MODULARITY ENABES STATE MMIS TO BE MORE FLEXIBLE AND TO ADD NEW COMPONENTS AND FUNCTIONALITIES THAT CAN HELP IMPROVE PROGRAM ADMINISTRATION.

STATES CAN MODERNIZE THEIR MEDICAID SYSTEMS, BUILDING NEW PLATFORMS THAT INCLUDE CAPABILITIES FOR INTEROPERABILITY AND MODULARITY.



These systems were implemented before today’s “smart” technologies emerged. Legacy MMIS are monolithic and hard-coded and are often so outdated they lack the capability to integrate these technologies. Upgrading or adding new functionality to these systems is expensive and time consuming. One option is to overhaul the entire system, but until recently, budget-strapped states couldn’t undertake this approach.

However, with additional federal funding, states can now modernize their Medicaid systems. They can build new platforms that include two all-important capabilities for administering a modern, service-based Medicaid program: interoperability and modularity.

CREATING MODULAR, INTEROPERABLE MEDICAID SYSTEMS

States are beginning to move away from a “big-bang approach” to IT development, where they completely replace an existing system with an entirely new one.

Instead, federal funding has empowered them to adopt a modular approach in which their MMIS is divided into separate components — or modules — that can be upgraded to improve different business processes, such as financial management, provider management, member eligibility and fee-for-service.

Modularity allows for interoperability so that each newly built part of the MMIS can communicate and share data and functionality with one another and with external systems such as health information exchanges (HIEs), providers’ electronic health record systems, managed care organizations (MCOs), and other health and human services (HHS) agencies.

Modularity enables state MMIS to be more flexible and to add new components and functionalities that can help improve program administration. Agencies can also potentially share data more securely with newer technologies built with privacy by design and a more robust security infrastructure.

When it comes to modularity, it’s important that state leaders begin building new systems that consider the demands and opportunities of the future rather than using blueprints of the past.

With a modular MMIS, states can more easily incorporate innovative technologies — like APIs, the cloud, machine learning, IoT and GIS — that transform these systems into smart Medicaid platforms.

USHERING IN A SMART TECHNOLOGY REVOLUTION IN MEDICAID

APIs

APIs allow different types of software to interact with one another and work together.

Open APIs are key to enable data sharing capabilities within Medicaid systems, since they allow other entities to securely gain access to a piece of software. Currently, sharing Medicaid data with external systems often requires the creation of a unique point-to-point interface. This approach is timely and costly. Instead, with open APIs, Medicaid programs can potentially improve the functionality of their systems and add new capabilities more quickly and at a lower cost.

Several states are embracing this approach. Ohio, Montana, Virginia and Wyoming are set to implement a systems integration solution with pre-defined APIs that will allow them to add new modules to their Medicaid systems. This will extend the capabilities of each state's MMIS and facilitate additional functionalities to meet evolving program needs and requirements.⁶

The Cloud

Medicaid systems are moving to the cloud as they embrace modularity and interoperability.

The cloud provides several cost savings for states, especially when it comes to storing their data since it reduces their reliance on on-premises data centers. The cloud also allows states to incorporate IoT-enabled devices and platforms and cloud-based solutions like machine learning from major public cloud providers at a much lower cost.

IoT & Machine Learning

IoT-connected devices can send and share data with one another, thanks to embedded sensors.

By 2020, an estimated 50 billion devices will be connected to the Internet.⁷ Already, we're seeing this interconnectivity between everyday objects, from refrigerators and thermostats to home security and entertainment systems, which all can be controlled from a smartphone or tablet.

In Medicaid, IoT-connected devices can enhance patient care by collecting patient data, analyzing it to detect patterns and using this information to devise preventive care models that lower health care utilization and improve program outcomes.⁸

Machine learning is one of the tools that enables this analysis. With machine learning, computers apply complex algorithms to large data sets to help organizations improve their decision-making and develop new insights.

This is especially critical in Medicaid, since the program serves 20 percent of the country's population⁹ and collects an ever-increasing amount of data as a result. States need a way to make sense of all their structured and unstructured data to automate

every part of their program administration, such as customer service inquiries, the Medicaid application process and improving access to care for at-risk populations.

Machine learning enables this automation, which can lead to increased program efficiency.

GIS

GIS tools help organizations visualize, analyze and interpret data to understand geographic relationships, patterns and trends.

In Medicaid, GIS tools can be used to understand how Medicaid members in a particular part of the country use the health care system. States then can use this data to find correlations between health care utilization and program outcomes or to understand emerging health public trends among a certain population, such as increased rates of diabetes or opioid overdoses. By using GIS tools, Medicaid programs can target interventions more effectively.

THE BENEFITS OF SMART TECHNOLOGIES IN MEDICAID

Smart technologies have several applications that could be beneficial to Medicaid:

BY 2020, AN ESTIMATED
50 BILLION DEVICES
WILL BE CONNECTED TO THE INTERNET.

IN MEDICAID, IOT-CONNECTED
DEVICES CAN BE USED TO **ENHANCE**
PATIENT CARE.



IoT can promote independent living through remote patient monitoring (RPM). So much of how people use health care is behavior-based, but sensor-based IoT devices installed in patients' homes and on their person that measure weight, glucose levels and blood pressure can enable hospitals and health care providers to access data that allows them to provide better care. With the help of machine learning algorithms, the data collected from these devices can be automatically analyzed to identify patterns. For example, IoT-enabled RPM can allow elderly Medicaid beneficiaries or those with disabilities to continue to live independently by collecting data about when each patient takes their medication or exercises. The sensor readings then can be stored in a database within a Medicaid agency's open API platform and combined with demographic and electronic health records (EHR) data that enables the agency to make better predictions about each member's risk and utilization.

Machine learning also can improve the predictive capabilities of Medicaid programs and develop targeted interventions.

In one study, Texas's Medicaid program used predictive models to forecast spending for high-risk, high-need patients.¹⁰

Texas has the third-largest Medicaid program in the country, and by studying claims data researchers identified patterns such as higher health care utilization among patients with chronic conditions like diabetes, which would lead to higher future Medicaid spending.¹¹

By identifying these kinds of trends sooner, Medicaid programs can be more proactive and devise targeted interventions — such as providing more diabetes education during these patients' doctor's visits — that may lower future program costs.

Machine learning also can streamline customer service for Medicaid agencies. With the help of intelligent chatbots that use natural language processing to mimic human conversations, Medicaid

agencies can optimize their call centers and use technology to help answer routine customer service questions from Medicaid members and future enrollees.

Through the cloud, Medicaid programs can integrate chatbot programs that enable more self-service and help guide people through the application process or troubleshoot common eligibility and benefits issues.

Machine learning can also be used in combination with **GIS tools to proactively deploy resources to potential public health hot spots.** For example, the University of Florida Family Data Center leveraged GIS tools to create hot spot density maps using data from several government agencies and community partners to map teen births, low birth weight babies, domestic violence incidents, child maltreatment reports, unexcused school absences and juvenile justice referrals. The maps helped the center identify communities that had the greatest needs. It then built a family resource center to service these populations and deployed mobile clinics to expand access to care in these communities.¹²

THE FUTURE OF MEDICAID IS "SMART"

Smart technologies hold so much promise for improving how Medicaid delivers care to millions of Americans. Medicaid spent \$557 billion in 2017,¹³ but that cost could arguably be much lower if Medicaid agencies embrace smart technologies.

Fortunately, many states are beginning to build modular, interoperable Medicaid platforms that can integrate these technologies. This can lead to innovation that helps agencies make better use of all the data they collect.

With the help of smart technologies, states can transform their data into a powerful asset that improves program administration and allows them to deliver lower cost, higher-quality care to populations who need it most.

ENDNOTES

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- ¹³ <https://www.kff.org/medicaid/issue-brief/medicaid-enrollment-spending-growth-fy-2018-2019/>

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**MAKING
COUNTRIES**



NG IT NT

Conversations about the importance of the Census tend to revolve around funding and political representation. But the “first high-tech Census” has even more at stake.

By Zack Quaintance

Much of the discussion about the 2020 U.S. Census has been dominated by President Trump's push to add a citizenship question, as well as critics who say he's doing so to undermine the count. But officials across the country are also grappling with conducting a Census in a country and world that have drastically changed in the past decade due to an acceleration of technology and new online threats.

Basically, when the 2020 U.S. Census arrives next spring, it will be seeking to accurately count a vastly different country than the one it surveyed 10 years ago.

The reference day used for the Census will again be April 1, as it has been since 1930, and the geographic space the Census covers will be the same. So too will the people, for the most part. What has changed since the federal government took its last sweeping decennial count of the population, however, is the way society engages with, shares, uses and values information.

The United States has counted its citizenry every 10 years since 1790, collecting data that includes age, gender, ethnicity and address, among other fields. Once the count is finished, the information is used by the federal government to plan how to best serve residents in a number of ways, including funding for health care, education, transportation, employment services and more. It is also used to help determine where to build vital infrastructure such as schools, roads and hospitals. Then there's political representation: Census data helps determine how many congressional seats certain areas get to represent them at the state and federal levels.

Funding and political representation have been at the forefront of recent conversations about why the Census matters. But what is perhaps less talked about is how the modern value of data — and the way local and state governments use it in tech and innovation offices — has made getting an accurate count all the more important. Unlike 10 years ago, we now live in a world in which more local governments are using

data to guide their decisions. Some of the actual data in that equation is often derived from the Census, increasing the stakes for communities this time around.

At the same time, the public's relationship with willingly surrendering data has become fraught. Hacks and data breaches are common, and the national climate is one in which many people are more reticent to share the exact information the Census seeks. At the same time, experts say bad actors online may be using the Census as a point of attack, warning about everything from foreign powers launching misinformation campaigns to petty criminals setting up fake websites to steal personal information for financial gain. Meanwhile, younger generations like millennials are all but unreachable via traditional methods of correspondence like phone, mail or door-to-door visits.

What this all adds up to is a far more complicated — and more high-stakes — environment for the U.S. Census Bureau to work within. But there are ways that local, county and state governments can assist. They are, after all, far more knowledgeable about



As the public becomes increasingly less willing to part with personal data, partnerships with established community organizations are a vital piece of Census-related outreach.

the people being counted in their communities than their federal counterparts.

What it comes down to, experts say, is understanding how the count will be taken, why it matters and what needs to be done to reach people and ensure they will be counted.

THE 'FIRST HIGH-TECH CENSUS'

When it comes to understanding how the count is taken, it is perhaps most important for local and state governments to realize there has been a major change for 2020: For the first time ever, residents can fill out the Census online. For whatever reason, however, this has been misconstrued by some to mean that all citizens will be required to do this, and that the old methods — mail, phone and in-person visits — have been abandoned. Terri Ann Lowenthal is a nationally recognized Census expert who was the staff director of the U.S. House of Representatives Census oversight subcommittee from 1987 to 1994. She also covered the Census Bureau for the 2008 Obama Presidential Transition Team. This year, she is advising many state and city Census support efforts.

Within that work, Lowenthal has identified frequent misgivings over the idea that this will be the nation's first fully digital Census, misgivings that she says are perhaps unfounded, owing to vague terminology.

"I think the term 'digital Census' suggests to many people that the response part of the Census will be done only online," Lowenthal said, "and that in fact has created a lot of worry at the community and local government level. The Census Bureau itself never used the term 'digital Census.'"

Lowenthal instead uses the phrase "first high-tech Census," meaning that Internet response is now an option for filling out the survey, but it is by no means the only way to respond. As a result, concerns at the local level that the Census will leave behind residents without access to the Internet are unfounded. Misunderstanding aside, Lowenthal says there are advantages to this high-tech Census.

"No one argues with the need to modernize the Census," Lowenthal said. "I

find it ironic that people could buy Girl Scout cookies online before they could respond to the nation's decennial Census online. Technology makes the Census more cost effective. Responding online is the least expensive way to gather data, and the Census Bureau is using technology not only to collect data, but also to prepare for the Census. ... It has to know where every housing unit is, because the Census doesn't just count people — it has to put them in the right location."

Things like satellite imaging, construction permit databases for residential housing and other new data sets that have been collected or digitized in the past decade all stand to make the Census Bureau's

“I think the term ‘digital Census’ suggests to many people that the response part of the Census will be done only online, and that in fact has created a lot of worry at the community and local government level.

work easier by giving them a better idea of where people live. The Census also has new access to administrative records that can help them count people who don't respond, although that is far from ideal. That all is the upshot of technology.

Conversely, having an online option to answer the Census creates potential for phishing attacks in which criminals trick the public into surrendering personal info. It also opens the country up as a whole to disinformation campaigns from foreign actors seeking to disrupt our political processes by fouling up the count.

"There is significant concern among local officials — and understandably so — that social media will be a conduit for rapidly spreading false information about the Census," Lowenthal said. "For example, in relation to who should respond and how Census data can and cannot be used."

Local governments can help the Census Bureau here by drowning out falsities

with accurate information, and by designing messaging campaigns with their own communities in mind that will effectively tell people the things they must know to stay safe and get counted correctly.

WHY THE COUNT MATTERS

The other focus of local governments when it comes to messaging, experts say, should be making sure their communities know why it is so important to get accurate Census data.

The idea that the Census is important because it influences funding and representation is perhaps an over-simplification. Andrew Reamer is a research professor at the George Washington Public Policy

Institute at The George Washington University in Washington, D.C. He is a nationally recognized expert in what Census data is used for, and specifically how it affects funding.

Reamer said that it is very rare for the Census data itself to directly influence exact dollar amounts for funding. What happens is that for the next 10 years, other data sets that are derived from the Census actually dictate these things. This

also has the potential to vary by state, with some states' federal funding allocation written into state law based on Census-derived data. What also might be unknown to most folks — both in government and within communities — is that Census-derived data influences private-sector decisions.

"Businesses use data derived from the Census to find out where to locate operations," Reamer said. "Target and Starbucks never locate a new operation without looking at the Census data. They have to understand how many people live in an area, what are their characteristics, how much money they have. If you're Target, you don't have cookie-cutter stores. Data will affect what you have inside, how you market, and how you advertise."

For some, it might be enough to learn that if they don't fill out their Census, the state highway authority might not have enough federal funding to repair roads. For others, however, it might ultimately be

more effective to stress that not responding to the Census could determine whether or not they have a Starbucks at the end of their block that they can walk to.

This all comes back to the idea that state and local governments know how best to reach the people in their areas, or, failing that, know how to recruit volunteers and staff who can. In fact, across the country, many state and local government leaders are doing their best to support the federal Census Bureau by acting as conveners, and by working with nonprofits and other groups who know the people even better than they do.

SUPPORTING THE COUNT

San Jose, Calif., Mayor Sam Liccardo understands what's at stake for his city with the Census, estimating that for every person missed, his community could lose roughly \$2,000.

As a leader of a city that consists of 40 percent residents born in another country, he also understands the challenges of crafting messaging for specific communities. This has been a focus of the city hall's work there to support the count, as has working with groups outside of government.

"We're doing some customary things and some unorthodox things," Liccardo said. "I think cities throughout the country are finding ways to message in multiple

“Nobody ever thought Pikachu would be a partner of local government, but we go where the people are.”

languages, to find trusted third parties such as churches and nonprofit organizations that can communicate the importance of the Census in their communities, and engaging many partners to ensure that we're all working together.”

Some of the unique things that San Jose has been doing include working with partners to create a texting app that can help locate residences that aren't on the map. This is technology that helps partners like nonprofits and faith-based organizations take

San Jose, Calif., Mayor Sam Liccardo estimates that every uncounted resident costs the city \$2,000 in federal funding.

FACEBOOK.COM/SAMI.LICCARDI



to the streets and identify signs of unorthodox housing situations, such as families living in garages, accessory dwelling units or other makeshift homes within a community affected by the soaring cost of living in Silicon Valley. With the texting app, San Jose has been able to geolocate these units on the map. They can then use that data in the future to better organize Census support efforts.

Part of the city's work with community groups includes clearly communicating that data being gathered for the Census won't be used for other governmental purposes.

"We have a lot of distrust to overcome as a result of the actions in Washington," Liccardo said.

San Jose is also leveraging unique partnerships with tech businesses in the area, including a particularly interesting one with Niantic, the company that makes the popular augmented reality game, Pokemon Go. In the past, Niantic has hosted events within Pokemon Go that require players going to a special area in the city to find rare Pokemon, areas that just so

happen to be where they can also register to vote. That effort was a success in San Jose, and Liccardo says something similar may be helpful to spark engagement again for the Census, especially with the often-elusive millennial generation.

"Nobody ever thought Pikachu would be a partner of local government," the mayor said, "but we go where the people are."

San Jose is just one example, but it speaks to the idea that local government and the groups it works with are well-suited to help the Census by leveraging their intimate knowledge of communities to get the word out, emphasizing why this is important while helping to drown out misinformation campaigns. While the modern era is an increasingly complex one for a federal agency tasked with accurate data collection, there are also new cost-efficient tools that can be leveraged to help. The more that local governments embrace and understand that now, well in advance of the actual count, the better off their communities will be not just on April 1, but in the following decade that depends on Census data. [99](#)

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A NEW SECURITY APPROACH FOR A CLOUD-FIRST WORLD

As state and local governments migrate to the cloud and employees increasingly rely on mobile devices, governments require a new security model.

More public sector IT activity takes place in the cloud than ever before. According to Gartner, nearly half of government organizations were actively using cloud services as of April 2018. Gartner predicts government spending on public cloud services will grow by an average of 17.1 percent through 2021.¹

At the same time, more government employees perform work on mobile devices. Whether they're public safety officers filing reports from the field, social workers updating client records during home visits, administrators who spend the week at various satellite locations or employees who work from home, government personnel often use laptops, tablets or smartphones to access data and applications from outside an agency's walls.

These trends pose significant security challenges. As public and private clouds replace the government data center and the internet replaces the government network, agencies can no longer rely on traditional security strategies. They need a new model that decouples security from the network and can enforce security policies wherever applications reside and wherever users connect. As applications move to the cloud, security needs to move there, too.

The Security Challenge

Cloud computing and mobility are fueling public sector digital transformation. But while government organizations enjoy the benefits of these megashifts, they must also deal with a growing barrage of cyberattacks and a complex threat

landscape. For example, the ransomware attack on Baltimore in May 2019 was the 20th such attack on a U.S. municipality this year.²

Traditional solutions to protect against threats create protective barriers only around the on-premises data center. This "castle and moat" approach worked well when all IT activity resided within the government-owned infrastructure. But many government IT activities no longer pass through the agency's data center or network. And employees connect their mobile devices to numerous networks, not all of which fall under the control of the government IT organization. Those employees often use applications housed not on government servers, but in a variety of clouds. One minute a worker might be using a commercial software-as-a-service (SaaS) application; the next she might be accessing a government application hosted on a public cloud, such as Microsoft Azure or Amazon Web Services.

As cloud services replace applications in the data center, and as the public internet replaces the private network, these trends leave government IT organizations without a network perimeter to defend.

Even when traffic continues to pass through a government data center, the cloud-first model makes it difficult for traditional security appliances to mount a sufficient defense. For instance, organizations that have adopted Microsoft Office 365 have seen traffic increase by as much as 150 percent.

To keep up with that growth, an organization would need to upgrade its legacy security systems and make significant investments in new hardware and software.

Another challenge governments face is a surge in secure socket layer (SSL) encryption. Nearly 80 percent of all internet traffic today is encrypted. While encryption is designed to conceal sensitive information, bad actors also use it to conceal attacks. That makes it essential to inspect all SSL-encrypted traffic — a tough task to perform at scale using legacy security appliances.

In the current environment — where an employee can work on any kind of mobile device anywhere in the world using any kind of internet connection, and then expose the government network to malware or other infections picked up along the way — security requires a new approach. Governments need a strategy based on a zero trust model, bringing all data traffic under scrutiny. But agencies need to bolster security without creating data bottlenecks and increasing latency. Employees get their work done — and citizens get the government services they need — only if data flows quickly and smoothly.

To protect public sector data and government employees while providing an optimal user experience, the best practice is to implement security services in the cloud.

How Cloud-Based Security Works

When an agency applies a traditional security solution to mobile users, data flows through a hub-and-spoke system. For example, consider an employee in the field who uses a tablet to access an agency-built application on a public cloud. That user's data passes through a virtual private network (VPN) to the agency's data center, where a security appliance inspects the traffic. Then the data flows from the data center to the cloud. The same thing happens in reverse as data moves from the application to the user's tablet.

In this scenario, network latency is a constant problem, making it difficult for the employee to get work done. Also, the IT department must create different security provisions for different users depending on the devices they use and the locations from which they work.

With a cloud-based security solution, data doesn't need to pass through the agency's data center. Instead, it can

pass through one of many cloud-based data centers run by the solution vendor. Data is routed automatically to the nearest center, ensuring quick transactions. Whichever center receives the traffic automatically applies the policies associated with that user and device.

Advantages of Cloud-Based Security

For government agencies that use private, public or hybrid cloud services, cloud-based security offers several benefits. First, it reduces risk by extending the network perimeter beyond the on-premises data center. A cloud-based solution protects employees and data no matter what device an employee uses or where the activity occurs.

The cloud-based approach also reduces cost. The agency no longer needs to invest in security appliances and software and then spend more when the system needs an upgrade. Nor must the agency devote resources to maintaining its security infrastructure. The cloud-based approach lets an IT organization outsource most of the heavy lifting associated with data protection. That includes the work of inspecting all of its SSL-encrypted traffic.

In addition, a multitenant, subscription-based security service in the cloud can help a government enable shared services. A central IT organization can give all of its constituents — perhaps different agencies or different local governments — exactly the security services each one requires. There's no need to design a system for the maximum possible number of users and then pay for that capacity. The IT organization can quickly scale security services, adding new functions or new constituents as demand requires, and pay only for what it uses.

Cloud-based security also ensures a good user experience, providing a safe, efficient path to the internet and cloud services.

Conclusion

The use of cloud computing and mobility in the public sector is expected to continue to grow dramatically over the next few years. Government IT organizations need to prepare for the security challenges that come with them now. In this new environment, cloud-based security solutions are the safest, most flexible, cost-efficient way to protect government employees and critical government data.

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2. Emily Sullivan, "Ransomware Cyberattacks Knock Baltimore's City, Gartner, Services Offline," National Public Radio, May 21, 2019, <https://www.npr.org/2019/05/21/72518702/ransomware-cyberattacks-on-baltimore-put-city-services-offline>



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Finding Hidden Threats

New crowd-scanning tech that uses artificial intelligence to identify hidden weapons will be tested across the country, including at the Virginia State Capitol Complex.

By Lucas Ropek / Staff Writer

Liberty Defense, a company that specializes in threat-detection solutions, has continued to partner with law enforcement agencies across the country in testing its HEXWAVE weapon-detection technology.

In July, the company announced a collaborative partnership with the Virginia Division of Capitol Police, which will allow it to beta test its product at the Virginia State Capitol Complex early next year.

The technology for HEXWAVE was originally developed by scientists with the Massachusetts Institute of Technology's (MIT) national security-oriented Lincoln Labs. It scans clothing and bags in areas of high pedestrian foot traffic to identify possibly dangerous weapons. The technology also has the potential to be installed covertly inside everyday structures like walls and walkways as clandestine surveillance devices. Artificial intelligence assists with weapons identification.

The beta testing will likely take place for a week next spring at the 12-acre capitol campus in downtown Richmond, said Joseph Macenka, public information officer with the Virginia Division of Capitol Police.

"It's a busy place and it's easy to get in and out of, so we need to be as vigilant as we can," said Macenka, speaking with *Government Technology*.

Earlier this year, Liberty Defense announced a partnership with the Utah Attorney General's Office that allows its product to be tested in a wide variety of settings, including places of worship,

event venues and government buildings. But the company has also developed testing partnerships in places as far flung as Canada and Germany as part of its product development process.

Bill Riker, CEO of Liberty Defense, said in an interview that the partnership in Virginia's capital city of Richmond would be a unique opportunity for his company to learn about deployment, incorporating the experience into evolving product design.

"Virginia is a very progressive state in terms of business, and it stays on the forefront of technology," he said. "They are in the process of upgrading multiple facilities in the Capitol and are recognizing [this as an opportunity] to capitalize on one of the most evolving technologies that would be ideal [for security]."

The product's appeal, Riker said, was its ability to both augment and perhaps someday replace current forms of facility security.

"We're really on the front end of where this can go," said Riker, describing the technology as "operationally agile."



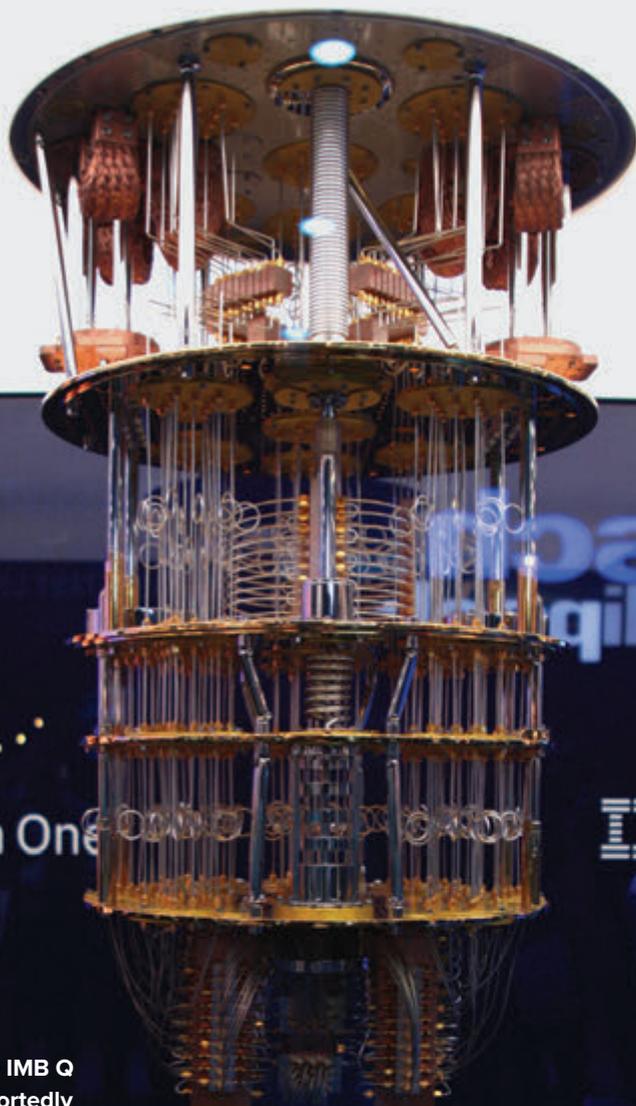
"We are developing a system that can be universally applied across a multitude of markets. ... Small footprint, indoors or outdoors, overt or covert," he said.

The interoperable potential of this device — its ability to be paired both with more traditional forms of surveillance and security management systems, while also augmenting security procedures for human operators — is what makes it such an exciting development, said Macenka.

"We would love to be able to find something where weapons detection technology could be tied to building lockdown technology," he said. "If [a threat incident] does happen, we can take the human component out of it. If a weapon is detected then that would automatically trigger the lockdown of the building, and that would prevent an active shooter situation."

"You always want to be prepared for any eventuality," he added. "Doing this beta test is a good step in that direction." 

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IBM unveiled the IBM Q System One, reportedly the world's first quantum computer for commercial use, at the Consumer Electronics Show in January 2019.

Quantum's Leap

Quantum computers can vault far past the capabilities of today's systems. But they will need a lot of help from technologists, academia and government to become truly useful.

By **Tod Newcombe** / Senior Editor

In 1981, renowned physicist Richard Feynman made a bold prediction that the phenomenon known as quantum mechanics could exponentially increase the processing power of computing and usher in a new age of problem-solving. Feynman, who won the Nobel Prize for his work, said that trying to find a computer simulation of physics “seems to me to be an excellent program to follow out.” Over the next several decades, scientists did just that and quantum computing has slowly moved from a theory into reality.

Today, quantum is about to enter what many believe is its golden age, with the potential to calculate a vast number of computational problems in a fraction of a second. Once confined to high-tech labs at research universities and leading technology firms, quantum computers are beginning to tackle a range of problems that include science, health care, business and government. Still, you can't go out and buy a quantum computer and put it in your data center — but the day when that can happen may be here sooner than some people think.

Bits, then Qubits

Today's computer — referred to as “classical” computing by quantum experts — generates a stream of binary bits in the form of 1s and 0s to create everything from an email message or document to a video or audio clip. The speed at which these bits are processed can be increased using high-performance computers (HPCs) or cluster computing. But there are limits to how fast a classical computer can stream and crunch the bits.

Quantum computing works somewhat differently by using what are known as quantum bits, or qubits, which are subatomic particles that also represent 0s and 1s, but can represent different possible combinations of binary bits at the same time, a technique known as superposition. Placing a qubit into superposition is difficult, but can be done using precision lasers or microwave beams. When it happens, a qubit in superposition can process a large number of binary bits simultaneously.

Another trick that researchers have developed is something called entanglement, in which pairs of qubits are linked or entwined. While analogous to doubling the speed of a classical computer, entanglement gives

quantum computers an exponential boost in power. Using specially devised algorithms, researchers can entangle a series of qubits. It is this capability that gives quantum computers the extraordinary power to process an enormous number of possible outcomes at the same time, far beyond anything capable using the fastest version of a classical computer.

By harnessing qubits, a quantum computer can tackle some major problems, ranging from the chemical reaction in a molecule to better understanding some of the mysteries around the intractable questions regarding climate change. “You can contemplate doing things that classical computers cannot do,” said Stewart Allen, chief operating officer for IonQ, a quantum computer company that was set up in 2015. “For some problems, a classical computer would require more memory than there are atoms in the universe, but quantum has the ability to tackle that kind of problem.”

Emerging Fields of Interest

IonQ was launched by its founders because they believed the days of prototyping were drawing to a close and that the ability to launch a fully functioning quantum computer was within reach, according to Allen. “We are within a couple of years of making something real, not a couple of decades,” he said.

While IonQ represents the brash, disruptive startup culture that has defined this generation of computing, the tech giants have not been idle. IBM has been researching quantum for nearly 50 years, but like IonQ, recognizes that quantum has entered a new phase.

For IBM, the new era began in 2016, when it made its quantum computer available for public use over cloud computing. “That changed the experience from a couple of people in a lab to allowing virtually anyone on the planet to have access to real quantum computers, so they could learn more,” said Scott Crowder, chief technology officer for IBM Q systems.

One of the problems that quantum could help solve has to do with certain aspects of cryptography, which have been outside the capabilities of classical computing. Other types of problems that demand huge computational effort include route optimization for airlines and financial portfolio research for banks, as well as a host of molecular-level scientific problems, according to Crowder.

As the cloud has opened up IBM’s quantum program to a new generation of users, the firm’s partnership program has been working more exclusively with select academic institutions, government laboratories and business customers for research into the behavior of matter at the molecular level, as well as into more practical problems. Crowder described these efforts as too small for any production value, but as a way for their partners to see how rapidly the technology is evolving. “It might take five years before we unlock any significant business value for them, because it takes

“For some problems, a classical computer would require more memory than there are atoms in the universe, but quantum has the ability to tackle that kind of problem.”

time to develop new algorithms and new computation methods into production. But if they don’t start now, they won’t be able to leverage the technology when it’s ready.”

Microsoft is another major player in quantum computing. The software giant has been working with the technology for almost 20 years and has ramped up work on creating a stable, end-to-end system that can be integrated with cloud technology, according to Julie Love, director of Quantum Business Development at Microsoft. “We see huge potential for quantum to accelerate problem solving across a wide range of fields, from climate change and health care to new materials development,” she said.

Turn Down the Noise

Microsoft is working with key customers to design quantum algorithms that can run on future, scalable hardware. But reaching that goal isn’t easy, whether you are Microsoft, IBM, IonQ or any of the other companies that are working to develop a quantum computer. No scalable, commercial-grade quantum computer exists yet. The problem lies in large part with the qubits that run in the computers. They are highly sensitive to vibration or temperature change — an interaction known as “noise” — that impacts how they maintain their superposition to get the job done.

One way to protect qubits is to place them inside a deep freezer. Microsoft is building a cryogenic control system that keeps its hardware in a deep freeze that is 100 to 200

times colder than deep space, according to Love. “There are challenges to doing that,” she said. IonQ stabilizes its qubits by trapping individual atoms in electromagnetic fields inside extremely high-vacuum chambers.

Until the hardware and controls necessary to operate a computer under such conditions is scalable, quantum researchers have turned to using error-correcting algorithms to eliminate as much of the qubit noise as possible. But doing that requires a lot of classical computing horsepower. “There’s a lot of work that goes on in turning those algorithms into code and then deploying the solution

into a customer’s infrastructure,” said Love.

Despite the challenges, researchers and tech firms are optimistic about the future of quantum computing.

“If we stay on the rate and pace [of doubling the quantum computer’s capabilities], which we believe we can, then by the 2020s, you are going to have systems large enough to have real business value,” said Crowder. Microsoft will likely start offering quantum computing as a service, according to Love. IonQ expects to do the same.

So, what does this mean for state and local government? For the moment, Crowder sees a role at the state and local level in terms of educating students in high school, college and post-graduate programs about the importance of quantum mechanics and computing. “It’s about getting them to understand the basics of machine learning before they move on to college,” he said. “There are a lot of opportunities there.”

Beyond that, Crowder thinks there will be ample opportunity to use quantum computing to help solve problems around climate change, health-care and policy outcomes. In the private sector, some European car companies have been testing quantum computing on traffic management scenarios, which could benefit large city governments down the road.

The bottom line is that quantum computing remains a heavy lift that can’t be carried by tech firms alone if the technology is to become sustainable and scalable. “We need a partnership between technology, business, academia and government to make this happen,” Crowder said. 

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What Unites Us

Despite vastly different political structures, smart city technology in China is developing along much the same path as it is in the U.S.

By **Dustin Haisler** / Chief Innovation Officer / Photos by Dustin Haisler



On the last day of May, I boarded a 13-hour flight to Beijing, not completely certain about what to expect over the next month. This was the beginning of my Zhi-Xing Eisenhower Fellowship. Over the next 28 days, I would travel to seven cities, meet with more than 100 people, and become fully immersed in a different culture.

Eisenhower Fellowships is a nonpartisan, nonprofit organization that brings together leaders through an international fellowship experience, creating a global network of people committed to working toward a peaceful world that is also prosperous and just. Each selected fellow has a primary focus area while abroad, and mine was to explore the ecosystem around smart cities and gov tech in China.

The Zhi-Xing Fellowship was a collaboration between Eisenhower Fellowships and the China Education Association for International Exchange (CEAIE), an organization that was pivotal to my on-the-ground support while in China. To get the full picture around the gov tech and smart cities ecosystem, CEAIE coordinated meetings with government, academia, private and state-owned companies, venture capitalists, and nonprofit firms from around the country. Here are some of my initial learnings:

China's planning process provides interconnectivity and shared purpose

China's five-year planning process is utilized to coordinate initiatives within government agencies, and is not just focused on technology. Since 1953, five-year plans have been issued to plan economic and social initiatives throughout the country tied to specific measurable outcomes. China is currently on its 13th five-year plan, which you can read more about in a report by the U.S.-China Economic and Security Review Commission.

Each of the five-year plans created at the national level serves as a guidepost for cities, but not necessarily an established direction. Each city and province is responsible for creating its own five-year plan, but they have some



A scannable barcode in Beijing lets residents leave feedback for or ask questions of the State Council using their mobile phones.



In Hangzhou, a representative of Alibaba provides an overview of their City Brain project, which connects real-time data with AI for smart city use cases, like intelligent traffic lights.

autonomy in specific areas of focus. But it was evident that local agencies that align their five-year plan directly to the national plan will have better financing or funding options for accomplishing their targets.

Each five-year plan has binding and expected targets. These quantifiable targets ensure that agencies are evaluating metrics for success. Binding targets are quotas that must be achieved, and expected targets are those representing desired or preferred outcomes. Performance measurement in the U.S. has been gaining significant traction, but I feel there is much that can be learned from the way China benchmarks success. They opt for quantifiable metrics, such as GDP

(on which each city has a binding target), instead of relying on qualitative goals.

China's smart city rollouts are similar to those in the U.S.

China has well over 500 active smart city pilots throughout the country, and much of their approach mirrors what can be seen in the United States. Three key points struck me about smart city development in China.

Whether originated by a government agency or a university, almost all smart city initiatives begin as pilots before being scaled to other cities or regions. Some of these pilots are even focused on a neighborhood or sub-district level.

Second, many smart city technology rollouts are verticalized within key focus areas, such as transportation. The other common areas of focus were transactional, such as financial and tourism use cases, for example, and public safety. Each of these verticals is also growing significantly within the U.S. market. Last, the private-sector, joint ventures and state-owned enterprises play an increasingly important role in the development and commercialization of new technologies in the market.

And even with vastly different political structures, their challenges with smart city rollouts are similar to those faced in the United States. The

Shanghai, China

Population 26.2 million

Cities with population of 1 million:



SOURCE: CHINA TODAY AND WWW.CNN.COM/2017/02/20/WORLD/ASIA/CHINA-FLOCRUZ/URBAN-GROWTH/INDEX.HTML

lack of a universal definition of a smart city, resistance to data sharing at the department or agency level, the pace of technological change and prohibitive regulations were repeatedly cited as obstacles to progress by Chinese officials.

China is still developing, but at a much larger scale

Both the private sector and government agencies made it clear that China is still a developing country. From a foreign perspective, it is easy to be detached from the reality and pace of development since China opened up, but China's smart city and gov tech markets are growing at almost seven times what we see in the United States year-over-year. In addition to its rapid growth rate, it's developing on a large scale. With a population of 1.4 billion people, most rural cities in China would be considered mega-cities in the United States.

The use of emerging technologies has much in common with the United States

One of the most important parts of my fellowship involved looking at the physical or planned rollouts of emerging technologies in the seven cities I visited. Although this isn't a full representation of China's adoption of emerging technologies, following are a few observations.

- **5G** is a national priority with an expected full-scale national rollout by the end of 2020. Many new cellular devices already have 5G chipsets embedded.
- **Artificial intelligence** is largely driven by the private-sector and state-owned enterprises. AI has been primarily applied to public safety, tourism and manufacturing verticals. There are also numerous examples of natural language processing in chatbots and other voice/text services incorporated into applications and third-party experiences.



The Ministry of Public Security in Beijing.

- **Blockchain** is primarily used by financial technology (fintech) firms for decentralized payment infrastructure and micro-and-peer lending.
- **Mobile adoption** is 120 to 150 percent depending on where you are in China, and phones are a primary mechanism for digital and physical payment through third-party applications like AliPay and WeChat.
- **Big data and overall data analysis** is a significant focus area for many agencies and companies in China. Agencies have struggled with analysis of data through on-premise infrastructure but are starting to work on data structures that will make big data a foundation for artificial intelligence.
- **IoT** is the most widely adopted emerging technology visible throughout China. From cameras to sensors on light poles, much of the public infrastructure in China has an Internet connection and is leveraged to enable intelligent use cases.
- **Low Earth orbit:** China's private-sector space industry is in its early stages, but numerous organizations validated that low Earth orbit could be the next big platform for smart cities applications. China's space agency, China Aerospace Science and Industry Corp., successfully deployed a low Earth orbit satellite in December of 2018 and is also working to catalyze private-sector space enterprises.

China is using third-party platforms to reach citizens where they are

Government agencies are commonly using third-party applications to reach the population where they are — instead of building infrastructure and expecting users to find it and use it. For example, WeChat, a popular messaging application developed by Tencent, now has over a billion users that use it for social updates, payments and messaging. Many cities throughout China have built mini-programs within WeChat to connect with their residents in a way that doesn't require that they leave



Professor Jie Lyu from the Renmin School of Agriculture Economics and Rural Development gives a lecture on China's five-year planning process in Beijing.

the application. In the United States, we are seeing the rise of many similar third-party platforms like Amazon's Alexa; however, the pace of adoption by government agencies is limited. In China, third-party platforms are not just experiments; they are the primary interaction points with end users.

China is open for collaboration on smart cities and emerging technologies

China is currently collaborating with many international institutions, such as the International Organization for Standardization, on standards for smart cities and gov tech, but there are limited direct collaborations with non-academic institutions in the United States. Numerous organizations that I met with were excited about the opportunity to work peer-to-peer with cities in the U.S. Some areas of significant interest relate to the ethics of emerging technologies, use cases for emerging technologies (i.e., AI, blockchain, IoT, etc.), standards related to cybersecurity, and new models for technology, economic development and innovation in the public sector.

What's next?

My journey to China was a life-changing experience, providing me an international perspective on technology's role in government-citizen interactions. In the months to come, I will write a series of articles and an industry report on smart cities and gov tech in China. Although our countries may be on different ends of the political spectrum, my time in China gave me renewed hope that together we can create systems that unlock new possibilities for government agencies and the citizens we serve — regardless of politics, language or geographical boundaries. [@t](#)

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Revitalize or Rewind?

Two years after Sidewalk Labs was named the private-sector partner to revitalize a waterfront community in Toronto, citizens and city officials remain divided about whether to move forward.

By **Jessica Mulholland** / Contributing Writer

The plan for a data-driven, mixed-use, responsive community in Toronto has been mired in controversy since its inception.

Sidewalk Labs, owned by Google's parent company, Alphabet, envisions a modern, tech-powered community that realizes sustainability goals through a variety of cutting-edge tools. The collection of systems envisioned for Quayside will add up to the biggest "climate-positive community at scale in northern America," according to Sidewalk Labs CEO Dan Doctoroff.

Urban innovations include traffic signals that would prioritize pedestrians needing

more time to cross the street by deploying technology that would judge their speed and adjust signals in real time. Dynamic curbs would feature passenger loading zones during rush hours and public spaces in off-peak hours; a freight logistics hub with underground delivery would reduce truck traffic on the local streets, and a self-financing light-rail transit extension would connect residents to jobs and entice workers and visitors to the waterfront.

In addition, the project would include advanced power infrastructure and stormwater management and pneumatic waste collection. With the traffic and curb

technology along with proposed cycling infrastructure (100 percent of buildings will be reachable by cyclists via a dedicated bike lane or cycling street) and expanded public transit, Sidewalk Labs estimates that once the project is at full scale, 77 percent of trips in Quayside will be via public transit, cycling or walking.

But every element of the plan is subject to approval, Doctoroff noted in late June, in a nod to the misgivings voiced by many in the community in giving a private company that much power to direct municipal development.

"We would not expect to have any unilateral right to deploy that sort of technology," Doctoroff noted. "We would need approval."



The proposal for Quayside along the waterfront in Toronto would create “the world’s first neighborhood built from the Internet up.”

Called Quayside, this 12-acre proposed development along the city’s eastern waterfront was announced in October 2017. The initial estimate to begin seeking approvals for implementation was December 2018, according to a March 2018 presentation from Sidewalk Toronto — the partnership between Alphabet’s Sidewalk Labs and Waterfront Toronto, a government-appointed nonprofit focused on development.

But fast-forward to summer 2019, when Sidewalk Labs released “Toronto Tomorrow: A New Approach for Inclusive Growth,” a 1,500-plus-page Master Innovation and Development Plan (MIDP), Torontonians remained divided about the vision for Quayside. As a result, the project’s fate is up in the air.

Concerns About Citizen Data

Since its inception, critics worried that such a mass collection of citizen data — especially from a tech giant like Google’s Alphabet — poses too substantial a risk to privacy. A Sidewalk Toronto

project update that leaked to a local news outlet in February intensified that criticism, and a lawsuit from the Canadian Civil Liberties Association (CCLA) followed, even before the MIDP was released.

The CCLA sued all three levels of Canadian government for a “reset of the Sidewalk Toronto project” for two primary reasons, one of which was the concern over citizen data collection.

It’s nearly impossible to refute that Google collects gobs of data. In fact, a report released in August 2018 revealed just how much data Google collects on the average Internet user.

According to *Google Data Collection*, authored by Professor Douglas C. Schmidt of Vanderbilt University, the number of “passive” data collection events outnumber “active” collection events by approximately two-to-one (in active data collection, users directly engage with Google products and services; in passive data collection, Google collects data in the background). The study notes that passive

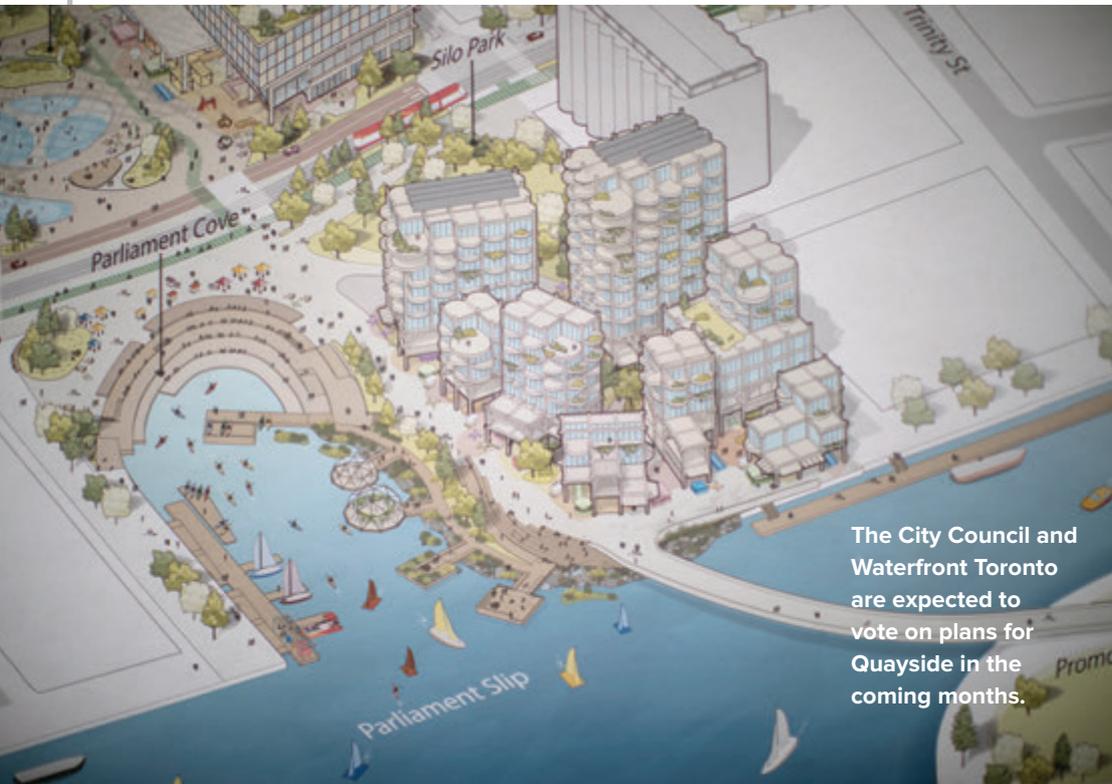
collection was of greater interest because it goes beyond location data and “remains relatively unrecognized by the users.”

And in that passive collection, an Android device communicated roughly 900 data samples and 4.4 MB of traffic data (location, ad domains, device uploads, app store and “other”) to Google’s servers during a 24-hour period — roughly 40 data requests per hour. (By contrast, Google collected less than 1 MB of data from an iPhone in a 24-hour period — and had about one request per hour.)

So it’s no surprise that questions around data and privacy arose following the announcement of a smart city development described as “the world’s first neighborhood built from the Internet up.”

And that, said Brenda McPhail, director of the Privacy, Technology and Surveillance Project at the CCLA, is the broader problem — moving the model of the Internet into city streets.

“All you have to do is open the newspaper to understand some of the issues that are arising — privacy and surveillance and



The City Council and Waterfront Toronto are expected to vote on plans for Quayside in the coming months.



DAVID KIDD

free expression and discrimination on the Internet,” she said. “So, at the core of our concerns about the way this will play out is how do we avoid those issues on city streets? How can we make sure that we’ve got the policies and the laws in place before we embed the sensors in our infrastructure?”

Protecting Data, Privacy

In its winning proposal, Sidewalk Labs stated that “with heightened ability to measure the neighborhood comes better ways to manage it,” and that “Sidewalk expects Quayside to become the most measurable community in the world.”

And measurement requires data, which Sidewalk Labs still hadn’t truly addressed nearly a year after winning the bid. But Sidewalk proposed that Quayside data be controlled by an independent Civic Data Trust that “would be guided by a charter ensuring that urban data is collected and used in a way that is beneficial to the community, protects privacy, and spurs innovation and investment,” wrote Alyssa Harvey Dawson, general counsel and head of legal, privacy and data governance for Sidewalk Labs, in an October 2018 blog.

Although the Civic Data Trust was a mere idea back then, the Friday following its announcement, then-Information and Privacy Commissioner of Ontario Ann Cavoukian submitted her resignation letter, saying that the proposed protection plan “is not acceptable” and that personally identifiable data must be de-identified at the source (sensors, smartphones, surveillance cameras).

In the digital governance proposal released during the Civic Data Trust announcement, Sidewalk Labs noted that data would be de-identified but didn’t guarantee when or who would do it. In addition, Cavoukian learned during a meeting that week that “third parties could access identifiable information gathered in the district.”

Just a few weeks prior to Cavoukian’s resignation, tech entrepreneur Saadia Muzaffar resigned from the Sidewalk Toronto Digital Strategy Advisory Panel.

“The most recent public roundtable in August displayed a blatant disregard for resident concerns about data and digital infrastructure,” she wrote in her resignation letter. “Broad licensing that does not prioritize digital rights of the

public can mean that surveillance infrastructure and valuable public data can lay latent for long periods of time, and avoid scrutiny easily, tucked in a foreign-owned company’s proprietary vault.”

Muzaffar also noted in her letter that at the time, there was “no version of being a good steward for the people of Toronto, where Waterfront Toronto does not ensure that both the data and the digital infrastructure in all its developments is controlled by our public institutions.”

The resignations and lawsuit aren’t the only hits against Sidewalk Toronto: On Feb. 25, 2019, Toronto residents took a stand, launching the #BlockSidewalk campaign “to stop Sidewalk Labs from ploughing ahead with a controversial proposal for



The proposal calls for hexagonal pavers that can be quickly reconfigured for changing urban needs.

DAVID KIDD

uses of “urban data”; make publicly accessible data that could reasonably be considered a public asset and is properly protected; and improve transparency by publishing Responsible Data Use Assessment summaries and showing the location of approved devices on a publicly accessible map.

Doctoroff also vowed that Sidewalk Labs won’t sell personal information, use it for advertising or disclose it to third parties without explicit consent.

And while more compliance with Canadian data laws may still be required and likely will be “part of the process of working out a very complex arrangement,” he added, “we expect over the course of the next several months to be working through those things. At the end of the day, it will be their [Waterfront Toronto’s] decision. Whatever they come up with, we’re absolutely prepared to comply with.”

Doctoroff also said that Sidewalk Labs is committed to de-identifying data at the source and never sending it to the cloud, but that ultimately the rules should be decided through the democratic process.

Still, the CCLA’s concerns remain, McPhail said, adding that an interesting dynamic appeared after the plan landed.

“Before it was released, critics were told that we were being premature, that we should wait for the plan. Now that it’s released, those who feel their criticisms remain valid are accused of being afraid — of technology, innovation and bold change,” she said. “I think it’s important to stand firm and note that people can embrace technology but not street-level surveillance; appreciate innovation that works for us and reject innovation that uses us as inputs; and ask for change that responds to needs we express rather than telling us what we should want.”

Waterfront Toronto Media Relations and Issues Advisor Andrew Tumilty pointed out that Sidewalk Labs’ proposal was selected from an international RFP that was open for more than five months.

“But at the end of that RFP, all Sidewalk Labs was granted was the right to produce a proposal,” he added. “They don’t have permission to [fill] a pothole right now.”

The MIDP is going through a very thorough and extensive evaluation before Waterfront Toronto determines what to move ahead with, if anything, Tumilty said.

High-Profile Support

A few weeks after the draft MIDP was released, the Toronto Region Board of Trade — a large and influential chamber of commerce — issued a letter acknowledging that while the project has problems that must be resolved, it ultimately would drive solutions to development challenges in Toronto and should be allowed to proceed.

“Several issues and details must still be resolved; for example, Quayside and other similar projects in the Toronto region will have to comply with clear data privacy regulations that are not yet in place, and the eastern waterfront will still need a final path to rapid transit financing before this project can be developed to its full potential,” the board of trade wrote in the letter. “Nevertheless, we also believe there are many exciting ideas in this proposal that can help Toronto tackle some of the major challenges we face.”

Now that the MIDP is in the hands of decision-makers, city staff are reviewing it and consulting with the public and stakeholders, said David Stonehouse, director of the Toronto Waterfront Secretariat.

From Sidewalk Labs’ perspective, the MIDP is the result of extensive planning work and discussions with more than 20,000 Torontonians over the last year and a half, said Keerthana Rang, communications associate at Sidewalk Labs.

“Robust public debate and discussion will only make these ideas better and we look forward to continuing to consult with Torontonians across the city to get this right,” she said. “This project is for Toronto and it will be up to residents, Waterfront Toronto and all three levels of government to decide if it should go forward.”

The Waterfront Toronto Board decision and City Council vote is expected around fall 2019/winter 2020. 

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the development of a large plot of waterfront land in downtown Toronto.”

Despite these high-profile resignations, Waterfront Toronto maintains “an exemplary relationship with them,” according to Waterfront Toronto’s vice president of Innovation, Sustainability and Prosperity, Kristina Verner.

And Sidewalk Labs CEO Dan Doctoroff made several data-related commitments in a press briefing when the company released the MIDP.

He said this independent and government-sanctioned trust (now being called the Urban Data Trust) will establish responsible data use guidelines that apply to all entities; approve and oversee proposed collections and



To Boldly Go?

When considering any emerging technology, the right answer might be “no.”

Most everyone in the public-sector IT community can map their careers — and many do — to key milestones in the *Star Trek* franchise that has spanned more than 50 years. The original television series debuted in 1966. Some 13 movies and multiple TV series have followed, including a much-anticipated return next year to *The Next Generation* timeline with *Star Trek: Picard* on CBS.

Patrick Stewart as Jean-Luc, along with his crew, explored future scenarios for good or for ill. As popular culture sometimes does, Picard inspired, informed and occasionally chastened us.

Faced with the digital divide, technologists 30 years ago embraced the Picardian notion that “things are only impossible until they are not.” In the intervening period, they have pushed the widescale introduction of devices and connectivity to flip the ratio of haves to have-nots from about 30-70 to 70-30. While impressive on one level, those numbers ignore the subtleties of what is increasingly labeled digital equity, a reflection of contemporary concerns of inclusivity and diversity for marginalized populations. All of that should remind the aforementioned technologists of another Picard formulation: “It is possible to commit no mistakes and still lose.”

While the Internet has, to a great degree, collapsed the time and distance that historically constrained government

service delivery, commerce, education and more, the conventional wisdom among many technologists and urbanists has pointed to cities as uniquely desirable places of opportunity to build the future.

But the literature around the smart cities movement, even the really compelling stuff, never asks whether we really want to do this, to build those future cities, forgetting Picard’s injunction that “You may test that assumption at your convenience.” Neither technologists nor urbanists asked, but a noted economist did.

MIT Economics Professor David H. Autor gave the prestigious Richard T. Ely lecture at this year’s American Economic Association, which showcased brand-new data that left the assembled group of hundreds of leading economists gobsmacked: Cities, it turns out, are only good places for as few as one in three people to live and work.

Unlike in earlier decades when cities provided a career escalator from entry-level positions to the executive suite, the contemporary urban workforce is rigidly bifurcated. The data shows there are now only high- and low-paying tiers, the latter in service to the former but occupied by people who would do better in lower-density communities outside of the city.

Add to this urban inequity something that feels truly futuristic even as it is increasingly used in industry and, to a lesser extent, government — artificial intelligence.

Last December, the Pew Research Center released a study on AI and the

future of humans and developed five categories of concerns. They are included here not to address them definitively, but to encourage us to become conversant with the issues and think about responses that satisfy ourselves and our neighbors:

- **Human Agency:** “People lack input and do not learn the context about how the tools work.”
- **Data Abuse:** “Values and ethics are often not baked into the digital systems making people’s decisions for them.”
- **Job Loss:** “While some expect new jobs will emerge, others worry about massive job losses, widening economic divides and social upheavals.”
- **Dependence Lock:** “People’s deepening dependence on machine-driven networks will erode their abilities to think for themselves, take action independent of automated systems and interact effectively with others.”
- **Mayhem:** “Use of weaponized information lies and propaganda to dangerously destabilize human groups [and] cybercriminals reach into economic systems.”

The good news is that we have time to prepare and develop thoughtful ways to address these concerns. And in considering any emerging technology, we must allow that the right answer may be “no.” Picard, however, was not one for one-syllable answers. He might put it this way: “If we’re going to be damned, let’s be damned for what we really are.” 

Paul Taylor is the chief content officer of e.Republic, Government Technology’s parent company.

35 km

Virgin Hyperloop One, just one of the companies developing transport systems that would ultimately move people and cargo almost as fast as the speed of sound, has announced plans for what will be the longest test track in the world to date at 35 km (21.7 mi). In partnership with Saudi Arabia, Virgin would build the tube in the western region of the country. Although the test track is still in the preliminary planning stages, the company says a complete hyperloop system in Saudi Arabia could reduce travel time between the cities of Riyadh and Jeddah from 10 hours by car to about an hour and 15 minutes.

SOURCE: NEW ATLAS

HYPHERLOOP-ONE.COM



NON-STARTER:

The current wisdom in California is that there is no fire season — it's always fire season. One company, Bee2FireDetection, together with IBM, is taking a high-tech approach to getting out ahead of destructive blazes with artificial intelligence. The system uses three different kinds of cameras, including an optical HD camera that uses IBM's AI to pick out smoke columns and light variations that may be early indicators of wildfire. The other cameras detect temperature changes and types of smoke. Bee2FireDetection recently opened its first office in the U.S., and is currently being used in Brazil and Portugal. SOURCE: DIGITAL TRENDS

BEE2FIREDETECTION.COM



TELESAT.COM

\$600M: The Canadian government is getting in on the space game. Telecom company Telesat, a competitor of SpaceX in the Internet vertical, announced a partnership in which the country's government will contribute \$600 million (Canadian dollars) over the next 10 years toward a fleet of low Earth orbit satellites. Another \$85 million will go toward STEM education, research and development, and job creation. The satellite network is designed to help rural Canadians access Internet at speeds closer to those found in cities. SOURCE: ENGADGET

Texas Chooses Cloud to Deliver Statewide ERP System

Cloud applications running on a cloud infrastructure with managed services reduces costs, improves system performance and allows for easier access.

The rollout of a big IT system seems fitting for a state as big as Texas. But for the Texas Comptroller of Public Accounts, it also meant a big effort, big decisions and a big challenge.

That challenge began in 2007, when the Texas Legislature charged the Comptroller's office with implementing a standard enterprise resource planning (ERP) system for all state agencies. To meet this mandate, the Comptroller's ProjectONE team (a group formed to focus on implementing the new ERP system) created a solution called the Centralized Accounting and Payroll/Personnel System (CAPPS), which is built on Oracle PeopleSoft financial, human resources and payroll applications.

The CAPPS deployment has evolved in two major ways since its launch. This evolution offers insights for other governments considering adoption of cloud applications and infrastructure for large, critical systems.

From In-House to the Cloud

The ProjectONE team initially implemented CAPPS on an internal infrastructure managed by an in-house team with support from external vendors. But with plans to eventually add more than 100 state agencies to the system, it became

clear that moving the infrastructure to an external managed services provider (MSP) was a better approach.

"It was difficult for our agency to keep up with the demands of a statewide ERP solution, including retaining qualified staff to keep the system running 24/7," says Sandra Woodruff, deputy director of Fiscal Management for the Texas Comptroller of Public Accounts. "We made the decision that we would be better served by going to a managed services provider that could support all of the applications and infrastructure."

After a competitive contracting process, Texas selected Accenture to provide managed services for the PeopleSoft applications and the

underlying infrastructure, with hosting in the Accenture Private Cloud. Although this met the state's objectives for using managed services, it became clear that a private cloud solution wouldn't be sustainable as the CAPPS deployment expanded to serve all state agencies.

As the next evolutionary step, the ProjectONE team began discussions with Accenture about moving the CAPPS application workloads and infrastructure to Oracle Cloud, with Accenture continuing to provide managed services. After joint work among teams from the Comptroller's office, Oracle and Accenture to define the new cloud architecture, the decision was made to move the CAPPS system again.

Minimizing the Risks of Change

As a core, mission-critical system, any change to CAPPS must be done in a way that minimizes risk of disruption or impact on users. Planning for a smooth transition to Oracle Cloud was a seven-month effort that involved extensive coordination among representatives — including executives — of the Comptroller's office, Oracle and Accenture.

The planning effort led to a successful go-live the last weekend in March 2019,

CAPPS Solution Elements

- Oracle Cloud Infrastructure hosting workloads for Oracle PeopleSoft 9.2 financial and HR applications
- Oracle Exadata Database Machine to improve database performance
- Accenture managed services for more than 90 distinct Oracle environments running on more than 50 virtual servers

when the switch was made from the Accenture cloud to the applications and infrastructure that had been prepared in Oracle Cloud. On the following Monday morning, more than 12,000 users simply entered a new URL to access CAPPs, then began their work with the same familiar system experience.

"The transition needed to be as painless for the users and the agencies as possible, and it was," says Woodruff.

Expected Benefits

Leaders at the Texas Comptroller of Public Accounts identified four key objectives for the move to Oracle Cloud Infrastructure:

- Projected 50 percent cost savings
- Improved system performance
- A system design that supports high application availability
- The ability to add agencies without a major installation effort or architecture change

Although definitive results for these objectives won't be known until 2020, early data is positive.

With the new cloud infrastructure in place, the ProjectONE team plans to expand the CAPPs offering. Addition of the mobile-optimized PeopleSoft Mobile Expenses module, which will eliminate paper forms and accelerate processing of employee reimbursement, is underway. The team is also exploring cloud-based chatbots to automate answers for common employee inquiries and reduce

support calls within the agencies. Future plans are guided in part by monthly user group meetings where the ProjectONE team receives input on agency needs.

Steps for Success

Woodruff recommends three important strategies for other states considering cloud migration for a key enterprise system:

Planning and communication. Create in-depth plans through a partnership with the cloud and application vendors, especially at the executive level.

"Having both Accenture and Oracle at the table was critical to their understanding of our needs and to the project's success," says Woodruff.

Throughout the project, regular communication among the multiple project teams is also essential.

Assessing cloud capabilities. The ProjectONE team evaluated cloud capabilities to meet requirements such as load balancing, agency connectivity and high availability.

"Work with the vendor to create an architecture that meets your needs, although it may be a different design than what you initially expect," says Woodruff.

Testing. The ProjectONE team worked with Accenture to test applications and identify how to take advantage of Oracle Exadata capabilities.

"The proof-of-concept testing gave us more confidence that the change to Oracle Cloud would be successful and that it could handle our large and

Snapshot: Statewide ERP in Texas

By the end of the 2022-2023 biennium, CAPPs will support accounting, personnel and payroll applications for:

- + More than **100 state agencies**
- + **156,000** full-time equivalent employees
- + Nearly **\$99 billion** in State of Texas spending

complex back office environment," says Woodruff.

Positioning for the Future

By combining the right applications with cloud infrastructure capabilities and managed services, Texas gains benefits now and over the long term. CAPPs meets the legislative mandate for a single ERP system that reduces costs and streamlines work for all state agencies. And the cloud deployment of CAPPs with managed services positions the Comptroller's office – and the agencies it serves – for continued savings and efficiencies.

 accenture

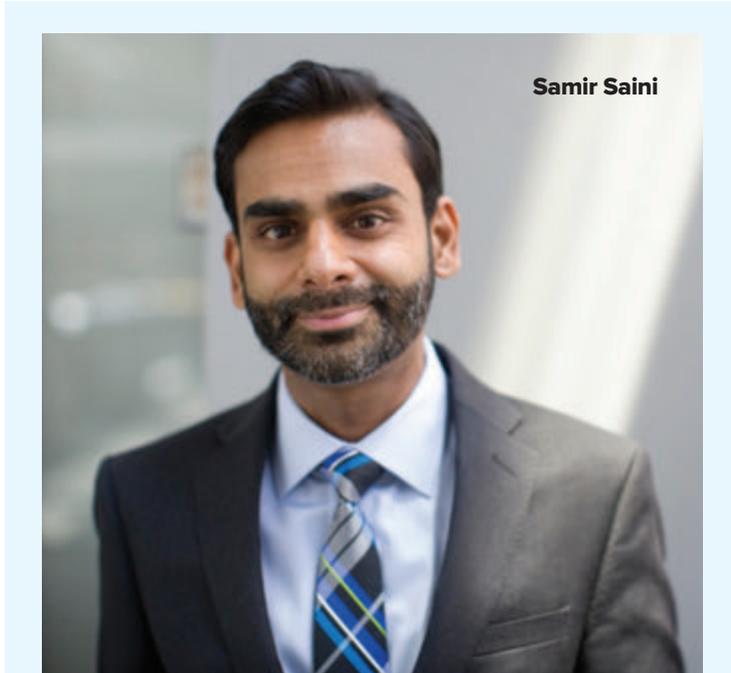
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Hear first-hand from Texas CPA at Oracle Open World in San Francisco Sept. 16-19. Search for Session CAS1642.

Read full reports and breaking news about career changes across tech-driven roles in government at govtech.com/people.



Samir Saini Departs NYC

After 18 months as New York City IT commissioner and CIO, **Samir Saini** resigned to take a job in the private sector. While his time with the city was not without troubles, including a major disruption of the municipal wireless network, a spokesperson for city hall noted that Saini “established five new agency divisions, launched key Web applications, expanded cell service to underserved communities” and more. He is succeeded in an interim capacity by Department of Finance CIO Eusebio “Seb” Formoso.



Mike Steinmetz

Rhode Island Governor Cuts CISO Position

In a somewhat controversial move, Rhode Island Gov. Gina Raimondo eliminated the chief information security officer position from her cabinet, cutting its funding from the state budget. **Mike Steinmetz** was CISO prior to the decision, having served in the role since 2017. His duties were divided among various staff.

“Cybersecurity remains a high priority for this administration, and our agencies will continue to collaborate with the goal of ensuring resiliency of our systems and protection of the state’s data and assets,” said Brenna McCabe, public information officer for the Department of Administration.



First CDO in San Diego Steps Down

Maksim Pecherskiy, chief data officer of San Diego, Calif., left the city after nearly five years in the post. He planned to work on side projects such as building custom software for the private sector, and may continue working in municipal governments internationally. Pecherskiy was San Diego’s first CDO; the city has yet to name a replacement.

Local Colorado CIO Changes

Longtime Fort Collins, Colo., CIO **Dan Coldiron**, who most recently spent nine years with the city, in July announced a move to the same position with the nearby city of Loveland. Just to the south in Westminster, Colo., **Emily Littlejohn**, formerly with other city departments, was named the new IT director.

Hennepin County, Minn., Names New IT Chief

Following Jerry Driessen’s move to San Jose, Calif., as assistant CIO, the Hennepin County, Minn., Board of Directors appointed **Glen Gilbertson** to head its IT department. Gilbertson has spent 23 years working for the county, most recently as acting CIO.

New Performance Officer for Cincinnati

Having served in an interim capacity since February, **Nicollette Staton** was named Cincinnati’s permanent chief performance officer and director of its Office of Performance and Data Analytics. She plans to build on the strong analytics work already underway in the city, and noted, “We’re now starting to see the local community in areas that aren’t around government come to us.” She succeeds Leigh Tami, a founder of Cincinnati’s data analytics program.



Nicollette Staton



Jascha Franklin-Hodge

Franklin-Hodge to Lead Transit Nonprofit

Former Boston CIO **Jascha Franklin-Hodge** is now the first executive director of the nonprofit Open Mobility Foundation. The organization comprises local governments and tech companies, and governs the Mobility Data Specification, an open source code system intended to standardize various kinds of transit data.



Laura Meixell

Pittsburgh Digital Director Goes to the County

Laura Meixell announced in June a move from Pittsburgh, where she served as assistant director of digital services, to a position as enterprise data architect of the Department of Human Services for Allegheny County, where Pittsburgh is located. She spent more than five years in tech and innovation work for the city.

Maryland Creates CISO Position

In June, Gov. Larry Hogan signed an executive order creating the Maryland Cyber Defense Initiative, an effort to centralize the state's cybersecurity defenses and create enterprisewide standards. The order includes the launch of the Office of Security Management within the existing Department of Information Technology, and **John Evans** will serve as the state's chief information security officer.



Danielle DuMerer

Chicago CIO DuMerer Leaves City Service

Chicago CIO and Commissioner **Danielle DuMerer** stepped down from her position with the city in July to take a job as vice president of technology at Chicago's Shedd Aquarium. Upon her departure, DuMerer cited among her greatest accomplishments the creation of an open data portal and programs that improved citizen access to technology and digital skills. DuMerer's move comes shortly after a mayoral transition, and her replacement has not yet been named.

New CIO for Johnson County, Kan.

Bill Nixon, former executive vice president and chief enterprise architect at UMB Bank, was named CIO of Johnson County, Kan., at the end of July. "As a county resident myself, I want to increase the efficiency of and access to our technology services in this digital age," he said. Nixon replaces Michael Aldridge as head of the Department of Technology and Innovation.

Florida Governor Names Deputy CIO

Following Gov. Ron DeSantis' reorganization of Florida's IT department, dissolving the Agency for State Technology (AST) and creating the Division of State Technologies within the Department of Management Services, **Heath Beach** was appointed deputy CIO. He was formerly the chief business officer of AST. Florida has yet to name a permanent CIO.



Laurie Panella

Laurie Panella Leaves for the Private Sector

Longtime Milwaukee County CIO **Laurie Panella** left government work after 27 years with the county and took a new role as IT chief at Marquette University, which she once attended. Panella served as county CIO since 2009, where she oversaw tech solutions and projects for the jurisdiction's \$1.1 billion enterprise. Milwaukee County will conduct a national search for her replacement.

Iowa Governor Appoints New CIO

In July, Iowa Gov. Kim Reynolds announced **Annette Dunn** as the successor to the state chief information officer post, previously held by Robert von Wolfradt. Dunn previously served as IT division director and CIO of the Iowa Department of Transportation since 2015. "From strengthening strategic initiatives such as cybersecurity and rural broadband connectivity, Annette will play an important role in helping our state meet the demands of a 21st-century digital economy," Reynolds said.

Tech Transitions in Arizona

Arizona CIO **Morgan Reed**, who led the state's Department of Administration and Technology since 2015, left his position at the end of July for a role in the private sector. His departure came around the same time that **Tim Roemer**, former deputy director of legislative affairs for Gov. Doug Ducey and a veteran of the CIA, was named chief information security officer. Roemer's predecessor, **Mike Lettman**, stepped down at the end of 2018.



Denver IT Developments

Paul Kresser was hired as Denver's new chief data officer in March, having previously served as chief performance management officer for Denver's Community, Planning and Development Department. The city is also seeking a new chief information security officer, according to a job posting that went up at the end of July.



Robert Samson

New York State CIO Retires

As of Aug. 15, New York State CIO **Robert Samson** retired from public service. The move marks his second retirement; he'd spent 36 years with IBM before stepping down, then came back to work to head the state's Office of Information Technology Services in May 2017. As of press time, a replacement had not been named.

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Print Power ▶

Xerox announced the B215 multifunction printer featuring Wi-Fi Direct technology that enables wireless printing without a router and mobile print functionality with Apple AirPrint, Google Cloud Print, Mopria and Android support. The device has a 600 MHz processor and prints up to 31 pages per minute, yielding high-resolution 1200 x 1200 dpi enhanced image quality. Photocopy resolution is up to 600 x 600 dpi. The B215 includes a 3.5-inch touchscreen and can copy, email, fax, print and scan. The printer also allows collation, booklet creation and poster printing. www.xerox.com



◀ Power Source

Anker's PowerCore 10000 Redux is a 10,000-milliamp-hour (mAh) portable charger that's light and compact. It weighs slightly more than a baseball, and can charge a phone twice and most tablets once before needing recharging itself. The company's PowerIQ and VoltageBoost technologies combine to ensure a quick charge, up to 2.4 amps. The charger offers surge protection and short circuit prevention. The device's trickle-charging mode is designed to deliver a fast and safe charge for every device, including small items and wearables. www.anker.com



◀ Data Command

The new Dell Precision 7740 laptop has a 17.3-inch screen and is available with either a Titan Gray aluminum or carbon fiber cover. It is virtual reality- and artificial intelligence-ready, designed for demanding data and graphics use, from complex CAD designs to machine learning projects and AI infrastructure transitions. The 7740 features either the latest Intel Xeon E or 9th Gen Intel Core 8-core processor, and comes with up to 128 GB of ECC memory, and up to 8 TB of PCIe SSD storage. The latest NVIDIA Quadro RTX graphics deliver real-time ray tracing with AI-based graphics acceleration. Its display options include a new 17.3-inch UltraSharp UHD IGZO display with 100 percent Adobe color gamut. www.dell.com

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