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Marking Milestones

A 2000 article from *Wired* magazine aimed to propel us 20 years into the future for a glimpse at what 2020 would hold. The jumping-off point was a gathering of futurists in San Francisco at an installment of the Next Twenty Years discussion series. Stanley Williams, director of the quantum structures research initiative at HP Labs, predicted that “our electronics will be 10,000 times as capable as they are today” in 2020. I won’t attempt to quibble the multiplier. It was a valid point.

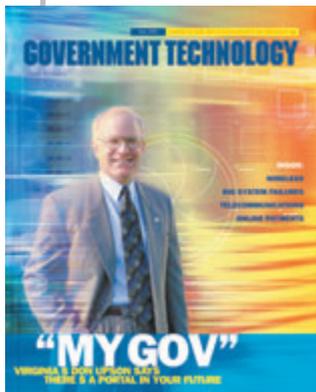
One of the benefits of having a more than 30-year history as a print magazine is that there are decades of archived copies of this magazine to page through when the decades pass into history. The May 2000 issue featured the cover story *Portals in the House*, envisioning a future in which states would offer up personalized, service-packed websites packed with capabilities for consumers that would keep them from having to visit government offices. Yes, the desire to conduct business online rather than stand in line was gaining traction even then. The story also predicted a privacy crisis triggered by all the data sharing that would need to happen for government portals to be truly effective.

In *2020: Back to the Future* (p. 14), we consider the state of our digital lives in the year 2000, as well as how we thought they would evolve by 2020. Self-driving cars are not, in fact, ubiquitous on city streets and

highways, despite the predictions, though advances in the past two decades have gotten us much closer to that reality. Likewise, casting a vote in a U.S. election is not something everyone does online from the comfort of their living room, which some forecasters pegged would be the case as early as 2008. And the reason for the delay — the explosion of cybersecurity vulnerabilities in recent years — gets to an issue almost no one fully anticipated as the millennium turned, despite the panic surrounding Y2K.

And the final milestone I’ll note is the newest one. Five years ago, this publication launched its inaugural GovTech 100 — a list of government-facing tech companies that jumped into an emerging market that is working its way toward the mainstream. This year, we’ve added a short list of international companies to the GT100, a recognition of how global this market segment has really become. But the bulk of the list is made up of U.S.-based businesses that earn more than half of their revenue from their work with the public sector.

Many companies on the 2020 list were formed within the last several years, and the most successful have done more than take a product built for the private sector and offer it to government. They’re embedding themselves in city halls and agency offices and drawing upon the expertise of public servants to solve problems that improve how government does its important work. These are good ideas gaining traction: This year’s companies have raised a total of \$4.8 billion from more than 500 unique investors. That’s more than enough reason to be, as one investor said, “gov-curious.”



2020

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Cloud-Based System Helps Ensure Vital Drug Delivery Around the World

When combined with the right people, processes and technology, data enables the supply chain visibility that government organizations need to transform operations, create public value and meet their missions. In the case of the United States Agency for International Development (USAID), real-time, accurate and complete data at every step in the supply chain can make the difference between delivering life-saving drugs and supplies — or not. To ensure it could predictably and efficiently deliver medicines anywhere in the world, even in remote areas, USAID worked with a Chemonics-led consortium of IBM and other industry leaders to implement a cloud-based global procurement and supply management program (PSM). Using the solution, USAID has saved millions of dollars, achieved 90 percent on-time delivery to even the most remote destinations, and helped ensure medicines and other health supplies are in stock when and where they're needed.

Managing Massive Scale and Complexity

The PSM program delivers about \$800 million per year in medicines and health commodities to more than 70 countries. It has local offices in 33 of those countries so it can better help host governments develop the capacity of their supply chains. Besides the sheer volume of supplies, countries, supply networks and end users that it serves, USAID must contend with in-country operating environments that vary widely in terms of technological and process maturity, as well as in the tools and systems used to manage and monitor the supply chain. Prior to the PSM solution, supply chain visibility in this complex environment was extremely difficult, especially as supplies moved further along the chain. Existing legacy systems had gaps in data and it was often difficult to verify data integrity.

"There were a lot of manual processes. In addition, parts of the supply chain were really distributed and systems weren't talking to each other," says Stephanie Waller, Senior Managing Consultant with IBM.

Using a cloud-based global procurement and supply management program, USAID has saved millions of dollars and achieved 90 percent on-time delivery of vital medicines and health supplies to even the most remote destinations.

Providing a Foundation for End-to-End Visibility

To address multiple challenges presented by services at this scale, the program team implemented a multi-cloud platform that enables secure data interoperability between multiple modules within the PSM system and also with partner systems such as the logistics management information system, finance management systems and more. Using a cloud model, the program can flexibly add storage and compute capacity as needed to accommodate growth and new processes. This approach is vital to bring supply chain management and monitoring capabilities to remote locations that lack infrastructure.

"In countries like Ethiopia and Nigeria, medicines are loaded onto camel or donkey caravans and taken to villages where they are dispensed. We need to have the systems and processes in place to track all the way to the village level," says Kim Shelsby, Director of Supply Chain Solutions at Chemonics.

An information system is at the heart of the solution and supports a large portfolio of business workflow processes. To get a head start and ensure workflows were built on best practices, the solution team leveraged an extensive library of well-documented, proven processes in the Chemonics quality management system.

"When we started up PSM, we had a subset of about 300 different processes for doing in-country procurements," says Shelsby.

A lot of new processes also had to be documented and brought into the PSM system. Where possible, the team leveraged existing process frameworks and then tailored them to specific countries and use cases.

An important benefit of supply chain visibility is that it provides transparency and helps document that medicines and other supplies actually reach their intended destination.

Getting Meds Where They Need to Go

By moving from manual to automated processes and creating a robust data architecture, the PSM program can capture a tremendous amount of data in a systematic way that allows program leaders to better understand and further improve the global supply chain. Using data collected from real-time integration between modules and external systems, the program can track medicines and health supplies as they move through in-country networks to reach rural areas. Once supplies have reached their destinations, recipients can send an electronic proof of delivery (ePOD) to the in-country office. By moving from a paper POD to ePOD, the program can speed up billing cycles. In Nigeria, for example, program leaders are in the process of eliminating 300,000 manual proofs of delivery.

“Instead of taking several months to pay the suppliers of those transport services, payment will literally be a matter of days. That makes the local supply chain more sustainable and more competitive because more companies can come into the market,” says Waller.

A Cognos analytics environment resides on the cloud architecture and allows data scientists and analysts to use data to forecast things such as delivery timelines and stock-outs. In addition, the program’s order-promise tool has allowed it to achieve 90 percent on-time delivery in the last year.

“It allows you to see exactly when an order will be delivered. A really complex set of logic is built into that. It depends on things like manufacturing timelines, which supplier you may be using, pick-ups and drop-offs, and waiver time for going through the port,” says Waller.

A stock-out early warning tool is also helping improve outcomes in multiple countries.

“In Zimbabwe, for example, we have about 400 unique SKUs — products — that are flowing into the supply chain and going through eight regional warehouses out to several thousand health facilities. This tool allows us to look into the future and determine when we are going to be out of stock of this commodity in this part of the country at this date. It allows us to be proactive in managing our supply chain,” says Shelsby.

Another important benefit of supply chain visibility is that it provides transparency and helps document that medicines and other supplies actually reach their intended destinations.

“We’re moving \$800 million a year of commodities through this global supply chain. Donors want to know where their products are and whether they are improving health outcomes,” says Shelsby.

Innovating for the Real World

Whether devising solutions from scratch or adapting processes that have worked someplace else, it’s vital that PSM program innovation adds value in real-world conditions. Waller suggests that organizations use an agile approach and focus on the data pieces that are most important to the organization’s mission. Shelsby emphasizes the importance of defining the problem well. His organization meets with in-country supply chain professionals to better understand the problems it needs to solve and then develops or adapts a solution that works in that context. Taking these approaches has helped create a highly effective global supply chain that meets the complex challenges of today and tomorrow while also freeing up money for USAID’s mission.

“We are literally saving millions of dollars, which allows us to buy that much more medicine to reach more people,” says Shelsby.

This session is part of the IBM Government Cloud Virtual Summit, a free, online event featuring 20 sessions with insightful keynotes, illustrative case studies and deep dives into job-critical topics for government leaders. To view any of these sessions, visit www.govtech.com/ibmvirtualsummit



Finding a Balance

As cyberattacks on local government increase, a question must be asked: How much is too much to share with the public? That was part of the discussion at the CityLab DC summit in November, where Albany, N.Y., Mayor Kathy Sheehan said she was transparent with citizens about an attack, while the CIO worried that would make the city even more vulnerable. Brian Nussbaum with New America's Cybersecurity Initiative explained that it's a balance, and that "it's possible to describe in general what's being done [to recover from an attack] without being specific."



SMARTER CITIES

In early proof-of-concept research from Verizon and tech firm NEC, findings show that fiber-optic networks could be used to collect the same transit data that Internet of Things sensors currently do. The concept has the potential to save on infrastructure resources for smart cities, and other applications could include gunshot detection or electrical grid monitoring.

Biz Beat

In a gov tech triple play, users of Accela's permitting software will in 2020 be able to access data analytics from Microsoft's Power BI as well as GIS tools from Esri in all Accela products. This means government customers can provide a wealth of information to new business owners looking for ideal locations, hopefully creating more data-driven outcomes.

WHO SAYS?

"Once you have this infrastructure in place, then it allows you to imagine. If you have broadband in place, you can imagine things that don't even exist now."

govtech.com/quotejanuary2020

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tech/bytes

1.5^M

The number of Louisiana Medicaid recipients who now have access to and can provide feedback on Healthy Louisiana, the nation's first Medicaid enrollment app.

10K

The number of U.S. agencies now enrolled with FirstNet, the nationwide public safety communications platform.

\$500^K

The amount the Los Angeles Cleantech Incubator will award for four pilots focused on growing emission-free delivery projects.

6

The number of gov tech companies Granicus has acquired since it was bought by Vista Equity Partners in 2016. Most recent was Host Compliance, whose software monitors short-term rental properties.



Responding to Deepfakes

States are working to legislate this rapidly evolving technology, but a federal approach might make more sense.

The past year has seen a remarkable rise in the quality and quantity of deepfakes — realistic-looking images and videos produced with artificial intelligence that portray someone doing or saying something that never actually happened, such as Nixon delivering an alternate moon landing speech. As the tools to produce this synthetic media advance, policymakers are scrambling to address public concerns, and state lawmakers in particular have put forth several proposals this year to respond to deepfakes.

One of the top concerns is that deepfakes will be used as part of a misinformation campaign to influence elections. For example, researchers at an MIT conference demonstrated how they could use the technology to create a real-time fake interview with Russian President Vladimir Putin. In response to such concerns, Texas passed a law in September to criminalize publishing and distributing deepfake videos intended to harm a

candidate or influence results within 30 days of an election. California passed a law in October that makes it illegal for anyone to intentionally distribute deepfakes intended to deceive voters or harm a candidate's reputation within 60 days of an election. The law excludes news broadcasters from its rules,

as well as any videos that are made for satire or parody and videos that are clearly labeled as being fake. These laws are good steps toward preventing campaigns from using deepfakes to attack their opponents, but they will do nothing to stop foreign political interference. And some First Amendment activists are concerned these laws might unduly restrict free speech.

Another major concern is that deepfake technology is used to create pornographic images or videos of individuals — mostly female celebrities — without their consent. In a September 2019 study, Deeptrace, an Amsterdam-based company that detects and tracks deepfakes on the Internet, found 14,678 deepfake videos on popular streaming websites — double the number from December 2018 — and discovered that 96 percent of the fake videos involved nonconsensual pornography. These videos are popular, having received approximately 134 million views. So far only one state, California, has passed a law addressing this issue. In October, Gov. Gavin Newsom signed a law that allows individuals to sue someone who has created a deepfake that makes their likeness appear in pornographic images or videos, even if the content is labeled as fake. The law tries to balance free speech concerns by excluding materials that have legitimate public interest, such as being newsworthy. While this law will provide victims with some recourse, it will not help them if

the source of the material is anonymous or out of the state's jurisdiction, nor will it stop the distribution of the content.

The last major issue lawmakers are grappling with is how to protect the rights of individuals to control the commercial use of their image and identity. Deepfake technology is advancing to the point that performers may have their likeness fully re-created in digital form, allowing their image to be used in projects they have no direct involvement in, even after their death. Celebrities typically charge for commercial use of their likeness, and these rights can be enormously valuable, so many want to ensure that they maintain these rights even with emerging technology. The New York state Legislature considered, but ultimately did not pass, legislation supported by the Screen Actors Guild that would have established a new right of publicity for individuals. In particular, it would have extended this right of publicity to 40 years past an individual's death, and it would have prohibited non-consensual use of a "digital replica" of an individual without their (or their heirs') consent.

Most of these laws generally take the right approach: They make it unlawful to distribute deepfakes with a malicious intent, and they create recourse for those in their state who have been negatively affected by bad actors. However, it is important that lawmakers carefully craft these laws so as not to erode free speech rights or undermine legitimate uses of the technology. As other states consider whether to pursue these types of laws, they should proceed cautiously, recognizing that deepfake technology is changing rapidly. And state laws will only be a first step — websites will also need to take down this content, and the rules for this may need to be decided at the federal level. [Gt](#)

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.

The Douglas-Omaha Technology Commission is a trailblazer, modernizing IT to provide constituents and employees alike with a better digital experience

DOTComm is the technology services provider for Douglas County and the city of Omaha

To increase efficiencies, reduce costs and improve IT services, Douglas County, Neb., and the city of Omaha merged their technology departments in 2003, creating a single organization. Today, that consolidated organization — the Douglas-Omaha Technology Commission (DOTComm) — provides technical support and consulting services to more than 70 governmental entities spread across 120 locations. Approximately 5,000 government workers rely on DOTComm's services every day.

"We maintain and support all IT applications used across the city and county, including about 500 COTS and legacy mainframe applications," says Vijay Badal, director of Web Applications and DOTComm leader. "But the fact that a lot of those applications are based on legacy technologies prevents us from delivering more modern experiences to agencies and constituents."

State and local governments are under pressure to modernize IT

DOTComm is not the only organization facing such challenges. For example, 10 of the federal government's legacy systems most in need of modernization cost about \$337 million a year to operate and maintain, according to the Government Accountability Office.¹ Those funds could otherwise be spent on more innovative, modern services. Legacy systems are also often less secure than systems built on newer technologies. While new software is constantly

being updated to protect against security breaches, older software solutions may no longer be supported and can stop receiving security updates, making them a target for cybercriminals.²

While consolidating IT has provided Douglas County and the city of Omaha with numerous benefits over the years, the number of legacy systems still present prevents the organization from accomplishing more.

"As we go forward, we need to think about how to modernize our technology so we can enable workers to be more efficient and provide citizens the same high levels of application performance, ease of use and 24/7 availability they receive from private sector digital services — without sacrificing safety or security," says Badal. "Citizens don't want to go to an office and get in line to pay taxes or get permits anymore. They want to do that from their phones while they're sitting at home. We have to make that happen."

Supporting modern applications with a move to cloud

Recently, Badal and team launched several cloud-based proofs-of-concept projects. The success of those projects provided a strong argument for migrating more DOTComm applications to the cloud. One such system, built on Salesforce Service Cloud, is a case management application for the Douglas County Department of Mental Health.

In Douglas County, individuals with mental illness are encouraged to obtain voluntary treatment. If that person doesn't obtain voluntary treatment, relatives can petition the Board for involuntary custody and treatment.

Building Off a Cloud Foundation

The Board of Health application inspired DOTComm to develop several other Salesforce-based applications, including:

- A Board of Equalization application that allows residents to electronically petition the county for reconsideration of property tax increases.
- An application that allows the Omaha Fire Department to track assets across different fire stations via smartphone.
- A volunteer management application for the Nebraska Emergency Management Agency that allows employees to track incoming donations and assign volunteers to various locations, as well as provides a centralized location to coordinate it all.
- A system that allows DOTComm to track IT assets for each agency it serves. Now, when DOTComm personnel respond to a request for IT help, all the information about the requestor's IT assets are available at their fingertips.
- A new IT service ticket management system that automatically provides DOTComm personnel data on which PC a user is on and which applications are used so they can respond to help requests more efficiently. Shortly after the launch of the application, DOTComm was already experiencing positive results.

"Our turnaround time and customer satisfaction numbers are up," says Badal. "And we are able to deliver applications a lot faster than before."

"Those processes involve 50 to 100 different types of documents and a lot of internal communication between the parties involved — including the county attorney's office, the sheriff's office, hospital administrators and physicians," says Badal.

The new Board of Mental Health application aggregates all that data, creating a one-stop shop where all stakeholders can see the status of a petition, read related documents, and view approvals and notifications. In addition, DOTComm created a workflow-driven patient intake system. Now, once the patient intake process is complete, patient data is automatically routed to all stakeholders securely.

"It makes the whole process seamless and efficient," says Badal. "It enables better team collaboration, and all communication is tacked to the patient, providing a comprehensive patient history that personnel can access at any time."

The Board of Mental Health application became a poster project for DOTComm that cleared the way for the organization to modernize additional applications. Today, DOTComm runs more than a hundred applications on a public cloud platform, which has saved hundreds of thousands of dollars per year, according to Badal.

Improving efficiency, enabling a better citizen experience

The Board of Mental Health's modern platform gives DOTComm flexibility to adapt the user experience based on the latest customer demands, bringing a degree of future-proofing to the platform that would not be possible on a legacy system.

"We don't have to rely on the telephone game from one email to the next," says Badal. "We don't have to worry about documents being saved in or shared from offline folders or local drives."

The application has also helped the Board of Mental Health move faster and in a more secure manner.

"This type of modern IT strategy has helped us accomplish more," says Badal. "We have a foundation that offers advanced levels of security, supports new applications and delivers a better employee experience — all while reducing costs and complexity."

Douglas County and the city of Omaha still run legacy platforms, but DOTComm plans to gradually transition more platforms to the cloud.

"There's still a lot of work to be done, but moving to cloud gives us an opportunity to find creative, innovative, secure ways to modernize on a small budget," says Badal.

This piece was developed and written by the Government Technology Content Studio, with information and input from Salesforce.

ENDNOTES

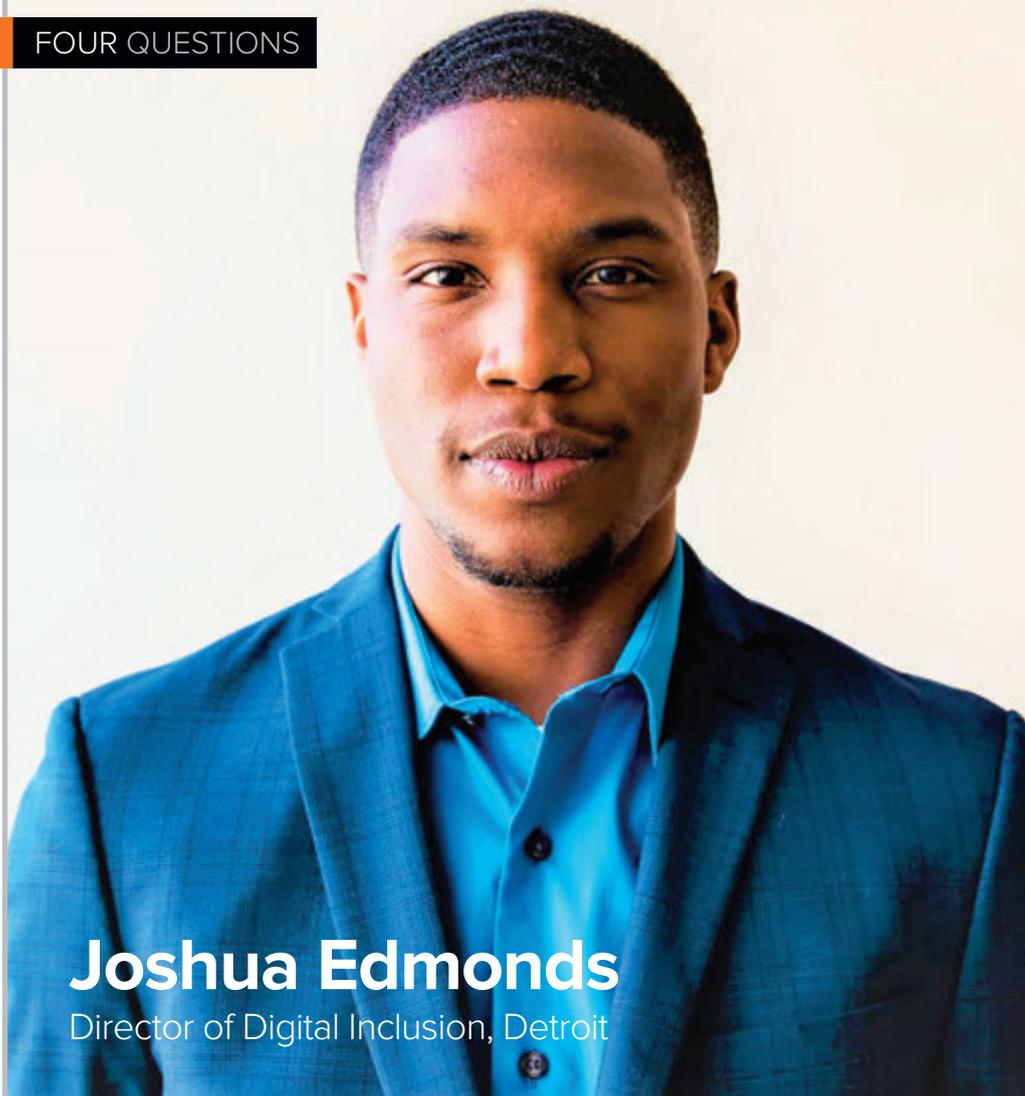
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Joshua Edmonds

Director of Digital Inclusion, Detroit

When *Joshua Edmonds* was named Detroit's director of digital inclusion this year, he became the first local government employee in the country with the title. Other cities have similar roles, but Edmonds is the first with the weight of director. As such, Government Technology spoke with him about his position, what it entails and Detroit's efforts to bridge the digital divide.

1 What does the role of director of digital inclusion entail? It's expanding technology to the community. In Detroit, almost a third of households don't have Internet. We've got to roll that back. We have 19 percent of households mobile-only, meaning they're only using cellphones for connectivity. This digital divide is a today problem with massive implications for tomorrow. When Amazon is on its HQ2 search, and it wants cities with a strong tech workforce, it's hard to say you have that when a third of residents lack Internet. My role is to say, how do we start conversations and position the city to be proactive about the digital divide, rather than reactive?

2 What makes digital inclusion work so important for Detroit? By 2030, the last baby boomer will retire from the workplace, and we're going to have a gap. So, as Detroit is moving into the future and everyone is talking about this renaissance we're having — money flowing into the city, amazing collaborations coming to fruition, large-scale tech organizations relocating here — that's not good enough. We need to remain relevant as technological changes affect the ecosystem, and the best way to do that is not by displacing our residents. If we have 33 percent of our population struggling with Internet, that's going to erode the workforce. We have to focus on this, otherwise we're not going to be able to fill the

jobs we need, or residents will be pushed out because they're not going to be able to get jobs they need to sustain life in our city.

3 What are some challenges Detroit faces in bridging the digital divide?

We are one of the most impoverished cities in America, and people sometimes don't understand the nuances of poverty. It literally robs you of options. We have kids who go to McDonald's to do homework, because that's where free Wi-Fi is. What happens when they go to McDonald's? They eat. No ill will toward McDonald's, but if you have kids eat there every day — what are the long-term health impacts? So, because of our lack of Internet, we're having kids do that, and we retroactively say, how do we improve health outcomes? It's a cycle due to poverty. What makes it more difficult is we're a mobility-challenged city. People are finding ways technology could help, but we have an inequitable way of looking at technology. When you're dealing with fast-moving technology and a long history of poverty, those things are incongruent. We have to acknowledge the power technology has in transforming cities, but we also have to acknowledge the history of poverty and how that has worn down willingness to try new things. We have to use vision and foresight, but empathy as well.

4 What are some advantages Detroit has in creating innovative solutions for digital equity?

We have an ability to write a blueprint with companies as partners. Every city in America has a digital divide, and what companies work on here, they can take anywhere. That's the baseline of partnership. There's a certain level of boldness these companies are empowered by: bold visions, bold ideas, things that transform cities. I'll talk to Google, and they want to make a difference in our community. They are aware they need to hire people from the community, and they're aware of the digital divide. So, for them, it's like, "Let's go. Let's get it. If you have that vision, we're behind you, because this is our mission as well." 

— Zack Quaintance, Assistant News Editor

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2020

BACK TO THE FUTURE

How does the state
of tech in 2020 compare
to predictions made
on the cusp of Y2K?

BY PAMELA MARTINEAU

Technology predictions made in 2000 describe city streets awash in autonomous vehicles, citizens voting online from the comfort of their homes, and police solving crimes and thwarting terrorist attacks with facial recognition software, DNA databases and drones.

Some of these tech predictions became reality, while others never came close or were only adopted in a limited fashion. And some — especially in the area of policing — exceeded expectations. And on the eve of the year 2000, the world held its collective breath, anticipating a massively disruptive Y2K computer crash. But that never happened at all, in large part because governments prepared for it. Nevertheless, Y2K hype changed the way governments view and secure digital systems.

Rob Atkinson, president of the Information Technology and Innovation Foundation,

said technological advancement sometimes can be too fickle to predict.

“People tend to overestimate the rate of technological change,” said Atkinson, though there are exceptions.

Stephen Goldsmith, director of the Innovations in Government Program and Data-Smart City Solutions at the John F. Kennedy School of Government at Harvard University, said that in some areas, technological advancements have exceeded expectations made in 2000. But governments have not kept up with the pace of change

to the degree that could assist their missions even more, he added.

“We still are operating in command control silos and hierarchical systems which tamp down the ability to dramatically use the technological changes,” said Goldsmith.

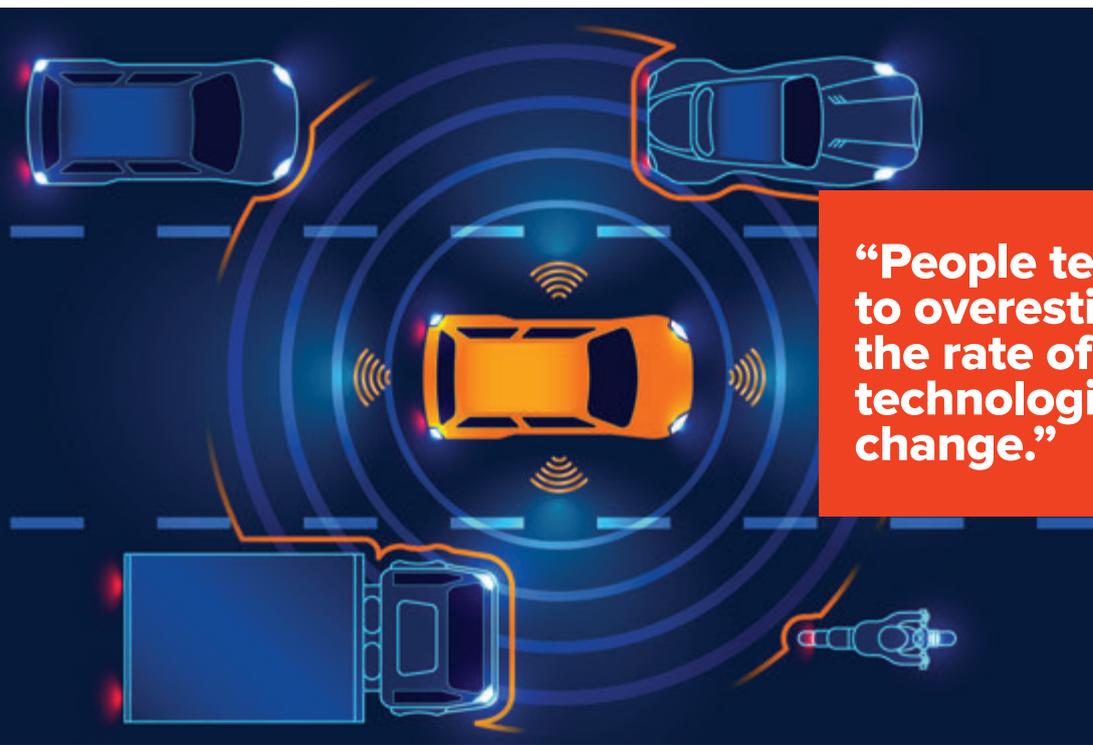
Here we look at where we were technologically 20 years ago, where we thought we’d be today and where we are in the year 2020.

AUTONOMOUS VEHICLES

In 2000, technology watchers predicted that by 2020, hundreds of thousands of autonomous vehicles (AVs) would be cruising streets throughout the U.S. The technology has advanced, experts say, but today, only a few thousand AVs are in use in 10 test sites throughout the nation.

Tech engineers, transportation officials and auto industry executives have long eyed AVs as a way to reduce auto accidents and fatalities by eliminating human error. AVs, also known as self-driving vehicles, are also viewed as possible mini-urban transit systems that can pick up a person, drop them off across town, then pick up another rider.

Google and several car manufacturers have invested heavily in AV technology. But Chris Urmson, who worked on AV technology at Google before founding Aurora, a company that makes self-driving car software, said he expects it will take 30 to 50 years before the cars are ubiquitous on U.S. streets. In five to 10 years, he expects modest adoption. The reason for the slow rollout? People need assurances AVs are safe and the industry needs to learn how customers want to use the technology, Urmson said. A recent survey by AAA revealed that 77 percent of U.S. drivers are afraid of the technology, an increase from



“People tend to overestimate the rate of technological change.”

63 percent at the end of 2017, probably due to some highly publicized crashes.

Still, governments are setting policy for the vehicles. Some 29 states and the District of Columbia have enacted AV legislation. Governments have set levels of autonomy for the vehicles — ranging from zero automation to level 5, where an automated system performs all driving tasks.

Atkinson said he doesn't believe the U.S. will get to level 5 for a "long, long time."

"There are certain problems that may be unsolvable," Atkinson said, such as developing sensitive enough artificial intelligence to pick up a child dressed in white winter wear during a blizzard.

ELECTRONIC VOTING

After the 2000 hanging chads election debacle in Florida, computerized voting was viewed by many as a panacea to slow, sloppy elections. Adoption of electronic voting technology spread quickly, and by the 2016 election, according to the Pew Research Center, 47 percent of voters across the U.S. voted with optical scanners, 28 percent with touchscreens and 19 percent with a combination of both. A small handful of jurisdictions used paper only.

But confidence in electronic voting has waned, in large part because of concerns over Russian interference in the 2016 election. Many jurisdictions are now adopting back-up paper trails — which some view as moving backward technologically.

"We've moved back to paper ballots due to security issues," said William Eggers, executive director of the Deloitte Center for Government Insights. "The progress has been much, much slower [than expected], even reversed."

By 2020, many experts predicted not just widespread electronic voting, but also online voting from home. In fact, a 1997 *Wired* article predicted that the majority of Americans would be voting online by 2008. Online voting is offered by only a small number of jurisdictions to some military personnel and expatriates living abroad. The voting uses advanced blockchain technology via an app made by the company Voatz.

Voters are assigned a unique ID number and a digital receipt of their votes is sent to a ballot tabulation center. The technology is not without critics, however. The Democratic National Convention, for example, would not approve the use of the technology in next year's primary in Alaska.

Atkinson said he doesn't see online voting happening en masse anytime soon, in part because the U.S. government lacked the "courage to put in place digital signatures" for residents that would make them recognizable to online security systems. The small northern European country of Estonia, often viewed as the poster child for digital government, uses such signatures and employs online voting almost exclusively in its elections.

POLICING/SURVEILLANCE

The digital shift in policing and surveillance in the last 20 years has been tectonic, experts say, although like all tech changes, those agencies with the greatest financial resources have transformed the most. And the changes have amplified thorny issues of privacy.

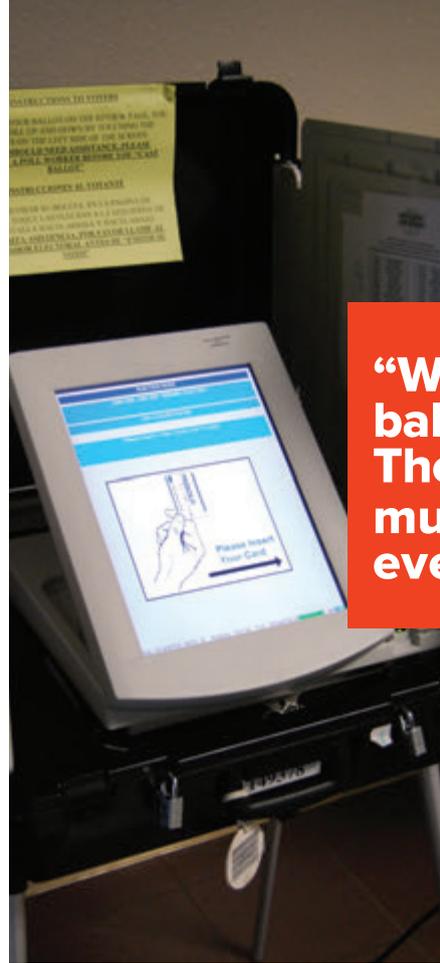
"We've moved back to paper ballots due to security issues. The progress has been much, much slower [than expected], even reversed."

In 2000, community policing was viewed as an antidote for crime-ridden neighborhoods. Police officers hit the streets — on foot and in cars — to drill down into communities to learn the players — good and bad — so they could disrupt patterns of crime. Now, community policing is aided by things like drones, facial recognition technology, and CCTV cameras and microphones that are monitored in real time. Advances in mapping software and analytics allow police departments to pinpoint hot spots — something known as predictive policing. Arrays of microphones combined with spatial mapping allow police to respond more rapidly to violent incidents. Gunshot detection technology allows more accurate responses to gunshot calls by more closely pinpointing their origins. Chatbots allow police officers to run profile checks and license plate numbers, bypassing dispatchers altogether. And body cams aid in investigations of suspected police abuse or suspect assault on officers. New records management systems also allow officers to make comparisons across cases, and in some cases across jurisdictions.

But these new technologies require humans to make sense of the streams of data. The Chicago Police Department created six high-tech police hubs — Strategic Decision Support Centers — to cull through data using a blend of human and computer analytics to develop police response. Other cities have similar centers.

The surveillance technologies also open up difficult issues of privacy. Throughout

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the nation, cities are enacting laws to place parameters around police surveillance. Seattle has enacted a law to review and place restrictions on use of the technology in all its city departments. San Francisco is among a small group of cities that have banned the use of facial recognition technology in all its municipal buildings, and other cities are considering similar bans.

CONSUMER HARDWARE/INTERNET

Few people in 2000 imagined that by 2020, millions of people across the planet would carry a mini computer in their pockets that could be used as a phone, camera, TV, stereo, security system activator and portal for millions of computer applications that can do everything from locate your airplane boarding pass to fetch you a ride on a freelancer-driven taxi. High-tech consumer hardware and applications have exploded over the past two decades, and not just because of the smartphone. From Bluetooth devices to virtual reality

“Part of the reason we’ve made such progress [in this area] is there is no role for government and no opposition.”

headsets, smart refrigerators and drones — not to mention the wide range of devices connected through the Internet of Things, or IoT — consumers have massive connectivity and convenience through an array of gadgets unimagined 20 years ago.

“Part of the reason we’ve made such progress [in this area],” said Atkinson, “is there is no role for government and no opposition.”

The Internet also has exploded beyond expectations. From 2000 to 2010, the number of Internet users increased 500 percent, from 361 million worldwide to almost 2 billion. Now, close to 4 billion people throughout the world use the Internet. People go online for everything from buying groceries and clothes to finding a date. They can register their cars online, earn a college degree, shop for houses and apply for a mortgage.

But the increase in online traffic spawned an increase in cyberbullying, scamming and people just generally behaving badly in the comments sections of articles and other forums. Darker forces lurk online as well, from bad actors looking to victimize youth for human trafficking to racist zealots looking to spew hate and spread their ideology. As awareness has grown of potential dangers

The 20-Year Reign of Big Outsourcing Draws to a Close

BY TOD NEWCOMBE

When the Virginia Information Technologies Agency (VITA) announced in 2018 the termination of its 12-year outsourcing contract with Northrop Grumman and plans to migrate to other suppliers, it marked an end of an era. For nearly 20 years, a handful of states and at least one large local government have pursued outsourcing strategies that put much of IT in the hands of big IT firms, contractors and system integrators.

The idea that government should privatize its tech operations took root in the late 1990s when computing in the public sector increased substantially, becoming more complex and costly. For mayors, county executives and especially governors, the growing burden of expensive hardware, software and specialized tech workers hit their budgets hard just as costs for education, health care and crime fighting continued to rise. At the same time, the growth of large-scale system integrators, along with fast-growing tech firms — IBM, Unisys and HP, for example — created an opportunity to change how government procured and ran its computer systems.

In 1999, Connecticut Gov. John Rowland explained why he wanted to change the role of IT in his state. “I hope that government entities, whether [they’re] cities, counties or states, take a very serious look at getting out of the business of information technology,” he told a governors’ Task Force on Information Technology during the National Governors Association meeting in February that year. Rowland, who was in the process of outsourcing his state’s entire IT operation to systems integrator EDS for an estimated \$1.35 billion over seven years, said the cost savings and improvement in services would be worth the effort.



Rowland wasn't the only government chief executive to believe outsourcing could be a better and cheaper way to run IT. That same year, San Diego County awarded a contract to Computer Sciences Corporation worth more than \$500 million over a 10-year period to run a substantial portion of its computer systems. Part of the plan was to use the contract to bring in new technology at a faster pace, allowing the county to move more services online while holding down overall costs.

Like Rowland, the county believed that government shouldn't be in the business of running technology. Former San Diego County Chief Administrator Lawrence Prior told *Government Technology* that outsourcing "this non-core business offers the best available opportunity to control costs and hold expenditures at a steadier level."

Not surprisingly, state and local government borrowed the idea of wholesale, mega-outsourcing deals from the private sector. In the 1980s, GM outsourced its entire IT operations to EDS. Kodak did the same with IBM. Like Connecticut and San Diego, these firms and others emphasized that technology was not part of their essential business and should be run by experts who could do it better and at a lower cost.

As enticing as this sounded, it soon became apparent that privatizing IT in the public sector was easier said than done. Connecticut's multi-year contract with EDS quickly ran into opposition from labor unions, legislators, the state comptroller and several state agencies. Not long after Rowland told fellow governors at the NGA meeting about the benefits of outsourcing, the project in Connecticut was dead.

Still, the interest in large-scale outsourcing continued to resonate,

especially at the state level. In 2003, Virginia Gov. Mark Warner, a former telecommunications businessman, created VITA as part of an IT consolidation and streamlining program. In 2005, he privatized the state's IT systems and services, signing a \$2 billion contract with Northrop Grumman to run tech for the state, with VITA overseeing the outsourced work. In 2006, Texas undertook a statewide IT consolidation project, which included outsourcing its data centers to IBM. In 2009, Georgia signed contracts with IBM and AT&T to run the state's IT infrastructure and to provide tech services to state agencies.

Two other states that embraced the outsourcing fever during this period were Pennsylvania and Florida. The Keystone State has had a series of large contracts with tech services firm Unisys, starting in 1999 with a \$621 million deal to consolidate its mainframe operations that was extended several times. In 2014, the state and Unisys signed a seven-year, \$681 million contract to move computing operations to the cloud. Florida, which has been a long-time proponent of outsourcing for just about every state service, entered into several IT contracts with vendors back around 2003, but many had to be rebid after allegations of mismanagement.

While Georgia's mega-outsourcing deal has operated relatively smoothly, both Virginia and Texas ran into trouble with their efforts. Some of the challenges were around transitioning IT workers from government jobs to the private sector, as was the case initially in Virginia. Structuring a contract to privatize an enterprise-scale computing environment also proved daunting, as did managing something so complex. But universally, tech firms struggled

to provide state agencies with the level of service that had been promised.

When Texas turned to IBM to consolidate 27 state agencies into two new data centers, the effort proved too daunting for the tech giant. Deadlines were missed and when the state tried to renegotiate the contract, progress stalled. By 2010, Texas decided to rebid the \$863 million deal and break up the consolidation into smaller chunks involving a variety of contractors, not just one.

That thinking mirrors somewhat the plan announced by Virginia's VITA last July to implement a multi-supplier model rather than rely on a single vendor to manage the state's IT services. Georgia has also begun to move in this direction, with plans to issue smaller, short-term contracts, covering PCs and cloud computing, for example, rather than the mega-deals that covered as much as a decade of service in some cases.

What will happen with outsourcing 20 years hence? Two decades ago, government computing was still heavily mainframe-based; client-server computing was where a lot of resources were focused; and the Internet was just beginning to become a mainstream phenomenon, though it would be years before social media and cloud computing would resonate. Going big with IT outsourcing made sense to public officials who believed government should be in the business of government, not running computers.

Today, the landscape is vastly different. The desire to turn over computing to the big integrators and tech firms has dissipated. But it's hard to rule out the appeal of big firms with lots of expertise handling the digital needs of government, always a tech laggard. Microsoft just signed a massive \$10 billion deal to handle cloud computing for the Pentagon, for example. Who's to say big deals won't come back to state and local government too?



“Open data and open government was on the way in 2000, but not anything like what we see today with the tools that are available and the third-party use.”

online, organizations have sprung up to teach online safety, with schools playing an important role in educating kids about digital dangers. But the attack surface is vast, and the nature and scope of threats seem to evolve ever more quickly.

Y2K/SECURITY

At 12:00 a.m. on Jan. 1 in the year 2000, computer systems throughout the world were predicted to crash due to outdated programming that could not read years ending in 00. That debacle was avoided, in large part because of massive reprogramming efforts by governments large and small. Y2k was a wake-up call on computer upgrades and cybersecurity. It helped spawn a massive industry in firewall and anti-virus software — but some experts say governments still have a long way to go to keep up with cyberthreats.

“This needs to be much, much higher on the priority list for governments, mayors and legislative bodies,” said Eggers.

Cyberattacks are growing for governments large and small. Data shows that in the past year they’ve spiked dramatically, particularly ransomware. There is no central authority that officially tracks cyberattacks, but cybersecurity firms do. An analysis

of data shows 47 reported ransomware attacks on government in 2016, compared with 77 in 2019, just through Sept. 30.

To shore up cybersecurity, governments are working with big data analytics to understand trends and patterns to reveal larger threats, including those coming from the inside. They’ve employed “ethical hackers” to search for vulnerabilities. Employees unknowingly clicking on a link or downloading an attachment have brought down entire networks, leading to massive increases in staff cybersecurity training programs. Cybersecurity has grown from a basic systems administrations function to one of the largest sectors in IT, estimated to be worth more than \$155.74 billion in 2019.

Still, said Eggers, “the level of sophistication in government is not high enough.”

CITIZEN ENGAGEMENT/SOCIAL MEDIA

On and around the year 2000, governments started to come online with websites that offered citizens information about services, public meetings and government leaders. But the sites were static, offering little interaction with users. Over time, governments retooled their websites to allow for citizen signup for city services and other programs, but the

progress was slow. In his book *Delivering on the Digital*, William Eggers argued that the glitch-ridden launch of the federal Affordable Care Act website in 2013 woke governments up to the failings in their digital presences from a user perspective. Large-scale reimaginings got underway.

Now, governments’ digital presence is greatly expanded as they strive to create Amazon-like experiences for citizens online. In addition to offering more service enrollments online, governments have opened up huge troves of data for citizens to mine, map and otherwise visualize what’s happening in their communities.

“Open data and open government was on the way in 2000, but not anything like what we see today with the tools that are available and the third-party use,” said Goldsmith.

Social media outreach also has evolved into a staple form of government communication. Jurisdictions use various channels to advise community members in real time about events, natural disasters, public service disruptions and other issues. Elected officials also communicate directly with their constituents via social media.

But Goldsmith argues that governments could be doing more “sentiment mining,” or consuming of residents’ social media feeds to identify problems earlier or pinpoint concerns about governance that could inform official decisions.

“What is immature is the mining of social media so they can better understand the trends of their residents ... digest the information and make it into policy,” said Goldsmith. [@](#)

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Why More Governments Should Consider Low-Code Development



Rikin Patel, DXC Public Sector Chief Technology Officer



Tim Duval, DXC Public Sector Chief Technology Officer

Compared to traditional computer programming, low-code development platforms (LCDPs) have made it much simpler and cost effective to create a business application. A variety of commercial platforms reduce both the need for in-house expertise and the labor involved in developing new applications.

States and localities could move faster and potentially reduce costs by taking advantage of LCDPs, but relatively few of them do. A recent Center for Digital Government (CDG) survey of more than 125 public sector decision-makers found only 21 percent are using low-code development. In this *Government Technology* Q&A, we talk with **Rikin Patel** and **Tim Duval** of DXC Technology about why more state and local agencies could benefit from this approach.

What exactly is an LCDP and why is it beneficial to government?

Patel: The traditional waterfall approach to building enterprise applications typically meant at least a one-year, \$1 million process, but rising citizen expectations and the pace of technological change are requiring a new model. A low-code approach streamlines development and gives users — with little to no programming experience — the ability to build applications. This means IT, business and other stakeholders can contribute to the process, making it easier to meet specified outcomes. In addition, by using the pre-built components and application programming interfaces (APIs) in an LCDP, governments can reduce the time and complexity in deploying next-generation applications.

Duval: Low-code also lets you build applications in a more iterative manner, which brings more flexibility and agility to the development process, allowing governments to react to changing demands.

Can these platforms help governments reduce costs?

Duval: Most state and local governments have strict budget constraints and procurement guidelines they must abide by, so when they look to acquire a new IT system they often have to go through a rigorous competitive procurement RFP process. But the beauty of an LCDP is that a department may be able to build its own application with lower upfront costs to potentially avoid going through a large procurement. It's like a self-service model for apps. So sometimes it's not so much

about cost savings as it is about cost avoidance and fulfilling unmet needs faster without going through complex procurement processes.

Patel: There is opportunity for cost savings as well. With an LCDP, governments need less people and custom development to build an application and manage it over time, so operational costs are lower long term. At the same time, governments don't need to wait years to realize outcomes of the applications they are building so time to value is significantly increased.

How can governments overcome concerns around security and compliance?

Duval: Many LCDPs can be configured to support the public sector and provisioned to run in government environments. The LCDPs can run in secure environments that have built-in controls and already comply with many security requirements like moderate NIST and FedRAMP controls. When governments build applications within these secure platforms, they take advantage of the security being offered by the underlying service or platform providers.

Patel: These LCDP and cloud providers have made significant investments in security, which gives their platforms a robust foundation. This allows state

and local governments to focus on the security architecture of their specific application and how to protect the data within it.

How can DXC help governments advance the adoption of LCDPs?

Patel: Partners like DXC add value by bringing expertise and experience about LCDPs and the cloud environments they run in. DXC brings capabilities like design thinking and DevSecOps needed to get applications off the ground quickly and scale them across the enterprise. This lowers the risk for governments to adopt this approach and helps ensure the whole process is successful.

Duval: We created our Digital Transformation Centers specifically to help our clients create innovative applications. To help government clients get off the ground with LCDPs, we discover their needs, engage them with design thinking for potential solutions, and then perform rapid digital development using a low-code approach to deliver one or more possible solutions. Since we can develop and demonstrate digital solutions in a short timeframe, it not only gives departments or agencies a quick win but also provides the foundation and capabilities for them to keep moving forward with digital government solutions.



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BY BEN MILLER AND ANDREW WESTROPE

100 GOVTECH 2020

BETTING ON GOVTECH

The last five years have seen major growth in an up-and-coming market. Here's where it's going next.



FIVE YEARS AGO, *Government Technology* saw something happening: Civic tech was changing. Fueled by new technologies, modern methodologies and a sudden interest from investors, startups were beginning to work more with government. In a space long dominated by incumbents, notorious for complex procurement and implementation cycles, agencies were hungering for something new.

We took note, and launched a list of 100 companies that represented that ecosystem. Now in its fifth year, the GovTech 100 has reached a new level of maturity. A lot has changed. A lot hasn't.

In terms of the headline-grabbing venture capital world, gov tech has not yet arrived. But it has come a long way.

That is to say, the venture-capitalist deals that garner attention are “unicorns” — the companies worth at least \$1 billion, often more, the companies that make apps one is likely to find on millions of people's smartphones. More focused, gov tech is not an environment conducive to that kind of scale. And so to many venture capitalists, gov tech is not going to look like an amazing area to invest in.

Nonetheless, the change has been palpable.

“I think it's still scary-looking to a lot of people, but when I talk to other investors today in other funds in my peer group, I don't get that look like ‘Are you crazy?’ ... as much as I used to,” said Frederik Groce, an associate at Storm Ventures who has invested his firm's money in gov

tech companies. “So I think we're seeing increasing comfort with gov tech.”

That has translated into what Groce calls “gov-curious” investors. Some of the larger, more generalist firms such as Sequoia Capital, Insight Partners and SJF Ventures have collectively made a handful of investments in the space. But there aren't a lot of venture capitalists out there who specialize in gov tech.

They exist, but they tend to be clustered in firms heavily focused on the space like Govtech Fund, Urban Us, Urban Innovation Fund and Ekistic Ventures.

Such expertise is valuable for gov tech companies. After all, investors influence what companies do, and government is a unique kind of customer.

“The go-to-market does look a little different in government,” Groce said. “So knowing what that looks like ... and building empathy with civil servants — asking what they need and how tech can help them, versus hearing a prescriptive pitch about what they need.”

That increasing comfort with what it means to be a gov tech company, and what it means for government to work with startups, isn't limited to investment dollars. Here are four trends that help tell the story of what's happened in gov tech these past five years.

INFRASTRUCTURE

Few recent trends have had a more profound impact on technology than the rise of the cloud. The move, still very much underway, fundamentally changes the way people use technology — in a word, from centralized to shared.

And government, despite its reputation as slow to change, is no exception. In recent years, the public sector has become more comfortable with cloud and turned to software-as-a-service solutions to make itself faster, more flexible and more effective.

Tiffany Chu, CEO and co-founder of the SaaS transportation startup Remix, has watched government officials' attitude toward cloud change in real time in her company's first four years.

“I remember early on I would always have to spend five or 10 minutes ... I even had a slide that explained what software



as a service was and how it was different from on-premises,” she said. “That was something that I usually had to cover because that wasn't common knowledge.”

These days, government appears more comfortable with cloud as a whole.

The public sector is certainly more familiar with cloud, but a number of things have also given the technology more credibility. Those include the Certified Cloud Security Professional certification, changes to procurement methods, and the federal government's FedRAMP program, which verifies that cloud technologies have met rigorous security standards before agencies use them.

For FedRAMP, vendors created government-specific clouds, and that helped, too.

“The security stuff, FedRAMP, that investment helps state and local government,” said Steve Ressler, president of the public safety tech startup Callyo. “Having these gov-only clouds helped [vendors] say, ‘Hey, a government-only cloud is probably safer than your own data center — we actually have more controls than you do.’”

Still, the penetration of cloud technology is uneven. It tends to succeed in government in places where it provides an obvious return on investment, such as reducing costs or dramatically improving the efficiency of workers.

An easy example comes from the city and county of Denver, where CIO David Edinger said cloud-enabled field inspectors have increased the number of inspections they can complete each day — in some cases, from eight to 12.

The time savings came because inspectors would previously collect information in the field, then drive back to the office at the end



Companies listed in **orange** are making their first appearance on the GovTech 100.

120WaterAudit

120WaterAudit offers cloud-based water management software.

Est. 2016 / 120wateraudit.com

Fast Fact: 120WaterAudit secured \$7 million in Series A funding in September 2019.

3AM Innovations

3AM's FLARE technology helps improve firefighters' situational awareness and safety during emergencies.

Est. 2015 / 3aminnovations.com

Fast Fact: 3AM was part of the 2019 Urban-X accelerator program.

Accela

Accela software helps government agencies automate transactions and service delivery in land management, asset management, licensing, and public health and safety.

Est. 1999 / accela.com

Acivilate

Acivilate offers software to help government and law enforcement reduce recidivism.

Est. 2014 / acivilate.com

ArchiveSocial

ArchiveSocial provides cloud-based social media archiving for records management, regulatory compliance and e-discovery. (Disclosure: The parent company of *Government Technology* is an investor in ArchiveSocial through e.Republic Ventures.)

Est. 2011 / archivesocial.com

Avenu Insights and Analytics

Avenu provides finance and consulting services for government agencies.

Est. 1989 / avenuinsights.com

Axon

Axon provides electronic control devices to law enforcement and corrections agencies.

Est. 1993 / axon.com

Balancing Act

Balancing Act is a suite of tools to help government engage citizens on budget priorities and financial issues. Product of Engaged Public.

Est. 1998 / abalancingact.com

Bang the Table

Bang the Table offers an online citizen engagement platform for local government.

Est. 2007 / bangthetable.com

Binti

Binti's software streamlines the approval process for prospective foster parents.

Est. 2014 / binti.com

Biobot Analytics

Biobot Analytics analyzes city sewage to estimate opioid consumption in a given area.

Est. 2017 / biobot.io

BlueLine Grid

BlueLine Grid helps first responders find one another and collaborate in the field.

Est. 2013 / worldaware.com

BondLink

BondLink provides tools to modernize municipal bonds and connect cities with investors.

Est. 2016 / bondlink.com

The Boring Co.

The Boring Company digs tunnels to facilitate underground transportation networks.

Est. 2016 / boringcompany.com

Callyo

Callyo's app for law enforcement lets officers capture and stream video via cellphone, offering an alternative to body cam recordings.

Est. 2009 / callyo.com

Calytera

Calytera helps government automate citizen-facing services like building permits, licenses and Freedom of Information Act (FOIA) requests.

Est. 1989 / calytera.com

Cardinality.ai

Cardinality.ai is an AI-based case management platform for health and human services.

Est. 2017 / cardinality.ai

Fast Fact: Before starting Cardinality, the company's founders built a health-care platform in Asia that covered 10 million patients.

Cartegraph

Cartegraph offers mobile-enabled asset and operations management software to cities and counties.

Est. 1994 / cartegraph.com

Casebook PBC

Casebook PBC provides software to help health and human services staff track workflow and clients.

Est. 2017 / casebook.net

CentralSquare Technologies

CentralSquare's platform supports public safety, administration and health-care agencies.

Est. 1979 / centralsquare.com

Citibot

Citibot allows citizens to directly text message their governments to report issues and ask questions.

Est. 2016 / citibot.io

Fast Fact: Citibot co-founder and CEO Bratton Riley is the son of former longtime Charleston, S.C., Mayor Joe Riley.

of the day and re-enter it all on a computer. With an app, they can put it in as they gather it.

“What you’re doing at the end of the day is just repeating the work you did in the field,” Edinger said. “By leveraging these cloud applications, these mobile applications, you’re making it so they [aren’t wasting as much time].”

Cloud technology also allows Denver to better keep up with fundamental duties such as app updates.

“Staying up to date with versions is a perennial challenge,” he said. “It’s not unusual for us to get many, many versions behind.”

Roughly half of the city’s 400 apps are in the cloud now, but Edinger is adamant about one thing: Denver is not barreling toward the cloud. It’s using cloud when it makes sense.

So in places like Denver, cloud is changing the gov tech picture. But not all at once, and not across the board.

“Basically it boils down to we’re not a cloud-only or cloud-first government ... we’re cloud-where-appropriate,” Edinger said.

EMERGING TECHNOLOGY

Both a factor and product of market growth, technological innovations opened new possibilities for startups to serve state and local governments of all sizes. Advances in data collection, processing, analytics, smart city devices, consumer tech and other fields created niche markets and tools that didn’t exist, and in some cases were not conceivable, only a few years prior.

The availability of lightweight consumer drones, for example, has created a demand for new applications, laws and platforms for safety and communication. This led to the companies Wing, AirMap and Uber working with standards bodies around the world on the open source InterUSS Platform to create a standardized way for drone pilots to plan flights and communicate.

With the continued explosion of smartphones and consumer apps came a need for government regulations, data management and software. In response to the popularization of Airbnb and VRBO, permitting software companies such as Accela and Host Compliance (which was acquired by Granicus in November 2019) launched

new products to help local governments navigate regulatory issues that followed.

A revolution in urban transportation options driven by mobile apps such as Uber, Lyft, Bird, Lime, Jump and Waze generated massive volumes of new data about the movement of people on streets and sidewalks. This created a space for collaboration between mobility companies and local governments, who realized they could use the data for urban planning. This new space inspired several startups, such as Ride Report and Remix, to make the data useful.

Martin Morzynski, vice president of marketing at StreetLight Data, said a steady stream of innovations helped his company get a foothold in the government market. One of StreetLight Data’s first projects was finding ideal locations for EV chargers, but its opportunity grew as cellular and navigation devices replaced old-fashioned methods of traffic counting, and smart city sensors enabled faster and broader data collection on roads.

“It’s a jump in magnitude in what’s possible, and that’s what’s so exciting about this,” he said. “Our cities have gone from being heavily vehicle-driven, to being more and more open to new modes. You have Ubers and Lyfts on the street, you have light delivery vehicles delivering Amazon packages, you have commute owls expanding from a typical 9-to-5 where you’re kind of flattening commute peaks and essentially [seeing] heavy traffic all day, and that kills the

old transportation models and requires a new approach that’s much more data-enabled.

You’re seeing this marriage of IoT and big data becoming more symbiotic, where big data, the stuff that we do, connects the dots between the incomplete set of IoT devices, but also uses the IoT devices to validate and improve. One makes the other better.”

Few innovations have been more essential or promising than artificial intelligence, an umbrella term for new capabilities in information processing and pattern recognition. For law enforcement, companies like Axon have employed AI to recognize faces and objects in surveillance videos in order to redact sensitive information fast enough to meet deadlines for public release.

In the case of Varuna, founded in December 2018, AI provided a way to analyze huge volumes of historic water-quality data and inform money-saving, and perhaps life-saving, predictions for local utility agencies.

“By helping them to predict contaminant shocks within the system, and the impact of the shock, we help them develop a plan for addressing the shock so they stay within EPA compliance,” said founder Seyi Fabode.

He added that AI is advanced enough that most small government agencies can’t afford the specialized expertise necessary to develop AI tools in-house, but realizing what’s now possible has inspired new thinking, new companies and demands for services that didn’t exist even 10 years ago.

“It’s an interesting time for the whole AI space. It has reached a local maximum. There’s almost a cap on what most can do right now,” Fabode said. “It’s still far ahead of what we could do before, but it almost feels like we now require a few more leaps ... that allow us to do more.”



PARTNERSHIPS

As technological advances created new markets and replaced many manual processes with software, the interests of different gov tech companies increasingly overlapped. Governments found themselves dealing with ecosystems of new applications that had to interface with one another and build on existing

CityLife

CityLife provides an end-to-end platform for developing city- and agency-specific mobile apps.

Est. 2009 / appcitylife.com

Citymart

Citymart helps cities solve problems by connecting them with new ideas through open challenges that engage entrepreneurs and citizens.

Est. 2011 / citymart.com

CivicActions

CivicActions uses open source tools and agile methodologies to help government develop digital platforms and large-scale software deployments.

Est. 2004 / civicactions.com

CivicPlus

CivicPlus builds custom websites for city and county governments.

Est. 1994 / civicplus.com

Civis Analytics

Civis Analytics' data platform tracks public issues at a granular level to improve decision-making.

Est. 2013 / civisanalytics.com

Fast Fact: *Civis Analytics' software was used in Houston to gauge damage caused by Hurricane Harvey.*

Clear Ballot Group

Clear Ballot provides a suite of transparent voting system solutions.

Est. 2009 / clearballot.com

ClearGov

ClearGov aggregates city financial data to help citizens and local officials understand and visualize how tax dollars are being spent compared to other jurisdictions.

Est. 2015 / cleargov.com

Colnspect

Colnspect builds mobile software to manage compliance and quality assurance for public health and safety agencies.

Est. 2014 / coinspectapp.com

Compology

Compology offers camera monitoring for waste container management.

Est. 2012 / compology.com

Computronix

Computronix provides software to automate and streamline permitting and licensing.

Est. 1979 / computronix.com

Coord

Coord's solutions include apps for curb management, transit and ride-sharing.

Est. 2016 / coord.co

coUrbanize

coUrbanize provides an online marketplace for undervalued and abandoned urban real estate.

Est. 2013 / courbanize.com

Cubic Corporation

Technology from Cubic Corporation modernizes fare payment for transit systems, and also serves the global defense market.

Est. 1951 / cubic.com

Fast Fact: *In 2017, Cubic was awarded \$500 million to overhaul New York City's subway and bus payments.*

EasyVote Solutions

EasyVote Solutions delivers a software-as-a-service platform to city, county and state election offices to help manage the election process.

Est. 2013 / easyvotesolutions.com

Electro Scan

Electro Scan offers sensors to monitor sewer, water and gas pipelines.

Est. 2011 / electroscan.com

Elucd

Elucd builds technology that helps police track and respond to precinct-level community trust in law enforcement.

Est. 2016 / elucd.com

Esri

Esri provides a geospatial platform and related tools for public agencies.

Est. 1969 / esri.com

FATHOM

FATHOM provides utilities with smart water meters and the software that supports them.

Est. 2003 / gwfathom.com

Fast Fact: *FATHOM reports that its users decrease their water consumption by 10 percent.*

Forensic Logic

Forensic Logic's COPLINK platform allows law enforcement agencies to search, analyze and share data.

Est. 2003 / forensiclogic.com

GCR

GCR is a software and consulting firm whose major government clients include secretaries of state and airports.

Est. 1979 / gcrincorporated.com

GovPilot

GovPilot is a Web-based management platform developed exclusively for local government.

Est. 2014 / govpilot.com

infrastructure. In many cases, gov tech companies announced partnerships, collaborating on product integrations and joint go-to-market strategies.

Building on several acquisitions in the past few years, integrated software provider CivicPlus combined its platform for managing websites and public meeting documents with civic engagement software from Canadian startup Civil Space. Cloud software giant OpenGov teamed up with ERP software provider Supereion (now part of CentralSquare), giving OpenGov access to new customers in exchange for OpenGov's data visualizations and other tools. Itself a fusion of four companies, CentralSquare partnered with the public safety tech company Genetec to give emergency responders access to camera feeds and other information. Traffic management companies Waycare and Waze are sharing data to improve their respective products. Granicus combined its public communications platform with a public engagement and analysis tool from Bang the Table. The list goes on.

Besides advances in AI, Varuna's water utility data benefited from the company's partnership with CityBase, which makes payment systems for government, including for water utilities. Varuna founder Fabode explained their relationship this way: His company uses data to help water utilities improve their services, which increases customer satisfaction, which increases collection via CityBase. In turn, Varuna gets access to data from customers who use and trust CityBase.

In an email, Bang the Table CEO Matt Crozier wrote that his company's partnership with Engaged Public boils down to "product complementarity and mission fit," succeeding by allowing both parties to diversify and stick to their areas of expertise at the same time.

"We have tried developing everything in-house before, but the more we diversify the more we dilute focus. We want to retain sharp focus on building and improving the EngagementHQ platform. We have some big ideas for it," he said. "Our partners have equally big ideas for their specialist areas. There has been a history of companies



losing focus and therefore some quality as they diversify. This will allow us and our partners to keep focused on delighting clients while giving those clients access to a range of solutions that play well together."

CORPORATE EXPANSION

Where the proliferation of new technology and markets created spaces for startups, it also made competitors out of larger businesses in once separate lanes. New ideas, innovations and competition prompted companies to add tools to their portfolios and expand their business to accommodate different types of customers. Top-level ERP software providers started selling to mid-market customers, special districts and other segments of state and local government. For those that had the resources, acquisition became a common strategy, as some product developers found it easier to pick up the best startup solutions than to build competing ones from scratch.

Since merging with GovDelivery in 2016, Granicus has undertaken several acquisitions and built a software portfolio that includes agenda management, citizen communications and website design. Launching its govService platform in 2018, Granicus got into the digital services game in competition with Accela, NIC, Tyler Technologies and PayIt.

Oracle announced several major investments in the past few years, including the construction of 12 cloud data centers around the world to compete with cloud hosts Amazon, Google and Microsoft. Oracle

also launched a new cloud solution, Oracle Public Sector Community Development, which continues to add new functions but started with permitting software, pitting it against Tyler Technologies and Accela.

Backed by steady investments and fed by acquisitions, cloud software giant OpenGov made in-roads into software markets for performance measurement, budget building, permitting and citizen engagement.

Fundraising statistics from Crunchbase validate the idea that gov tech is gaining ground with investors. From 2003 to 2019, companies tagged "gov tech" on Crunchbase have raised \$2.8 billion in investment. About two-thirds of that has happened in the past five years.

But what investors are looking at are exits — when an investor cashes out on their stake in a company. Conventional wisdom in venture capital is that only a handful of investments will result in highly successful exits, and those will pay for the entire investment portfolio many times over.

Gov tech has seen many exits — in the past year CivicPlus acquired SeeClickFix, Motorola Solutions bought WatchGuard and OpenGov purchased ViewPoint, to name a few — but it's mostly been smaller deals. If the space can produce some more splashy success stories for investors, Groce predicts that more money will come into gov tech.

"If somebody is making money in a category, they're more likely to reinvest money in that category," he said.

Even without that, Groce expects momentum to continue in the next five years. That's because even the smaller firms working in the space, if they can pile up those deals, will continue building capacity. And as smaller companies are acquired, it's likely their founders will go on to create more gov tech companies. Everybody involved, including investors, will gain experience.

"That will breed more people who want to spend their time on this ... and develop that expertise and specialty internally," he said.

bmiller@govtech.com
awestrope@govtech.com

Follow our continuing coverage of the gov tech market at govtech.com/biz.

GovQA

GovQA's software replaces paper-based rulemaking processes in legislatures and government regulatory agencies.

Est. 2000 / govqa.com

GovSense

GovSense is cloud-based permitting, licensing and financial software for state and local government.

Est. 2014 / govsense.com

Granicus

Granicus provides cloud-based technology solutions for creating, managing and distributing live and on-demand streaming media content.

Est. 1999 / granicus.com

Gridics

Gridics' software uses GIS data to simplify real-estate development.

Est. 2015 / gridics.com

GTY Technology Holdings

GTY Holdings is a gov tech acquisitions company comprising a number of smaller startups.

Est. 2016 / gtytechnology.com

HAAS Alert

HAAS uses mobile data to alert drivers (and cyclists) of approaching emergency vehicles through vehicle-to-vehicle notifications.

Est. 2015 / haasalert.com

IPS Group

IPS Group globally delivers smart city tech within an Internet of Things framework.

Est. 1995 / ipsgroupinc.com

Itron

Itron offers technology and services focused on measuring and controlling energy and water use.

Est. 1977 / itron.com

LiveStories

LiveStories provides an integrated civic data hub to discover, analyze and publish civic data.

Est. 2013 / livestories.com

LotaData

LotaData uses an AI platform to locate mobile users, enhance customer profiles and study geo-behaviors to help improve citizen service offerings.

Est. 2015 / lotadata.com

Mark43

Mark43 software allows police to collect, manage, analyze and share information.

Est. 2012 / mark43.com

Maximus

Maximus software and services help governments administer health, child, family and community development programs.

Est. 1975 / maximus.com

Moovit

Moovit offers an integrated transit app powered by crowdsourced data and transit system information.

Est. 2012 / moovitapp.com

Motorola Solutions

Motorola Solutions provides equipment for data communications and telecommunications.

Est. 1928 / motorolasolutions.com

Munetrix

Munetrix provides tools for visualizing and using financial information from municipal governments.

Est. 2010 / munetrix.com

Municode

Municode offers legal, editorial and publishing services for managing city codes.

Est. 1951 / municode.com

Neighborland

Neighborland's platform enables residents to collaborate with local organizations and take action on issues in their area.

Est. 2011 / neighborland.com

NEOGOV

NEOGOV provides on-demand human resources software to automate the hiring, onboarding and performance evaluation process.

Est. 1999 / neogov.com

Nextdoor

Nextdoor is a neighborhood-specific social network.

Est. 2010 / nextdoor.com

NextRequest

NextRequest provides user-friendly FOIA and public records processing software for governments.

Est. 2015 / nextrequest.com

NIC

NIC develops and operates official government websites, mobile apps and secure payment processing for public-sector clients.

Est. 1991 / egov.com

Numetric

An analytics company focused on transportation data, Numetric works with departments of transportation to put data sources to work for safer roads.

Est. 2015 / numetric.com

One Concern

One Concern uses AI to complete risk assessments and damage and loss estimations.

Est. 2015 / oneconcern.com

OpenDataSoft

OpenDataSoft is an open data hub for citizens and city departments, allowing self-service data preparation.

Est. 2011 / opendatasoft.com

OpenGov

OpenGov software allows interested parties to access, explore and share finance and budget information held by government.

Est. 2012 / opengov.com

Passport

Passport specializes in enterprise business applications and payments for parking and transportation.

Est. 2010 / passportinc.com

PayIt

PayIt simplifies doing business with federal, state and local governments through its mobile transaction and payment platform.

Est. 2013 / payitgov.com

Periscope Holdings

Periscope provides procurement services to government.

Est. 2001 / periscopeholdings.com

Planet

Planet's small satellites help cities map, analyze and manage land and urban growth.

Est. 2010 / planet.com

Fast Fact: Planet was founded by former NASA scientists.

Pondera Solutions

Pondera helps public agencies use analytics to identify and remediate fraud, waste and abuse in large government programs.

Est. 2011 / ponderasolutions.com

PredPol

PredPol identifies the highest-risk times and places for criminal activity in near-real time.

Est. 2012 / predpol.com

PrimeGov

PrimeGov's software streamlines legislative management and facilitates collaboration.

Est. 2014 / primegov.com

Fast Fact: Fellow legislation management solution provider Propylon invested \$1.5 million in PrimeGov in 2018.

Promise

Promise aims to improve public safety by lowering recidivism rates with an equitable, data-driven approach to intervention.

Est. 2017 / joinpromise.com

ProudCity

ProudCity's software provides cities with websites and online government services.

Est. 2016 / proudcity.com

Quicket Solutions

Quicket provides a cloud-based data management and operational intelligence platform for public safety, code enforcement and justice agencies.

Est. 2013 / quicketsolutions.com

Rachio

Rachio offers a smart irrigation controller with cloud-based software and Web-based dashboards.

Est. 2012 / rachio.com

RapidDeploy

RapidDeploy offers a cloud-based computer-aided dispatch system.

Est. 2013 / rapiddeploy.com

RapidSOS

RapidSOS uses technology to rethink emergency communications and is working on a platform to predict emergencies before they occur.

Est. 2013 / rapidsos.com

Remix

Remix allows city transit planners to see the cost, demographic and fiscal impact of proposed route changes.

Est. 2014 / remix.com

Replica

Replica is a tool to help public agencies use transportation data to improve urban land use.

Est. 2017 / replicahq.com

Fast Fact: Replica was originally part of Sidewalk Labs.

RoadBotics

RoadBotics uses AI to monitor the status of road conditions before emergency crews are needed for repairs.

Est. 2016 / roadbotics.com

Rock Solid Technologies

Rock Solid Technologies is a software research and development company.

Est. 1994 / rocksolid.com

Fast Fact: Rock Solid is headquartered in San Juan, Puerto Rico.

Sagitec

Sagitec provides custom pension, provident fund, unemployment insurance, health-care and life sciences software.

Est. 2004 / sagitec.com

SeamlessDocs

SeamlessDocs converts PDFs and paper forms into fillable, e-signable, secure online digital forms.

Est. 2011 / seamlessdocs.com



Sidewalk Labs

Sidewalk Labs works with cities to build products that address urban problems.

Est. 2015 / sidewalklabs.com

Smarking

Smarking lets clients own or manage a holistic view of their parking assets and data through a variety of technology systems.

Est. 2014 / smarking.com

SST

SST develops ShotSpotter gunshot detection and location technology to help reduce gun violence in cities.

Est. 1996 / shotspotter.com

StreetLight Data

StreetLight Data delivers geospatial business intelligence to support critical decisions and improve return on investment.

Est. 2010 / streetlightdata.com

Swiftly

Swiftly works with cities and transit agencies to harness real-time data to optimize services.

Est. 2014 / goswift.ly

Tyler Technologies

Tyler is a provider of end-to-end information management solutions and services for local governments.

Est. 1966 / tylertech.com

UrbanLeap

UrbanLeap offers software that helps governments run pilot projects to test new technologies.

Est. 2017 / urbanleap.io

Fast Fact: *UrbanLeap counts Pittsburgh, Las Vegas and Palo Alto, Calif., among its clients.*

Utilidata

Utilidata works with utilities to save energy, increase reliability and better detect grid anomalies.

Est. 1983 / utilidata.com

Utilis

Utilis uses satellite imagery to monitor underground water systems and detect leaks.

Est. 2013 / utiliscorp.com

Fast Fact: *Utilis' technology was first used to detect water on Mars.*

Varuna

Varuna's dashboards gather water utility data and make predictions and recommendations for improvement.

Est. 2018 / varunaiot.com

Fast Fact: *"Varuna" is the name of the Vedic deity of water and enlightenment.*

Visionary Integration Professionals

VIP makes business strategy software for governments and corporations.

Est. 1996 / trustvip.com

Voyage

Voyage enables greater mobility within communities with autonomous vehicles that residents can summon with an app.

Est. 2017 / voyage.auto

WaterSmart Software

WaterSmart Software uses mobile and online tools to help water utilities educate and engage their customers about efficient water use.

Est. 2009 / watersmart.com

Waycare

Waycare helps cities manage their roads by harnessing municipal traffic data.

Est. 2016 / waycaretech.com

2020 marks the first year we've added internationally based firms to the list. Here are 10 companies outside the U.S. who are getting in on gov tech.

BasicGov Systems

BasicGov's cloud platform streamlines government services and operations.

Est. 2006 / basicgov.com

Headquarters: Vancouver, BC, Canada

CitizenLab

CitizenLab citizen engagement software helps agencies reach residents and make informed decisions.

Est. 2015 / citizenlab.co

Headquarters: Brussels, Belgium

Envisio Solutions Inc.

Envisio's products increase government transparency and track strategic plans.

Est. 2012 / envisio.com

Headquarters: Richmond, BC, Canada

iCompass Technologies

iCompass provides meeting and agenda management software for local government.

Est. 1999 / icompasstech.com

Headquarters: Kamloops, BC, Canada

Optibus

Optibus software lets cities model transportation networks to optimize transit systems.

Est. 2014 / optibus.com

Headquarters: Tel Aviv, Israel

Qucit

Qucit uses artificial intelligence for urban development and mobility planning.

Est. 2014 / qucit.com

Headquarters: Bèlges, France

ScytI

ScytI's election solutions make online voting accessible, transparent and secure.

Est. 2001 / scytI.com

Headquarters: Barcelona, Spain

Transit

Transit is a mobile app for finding urban transportation options.

Est. 2013 / transitapp.com

Headquarters: Montreal, QC, Canada

UrbanLogiq

UrbanLogiq brings together and analyzes diverse data sets to improve communities.

Est. 2016 / urbanlogiq.com

Headquarters: Surry, BC, Canada

Zencity

Zencity's platform aggregates and analyzes citizen feedback for local government.

Est. 2015 / zencity.io

Headquarters: Tel Aviv, Israel



Voices in Gov Tech

The crux of gov tech is evolution — everybody wants government to improve. But change, if it will last, must come from all directions. Here are five leaders in gov tech on what they feel has — and hasn't — changed in the past five years, and how that compares to what they expected.



Gabriela Dow

Owner, Mora Dow Consulting; partner, Plug and Play San Diego, a startup accelerator

Q: In the past five years, what did you expect to happen in gov tech that has happened?

Since launching my own startups in 2000 on, I expected the barrier to entry to continue to decrease and I have certainly seen this trend escalate over the past five years. Anybody, in any place on the planet, can be approached, engaged and sold to from anybody else — or perhaps a robot/machine learning script — from any other place on the planet. There are many positive developments with this ease of access, such as an increased quality of life for so many people that can become entrepreneurs. But there are also pitfalls in terms of security.

Q: What did you expect to happen that hasn't?

I expected security to tighten and improve with more precise tracking and auditing available due to increased technology improvements and deeper, interconnected layers of data that could help corporations detect abuses and law enforcement detect and prevent threats that could lead to physical harm. It is troubling to see that security systems have lagged behind global criminal enterprises, and with the rise of deepfakes and wider spread of misinformation, it is deeply concerning to know that society may not have the tools to slow or stop this type of criminal activity.



Luke Fretwell

CEO, ProudCity; founder, GovFresh

Q: In the past five years, what did you expect to happen in gov tech that has happened?

Definitely the mergers and acquisitions (M&A) activity given the steady venture and financial interest we've seen around ProudCity. The GovTech 100 list has played a critical role in the finance and investment industry's heightened interest in gov tech, and that was immediately obvious when we were included. I imagine the gov tech M&A activity has surpassed most industry insider expectations, but early on, it was obvious this was inevitable.

Q: What did you expect to happen that hasn't?

I thought surely there would be an acceleration of technology, purchasing and delivery innovation, particularly at the local government level. Unfortunately, we still see the traditional vendors offering the same solutions with opaque pricing and much of government still following dated procurement processes. There's a dire need for more awareness around modern technology best practices and why governments must move away from legacy thinking if we're truly going to serve the communities of the future. If we don't, my fear is that we'll see an increase in dissatisfaction in government, but also a general ambivalence toward civic institutions, whether you want to work for or engage with them. Now, more than ever, we need an ecosystem that fosters civic innovation rather than stifling it.



Cyd Harrell

Service design lead (consulting), Judicial Council of California; former chief of staff at 18F and product director at Code for America

Q: In the past five years, what did you expect to happen in gov tech that has happened?

I very much expected and hoped that by 2019, user-centered design would be considered a critical discipline in government/civic tech. While there's still more work to do, this has largely come to pass. Both 18F and [the U.S. Digital Service] included design as a core capability from their founding, and as state and city innovation groups have launched, nearly all of them include designers at multiple levels. Achievements like the open source U.S. Web Design System also make great, accessible digital design more available to governments at all levels.

Q: What did you expect to happen that hasn't?

I believed that the type of modern tech and design practices that have brought so much to public-facing government services (mostly on the Web) would have worked their way deeper into the stack. That by now, industry practitioners would have gained the trust of government partners to be invited to work on major database and back-end systems, as well as the Web, but that work is much less advanced. With the bigger systems (which could play a much larger role in saving taxpayer money on gov tech) there's lip service to agile in many places, but far less user-centered design and product management practice. There's still much to prove and much to be gained, and I'm optimistic for where we'll be in 2024.



Lauren Lockwood

Founder and principal, Bloom Government Digital Services; former chief digital officer of Boston

Q: In the past five years, what did you expect to happen in gov tech that has happened?

The number of talented, impact-driven people who have joined government ranks as procurement officers, engineers, etc., has far exceeded what I expected. I think this is due in large part to pioneers in the space evangelizing and building a brand for working in government (e.g., New Urban Mechanics, USDS, Code for America, Harvard Kennedy School and so many others).

Q: What did you expect to happen that hasn't?

When I joined government five years ago, it felt like the Wild West in terms of experiments and various groups developing best practices. I thought we'd arrive sooner at a more formal structure for capturing and disseminating what works. But in the last few years, I've also seen how complex systems, processes and culture are. What we do seem to be seeing — which is very cool — is this happening in pockets around subject areas (e.g., integrated benefits) or layers of the service stack (e.g., technology, procurement, policy).



Steve Ressler

President, Callyo; former president (and founder), GovLoop; former CMO, GovDelivery and Granicus

Q: In the past five years, what did you expect to happen in gov tech that has happened?

Five years ago, it was clear that the future of technology delivery was cloud-first and now we are delivering on that promise. Legacy vendors have been moving their applications to the cloud and new cloud-first vendors are being adopted. Second, the mobile-first trend was clear five years ago and has happened, whether it's new versions of legacy applications, new solutions for government workflows, new government-focused mobile devices or enabling a modern workforce. Third, I expected investors to increase interest in the gov tech SaaS market, and there has been significant movement there, especially from growth equity.

Q: What did you expect to happen that hasn't?

I expected state and local governments to develop new R&D and investment models like DARPA and In-Q-Tel. While there have been launches of unique programs working on the problem like City Innovate, they are still limited in actual dollars allocated from governments directly to startups. I expected government to launch large-scale training initiatives to retrain employees on the newer technologies to improve service. However, training budgets still remain the first to be cut, and training is still primarily focused on legacy topics.

Victory Over Vitriol

A citizen engagement platform informed by trial and error overseas offers some tips on fostering productive public discourse in the U.S.

By Zack Quaintance /
Assistant News Editor

The world of online discourse was vastly different one decade ago. This was before foreign election meddling, before social media execs were questioned by Congress, and before fighting with cantankerous uncles became an online trope. The world was perhaps more naïve, with a wide-eyed belief in some circles that Internet forums would amplify the voiceless within democracy.

This was the world in which Róbert Bjarnason and his collaborators lived. Based in Iceland, Bjarnason and his team developed a platform in 2010 for digital democracy. It was called Shadow Parliament, and its aim was simply to connect Iceland's people with its governmental leadership. The platform launched one morning that year, with a comments section for debate. By evening, two users were locked in a deeply personal argument.

"We just looked at each other and thought, this is not going to be too much fun," Bjarnason recalled recently. "We had just created one more platform for people to argue on."

Sure, the engagement level was quite high, bringing furious users back to the site repeatedly to launch vitriol, but Shadow Parliament was not fostering the helpful discourse for which it was designed. So, developers scrapped it, pulling from the wreckage lessons to inform future work.

Bjarnason and team, officially a nonprofit called Citizens Foundation, worked for roughly a year, and, eventually, a new



The work of nonprofit Citizens Foundation has spread to 20 countries.

platform called Better Reykjavik was born. Better Reykjavik had key differences, chief among them a new debate system with simple tweaks: Citizens must list arguments for and against ideas, and instead of replying to each other directly, they can only down-vote things with which they disagree. This is a design that essentially forces users to create standalone points, rather than volley combative responses at one another, threaded in the fashion of Facebook or Twitter.

"With this framing of it," Bjarnason said, "we're not asking people to write the first comment they think of. We're actually asking people to evaluate the idea."

One tradeoff is that fury has proven itself to be an incredible driver of traffic, and the site loses that. But what the platform sacrifices in irate engagement, it gains in thoughtful debate. It's essentially trading anger clicks for coherent discourse, and it's seen tremendous success within Iceland — where some municipalities report 20 percent citizen usage — as well as throughout the international community,

primarily in Europe. All told, Citizens Foundation has now built like-minded projects in 20 countries. And now, it is starting to build platforms for communities in the U.S.

So far, Citizens Foundation has a nascent collaboration with New Jersey. It is supporting work led by the New York City-based academic research entity The Governance Lab (GovLab), bringing a Better Reykjavik-esque platform to state employees. There is optimism for a similar project aimed at the public next year.

Still, the question looms: Will Americans — who find themselves torn by unprecedented polarization in 2020 — embrace an online digital democracy system that prizes rationality over team sport rhetoric? A look at current digital engagement efforts across the U.S. offers some valuable insights.

Civic Engagement in the U.S.

Creating platforms for digital democracy is almost a cottage industry in the U.S., one that has grown rapidly in recent years as tech has accelerated and concerns about the health of the republic have

grown in the wake of election meddling and online misinformation campaigns.

Yet, no one platform has become the dominant place for local, county and state government agencies seeking to offer citizens easy and productive ways to participate in the governance of their communities. One major success story, however, is the town of Gilbert, Ariz. The work there is led by Dana Berchman, the town's charismatic chief digital officer, who has private-sector media experience with massive entities such as MTV.

With a small department and a budget no larger than any strapped local government, Berchman's efforts have drawn large segments of Gilbert's population to engage with government online. Berchman said residents are interested in participating with government, even if busy schedules and lack of knowledge about how to do so make it difficult.

"There's this misconception that people don't care," Berchman said, "and that they won't participate. No, they do care, you just don't make it easy for them to participate."

The key is meeting them where they spend their time — which for many is online. To that end, Berchman has had much success engaging residents of Gilbert with the neighborhood social networking platform Nextdoor, which requires verification that residents actually live in the communities they are voicing opinions about. In other words, that uncle who always sails in with a hot take about your Facebook posts couldn't do that unless he lived right next to you. That's one way to reduce the threat of personal attacks and unproductive debates, while at the same time giving elected officials real data at a low cost from verified constituents. Gilbert, for example, recently crowdsourced a public consensus about laws pertaining to the e-scooters that are laying siege to U.S. communities nationwide.

The challenge, however, is creating a culture in which people are as enthusiastic about using a digital democracy platform as they are about scrolling through Facebook.

One idea that has proven useful for this in the U.S. is building online platforms with specific, results-oriented missions. These are projects that reel residents into participatory online spaces by asking them to help solve problems they care about, ultimately

keeping them coming back by showing them the actual results of their contributions.

This has certainly been the case in Flint, Mich., where the local government has long struggled with a rash of blighted buildings. Within the last decade, work on a master plan there found that blighted buildings were often a problem for private businesses and communities alike. In fact, the plan found that roughly 60 percent of blighted buildings there were owned by entities outside of the public sector, said Suzanne Wilcox, Flint's director of planning and development.

In response, the city created the Flint Property Portal, which gives residents a place to easily report information about blighted properties in their neighborhoods. With this portal, which is accessible via both a website and mobile app, people who live in Flint can send messages about blighted properties to the local government, creating useful data. They can then track the data to see how the government is responding to it.

In 2019, the Flint Property Portal received Cities of Service's Engaged Cities Award, an international citizen engagement accolade. At the time of the award in October, officials noted that more than 189,000 informational messages about blight had been sent to the city from its residents, leading to a \$60 million blight elimination grant from the federal government that has so far helped demolish more than 4,000 structures.

Moreover, Wilcox said the portal has inspired many who use it to continue engaging with their local government, as well as to collaborate with neighbors on taking personal responsibility for other blighted lots. Basically, rather than fighting about the political reasons the town has become blighted, this results-oriented work has created an actionable channel for making real, lasting change. No matter how eloquently worded, no social media retort is capable of that.

Can Better Reykjavik Work Here?

These types of success stories seem to be limited in the U.S., however, as compared to broader commensurate efforts such as Better Reykjavik in Europe.

Mauricio Garcia is the deputy director of Cities of Service, which

bestows the Engaged Cities awards. Garcia has followed international citizen engagement efforts for the past four years and noted a clear increase in the work both abroad and in the U.S.

"Just over the last couple of years here, you've seen a lot more investment in dollars as well as in political and social capital," Garcia said, pointing to Bloomberg Philanthropies and the Knight Foundation as vital supporters of the work domestically.

Garcia agreed that many citizen engagement efforts in the U.S. have more specific asks than the broad workings of projects in Iceland, the United Kingdom, and elsewhere. He also noted that Better Reykjavik is one of a growing number of these platforms, pointing to a company called Bang the Table, as well as to a municipal project in New York City. Garcia said that the domestic and international work has become complementary.

"We're ahead in some ways and they're ahead in others," Garcia said, "and we're learning from each other."

Bjarnason, for his part, also noted that the seemingly insurmountable divides in modern American politics are not unique to this country, with his homeland of Iceland as well as other European nations facing similar climates. The key, he reiterated, is keeping the focus on useful ways to help.

"It's a simple thing to show people that a little bit of transparency and a little bit of participation dramatically decreases divisions between people," Bjarnason said, "especially if it's happening at the state or local level."

In fact, New Jersey has already used the Better Reykjavik platform to support an internal innovation challenge. Citizens Foundation has also set up an American nonprofit group called Citizens Foundation United States, which is being led by Oregon-based Joshua Lanthier-Welch as it works to bring the platform to more of this country.

Nobody involved is terribly concerned that American divisions or culture will mitigate the impact of the work, if public outreach is done in an effective way that introduces users to the full potential of the platform.

"People see technology as having undermined democracy," said Lanthier-Welch, "and we have to show them that the same technology can be used to build it back up." 

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Staying Current

As a new decade dawns and new tech emerges, how will you keep up with the trends?

What technologies will be the most disruptive in the 2020s? Is the latest cybersecurity story real or just fake news? Can we protect privacy, given the recent onslaught of data breaches? Can my business function even survive this exponential pace of change?

Or some ask, will artificial intelligence eliminate my current job?

The tech innovation that has transformed business and government over the past two decades is incredible. And yet, experts urge us to hang on to our collective safety belts — because we ain't seen nothing yet.

From AI to autonomous vehicles and back-office quantum computing to front-office robots, our world will be turned upside down (again) over the next few years. Smart cities, smart homes and smarter everything else will realign business and public-sector processes and redefine what it means to be tech smart, both at home and at work.

What's your plan to stay tech savvy? What tips can help individuals and groups thrive in an environment of constant tech change?

First, truly become a lifelong learner. Robert B. Tucker, a futurist who regularly speaks on innovation in leadership, writes that we all need a “personal innovation strategy,” a well-conceived (and written-down) set of goals, habits and

daily actions that alert us to threats, help us seize opportunities and ensure our viability over time. Tucker urges us to take at least 15 minutes daily to learn something new about what's changing in our profession.

“What's your plan to stay tech savvy? What tips can help individuals and groups thrive in an environment of constant tech change?”

Second, share what you know. Our instinct is to hoard knowledge. But freely give it away and help others in their journeys. This will strengthen your skills, since we learn more and become true experts when we effectively teach others. Also, you can become a thought leader within specific tech or security areas by writing articles or blogs, interacting in social media professional communities like LinkedIn, or attending and presenting at conferences.

Third, break out of the box of your current role. Pick a cutting-edge technology area that interests you and will impact your government or business in the coming years. Volunteer for groups working in these areas, or create your own group — with management support. Perhaps this new area will become your full-time job sooner than you planned.

While this third option may seem like a stretch to some, if you generate good

ideas and look for organizational needs that aren't being met, you'll be surprised what opportunities management will be open to supporting. Discuss current problems and potential low-cost solutions with your managers.

Also, think of partnerships beyond your own organization. What industrywide opportunities can you take advantage of?

For example, when I was an agency CIO in Michigan government at the turn of the millennium, organizational websites were rampant and growing out of control. A group of Web experts joined forces. They saw the unsustainability of hundreds of unique portals in state government, and a desire from leadership to streamline content management and data repositories that would enable enterprisewide solutions with a common look and feel.

By aggressively pursuing this opportunity, our e-Michigan team was able to lead the statewide effort that created and launched Michigan.gov. This was the first .gov enterprise portal in the country for state governments, and broke new ground in dozens of ways, winning awards along the way. Leading security for that new effort set the stage for my becoming the first chief security officer in Michigan.

Many similar opportunities exist today in governments and businesses worldwide. Cybersecurity will be the key ingredient in many of these projects. The question is, who will take the lead in making these visions a reality using new technology? **it**

Daniel J. Lohrmann is the chief security officer and chief strategist at Security Mentor. He is an internationally recognized cybersecurity leader, technologist and author. From 2002 to 2014, Lohrmann led Michigan's award-winning technology and cybersecurity programs, serving as CSO, CTO and CISO.



Q&A: Modernizing Workforce Management in Mid-Sized Cities and Counties

Employees are the public sector's most valuable assets, but paper processes and siloed legacy systems often prevent government agencies from gaining efficiencies and realizing cost savings to reinvest back into their employees. Ultimately, modernized workforce management can empower city and county leaders to build a more sustainable public workforce for the future.

It's clear a workforce management revolution is overdue. *Governing* recently spoke with both public sector leaders and private sector experts about the importance of modernized workforce management — particularly for mid-sized cities and counties — and the benefits for both government agencies and their employees.



Barbara Hill,
Director of
Human Resource
Development, City
of Fayetteville, N.C.



Kate Baldwin,
Human Resources
and Benefits Manager,
City of Sterling
Heights, Mich.



Linda Misegadis,
Public Sector
Business Consultant
Director, Kronos

Why is modernizing workforce management in the public sector so important?

Misegadis: Workforce management in the public sector is unique because you essentially have a single employer with multiple industries that work underneath that employer. Each of those industries has different business requirements. This creates a complex environment that would see drastic benefits from increased automation.

Hill: Before we implemented workforce management technology, we were all over the map when it came to managing time and attendance for our employees. Manual, paper-based processes created so many opportunities for fraudulent reporting of time and use of paid time off, which was a waste of taxpayer dollars.

Baldwin: With outdated workforce tools, it can be difficult to capture historic data on an employee or an employee's career progression over their employment duration. For example, we have hundreds of retirees. When we look back at when a retiree last worked, what collective bargaining agreement he or she retired from, and what his or her health insurance benefits are based on that retirement date, it's all piecemealed in various spots. This makes it difficult to accurately capture the retiree's information. Modernized workforce management provides greater visibility into every employee or retiree and brings data together for greater insights and better decision-making.

What efficiencies can cities and counties realize by modernizing their workforce management?

Hill: In Fayetteville, we have significantly reduced the time it takes to produce our time and attendance files and our payroll records. We have cut almost a day and a half off the process at every location. So, a process that would take a department between 12 and 20 hours, depending on the number of employees they had to enter, is now down to two to four hours to get time and attendance submitted to the payroll department and obtain approvals.

What benefits do employees get from modernized workforce management?

Baldwin: From a user perspective, a workforce management solution is much more streamlined. It's all inclusive where employees can manage their timekeeping and fill out their hours each day online. They can also check their payroll information, their benefits elections and much more. Every employee has applicable settings assigned to them based on their bargaining unit. The system is all encompassing and doesn't allow anyone to make errors.

How can you best obtain employee buy-in for a workforce management solution?

Hill: You need to help employees understand this is not being brought into the city to harm them or because you don't trust them. It's to provide a level playing field.

Misegadis: I think really being prepared and understanding that you're going to have to go through change management and have the right people and skills come in and help drive this change can help ensure the success of these projects.

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

NYPD CIO to Lead NYC IT

Jessica Tisch was tapped by New York City Mayor Bill de Blasio as commissioner of the Department of Information Technology and Telecommunications. Tisch previously spent six years as head of the New York City Police Department's IT Bureau. DoITT has had an interim CIO in place since Samir Saini departed in June.



Jessica Tisch

In November, de Blasio issued an executive order creating the role of algorithms management and policy officer, who will report to the director of the Mayor's Office of Operations. As of press time, this role had not been filled.

Maricopa County, Ariz., Replaces CISO

Home to Phoenix, the country's fifth-largest city by population, Maricopa County, Ariz., in November named **Lester Godsey** as its new chief information security officer. Godsey brings more than 20 years of experience in IT and cybersecurity, and replaces Robert O'Connor, who was with Maricopa County for three years.



Krista Canellakis

San Francisco Innovation Officer Departs

After a nearly seven-year career with the city, San Francisco Chief Innovation Officer **Krista Canellakis** left her post. She held a variety of roles during her tenure, including as a Mayor's Innovation Fellow and deputy CIO. A replacement for Canellakis has not been named.

San Diego Appoints New CDO

Mayor Kevin Faulconer in November announced **Andrell Bower** as San Diego's new chief data officer. She was previously part of the city's Performance and Analytics Department as the open data program coordinator. Former CDO Maksim Pecherskiy left the position in July.



Andrell Bower

Alaska Names Permanent CIO

Following a string of interim chief information officers during a nationwide search of more than 100 candidates, Alaska named **Bill Smith** to the role in a permanent capacity. Smith brings nearly three decades of IT experience, including with the U.S. Army. He will be based in Anchorage but work closely with officials in Juneau.

New York State Replaces Acting CIO

Jeremy M. Goldberg, most recently deputy secretary to Gov. Andrew Cuomo for General Government, Technology and Innovation and the state's budget office, has been named New York state acting CIO. Goldberg was previously CTO of New York City and led the city's NYCx program. He replaces acting state CIO Joseph Rabito.



Jeremy M. Goldberg

Florida Deputy CIO Departs for Private Sector

In December, Florida Deputy CIO **Heath Beach** resigned from public service after leading state IT since January 2019; the CIO position has been vacant during that time. Beach plans to transition to consulting work in the private sector following 20 years in government.

CIO Named in Alabama

Having served as interim IT chief since June, following the departure of Jim Purcell, **Marty Redden** was named Alabama's permanent secretary of the Office of Information Technology. "His decades of experience in the technology field is already paying off for OIT and our other state agencies," said Gov. Kay Ivey in a press release, "which is why I am proud that he will continue serving in this capacity."

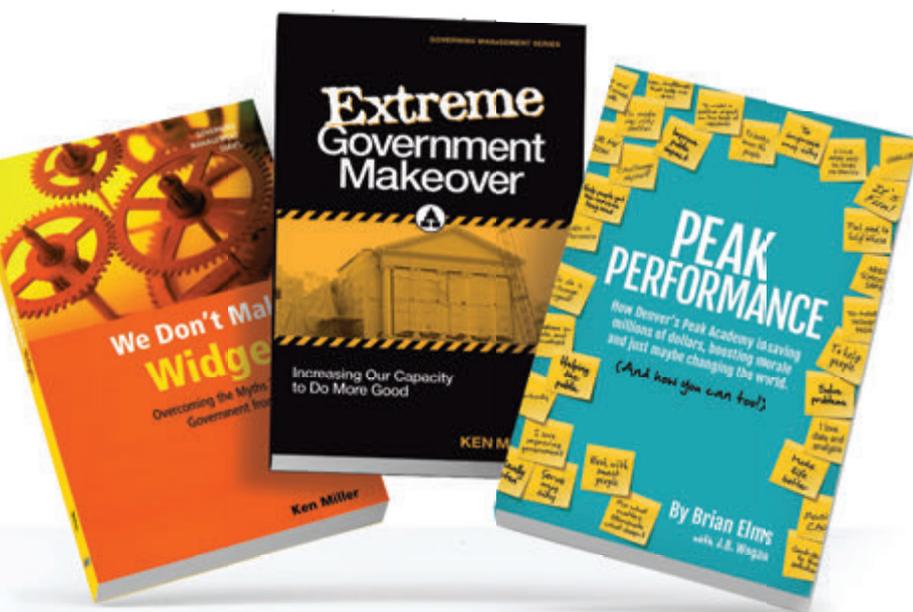
New Kentucky Gov. Replaces CIO

Incoming Kentucky Gov. Andy Beshear announced as part of his cabinet that **Ruth Day**, a certified public accountant from the private sector, will take over as chief information officer. Day takes the place of Chuck Grindle, who served in the position since late 2017.

State CDOs Trend Up

The end of 2019 saw a flurry of activity in the area of chief data officers at the state level. **Tammy Roust**, previously associate director and risk analyst for the federal Commodities Future Trading Commission, filled the position in Illinois, which had been vacant since 2018. Wyoming brought on **Drew Dilly** as the state's first chief data officer in the Department of Enterprise Technology Services. While the state is still defining the scope of the position, Dilly described it as "a dream job." Iowa also named an inaugural CDO when **Matthew Rensch**, previously in data and IT for the state's department of transportation, was appointed to the post. And in Connecticut, **Scott Gaul** replaced longtime CDO Tyler Kleykamp, who left in September. Gaul brings 20 years of experience in the private and nonprofit sectors.

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Improving Transit Safety and Convenience in San Diego

Modern network powers rider-friendly upgrades for the city's Metropolitan Transit System.

Public transit riders in San Diego enjoy safer, more reliable and more convenient service thanks to technology upgrades implemented over the past several years by the San Diego Metropolitan Transit System (MTS).

Station signs and mobile apps now provide riders with accurate arrival information for trolleys and buses. Real-time diagnostic data enables MTS maintenance crews to spot and address mechanical issues before they cause breakdowns. A new fare system supports simple and secure mobile ticketing transactions. And expanding use of wireless video feeds gives transit system officials a near-real time view of onboard incidents or emergencies.

“We’re committed to providing safe, reliable, accessible and convenient transportation in the San Diego region — with an emphasis on customer satisfaction,” says Sandra Bobek,

who was chief information officer for MTS from 2012 until her retirement in October 2019. “We’re aligning our technology with that mission as much as we possibly can, as quickly as we can.”

MTS — which operates bus and trolley lines that complete a total of 300,000 passenger trips on a typical weekday — made dramatic progress on that task during Bobek’s tenure as CIO. When she arrived, MTS relied on network gear so old that staff members scrounged for replacement parts on eBay. Multiple separate communication systems served buses, trolleys and the back office. And the bulk of customer service had been outsourced to other agencies in the area.

The hodgepodge of outdated technologies made it nearly impossible to launch innovative new services and achieve real coordination and insight across a transit system that stretches

from the Mexican border to points throughout the 570 square-mile San Diego metropolitan area.

Building the Foundation

MTS kicked off its modernization effort by creating a new network foundation. The transit system standardized and consolidated equipment as it upgraded, creating a unified communications platform to support operations across the region.

MTS worked closely with AT&T to transition from legacy technologies to modern local and wide area network platforms, and to leverage existing dark fiber owned by the transit system. These improvements positioned MTS to meet riders’ present needs and adapt to future requirements.

The modern network foundation enabled MTS to open its own customer service call center a few years ago, and

it supports a growing suite of rider-friendly improvements.

“Tons of projects are happening,” says Gene Bild, principal architect with AT&T Public Sector, who has been working hand-in-glove with the transit agency. “Once we pulled together the network backbone, we could start thinking about how to support the transit of the future.”

Gaining the ability to react to evolving customer expectations was critical for MTS, adds Bobek.

“We need to keep moving with the times. We need to keep pace with changes in how riders want to communicate with us and how they want to use different modes of transportation,” she says.

Showing Up on Time

Prior to the upgrades, MTS struggled to track its own vehicles. Arrival signs at trolley stations were nothing more than glorified clocks. They displayed the station name and time of day only. The lack of information was a source of frustration for riders counting on reaching their destinations reasonably close to the scheduled time.

Now MTS uses application programming interfaces (APIs) and cellular connectivity to pull GPS location information from the trains as they move through the system. The data then runs through an algorithm that estimates travel times and displays highly accurate arrival time for riders at the station.

“We’re collecting latitude and longitude information every five to 10 seconds,” says Bild. “Now signs at the stations let riders know when a train is three minutes out, two minutes out, etc. Arrival information suddenly went from unreliable to very reliable.”

Bus and trolley riders can access essentially the same service through a free mobile app called One Bus Away, which was developed by the University of Washington.

MTS works hard to keep to its schedule, but in a busy city like San Diego — where buses and trolleys don’t have priority at traffic lights — you never know when a stalled truck is going to slow traffic.

“We need to keep moving with the times. We need to keep pace with changes in how riders want to communicate with us and how they want to use different modes of transportation.”

Sandra Bobek, Former CIO, San Diego MTS

“Now, if the bus or trolley is running a few minutes late, the app lets you know if you have time to grab a cup of coffee,” Bobek says.

Fixing Equipment Before It Breaks

Proactive maintenance is another way MTS is improving rider experience.

Trolleys that receive heavy daily use inevitably are going to have parts that wear out, potentially causing breakdowns and delays. MTS is tapping into the onboard computers to track diagnostic data in real time. Instead of waiting for trains to break down, MTS will use the information to determine which faults are occurring on which cars, detecting patterns and proactively making fixes.

This approach will let MTS maintenance crews remove trolleys from service before they have issues that impact service, or even meet a trolley at a station to quickly swap out a failing part.

Safety First — and Fast

Technology is improving rider safety as well. With Wi-Fi in every station and routers on board the trolleys, MTS can transfer video whenever trolleys are within sight of a station. It’s not quite real time, but it enables trolley operators to get critical video segments to first responders faster. Formerly, such transfers could only be done when a train was stopped at a station.

MTS also is launching an app that lets riders send a link to loved ones who want to track their ride.

“From a safety point of view,” says Bobek, “that app will do a lot for us.”

And with 5G coming, MTS is experimenting with a sort of panic button that will let operators send real-time video of onboard incidents to authorities. An operator in a bad situation will be able to hit a button that sends a link to live video streams from all eight cameras on the trolley.

Getting More People on Board

Finally, a next-generation fare system will give riders new options and features. For instance, it will let customers take advantage of a concept called “fare capping,” which rewards passengers with free rides after they meet the fare equivalent of a daily, weekly or monthly pass.

The new system also enables secure, mobile and real-time transactions. This supports credit card purchases on buses and trolleys, not just in stations.

“It’ll be completely modern and have all the bells and whistles that today’s riders expect,” says Bobek.

Ultimately, the technological upgrades implemented by MTS help buses and trolleys run more promptly, efficiently and safely, while making the system easier for riders to navigate.

“At the end of the day,” says Bobek, “it’s all about convenience for the customer.”



There's an App for That

Craigslist, a mainstay of Internet commerce, has finally caught up with its users: after 11 years, there's now a Craigslist app. It's fully available on iOS and has a beta version running for Android, and it reportedly replicates the full website. No account is required, and users can sift through post categories and favorite items, save searches, and filter results. And just like the website, it's all anonymous.

SOURCE: TECHCRUNCH



76,000

The estimated number of cellphone-related injuries that occurred in the U.S. between 1998 and 2017, according to a study published last month in a journal of the American Medical Association. These include mechanical injuries, like accidentally dropping your cellphone on your face, and use-associated injuries such as tripping on the curb while looking at your phone. The study also found that users above the age of 50 were more likely to incur use-associated injuries, while the majority of users under 13 (82 percent) were at a higher risk of mechanical injuries.

SOURCE: THE VERGE

Can't Fool Me

Quite a few online sellers have been introducing something called "adversarial T-shirts" that can supposedly fool facial recognition systems and make the wearer invisible to this technology. But before reaching for their credit cards, potential buyers may want to take a second look at the data. The most advanced adversarial T-shirt to date was developed by scientists at Northeastern University and the MIT-IBM Watson AI Lab, but it only has a success rate of 57 percent.

SOURCE: QUARTZ



62%

The Pew Research Center recently found that women are more likely than men to say "please" when speaking to an AI voice assistant such as Amazon's Alexa. While 62 percent of women surveyed reported that they said "please" to their smart speaker at least occasionally, only 45 percent of men surveyed gave the same answer. SOURCE: PEW RESEARCH CENTER



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