

Congrats

2020 Special Districts Technology Innovation Award Winners!



Northeast Region

CITIZENS CATEGORY

Chester Housing Authority
Building Community Video Series

Delaware River Port Authority Solar Carport System

Westchester Library System Senior Services

OPERATIONS CATEGORY

Brunswick Sewer District
Technology Investment and Preparation for COVID-19

New York Power Authority COVID-19 Response

Philadelphia Parking Authority Safe Work Playbook

WSSC Water
Operational Continuity for the Pandemic

LEADERSHIP CATEGORY

Delaware River Port Authority
John Hanson, Chief Executive Officer

Philadelphia Parking Authority
Richard Dickson, First Deputy Executive
Director

Western Monmouth Utilities Authority Brian J. Valentino, MPA, CEAS, ICMA-CM, Executive Director & Chief Executive Officer

Midwest Region

CITIZENS CATEGORY

Metro Waste Authority
Online Citizen Supplies Ordering

St. Louis County Library Digital Equity Initiative

Western DuPage Special Recreation Association Transformation of Special Needs Programs During the Pandemic

OPERATIONS CATEGORY

Metropolitan Airports Commission EOC Data Visualization and the Lunch and Learn Series

Ohio Turnpike and Infrastructure CommissionStrategy Execution Program

Rockford Public Library Laser-cut Face Shields and 3D Printed Ear Guards

LEADERSHIP CATEGORY

Great Lakes Water Authority
Jeffrey E. Small, Chief Information
Officer

Naperville Park District
Omar Sandoval, Information Technology
Director

Schaumburg Township District Library Anita Forte-Scott, President, Board of Trustees

West Region

CITIZENS CATEGORY

Cordova Recreation and Park District Drone-filmed Virtual Pool-Building Outreach and Groundbreaking Video

MCE

Public Meetings Live-Streamed via Zoom

Orange County Water District
Virtual Outreach Response to COVID-19

OPERATIONS CATEGORY

Bremerton Housing Authority
Telecommuting Implementation

Mason County Public Utility District No. 1
Pandemic Response Plan

Placentia Library District
Virtual Programs and Staff-made Masks

LEADERSHIP CATEGORY

Los Angeles County Metropolitan Transportation Authority

Bryan M. Sastokas, Chief Information and Technology Officer

Meridian Library District Book Service Delivery

Southern Nevada Health District
Jason Frame, Chief Information Officer

To learn more about the winners' initiatives and the Special Discticts Program, visit:

govtech.com/districts



The growing and dynamic gov tech market helped government respond to COVID-19 in myriad critical ways. And they grew their business in the process.

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Before COVID-19, a few leading governments were dabbling in chatbot technology. In 2021, it's hard to imagine government doing the people's business without them.

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More research, more science, more technology.

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government technology

GT100 in a Time of COVID

s with every facet of our coverage over the past year, our annual GT100 list has been affected and informed by the global pandemic. But similarly, the trends and issues *Government Technology* readers care about today feature several through lines that pre-date the pandemic and will also outlive it.

Six years ago, we set out to define a new market segment by annually benchmarking 100 companies that were starting to unlock solutions to government problems using innovative technology. These aren't the giant incumbent players that snag the lion's share of large government contracts. They are newer entrants to the scene that started small and have gone on to prove that state and local governments do indeed want to experiment with new ideas and that it can in fact be a profitable business model.

Skepticism on the part of the investment community has begun to fade as the viability of the gov tech market has increasingly proven itself. Can companies make a profit focusing on government? It turns out the answer is yes. Nearly 500 investors in this year's GT100 companies certainly seem to think so.

2016 was the first year we published the GT100. Venture funding for that inaugural group totaled just over \$1 billion at the time. The average age of a 2016 GT100 company was nine years, and the group boasted 23 acquisitions to date among them.

Fast forward to 2021, version 6.0, which we unveil for the first time in this issue. Companies on the list have matured alongside the list itself, now averaging 14 years old. Other notable numbers have jumped too: Companies on the 2021 list have raised a combined \$3.2 billion. And another indicator that the gov tech market is coming into its own? The number of acquisitions for the 2021 list is 199, more than eight times the total from the 2016 list.

When planning our editorial coverage for this issue, we wondered what, if any, impact COVID-19 had on

the maturing marketplace captured in the GT100. The title of our feature story for 2021, *Essential*, should resolve any uncertainty on that front.

2020 served as a force multiplier for digital transformation in state and local government. Services were migrated online by necessity and many government norms were turned on their heads. Work-at-home capabilities got a massive boost, bringing previous productivity skeptics along for the ride. Citizen engagement has never been more important as residents turned to trusted local authorities to guide them through uncertain times. Companies on the GT100 list smartly pivoted to handle dramatic new demands for services online.

The last few years have seen an uptick in government tapping into sentimentmining tools to better track trending issues and residents' feelings about them and use social media and other outreach tools to respond. GT100 company Zencity saw a major increase in local government customers due to COVID-19. The tool helped municipalities track whether citizens understood things like the latest local guidance about masks and business operations, allowing them to quickly shift communications tactics to combat misinformation gaining momentum. And Zencity experienced something many experts on tech use in government have noted: The extenuating circumstances of the pandemic led many to skip the small pilot project that often precedes a bigger contract.

Noting the trajectory of service providers toward the digital, Granicus CEO Mark Hynes viewed government agencies in the U.S. as being on a similar, inevitable path. "It's really a market adoption curve question, and COVID has bent that adoption curve up dramatically."

Read more about these companies and check out the full 2021 GT100, starting on p. 14, and online at govtech.com/100.

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Slowing Down

Transit experts were excited by opportunities to rethink public thoroughfares during the pandemic, giving rise to the "slow streets" movement, repurposing formerly busy roads into safer spaces for bikes, scooters and the like. But this has only been beneficial to economically advantaged communities, where residents are working from home and driving less. Less wealthy areas still rely heavily on transit and driving to get to work, meaning "slow streets" resources are better used to boost local businesses, like facilitating outdoor dining for restaurants.



BIZ BEAT

As news of promising COVID-19 vaccines grows, so too do the technologies to help manage their distribution. One option comes from Simplus, part of tech giant Infosys, which touts an "end to end" solution built on the Salesforce platform that covers everything from mapping the supply chain to registering citizens and running wellness surveys. Similar solutions are available from Accenture, Qualtrics and Salesforce itself.

Making Connections

At a November webinar from the National Telecommunications and Information Administration, presenters explained how broadband expansion can boost regional economic development if providers foster openness rather than competition. Lauren Mathena with the Mid-Atlantic Broadband Communities Corp. said her organization allows ISPs to connect to its 1,900-mile fiber backbone, which reduces costs and allows providers to focus on delivering crucial last-mile service.

WHO SAYS?

"I refuse to have the right thing be shot down because of politics."

govtech.com/quotejanuary2021

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The Biden Administration Could Be Good for Smart Cities

Approved California Props May Send Ripples Through Other States

Three Cities Use Smart City Concepts to Improve Transportation

Trump Fires CISA Director Chris Krebs Over Election Dispute

Blockchain Voting Debate Heats Up After Historic Election

tech/bytes

11

The number of companies selected to participate in the 2020 Hyperspace Challenge accelerator program.

3.9_M

The amount of grant funding awarded to the Chattanooga Area Regional Transit Authority and academic partners to develop machine learning models for transit.

33%

The increase in scooter trips in the Northeast in April 2020 over the previous year, according to micromobility company Spin.

12.6M

The number of property parcels in California coded in software from Symbium to help homeowners plan and design accessory dwelling units.



In the Spotlight

Five ways COVID-19 pushed digital services toward a starring role in government.

ocal government continues to struggle against the compounding forces of collapsing revenues and sharply escalating demands for more services, especially as residents face small business losses, poverty or illness. Over the last year — and in the face of these challenges — digital services emerged from their half-decade of growing pains, a struggle that mostly occurred in the shadows, to become a key player in municipal solutions.

The following five broad areas of accomplishment are a tribute to the skills and hard work of those involved, but are also a road map for future improvements in governance.

First is the increasing recognition of data as a valuable asset in and of itself. Kelly Jin, chief analytics officer and director of the New York City Mayor's Office of Data Analytics, quickly found herself at the center of escalating requests from city agencies and external organizations, who offered assistance in the form of information and data, in addition to supplies. Jin, who also chairs the Harvard Kennedy School's chief data officers leadership group, the Civic

Analytics Network, quickly produced the NYC Recovery Data Partnership. A similar effort in D.C., according to the district's Chief Data Officer Barney Krucoff, was a high-quality and easy-to-use COVID data coordination,

> flow and cataloging project. The second area is the mainstreaming of GIS data

and visualizations, not just for problem management and solution services, but also for creating shared narratives that powered community solutions. Whether the maps are global, such as the Johns Hopkins Coronavirus Resource Map, or local like those used by Cobb County, Ga., to crowdsource grocery inventory, the ability of maps to frame a narrative and help a mayor or governor rally public opinion became crystal clear.

Third was the rapid deployment of solutions in a manner that was previously unimaginable. One such effort, an initiative between NYC and the software company Ungork, was a New York Citybased no-code software project that automated the delivery of food to highneed families and individuals. By creating food delivery routes that utilized out-ofwork taxi drivers to connect distribution centers with those needing supplies, the city was able to meet an urgent need in weeks, not months or years.

Additionally, companies like Contrace recruited 300,000 Americans interested and ready to serve as COVID-19 contact tracers and then partnered with staffing/ consulting firms across the country to rapidly deploy them. Tracers were assigned to teams across the U.S. and were quickly trained on digital tools in order to fulfill their mission of tracking and alerting exposure to the coronavirus. A group of adjoining cities in Pennsylvania (Allentown, Bethlehem, Wilkes-Barre and York) combined to use Esri's GIS cloud-based tools and data analytics platform to help organize and deploy the contact tracers.

Fourth, many cities quickly began using data to manage infection risk. This includes using data to monitor risk by neighborhood or business, as well as implementing contactless government to minimize in-person contact. Many local governments quickly digitized services, as well as offered expanded digital payment options to decrease physical touchpoints. One example of the latter is Austin's parking payment initiative that allows drivers to pay for parking through multiple apps, including Google Maps.

Finally, one other major area of accomplishment involved using digital tools to monitor and manage equity across a variety of areas. The Anchor Collaborative consortium, which includes the NAACP, uses layered data and maps to improve Census response rates and voter registration. As Betsy Gardner explained in a story for Data-Smart City Solutions:

By visualizing, tracking and sharing data on Census responses, voter registration and voter suppression, the Anchor Collaborative is intent on revealing and repairing the racist power structures that have disenfranchised millions of Americans of color, while best directing their limited funding in a data-driven way.

Over the past year, many cities have focused on equity through the lens of access, an especially important area as many schools moved to distance learning and many workplaces shifted to remote work. In Philadelphia, a project to increase reliable high-speed Internet access was a critical part of this year's governance.

This list is clear, as are the principles. When supplies become limited and needs unlimited, data can help city officials direct services where they will make the biggest impact and chart risk in ways that instigate a necessary recalibration of government.

Stephen Goldsmith is

a professor at Harvard Kennedy School and director of the Innovations in Government Program and Data-Smart City Solutions. The former mayor of Indianapolis, his latest book is A New City O/S: The Power of Open, Collaborative and Distributed Governance

HOW TO BALANCE TECHNOLOGY MODERNIZATION & REDUCED BUDGETS

It may seem like a tall order, but modernization pays off when it comes to helping government organizations make the most of smaller budgets.

he COVID-19 pandemic exposed the need for governments to provide effective digital experiences for citizens and enable remote work. At the same time, massive revenue loss means governments have fewer resources to work with. It's estimated that the current recession will cost states and localities up to \$500B through FY 2022. Meanwhile, federal orders like increases to UI benefits put more fiscal pressure on government organizations.

Addressing these two critical issues — the need to modernize and reduced budgets — simultaneously is challenging but doable. Success will require organizations to strike a delicate balance.

Modernizing on a Budget

Legacy IT applications continue to pose a major challenge to state UI, Medicaid and other programs. When the pandemic struck, some states and localities successfully implemented quick technology solutions to fill the gaps. But longer term, government organizations need to make broader changes that will prepare them for years of higher service demands paired with lower budgets.

"Budget reductions are going to be a shock to the system. Government organizations might be experiencing some of that already, but it's going to hit really hard in the next couple of budget cycles," says Bob Nevins, director of state and local government strategy at Oracle. "That's going to force agencies to assess their most critical functions, prioritize, and then figure out how to deliver those services as efficiently and effectively as possible."

To address these longer-term needs, government organizations need to shore up supporting IT infrastructure and accelerate adoption of cloud and software-as-a-service

(SaaS) into mission-critical layers of their IT infrastructures. Organizations that accomplish this will create a foundation for modernization that will enable them to operate more efficiently. For example, moving on-premises applications into cloud environments can help agencies automate and thereby reduce or eliminate many IT maintenance functions.

"Pushing day-to-day maintenance functions onto a cloud service also means you pay for them through an operating budget that's more predictable and manageable," says Nevins. "That also allows you to scale your services up and down when you have sharp spikes or valleys in usage."

Migrating to cloud also provides the foundation government organizations need to:

- Improve the user experience and create new digital experiences to serve citizens
- Address workforce issues such as managing and running projects long-term, which is especially critical for employees that continue to work remotely
- Enable more flexibility so agencies are better prepared to face new challenges and move employees to remote work environments quickly and easily if needed

Five Places to Begin

While migrating to cloud comes with a cost, there are smaller investments state and local governments can make that will help them move toward greater modernization.

1. Reconsider Disaster Recovery. On-premises disaster recovery (DR) solutions can be expensive, requiring recurring capital investments and maintenance, management and IT support costs. These solutions also limit scalability and do not

offer any guaranteed up-time. Moving DR to the cloud allows an agency to reduce or eliminate onsite hardware building costs, pay only for what they use, back up data more consistently and scale easily as needed.

"COVID-19 expanded the traditional definition of disaster recovery," says Matt Fullerton, senior director for Oracle's North America Public Sector Channel Sales. "Everyone has been asked to deploy resources, protect people and spin up systems in an environment that may appear to be eerily normal."

2. Tackle Development Environments. When agencies develop new applications, such as citizen self-service apps, they typically create a separate development environment. Most agencies mirror those environments for testing, so they can do so using the same platform they will use when they move to production. But this is expensive.

"It's effectively like having three production environments," says Nevins.

Moving development and test environments to the cloud, even if the agency doesn't ultimately launch the production environment in the cloud, reduces costs.

- **3. Work on the Edge.** Legacy systems that fail under the weight of sudden demand like some state UI systems when COVID-19 hit can cause huge headaches. And while shifting entire systems to the cloud might not be feasible now, agencies can consider cloud or SaaS-based systems that work on the edge to do things like facilitate customer service. For example, many states implemented chatbots in their call centers to handle basic citizen inquires during the first stages of the pandemic. This helped reduce call wait times for citizens and allowed employees to focus on more complex inquires.
- **4. Use Analytics to Get More Out of Data.** Modernization also helps agencies leverage analytics to get ahead of problems and operate more cost effectively.

"There are mounds of data available to agencies today, both their own data and external data that impacts the citizens they serve," says Nevins. "Harnessing that data and using analytics tools allows you to help citizens faster and identify pain points before they happen. Who are the frequent callers who have similar needs across different agencies? Where might we consolidate or share resources? The only way to get those types of insights is to garner data and analyze it."

However, today's analytics tools are easy for even non-technical people to use to gather insights that can reduce costs and improve efficiencies across the organization.

5. Take Care of Your People. Without people, technology simply does not work. During the pandemic, leaders recognized the importance of keeping their teams healthy and safe while maintaining business continuity.

"For decades, we've talked about protecting data, but now, we need to think about protecting our most important resource — our people," says Fullerton. "And that goes beyond government teams."

Tough Choices Ahead

Reduced budgets will be a challenge but investing in modernization has the potential to help ease some of the pain.

"Ultimately, you cut more wood by taking some time out to sharpen your saw," says Nevins.

That doesn't mean there won't be tough choices ahead.

"In the end, various divisions within an agency are going to have to sit down and make some critical decisions about how budget is spent," says Nevins. "There may be situations where you need to borrow from a non-IT area to enable you to move toward a more modern and streamlined approach that ultimately will improve the overall agency."

This piece was written and produced by the Center for Digital Government Content Studio, with information and input from Oracle.

Footnote:

Next Federal Relief Act Needs \$500B to Avert Big State, City Layoffs, Florida Politics, June 24, 2020, https://floridapolitics.com/archives/343590-moodys-report-next-federal-relief-act-needs-500b-to-avert-big-state-city-layoffs

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Brendan Babb

Chief Innovation Officer, Anchorage, Alaska

Brendan Babb has been the chief innovation officer in Anchorage, Alaska, for more than four years, coming to the city after being part of a local civic tech group. For the majority of his time there, Anchorage received a Bloomberg Innovation Teams grant, which has given Babb a team of four to work with, as well as access to bleeding-edge civic tech trends. GT caught up with Babb in November to discuss innovation work during COVID-19, the singular nature of Anchorage and trends he's seen during his time in the role.

COVID-19 brought to Anchorage?
Early in the pandemic, we were
worried about personal protective
equipment (PPE) and having enough N95
masks. All cities were worried about that,
but Anchorage is farther away so things
take longer to get here. Our supply channels are more complicated. Our municipal
manager was interested in innovative
ways we could come up with PPE. I asked
people on Facebook if they had a 3D
printer and whether they would be willing
to help make medical equipment with it.

What innovation opportunities has

We had about 50 people sign up. Then a doctor got in contact with me. He had experience with 3D printing and he had experience with N95 masks. We started experimenting with different masks and were able to eventually make 250 for medical professionals. I was just kind of a figurehead in it, but it was amazing to see volunteers quickly iterate on 10 different designs.

Has the crisis changed circumstances for innovation work at all? One thing that has been beneficial is that because of emergency operation centers and everyone just pulling together — people from different departments being in the same room collaborating, as well as working with the health department and the state of Alaska — we've been able to do things that might have been more challenging or taken longer in the past.

What are some of the advantages of doing innovation work in a unique city like Anchorage? Anchorage is about 41 percent of the population of Alaska. It's similar to New York City, which I believe is about 42 percent of New York, but we don't have a borough above us. We're a municipality and then above us is the state. If we make something better than is available at the state level, one out of two people will be in Anchorage, and it will benefit them. There's a unique capability there.

How have you seen innovation and civic tech work evolve during your tenure with Anchorage? I've

been here a little over four years as the innovation officer, and we've had a Bloomberg Innovation Team since about six months after I got here. It's been interesting. We've used a lot of humancentered design, and we've worked with behavioral insights. One change is that here in Anchorage people are thinking more about how to use a service. Everyone has good intentions when they get into government. They want to help people, but after they've been there a while, they know things so well that they don't understand what it would be like to, for example, file for property tax extensions for the first time. We did a behavioral insights project with that.

One thing I'd like to do a better job with in civic tech — and I've seen other cities do this — is list what types of problems we're trying to solve with our open data. The early phase was open data for the sake of open data, which was good, but now I see an evolution where hackathons are targeted around data sets and a specific direction, like addressing COVID solutions or achieving equity.

- Zack Quaintance, Associate Editor

2020 Required More Than Preparation ... Agencies Had to Be FITURE READY

This year, in partnership with Google Cloud, we're recognizing five state and local government agencies that demonstrated what it means to be Future Ready by leveraging innovative technologies, processes and leadership.



This month, we're recognizing the city of Lynchburg, Va., as a 2020 Future Ready Award Winner. A few highlights for how Lynchburg prepared for the future:

- ✓ The city of Lynchburg aligned its IT strategic plan to the citywide master plan to ensure people, processes and technologies were focused on the same objectives.
- ✓ The city of Lynchburg engaged collaboratively with the school district and state agencies on new applications and cloud infrastructure to increase overall resilience.
- ✓ The city of Lynchburg is continuously adapting by identifying and utilizing emerging technologies to solve mission-critical problems. For example, it is using artificial intelligence and machine learning to monitor rainfall and water levels to avoid flooding.





Read more about all the 2020 Future Ready Award winners at

2020 Digital States Survey Data: IT Efforts at a Glance

A lot has changed since the last Digital States Survey, the biennial review of state technology practices from *Government Technology*'s research arm, the Center for Digital Government. Below are some insights on spending, strategy and the overall status of IT in the states in 2020. For our full editorial coverage, including state-specific analyses of current plans and programs, visit **govtech.com/DigitalStates2020**.

"A" States

Ohio A- 11 states B+ 14 states B- 4 states C+ 2 states C 1 state

Top of the List: State IT Priorities



IT Spending Breakdown



Department IT Collaboration

Top Law Enforcement Tech Tools

(percentage of states using these technologies now)



BIOMETRICS (FINGERPRINTS, MUGSHOTS, FACIAL RECOGNITION)



FIXED SURVEILLANCE (VIDEO, AUDIO)



MOBILE SURVEILLANCE (BODY CAMERAS, DRONES)



FIRSTNET



GENERATION 911

Cloud Bound

56% (2)



of states say less than 10 percent of their systems and applications are in the cloud today, but 46 percent say more than 50 percent of their systems and applications could eventually be migrated to the cloud.

Here are their top candidates for cloud migration:

- ✓ Health and Human Services
- ✓ Finance/Administration
- Application Development and Testing
- ✓ Human Resources
- ✓ Transportation



of states report using telemedicine, and the remaining 10 percent say it's on the way.



of states have established infrastructure to support autonomous/connected vehicles, and another 49 percent say it's on the agenda in the next 12-18 months.

Access to supplies (IT hardware/equipment)

Remote workforce management

Technology access for employees

Impact on revenues

Cybersecurity



of states benefitted from pro bono help in responding to COVID-19.



Biggest COVID-19 Response Challenges















2021

BY BEN MILLER AND ANDREW WESTROPE

ESSENTIAL

The growing and dynamic gov tech market helped government respond to COVID-19 in myriad critical ways. And they grew their business in the process.



From a distance, one might imagine a gruesome collision

— the COVID-19 pandemic, unforeseeable and sudden, forced government to shut many of its doors while dealing with increased demand for services, massive budget hits and a need to adapt complicated, decades-old processes for modern consumption. One might imagine government sputtering, coughing and failing to meet the challenge.

That's not what happened. Instead, government offices at every level found ways to quickly change the way they did business — often leaning heavily on technology they either weren't using before or were using very little. So many government agencies have stories of setting up remote work capabilities for thousands of workers at once. or adopting digital signatures over a weekend, or deploying an entirely new service far faster than they used to.

For six years now, the GovTech 100 list has presented companies that were helping government to pull itself forward. They've introduced new ideas, they've found better ways to handle business, and they've set the stage for government to prove people wrong when they snicker about inefficiency and ineptitude.

Before the pandemic, it was hard to see just how well the stage had been set. But many, many government agencies have found themselves doing things they didn't expect to do for years, if ever.

These are the stories of four of the companies at the center of the gov tech response to the pandemic.

Zencity

In the fires of crisis, ignorance is fastburning fuel. And as society closed down at the beginning of the pandemic, there was plenty of misinformation and misunderstanding to go around.

Zencity, a startup that gathers sentiment and input from residents and feeds it to their government, found itself at the center of a new, sudden, urgent need to help the public sector tap into the public conversation.

Among its existing local government clients, visits to websites and social media channels rose dramatically. The number of U.S. local governments using the company's product doubled to about 170.

"It was, I think, a Friday or Saturday where we just saw usage data across our customers on the West Coast spike. As you know, the first high number of cases was starting to come in from Washington state, in that area, and we just saw unprecedented daily and hourly usage of our platform," said Eyal Feder-Levy, the company's CEO. "And that was the moment where it hit us that, OK, something is very different."

Much changed. Public servants who used to check Zencity to identify conversation trends in their jurisdictions once or twice a week started hopping on every day — including weekends. Customers started signing contracts much more quickly, looking for a fast way to start measuring whether their outreach on topics such as mask mandates and business closures was registering with their communities.

"Because of the immediate need, we got calls from cities over a weekend saying, 'Hey, the mayor wants this in the EOC by Monday morning' — things like that we don't see very often. [Usually clients] tend to be slower to contract," Feder-Levy said.

The product helped governments get a handle on the myriad unforeseeable ways a far-reaching event like a pandemic could change daily life, he said. An example: One customer was in the midst of a major business district renovation involving replacing infrastructure. That would mean shutting off water to a neighborhood for a while. In normal times, that might've been fine. But during the pandemic, with people



confined to their houses, it was a much more significant matter. A city manager found that aspect of the project being challenged through Zencity and took the matter to the local government, who changed the timeline to soften the impact.

Another change Feder-Levy noted: fewer pilot projects. As many a gov tech startup can attest, early business often involves pilot projects that turn into contracts. Zencity was no stranger to that game, but during the pandemic many more prospective clients were skipping that step and heading straight to the dotted line.

Will they still have need for it after the pandemic?

"A lot of cities and counties overnight became much more data-driven." Feder-Levy said. "They review a report every week of case numbers and changes and people in quarantine. Those types of processes ... they're just great management processes and great engagement processes that hopefully will stay with us after the pandemic. The question is will these platforms know how to adapt to these new realities after COVID, and are these changes really being embedded, and are local governments feeling the value beyond just closing a hole for them? And I'm super optimistic about this, and I see that in our usage. All these governments who bought us for COVID-19 purposes use us today for other purposes — for public safety, for transportation, for sales tax [and] other things that it's important to get input on."



120WaterAudit

120WaterAudit offers cloud-based water management software.

Est. 2016 / 120wateraudit.com

3AM Innovations

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

Est. 2015 / 3aminnovations.com

Accela

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

Est. 1981 / accela.com

Acivilate

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

Est. 2014 / acivilate.com

Airspace Link

Airspace Link helps local governments manage drone use.

Est. 2018 / airspacelink.com

Fast Fact: Airspace Link processes risk data for both ground and air to map "highways in the sky."

ArchiveSocial

ArchiveSocial provides cloud-based social media archiving for records management, regulatory compliance and e-discovery.

Est. 2011 / archivesocial.com

Aurigo Software

Aurigo makes software for managing capital projects from planning to maintenance.

Est. 2003 / aurigo.com

Fast Fact: Aurigo's name comes from Auriga, a constellation in the Northern Hemisphere that means "the charioteer" in Latin.

Automotus

Automotus uses video technology to improve urban curb management and reduce traffic congestion.

Est. 2017 / automotus.co

Fast Fact: Automotus reports it has improved its customers' parking turnover by 25 percent.

Avenu Insights and Analytics

Avenu provides finance and consulting services for government agencies.

Est. 1989 / avenuinsights.com

Axon

Axon creates Taser weapons, as well as bodyworn cameras and software for public safety customers.

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 help understand more about public health.

Est. 2017 / biobot.io

BondLink

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

Est. 2016 / bondlink.com

Cardinality.ai

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

Est. 2017 / cardinality.ai

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 message their governments via text or chatbot to report issues and ask questions.

Est. 2016 / citibot.io

CityGrows

CityGrows' software automates government workflow processes like permitting and payment processing.

Est. 2015 / citygro.ws

Fast Fact: CityGrows' first government partner was Santa Monica, Calif.

CitvLife

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

Total number of acquisitions by the 2021 GovTech 100:

199

SOURCE: CRUNCHBASE



Granicus

Even before the events of 2020 accelerated the transition from in-person to digital services, that change was heralded by Granicus. Formerly focused on software for managing government meetings, documents and citizen engagement, the company acquired the U.K.-based Firmstep in April 2019 and used its technology to launch govService, Granicus' digital services platform, later that year. CEO Mark Hynes said he thought the shift to online services was inevitable in the U.S., based on what was happening across the pond.

"The U.K. is probably six to seven or more years ahead of the United States as it relates to digital transformation," he said. "If you were to go to a website of a local government in the U.K., virtually 90 percent of the services that you would typically go to a city hall or another government office for today in the United States — all your permits, licenses, transactions, where you grab a form, fill it out, staple a check and hand it to an attendant — 90 to 100 percent of those services are all delivered online in the U.K."

It turned out to be a fortuitous new direction for Granicus. When COVID-19 hit, Hynes said three tasks emerged for their customers: to create direct channels of reliable information, to keep government operating and serving people even with remote staff, and to enable governing bodies like city councils to make policy decisions even with chambers shuttered. For the first task, Granicus gave customers free access to its software tools for emails, texts and social media management to cut

Founded: 1999

Founders: Javier Muniz, Scott Burns, Tom Spengler, Zach Stabenow

Headquarters: Denver, Colo.

Top investors: JMI Equity

Total funding to date: \$10.3 million*

SOURCE: CRUNCHBASE

* The firm that owns Granicus, Vista Equity Partners, has invested an unspecified amount in this company that far exceeds this number.

through a growing storm of misinformation. The company also started pre-packaging information about the virus for governments to share according to Web traffic and what citizens seemed most interested in.

Hynes said among the company's 4,200 federal, state and local customers, websites saw hundreds to thousands of times more traffic than usual as public information offices were flooded with questions about safety measures, medical vulnerabilities and policies.

"What we were finding is that governments were the backstops of truth, the one source you can trust in these moments to get accurate and vital information," he said.

Granicus saw use cases around the world for its new digital services. Hynes said the demands of speed and flexibility favored a platform that could build applications for digital services, rather than coming with separate, ready-made point solutions for every workflow. In Oklahoma, it took about a weekend for the company to help the state build an online portal for a specialized program that didn't exist only months before — Pandemic Unemployment Assistance,

which wound up processing close to 60,000 claims a week, compared to the 1,500 for traditional unemployment before COVID-19.

Hynes said that as with the digitization of shopping, banking and other tasks in people's day-to-day lives, there was an inevitability about moving these services online, especially with advances in cloud and software development. But where digital automation or modernization of services used to be a second or third priority for Granicus customers, Hynes said, it has become a first priority. With this in mind, Granicus in October acquired another digital services company, Calytera, for its expertise in best practices in the space. Competitors invested heavily in digital services in 2020, too: CivicPlus announced a low-code tool in May for standing up digital services, Accela partnered with OpenCities in September on a no-code tool to stand up digital services, and Salesforce announced its first purposebuilt licensing and permitting applications.

"Virtually every other service provider relationship has been digitized, and government will get there," Hynes said. "It's really a market adoption curve question, and COVID has bent that adoption curve up dramatically. It probably accelerated it by three, four, maybe even five years, and what it says to Granicus is, we need to move faster as a company."

The other lesson Hynes took from the last several months was the value of collaboration. Whether it was connecting government customers to share best practices with each other, as Granicus did with Oklahoma and New York, or acquiring innovations from competitors, he saw more positive transformation in the gov tech space in a short amount of time than in many other industries.

"The ability to pull together communicators from the federal governments, state, local, the U.K. even, in a way that they could share best practices, in a high-velocity situation ... was massive," he said. "We made massive innovation leaps because we collaborated as an industry that I think are incredibly unique to us as a group ... In our product road maps, we are now building capabilities for collaboration and sharing around best practices."





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

Civix

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

Est. 1979 / gocivix.com

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

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

EasyVote Solutions

EasyVote Solutions delivers a software-as-aservice platform to city, county and state election offices to help manage the election process. (Disclosure: The parent company of Government Technology is an investor in EasyVote through e.Republic Ventures.) Est. 2013 / easyvotesolutions.com

Edmunds GovTech

Edmunds GovTech provides ERP solutions for local government.

Est. 1972 / edmundsgovtech.com

Fast Fact: Originally called Edmunds and Associates, the company initially focused on programming work for the Department of Defense.

Esri

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

Est. 1969 / esri.com

The Exemption Project

The Exemption Project helps maintain property tax rolls by identifying unclaimed and unqualified homesteading exemptions.

Est. 2018 / exemptionproject.com

Fast Fact: While counties typically check for unclaimed and unqualified properties every three to six years, The Exemption Project's software uses AI to proactively monitor data.

Forensic Logic

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

Est. 2003 / forensiclogic.com

GovPilot

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

Est. 2014 / govpilot.com

GovQA

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

Est. 2000 / govqa.com

Total funding raised by 2021 GovTech 100 companies: \$3.2B

Granicus

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

Est. 1999 / granicus.com

GTY Technology Holdings

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

Est. 2016 / gtytechnology.com

gWorks

gWorks' software solutions include platforms for municipal asset management, GIS and payroll.

Est. 1999 / gworks.com

Fast Fact: gWorks is headquartered in Omaha, Neb.

HAAS Alert

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

Est. 2015 / haasalert.com

Hayden Al

Hayden Al puts cameras on city vehicles to gather data and spot traffic violations.

Est. 2019 / hayden.ai

Fast Fact: Former U.S. Transportation Secretary Anthony Foxx serves on Hayden Al's board of directors.

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

Kofile

Kofile digitizes government services so information is secure, accessible and scalable.

Est. 2009 / kofile.com

Fast Fact: Kofile acquired longtime GT100 company SeamlessDocs in October 2020.



Biobot Analytics

Another case of being in the right market at the right time, Biobot Analytics had been working for years with state and local governments on culling data about opioid use from wastewater when, in February 2020, it became clear that a new public health crisis was about to take priority. The company's Co-founder and President Newsha Ghaeli said early research revealed COVID-19 was shed in stool, and it wasn't a leap for her to assume local governments would soon want ways to detect it and that Biobot could do so.

Partnering with research collaborators at the Massachusetts Institute of Technology and the Harvard School of Public Health to develop testing methods for COVID-19, Biobot Analytics was the first team in the U.S. to successfully detect the virus in wastewater, Ghaeli said.

"That's when we knew that this data could potentially be very valuable to communities," she said. "We didn't know for sure, and that's why we decided to put together a pro bono campaign to be able to test this hypothesis."

In March, Biobot began shipping sampling kits and instructions at cost — about \$120 — to wastewater treatment facilities that fill out an application, recommending that they take a couple samples a week and mail them back for analysis. Their target at the time was



to have 100 communities sending them weekly samples, so they could learn how the virus behaves in wastewater, what data it could provide and if that could be helpful to decision-making. Quickly overwhelmed with interest, the campaign ran through the end of May and wound up with more than 400 sampling locations across the U.S. from about half that many agencies.

By plotting concentrations of the virus in wastewater over time, Ghaeli said her team realized the data tended to foreshadow clinical cases.

"We saw that pretty consistently, a spike in wastewater data would be followed by a spike in clinical cases, and that lead time ranged anywhere from five to 15 days," she said. "We were able to learn a lot as well from working with communities and what was important to them during that time."

Customers found different uses for the data. In New Castle County, Del., because

they were sampling across a dozen locations, the government built a public-facing dashboard with a kind of "heat map" that helped them know how to prioritize and target mobile testing capacity.

In Massachusetts, Cambridge Public Schools tracked three measurements in the community — virus concentration in wastewater, percent positive test rate and number of new clinical cases — and committed to remote learning if two out of three passed a certain threshold.

For Biobot, COVID-19 was a marketing opportunity to put its technology and data out there, but it was also a learning experience. Specifically, wastewater is a leading indicator of COVID, and rapid turnaround time is what makes the data useful. On June 1, the company started charging for its service, which allowed them to invest and improve their product to a point where Ghaeli anticipates the ability to produce same-day results soon.

"As an organization, we have now understood how important it was, both for us as a business but also just for the communities, that we were able to respond quickly. We're aware that this might happen again. In two years' time, something might emerge that overnight becomes the priority, and we always want to be responsive as a company, no matter how big we get," she said. "So we've internally put organizational practices and processes in place to ensure that we never lose that dynamism that usually just small startups have."

Besides the necessity of rapid results, Ghaeli said Biobot learned some of its most valuable collaborators, the ones whose insights lead to the most useful improvements, are its own customers.

"We've learned the value and the need to really listen to our customers and work in an iterative fashion, where we want to get data and information and product into the hands of people on front lines of whatever the problem is ... and then hear from them what's working, what's not working," she said. "For something as critical and dynamic as human health, I think that feedback loop will always be important."





LiveStories

LiveStories provides an integrated hub to discover, analyze and publish civic data. Est. 2013 / livestories.com

LotaData

LotaData uses an Al platform to locate mobile users, enhance customer profiles and study geobehaviors 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

Motorola Solutions

Motorola Solutions provides equipment for data communications and telecommunications.

Est. 2011 / 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

NEOGOV

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

Est. 1999 / neogov.com

Average number of founders of a 2021 GovTech100 company:

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

OpenCities

OpenCities helps make government websites more user-friendly.

Est. 2008 / opencities.com

Fast Fact: OpenCities is based in Melbourne, Australia, and also has an office in San Francisco.

OpenGov

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

Est. 2012 / opengov.com

OpenLattice

OpenLattice is a data integration platform to help public agencies make more informed decisions.

Est. 2017 / openlattice.com

Fast Fact: OpenLattice reports its services have helped more than 13 million citizens nationwide.

Passport

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

Est. 2010 / passportinc.com

PayIt

Paylt 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

Pondera Solutions

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

Est. 2011 / ponderasolutions.com

PrimeGov

PrimeGov's software streamlines legislative management and facilitates collaboration.

Est. 2014 / primegov.com

ProudCity

ProudCity's software provides cities with websites and online government services. **Est. 2016 / proudcity.com**

Qucit

Qucit uses artificial intelligence for urban development and mobility planning.

Est. 2014 / qucit.com

Fast Fact: The name Qucit is short for "quantified cities."

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



PayIt

Driver's licenses. Utility payments. Pet registration. Birth certificates. Property taxes. There are endless reasons a person might need to step into a government office. And in late March 2020, many of them closed their doors.

Overnight, digital services went from being a luxury to a necessity for many.

The companies that help government agencies put their services online - and there are many, ranging from NIC to ProudCity — suddenly found themselves responding to agencies who needed to move services online immediately.

One such company was PayIt, whose CEO John Thomson watched as demand for customers' existing digital services spiked.

"When the pandemic hit and everyone went home, I think, you know, the cloud is always on. Our platform is always on. So we kept the lights on for our clients, and then we saw a big shift, or acceleration in the shift from walk-in, call-in or mail-in interactions with government to digital," Thomson said. "And we saw clients — just three states without naming names - in April, one client [whose] digital revenue collection was up 54 percent year-overyear. Another was up 55 percent, and another was up 125 percent."

Thomson underscored that the cloud has made things like this much simpler. It was built with sudden scaling up and down in mind, so it could handle such

simpler and faster to implement, so governments could move those various permitting, licensing, payment and form processes online quickly.

"We were putting new services into the cloud in hours for our clients during the pandemic because the offices were shut down, and they needed to get those services online," he said. "If you've got sort of old, custom tech that's on-prem or you've just moved it to your cloud and you have to go deploy and it takes months to do that, you're just in a different place to be able to serve your clients in this market."

Thomson said being cloud-native his company was founded in 2013 also helped the company onboard new customers and deploy their services quickly.

One somewhat unresolved question is how much of it will last. That is, should society get more or less "back to normal," will the governments that suddenly adopted digital services keep using them at the same rate, or will they revert to the old ways?

On that front, Thomson is optimistic. "I think [the pandemic] really just put a finer point on the need to embrace the cloud and cloud-native platforms and kind of this move to Netflix away from Blockbuster, in a really oversimplified explanation," he said.

a demand spike. And it can often be

Average age of a 2021 GovTech 100 company: Years SOURCE: CRUNCHBASE

RanMarine USA

RanMarine USA uses drones for waterway cleanup and data collection.

Est. 2019 / wasteshark.com

Fast Fact: RanMarine's WasteShark drone can remove 1,000 pounds of trash from water per day.

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. 2012 / rapidsos.com

Remix

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

Est. 2014 / remix.com

Ride Report

Ride Report gives cities micromobility data from private companies like scooter shares.

Est. 2015 / ridereport.com

Fast Fact: Ride Report works with more than 70 cities across the globe.

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





Sagitec Solutions

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

Est. 2004 / sagitec.com

SimpliGov

SimpliGov automates government workflows to help agencies work more efficiently.

Est. 2018 / simpligov.com

Fast Fact: SimpliGov estimates \$12.2 million in savings annually for customers using its software.

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

SOMA Global

SOMA Global offers a public-safety-as-aservice platform for systems like computeraided dispatch and agency interoperability.

Est. 2017 / somaglobal.com

Fast Fact: SOMA Global works with fellow GT100 companies OpenGov, Esri and RapidSOS.

Spatial Data Logic

Spatial Data Logic's municipal management platform automates government workflows.

Est. 1997 / spatialdatalogic.com

Fast Fact: Spatial Data Logic reports it has completed more than 1.7 million inspections.

SPIDR Tech

SPIDR Tech offers a community engagement platform that helps police departments serve their communities.

Est. 2015 / spidrtech.com

Springbrook Software

Springbrook Software supports local government financial systems, including budgeting and utility payments.

Est. 1985 / springbrooksoftware.com

Fast Fact: From 2015 until 2020, Springbrook Software was a subsidiary of Accela.

SSI

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

Symbium

Symbium's interactive mapping platform helps property owners understand whether they can build accessory dwelling units.

Est. 2018 / symbium.com

Fast Fact: Symbium was founded by an attorney who recognized the difficulty citizens had working with municipal regulations and wanted to help California's housing crisis.

Tyler Technologies

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

Est. 1966 / tylertech.com

Ubicauia

Ubicquia makes hardware and software for smart streetlights.

Est. 2014 / ubicquia.com

Fast Fact: In September 2020, Ubicquia announced \$30 million in new funding from Fuel Venture Capital and other investors.

UrbanFootprint

UrbanFootprint compiles municipal data and uses Al to help developers make informed decisions.

Est. 2014 / urbanfootprint.com

Fast Fact: *UrbanFootprint works with NASA as part of a team developing a 3D urban airspace map.*

Total investors in GovTech 100 companies:

UrbanLeap

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

Est. 2017 / urbanleap.io

Utilis Inc.

Utilis uses satellite imagery to monitor underground water systems and detect leaks. Est. 2013 / utiliscorp.com

Varuna

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

Est. 2018 / varunaiot.com

Verra Mobility

Verra Mobility offers smart transportation solutions like tolls and traffic cameras.

Est. 1988 / verramobility.com

Fast Fact: Verra Mobility has clients in 15 countries.

VertexOne

VertexOne provides on-premise and cloud-based customer management software for utilities.

Est. 1996 / vertexone.net

Fast Fact: *VertexOne estimates its software reaches 5.6 million end users.*

Visionary Integration Professionals

VIP makes business strategy software for governments and corporations.

Est. 1996 / trustvip.com

Waycare

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

Est. 2016 / waycaretech.com

Whyline

Whyline offers software to help government agencies virtually manage customer wait times.

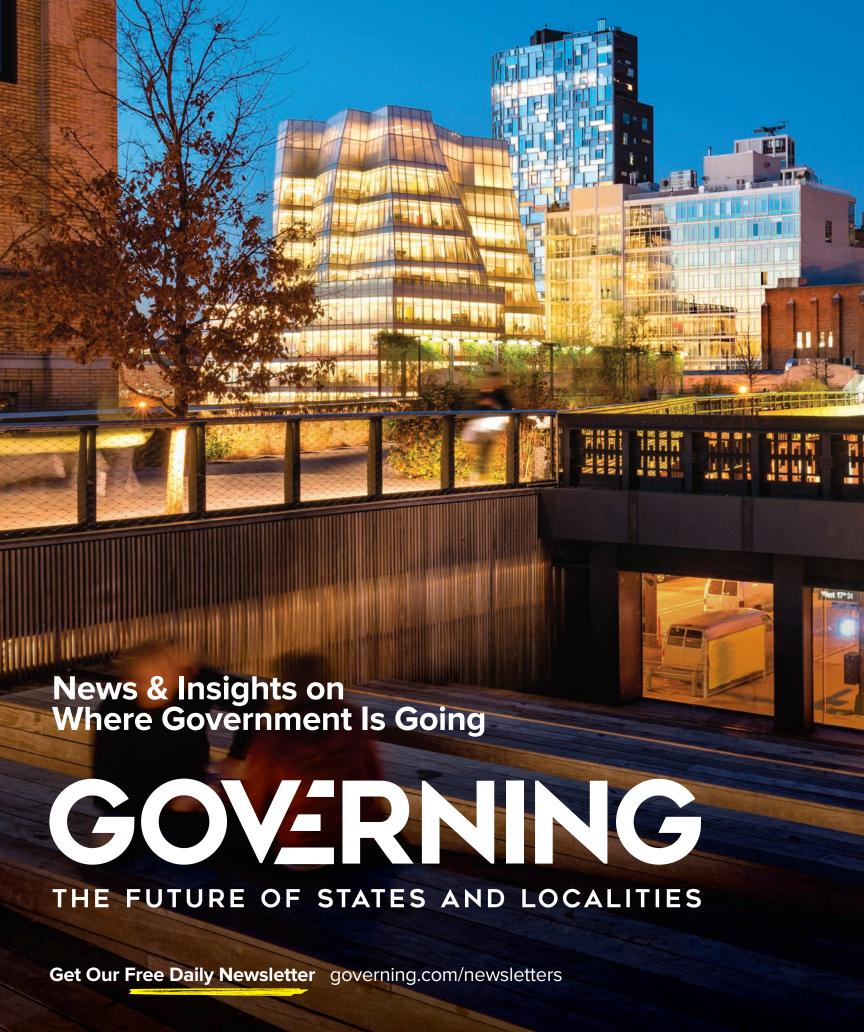
Est. 2015 / whyline.com

Fast Fact: Whyline's app crowdsources data so users can see how long lines are in real time.

Zencity

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

Est. 2015 / zencity.io



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ant to see the future of law enforcement? You might start by looking at the small town of Linn, Wis.

With about 2,200 residents scattered across 34 square miles, the town may seem an unlikely location for cutting-edge policing. But the Linn Police Department has used drones for the past five years to locate missing persons, track fleeing crime suspects and perform a variety of other law enforcement duties.

The unmanned flying vehicles act as a force multiplier for local police. Within months of purchasing its first drone in 2015, the department used the technology to locate a drowning victim in Lake Geneva, which bisects the town. The mission, which typically would have required hours of effort from multiple officers, was accomplished in about two minutes of flight time, Police Chief James Bushey told *Government Technology*.¹

By contrast, Bushey pointed to the recent recovery of another Lake Geneva drowning victim which was handled by other agencies that declined to use a drone. That operation took five hours and involved a team of 13 agencies from Wisconsin and Illinois, he says.

The city of Brookhaven, Ga., intends to take the concept a step further. In November, city leaders approved funding to purchase four drones that will be used to respond to 911 calls and other emergencies.² Brookhaven police say the project will give officers more flexibility, availability and information, while limiting in-person contact amid the coronavirus pandemic.

"It's literally a game changer," said Brookhaven Police Lt. Abrem Ayana during a recent city council meeting.

Bracing for Bleak Budgets

For police departments facing growing demands and tightening budgets, using technology to increase the impact of existing staff and resources is a big part of the future.

"This is not a situation that agencies will be able to hire their way out of," says Morgan Wright, a senior fellow with the Center for Digital Government (CDG) who spent 18 years in state and local law enforcement. "The tax base is dropping and everybody's going to take a hit."

In July, *USA Today* reported that the combination of pandemic-induced economic woes and the national movement to "defund the police" could lead to the biggest budget cuts for law enforcement

agencies since the Great Recession of 2008.³ The newspaper cited a survey of 258 police departments conducted by the non-partisan Police Executive Research Forum, which showed almost half of the responding agencies either expected or had already experienced funding cuts, mostly in the range of five to 10 percent.

Few agencies are being spared, according to the research. Deep reductions have been ordered or proposed in big-city departments in Los Angeles and New York, as well as small towns like Eureka, Calif.

Filling Resource Gaps

Against this backdrop, agencies must find technologies that can help them fill the gaps.

Clearly, autonomous vehicles like drones can augment human workforces, in some cases doing the work of multiple officers.

These devices also can improve officer safety. In 2016, Dallas police used a robot armed with explosives to end a standoff with a sniper suspected of killing five police officers.

"We saw no other option but to use our bomb robot and place a device on its extension for it to detonate where the suspect was," Dallas Mayor Mike Rawlings told reporters after the incident, which is thought to be the first time U.S. police have used a robot in a show of lethal force.⁴ "Other options would have exposed our officers to grave danger."

Autonomous technologies are continuing to evolve. For example, a Colorado-based company recently released a "throwable" robot designed to provide situational awareness to police and other first responders in dangerous situations. The one-pound device — equipped with a high-resolution video camera, microphone and a slew of other sensors — is designed to be tossed into risky environments and then stream conditions back to users' smartphones.⁵

Better connectivity and lighter, more capable mobile devices are another part of the equation. Officers are gaining more access to real-time video and other timely information in the field that enables them to make better decisions, which ultimately improves effectiveness.

The FirstNet dedicated wireless network for first responders — a national initiative led by the federal government — is helping local law enforcement agencies deliver richer and more relevant information to officers in the field. And today's officers are more likely to receive this information on lighter, consumergrade smartphones and tablets instead of bulky ruggedized equipment.

Finally, sophisticated photo and video surveillance and analytics are other important force multipliers. These initiatives take various forms, but all of them extend the reach of human officers.

For example, the Wichita, Kan., Police
Department recently began deploying license
plate readers on traffic signals and other city
infrastructure to reduce drive-by shootings
and other violent crime in the city. The
solar-powered devices can be easily moved
from one part of the city to another as crime
patterns change. The city had installed readers
in about 35 locations as of early November.

"[The technology is] able to be in various areas that we just don't have the resources and time to be able to be in all the time," Wichita Police Lt. Casey Slaughter told Government Technology.⁶ "We can't have an officer standing next to an intersection looking at and writing down tags as they go by. This will do it in an automated and very efficient fashion."

Advances in analytics are helping departments examine data they collect from cameras and other information sources to anticipate crime or disruptive events and proactively address them. Thirty percent of respondents in CDG's 2020 Digital Cities Survey said they are already using predictive analytics in public safety.

The Power of Transparency

As police departments enter a future marked by funding and resource constraints, technologies like these will be increasingly important to their success. However, growing use of advanced technologies must be accompanied by responsible use policies and

transparency — particularly as agencies expand camera networks and leverage new tools like facial recognition.

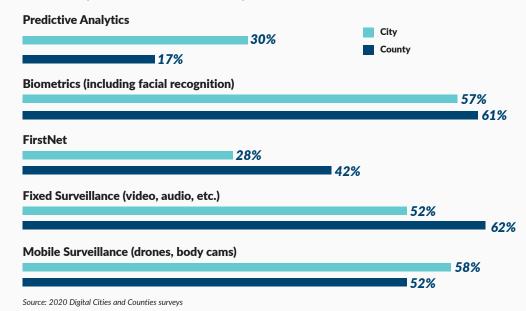
Already, a handful of cities have limited or banned government use of facial recognition technologies due to privacy concerns. CDG's Wright says the antidote to these objections is community engagement.

"Departments need to get their communities involved in the drafting of policies around these technologies," he says. "They need to be transparent about the information they will collect, how it will be collected, how it will be used and how long it will be retained — and then they need to follow through on that."

In some cases, Wright adds, technology itself may help departments strengthen their bonds with citizens.

"I think that's where we need more real-time analysis of crime trends, so departments can do a better job of preempting that activity and collaborating with the public to make them aware of it," he says. "They should be engaging with citizens around the trends they're seeing and how they can protect themselves."

Force Multipliers for Local Public Safety in Use Now



¹ Drones Have Earned Their Place in Small-Town Wisconsin. Government Technology. https://www.govtech.com/products/Drones-Have-Earned-Their-Place-in-Small-Town-Wisconsin.html

²Unmanned Drones to Respond to 911 Calls in Georgia Town. Government Technology. https://www.govtech.com/public-safety/Unmanned-Drones-to-Respond-to-911-Calls-in-Georgia-Town.html

³ 'Perfect storm': Defund the police, COVID-19 lead to biggest police budget cuts in decade. USA Today. https://www.usatoday.com/story/news/politics/2020/07/31/defund-police-covid-19-force-deepest-cop-budget-cuts-decade/5538397002/

⁴ Dallas Police Used Robot With Bomb to Kill Ambush Suspect: Mayor. NBC News. https://www.nbcnews.com/storyline/dallas-police-ambush/dallas-police-used-robot-bomb-kill-ambush-suspect-mayor-n605896

⁵ Company Six Unveils 'Throwable' Robot for First Responders. Government Technology, https://www.govtech.com/biz/Company-Six-Unveils-Throwable-Robot-for-First-Responders.html

⁶ Wichita, Kan., Police Adopt Stationary License Plate Readers. Government Technology. https://www.govtech.com/public-safety/Wichita-Kan-Police-Adopt-Stationary-License-Plate-Readers.html

Managing Cyber Exposure in Law Enforcement



As IT plays an increasingly critical role in crime-fighting and public safety, law enforcement agencies are facing new cybersecurity challenges. Michael Rothschild, Senior Director of Marketing for Tenable, shares advice for protecting data and resources even as the cybercrime landscape expands and evolves.

What trends are you seeing around threats and vulnerabilities within law enforcement agencies?

We are seeing more ransomware attacks, where hackers use an unaddressed vulnerability to gain entry and then lock law enforcement files until payment is made. These demanded payments are cleverly set at an amount that makes the attack worthwhile for the hacker but cost-effective enough that the municipality will agree to pay to get its data back.

What are the biggest cybersecurity challenges for law enforcement agencies?

A law enforcement agency can face a variety of issues. It may need to address issues related to who has access to what information based on their role. It may need to segment its network — for example, to separate CJIS lookups from other areas that are open to the public. Law enforcement organizations may also be connected to other municipal departments such as the Department of Public Works or even other departments outside the municipality. Addressing these potential attack vectors requires security

expertise, which in many cases is not on the agency's priority list or in its budget. As a result, these agencies become even more susceptible to attack.

What is cyber exposure management and how can it help law enforcement agencies protect their systems and data?

Whether it is CJIS, digital fingerprinting, NCIC lookups, e-tickets or e-reports, paper is a thing of the past. Technology is making these departments more efficient and effective in carrying out their missions, but it can also add exposure from a cyber risk perspective. Therefore, it is important that law enforcement agencies roll out their new technology with security built in instead of adding it as an afterthought. It is also important to regularly assess security policies and technologies to detect vulnerabilities and threats before an attack occurs. Doing so will help ensure successful alignment with the agency's core mission without introducing potential threats and attack vectors.

How can organizations best protect data that is accessed or shared from mobile devices?

There is much in the way of security technology that helps accomplish this. Some of the base systems are spelled out in compliance regulations. The technologies include encryption, access control, physical security and more. Agencies should work with partners that have expertise in both technology and law enforcement to ensure they are compliant, secured and compatible with new regulations and threats both now and in the future.

What best practices do you recommend in terms of risk and vulnerability management?

Because the security environment is in constant flux and new vulnerabilities regularly arise, we recommend ongoing assessments that can find new weak points before they are exploited. We also recommend a "triaged" approach to deal with these alarms or concerns, because it is impossible to meaningfully handle multiple alarms at the same time. Taking a risk-based view and having the system assign a vulnerability priority rating (VPR) score that is specific to the threat in your unique environment will help you meaningfully address threats in an appropriate order to keep your agency safe.

With looming budget cuts, how can law enforcement agencies invest strategically to transform cybersecurity?

No single product can definitively and magically deliver security. Instead, security requires different best-in-class products to deliver solutions to specific challenges. As mentioned before, these solutions include encryption, vulnerability management, access control and more. The magic happens when these products work together to deliver a security-in-depth solution where the combined and fully integrated solution working together delivers more than the sum of its parts. This yields a strong security posture with a compelling ROI that moves the needle without bankrupting the budget.



Too many vulnerabilities to manage?

Prioritize remediation based on cyber risk.

Learn more at tenable.com

Using Blockchain Analysis to Fight Crime



Criminals and rogue nations may believe they can hide behind cryptocurrency and blockchain transactions, but blockchain analysis makes that more difficult.

Don Spies, Director of Market Development for Chainalysis, discusses how law enforcement agencies can use this cutting-edge technology to fight crime.

transact with each other on these public ledgers. For example, we can show that a given transaction took place between two different cryptocurrency exchanges or between a cryptocurrency exchange and an illicit entity, such as one conducted by a sanctioned individual or organization. With blockchain analysis tools and exchanges' know your customer (KYC) information, law enforcement can gain transparency into blockchain activity in ways that aren't possible in traditional finance.

What opportunities do blockchains present for law enforcement agencies?

Cryptocurrency offers an unprecedented opportunity to quantify and investigate financial crime. Cryptocurrencies are the first global payment system outside of any single organization's control, and their blockchains create permanent public records, or ledgers, of illicit activity. Although crime makes up a small subset of a much larger cryptocurrency market — one percent - it remains significant. For example, cryptocurrency is used for money laundering, terrorist financing, darknet markets, child abuse material, ransomware, scams and more. Fortunately, the transparency afforded by blockchains helps law enforcement weed out bad actors. This will help build trust in blockchains and pave the way for mainstream uses of cryptocurrencies.

What is blockchain analysis and how are law enforcement agencies using it?

Blockchain analysis helps people interpret the public blockchain ledgers. With Chainalysis tools, government agencies can understand which real-world entities

Discuss the use of blockchain analysis in other areas of the justice system.

It's a burgeoning field, and use cases are still being discovered. The unique nature of this is that blockchains are completely open. Anyone can go to a blockchain ledger website and see all the data that's there. Depending on the scenario and the blockchain analysis tools used, organizations can follow the money on the blockchain, monitor transactions for suspicious activity and anti-money laundering compliance, and obtain profiles of cryptocurrency businesses. Information gleaned from blockchain analysis can be used in a court of law.

Are there hacking or other security issues associated with blockchains and cryptocurrency?

To my knowledge, no one has ever hacked the major coins, such as Bitcoin. Hacking the technology underlying cryptocurrency, which is the blockchain, would require an amount of computing that doesn't exist right now. What's important to understand is there are on-ramps and off-ramps in coin infrastructures like exchanges that can

be compromised if they're not properly configured. Having said that, stolen funds can be traced. You literally can see where funds go on the blockchain, because everything is open.

What should organizations look for in a blockchain analysis solution?

It comes down to having the right data and making it actionable. Specifically, law enforcement should be interested in a partner with data attributing services, which attribute addresses to the clusters — that is, the entities — that control them. In this case, that would be clusters associated with criminal activity and their cashout points.

The historical data behind this capability is an important differentiator. Chainalysis is the only company that has systematically collected information that links real-world entities to blockchain transactions since 2014. This allows the software to accurately distinguish different clusters of entities and attribute more data than can be seen on the blockchain.

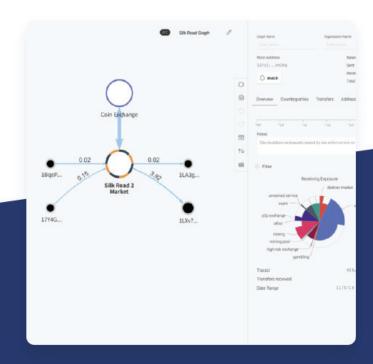
What is the biggest misconception about cryptocurrency?

Cryptocurrency's decentralized, semiautonomous nature makes it uniquely appealing to criminals, and their embrace of the technology has helped shape its overall reputation. But in fact, unlike cash and other traditional forms of value transfer, cryptocurrency is inherently transparent and easier to trace. Every transaction is recorded in a publicly visible ledger. With the right tools, we can see how much of all cryptocurrency activity is associated with illicit activity.



Myth: Cryptocurrency is untraceable. Fact: Chainalysis empowers investigators to follow illicit funds on the blockchain.

Chainalysis helps identify the services behind the majority of transactions on cryptocurrency blockchains. Law enforcement and intelligence agencies have used Chainalysis to take down notorious darknet markets, a child exploitation ring, and help address national security threats around the world.



- Enter an address, a transaction, or service name to understand who controls funds
- Create graphs showing cryptocurrency activity using our intuitive interface
- © Conduct investigations covering 85% of cryptocurrency market value, with new coins added all the time

Supporting the Law Enforcement Community During COVID-19 and Beyond



The COVID-19 pandemic spurred big changes throughout the public sector, and law enforcement is no exception.

Lacey Wean, Director of the Law Enforcement Team at Carahsoft, walks through how the agencies that form the criminal justice system adapted to meet these challenges.

What are the most important trends in law enforcement today?

Some of the biggest trends include demands for police reforms and the need for technology to address these issues. Although they may seem independent, these issues often are highly intertwined, and many have been accelerated by the COVID-19 pandemic.

Citizens want transparency in their police departments. Recently, agencies have adopted analytics to address ethical concerns — including monitoring officer conduct — and they're earning citizens' trust with public-facing dashboards for greater transparency.

In addition, the COVID-19 pandemic has encouraged a surge in cybercrime, which presents challenges to law enforcement. Inter-agency cooperation and advanced tools allow investigators to reveal the identities of malicious actors and tie illicit digital currency to their crimes.

Social networking also offers digital avenues for criminal activity. Traditionally, law enforcement has been a step behind actors who use social media to obfuscate their activities, but new purpose-built tools

are available to level the playing field by aggregating and analyzing social media for investigations. These solutions can also present evidence during the prosecution, which aids jurors' understanding of the case.

How is COVID-19 impacting police departments?

COVID-19 created an unprecedented urgency for state, county and municipal workers to operate remotely whenever possible. This caught many agencies by surprise. Although these organizations moved with commendable speed to equip staff to work from home, the needs of the public only increased.

Law enforcement agencies had to quickly adapt to the dangers of a pandemic amid calls for police reforms. These officials had to balance protecting the public, themselves and their colleagues in an ever-changing environment. Many departments have come to appreciate how technology enabled them to address these critical priorities.

How is the prevalence of video impacting law enforcement? How will this evolve?

Video is instrumental in solving crimes and increasing transparency in policing. However, the volume of video collected in recent years has increased the need for storage, evidence tagging and chain of custody solutions. The proliferation of Internet of Things devices in the home and workplace has expanded the number of sources for video evidence dramatically.

Facial recognition and artificial intelligence (AI), which can assist in identification and redaction, are just two of the use

cases for greater integration of video into investigative work. When used responsibly, these technologies can help apprehend suspects quicker and correct for misidentifications.

What does the increasing sophistication of autonomous devices mean for the future of law enforcement?

Autonomous devices such as unmanned aerial vehicles are in the early stages of adoption by law enforcement agencies. Drones are an effective tool for scene reconstruction, search and rescue, and critical incident response for a fraction of the cost of a helicopter.

Al and robotic process automation have benefitted many federal agencies, and could be adapted to law enforcement use cases, such as automating routine 911 calls and court processes to free up human resources.

Finally, security in the law enforcement community is a fight on two fronts: Law enforcement agencies must apprehend perpetrators of cybercrime and also protect themselves from cybercriminals. The number of local government agencies that experience ransomware attacks continues to rise. Every law enforcement executive must take steps to ensure their critical infrastructure is protected.

Carahsoft offers solutions on both fronts — tools to forensically investigate crime across digital and real-world environments, as well as solutions and partnerships with vendors and integrators to protect law enforcement agencies from cyber attacks and secure their critical data.

Carahsoft IT Solutions for Law Enforcement

Carahsoft's strong relationships with leading law enforcement partners and our deep understanding of the law enforcement landscape provides customers with the confidence they need to accurately match project requirements with supporting technologies.

The Law Enforcement portfolio at Carahsoft brings together industry-leading software and hardware solutions to support Federal, State and Local law enforcement agencies. Carahsoft offers proven solutions to support the mission of progressive law enforcement agencies ranging from citizen facing applications to dark web investigative tools.



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Solutions are available on Carahsoft's GSA Schedule 70, NASPO ValuePoint, NCPA, OMNIA Partners, and numerous state and local contracts.

Cloud: The IT Force Multiplier



In this Q&A, Ryan Reynolds, Public Safety Strategy Leader for Amazon Web Services (AWS), explains how the cloud can be a force multiplier by enabling law enforcement agencies to streamline processes and deploy crime-fighting tools faster.

What trends are you seeing in terms of law enforcement's use of technology?

We're seeing two main trends. The first is a fundamental change in how agencies consume mission-critical applications. These applications traditionally operated on premises, but software-as-a-service (SaaS) has now become the predominant approach for using records management systems, computer-aided dispatch systems, body worn cameras and other applications. The second trend is the increasing necessity for highly available systems. The accepted availability standard for emergency response systems is 99.999 percent, or five nines; that's about five minutes and 15 seconds of downtime per year. Five nines availability requires geographic distribution of multiple data centers and a level of redundancy that can be too costly and complex for most law enforcement agencies to achieve in house.

What data challenges do law enforcement agencies face as they embrace digital technology?

Storing, managing and effectively using an ever-increasing volume of digital data presents multiple challenges. Buying and maintaining hardware for data storage is expensive and challenging and diverts resources from the core mission of public safety. Then, agencies must manage stored data so it is discoverable, retrievable and in

compliance with legally mandated retention policies. Without a sound digital evidence management solution and automated life cycle retention solutions, data management is nearly impossible. Finally, because data is produced in multiple systems, integrating and normalizing that data so it can be searched, analyzed and shared is challenging. Without a strong data management approach and systems, agencies must access multiple systems to discover data that is in different formats, making it very difficult to integrate and gain insights from that information.

What can agencies do in the cloud that they couldn't do as well — or at all — on premises?

The cloud enables effective, efficient management of data. Storage in the cloud can scale infinitely, so agencies don't have to worry about running out of space or overbuying hardware. In addition, automated data life cycle policies and tiered storage enable cost optimization. The cloud's scalability also makes sure computing resources for mission-critical applications like computer-aided dispatch and records management systems are always available, regardless of time or volume of demand. Security is another important benefit. Because cloud service providers (CSPs) work with customers across verticals and industries that have stringent security and compliance requirements, CSPs have the assets to employ top experts and develop tools and resources that help organizations optimize security and compliance.

Finally, the cloud enables that high availability we discussed earlier. Instead of applications existing in a single data center, availability zones make sure that applications are redundant across geographies. This means even with a massive outage or loss of

infrastructure, applications will continue to function to meet public safety needs.

How can agencies prepare for the adoption of data analytics and media analytics?

Data and media analytics can help law enforcement personnel make better and faster decisions. Because of the volume of data and the amount of computing required, these analytics are very difficult and expensive to host on premises. Having your data in the cloud enables access to resources and tools that aren't available in house. For example, the cloud provides tools to help control the cost of storing and analyzing massive data volumes.

How can technology facilitate collaboration among law enforcement agencies, district attorneys, the courts, detention centers and other justice system stakeholders?

The cloud enables secure and efficient sharing of information. Previously, sharing of evidence or sensitive information required thumb drives, CDs or paper. Because the cloud offers shared infrastructure with highly robust access controls and auditing capabilities, collaborating and sharing data can be much more efficient.

Given the budget cuts ahead, how can agencies invest so their dollars have the most impact?

Spending efficiently and strategically will be critical for municipalities that face reduced budgets in the coming months and years. Investing in cloud infrastructure and services can help agencies take advantage of the economies of scale the cloud provides. For agencies that are due for hardware refreshes, the cloud enables them to avoid large upfront capital expenditures and spread the cost over time as resources are consumed.



Fight Crime With the Cloud:

meet mission critical system objectives with AWS





organ Wright is an internationally recognized expert on cybersecurity strategy, cyberterrorism, identity theft and privacy. Wright was a senior adviser in the U.S. State Department Antiterrorism Assistance Program and senior law enforcement adviser for the 2012 Republican National Convention. In addition to 18 years in state and local law enforcement as a state trooper and detective, Wright has developed solutions in defense, justice and intelligence for some of the largest technology companies in the world.

Government Technology recently spoke with Wright about how technology can help law enforcement agencies manage challenges created by the COVID-19 pandemic and other recent events.

How can technology help law enforcement agencies address some of their biggest challenges?

Law enforcement departments are facing severe budget pressure. At the same time, crime continues to increase in some of our major cities. Homicides in Minneapolis are up 86 percent year over year, for example. Technology can help police departments provide services more efficiently. With fewer officers on the

street, we need to identify technologies that can increase the capabilities of each officer — solutions that improve access to information and enable them to make better decisions faster. Used well, technology can be a force multiplier in that respect.

Which types of technologies can benefit law enforcement the most right now?

Mobility is critical. Officers need the ability to access data from anywhere on devices that are easy to carry. Access to video and information sharing capabilities are especially important. The more law enforcement personnel know, the more effective they are and the safer everyone can be. 5G will enable many of those capabilities.

Analytics is also important. The more realtime analysis an officer has, the better he or she can preempt dangerous activities and collaborate with the public to enhance safety.

How has COVID-19 impacted police departments, and how might technology help address those impacts?

The pandemic decreased proactive activities. There are fewer cases where an officer might stop you for speeding 10 mph over the speed limit, for example. Departments have to weigh whether it's worth the risk to stop a car to issue a traffic ticket and

potentially be exposed to COVID-19, or to reserve their exposure time for things that are a matter of life or death. The impact of that is reduced revenue generation.

COVID-19 also impacted morale. More law enforcement personnel have died from COVID-19 this year than have died in the line of duty. That impacts a police department and its morale — people work longer shifts, and health often suffers. We need more efficient ways to get the results we need. COVID-19 also changed crime patterns — some types of crimes have gone up; other types have gone down. Again, that's where analytics comes in. Analytics can help law enforcement understand shifts in criminal behavior and patterns of crime, and then change staffing levels or tactics in response.

What else should law enforcement agencies keep in mind about technology?

Don't forget about cybersecurity. Implementing technology is great, but you have to keep it secure.

Nobody wants to call 911 and get a busy signal because the system has been taken down by ransomware. As departments become more reliant on technology, they're going to have to get smarter about the cybersecurity aspects of it, too.



The NACo County Tech Xchange is an online portal designed to connect county CIOs, IT Directors, CISOs, and other IT leadership. This portal provides valuable resources in a central location which counties can use to improve their overall technology infrastructure.

WHAT'S IN IT FOR YOU AND YOUR COUNTY

- · A rich community of interaction with other county IT professionals
- An online library of technology policies, job descriptions, request for proposals, best practices as well as toolkits
- Monthly IT newsletters
- Technology webinars presented by speakers from the federal, state, local and corporate communities
- Valuable external resources that county IT staff can leverage to improve their county IT infrastructure
- Surveys garnering county feedback on technology opportunities such as technology software and services aggregate agreements

This is the type of information that we have been missing.

- Mark Curtis, IT Director, Stevens County, WA

Great opportunity here to interconnect all of the Counties across the US to the resources we need access to!

- Phillip Walter, MS, Chief Information Officer, Adams County, PA

Tech Xchange is coming along. Good work!

- Christopher Nchopa-Ayafor, CIO, Tarrant County, Texas

For more information, please contact:

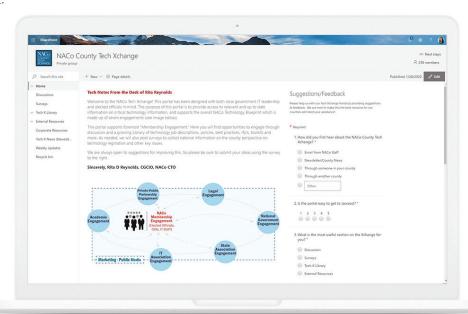
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By Ben Miller

From Novelty to Necessity

Before COVID-19, a few leading governments were dabbling in chatbot technology. In 2021, it's hard to imagine government doing the people's business without them.

he 2020 Center for Digital
Government Surveys,* which
collected responses from
public officials in states, cities
and counties across the country, provided
tangible evidence that several emerging
technologies were gaining momentum.
Responses came in before and during the
COVID-19 pandemic, an event that has
pushed many governments to rapidly
adopt technologies they either had little
interest in or were eyeing for future use.

That includes chatbots, which governments have used to help handle a massive influx of questions from the public.

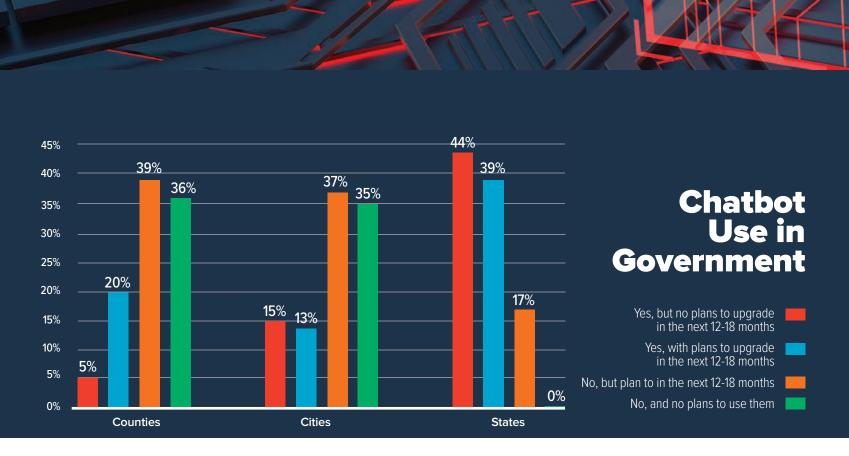
The idea is that chatbots, which typically use some form of AI algorithm, can handle common questions and leave less common or more complicated questions for human staff to answer.

And while the data on chatbot use shouldn't be treated as a nationally representative sample, it does provide a picture of the general state of chatbots in government.

HOW THEY WORK

Most jurisdictions that use bots have a definite list of questions they are capable of answering — in other words, we aren't talking about Asimov-style intelligences that can learn to solve new problems and answer new questions on their own. Rather, the IT department might spend time configuring the chatbot before it goes live in order to work on how the bot recognizes and responds to questions.

They are often structured for triage, the weeding out of people whose questions can be answered easily so that call-takers can focus on people whose questions will



take more effort. That's especially important during the pandemic because, as many vendors and governments have documented, people have been turning to the government a lot more than usual for things like health testing, unemployment benefits and other kinds of assistance. Records have been set all over the country for visits to .gov websites, as in-person office visits became restricted, placing new emphasis on all citizen engagement channels.

In King County, Wash., for example, a chatbot helped identify which people

calling for a professional nurse had coronavirus-like symptoms and which didn't. The county estimated that the chatbot saved 35 percent of the time nurses had been spending speaking to people without those symptoms.

And in states across the country, chatbots served a vital role in augmenting the capabilities of human staff members to deal with unrelenting waves of questions from applicants of unemployment programs. The Texas Workforce Commission, for example, relied upon chatbots to field frequently asked questions, again letting employees focus on more complex issues.

MANY PURPOSES

A lot of the jurisdictions surveyed used their chatbots for COVID-19-related purposes. Connecticut's COVID chatbot, for example, built using technology from IBM Watson, logged nearly 40,000 interactions in a four-month period beginning last March. The state estimates that it did the work of four full-time employees during that time. But chatbots often proved useful well beyond COVID-19 needs as well.

Placer County, Calif., for example, has a bot called Ask Placer capable of answering more than 375 questions. IT agencies in San Joaquin County, Calif., and Fairfax County, Va., both worked with other departments to figure out what their needs were and what their most frequent questions were so that they could build those into their chatbots.

Minnesota has a similar approach, leaning on its IBM Watson chatbot to help address general inquiries. Iowa's chatbot dates back to late 2018, and capabilities continue to be added as new needs arise. Seventeen agencies now use it, and so does the public. In May 2020, the state's chatbot



King County, Wash., reports its chatbot saved 35 percent of the time nurses would have spent talking to callers without COVID-19 symptoms.

tools, combined with its live chat function, saved an estimated 1,700 hours of staff time that would have been spent addressing those same inquiries using traditional tools.

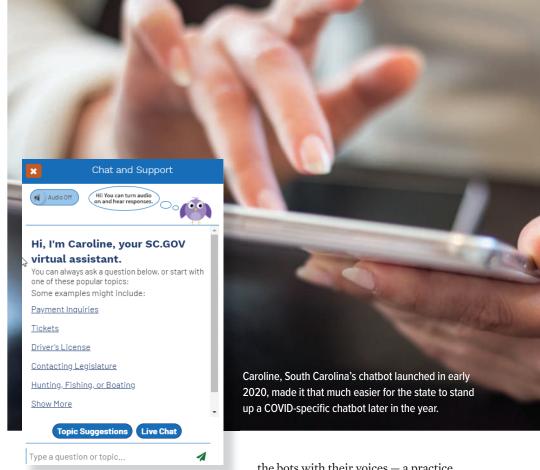
Cabarrus County, N.C.'s chatbot was integrated with Laserfiche technology in order to help people use digital services. The chatbot is capable of pulling in information from other systems in order to help the user. Missouri's Department of Revenue worked with Accenture on a virtual agent named DORA, which answered 100,000 resident questions in its first three months since its debut in November 2019. Agency goals were to help field questions on taxes, driver's licenses and motor vehicles, though the tool has also proven useful in addressing pandemic and unemploymentrelated inquiries. Since digital services have become a necessity for many government agencies that have found themselves transitioning to telework during the pandemic, tools to help citizens use digital services make a lot of sense.

FLEXIBILITY

A key feature of chatbots is that they're designed to answer a growing number of questions over time. Kansas City's Facebook chatbot was born several years ago out of a desire to make it easier for citizens to navigate and use its open data portal. The effort at the time got a lot of grassroots help from the local Code for America Brigade, and city officials considered the chatbot an experiment of sorts, to better understand how the technology could be used more broadly.

Many governments use data analysis tools to follow the kinds of questions citizens ask — as well as the ways they ask them — so that they can add answers to those questions over time, and so bots can learn how to respond to variations. San Jose, Calif., for example, has a chatbot on its 311 page, SJ311, which gathers feedback to fuel continuous improvement.

South Carolina's first foray into chatbots was Caroline, developed with its partner NIC and launched in early 2020 to provide a simple path to information for site visitors. The deployment undoubtedly



smoothed the way in mid-2020 for Axel, a chatbot feature incorporated into the state's COVID-19 recovery portal, accelerateSC.

Chatbots can also take inputs in many different forms, which gives them the unique ability to serve citizens across multiple channels. Several jurisdictions got into chatbots by first making them available via text, a more ubiquitous option a few years ago when the technology was first taking off. This was the case in North Charleston, S.C., as well as Williamsburg, Va., which this year has added Web functionality, greatly increasing citizen use of the chatbot. Washington County, Ark., too, is working on a bot that works with texting, while Placer and King counties integrated with Google Assistant and Amazon Alexa so residents could access

the bots with their voices — a practice also gaining ground in government.

San Joaquin County also built its bot to work in three languages, with more planned for the future. This tactic, too, is spreading across government as jurisdictions seek to develop tools that are as useful as possible to the specific needs of their community. Bellevue, Wash., for instance, has a chatbot offering COVID-related information in seven languages.

THE FUTURE

Survey results and the trends of government technology during the pandemic point to a time of growth for government chatbots. Especially if they can help make digital services, emergency operations and telework more workable for local governments, their usefulness might make them hard for many jurisdictions to ignore. Editor Noelle Knell contributed to this story.



Shift Change

How the incoming administration could move the conversation on cybersecurity.

By Lucas Ropek / Staff Writer

s the Joe Biden presidential transition picks up speed, many have wondered just how the new administration will address the myriad threats that lurk in cyberspace.

If cyber hasn't exactly languished under the Trump administration, it hasn't quite blossomed either.

To be sure, Trump presided over some big changes — most notably, the 2018 creation of the Cybersecurity and Infrastructure Security Agency (CISA). CISA has proven to be a real leader, establishing itself as America's top advisory agency, playing a big role in boosting state, local, tribal and territorial (SLTT) election security, while also providing a variety of services to the private sector.

Trump also proved amenable to cyber-related legislation, signing a bevy of federal policies over the past four years, including bills to crack down on hackers, to strengthen the federal cyberworkforce, protect critical infrastructure and federal networks, and to establish security principles for space systems.

While it's undeniable that the outgoing president left a mark in the space, he has also made some decisions that called into question his commitment to a robust cybersecurity agenda and seemed to lack an identifiable strategy.

In particular, Trump eliminated some critical positions, like the national cybersecurity coordinator role, that would've arguably helped keep America's cyberstrategy front and center.

At the same time, despite repeated attempts by congressional homeland







In terms of how federal policy may trickle down to state, local and territorial governments, all eyes should be on the Cybersecurity and Infrastructure Security Agency (CISA).

security committees to unleash the federal purse strings for state, local and territorial cybersecurity needs, new financial help has so far failed to materialize.

Then there was the unfortunate sacking of CISA Director Chris Krebs after he spoke out about a lack of evidence to support the president's claims of widespread election interference. That decision was condemned from both sides of the aisle by the homeland security community.

Under Biden, some expect federal cybersecurity to take a much more prominent, strategic position, as he pushes the federal government to build off of work done in the Trump years, while also bringing on board some cyberprofessionals who played prominent roles during the Obama years.

"It's a sea change in terms of having folks at this level of experience," Chris Painter, an Obama-era cyberofficial, told the *Washington Post*. "They don't need to be spoon-fed or brought up to speed. Cybersecurity will be a key foreign policy issue with this group."

Biden's pick of Alejandro Mayorkas to lead DHS has been considered a promising sign for cybersecurity. Mayorkas, who was the deputy DHS secretary during the Obama years, presided over a number of large international cybersecurity agreements that helped to still cyberhostilities between nations. In this way, the Biden administration may seek to use diplomacy to force foreign nations to deal with hackers internally, as a means of mitigating the ongoing attacks aimed at the U.S.

That said, Biden is also expected to take a somewhat more hardline approach to China, a fact that will surely have big implications for cybersecurity, both at home and abroad.

Biden has also selected Avril Haines as his pick for director of national intelligence, who — in addition to being the first woman ever nominated to the role — comes to the job with significant cybersecurity experience. Haines, who served as CIA deputy director between 2013 and 2015, worked at the agency during a time when cyberoperations were becoming much more integrated into its overall mission.

The picks, when taken together, certainly show a priority given to national security officials with healthy backgrounds in cybersecurity, while also suggesting a willingness to use U.S. cybercapabilities as both a shield and a cudgel.

Dan Stroman, with cloud services provider CloudCheckr, said that regardless of specific policy decisions from the executive branch, we can definitely expect the coming years to see a boom for the cybersecurity industry — particularly as it relates to cloud procurement at the federal level.

Case in point is the recently announced C2E contract, the multibillion-dollar arrangement to provide cloud applications to the U.S. intelligence community, specifically the CIA.

"The whole construct behind C2E is cybersecurity for the intelligence agencies," said Stroman.

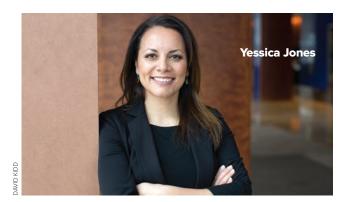
In terms of how federal policy may trickle down to state, local and territorial governments, all eyes should be on CISA. The agency has been looking to expand, both in terms of its active operational capacities and its potential role as a benefactor to smaller governments à la hypothetical grant programs.

If the Biden presidency is looking to prioritize national cybersecurity, CISA will surely be a central figure in that process.

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



Arkansas CIO Departs for Private Sector

Yessica Jones left her role as Arkansas' IT leader — a position she was named to permanently in 2017 — for the private sector. Jones' official title with the state was chief technology officer and Division of Information Technology director. She first joined state government as a liaison to Gov. Asa Hutchinson's office. Jones was replaced by **Jonathan Atkins**, who was previously with private firm Acxiom and also served on Arkansas' Data Transparency Commission.



Pittsburgh CIO Returns to South Bend, Ind.

Roughly two years ago, **Santiago Garces** left his role as the CIO of South Bend, Ind., for the same position with Pittsburgh. Now, Garces has returned to South Bend, taking a new job as executive director of community investment for the city. In the wake of

Garces' departure, Heidi Norman, formerly Pittsburgh's deputy director of innovation and performance since 2017, was named acting CIO.

Atlanta CIO Steps Down

Atlanta CIO **Gary Brantley** stepped down from the job. In his place, Chief Technology Officer Tye Hayes was named interim CIO. Brantley served with the city for about two years, playing a key role in the recovery from a debilitating ransomware attack. Brantley noted on Twitter that he is taking a C-suite position in the private sector, but did not specify where.



New York State Names New CIO

Angelo Riddick, formerly chief information officer for the U.S. Virgin Islands from 2016 to 2019, was named CIO of New York. The state had been without a permanent tech chief since Robert Samson retired in August 2019.

San Francisco CDO Departs

Chief Data Officer **Jason Lally** announced via Twitter he would leave city service after seven years with San Francisco. He had served as CDO since February 2020. At press time, a replacement had not yet been named.

CISA Director Fired Over Election Dispute

President Trump removed **Chris Krebs** as director of the Cybersecurity and Infrastructure Security Agency after he disputed Trump's claims of widespread voter fraud. Krebs had been with the Department of Homeland Security since 2017, and under his lead, CISA grew to become the federal government's top cybersecurity watchdog.



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Verifying Votes

While claims of fraud in the 2020 election were unfounded, end-to-end verification can help make U.S. voting more secure.

n the days following the election, President Trump and his surrogates made allegations of widespread voter fraud, claiming this was the reason he lost his campaign for re-election. And Trump's team was not the only one claiming malfeasance at the polls multiple candidates across the country who lost decisively still refused to concede their races on the grounds that they were victims of election fraud. Though unsubstantiated, these claims had an impact on voters: A week before the election, 68 percent of Republicans reported that they trusted U.S. elections "a lot" or "some," on par with Democrats, but a week after the election, following an endless stream of accusations of election fraud, trust in U.S. elections among Republicans had dropped to 34 percent.

While there is no evidence to support the notion that voters or election officials have tampered with the results, this does not mean that conversations about how to make elections more secure should be off the table. On the contrary, as state and

local election officials look toward future elections that may similarly be marked with voters deeply divided along partisan lines, it will be more important than ever for them to strengthen election security so that voters have confidence in election results.

Many states have already made some progress in

recent years. Previously, most voters could not check whether election officials had received their mail-in ballots. As of the 2020 presidential election, 45 states and the District of Columbia had some form of mail-in ballot tracking, so voters could see if (and when) their local election office had sent or received their absentee ballots.

The problem for voters is that ballot tracking only solves part of the problem. Voters may still question whether anyone has tampered with their ballots, whether anyone has stuffed the ballot box and whether the ballots have been correctly tallied. To be clear, election officials have multiple processes and procedures in place to mitigate these threats, such as physical security controls to prevent election officials from introducing fraudulent ballots, election observers to witness any ballot tampering and post-election audits to uncover any tabulation errors. But voters who distrust the system need more.

One solution to this problem is to introduce end-to-end (E2E) verifiability in elections. E2E allows voters to know that not only have election officials received their ballot, but also that no one has tampered with it along the way. E2E makes this possible by creating a unique tracking number that is cryptographically linked to how they cast their vote, ensuring that any attempt to alter their ballot could be detected.

Moreover, E2E allows everyone — news media, political parties, candidates, voters and outside observers — to fully audit

the results of an election, ensuring that all ballots are counted as cast, while still protecting voters' privacy. E2E enables this feature using homomorphic encryption — a special type of encryption that allows people to perform certain mathematical operations, such as addition, on encrypted data without first decrypting it.

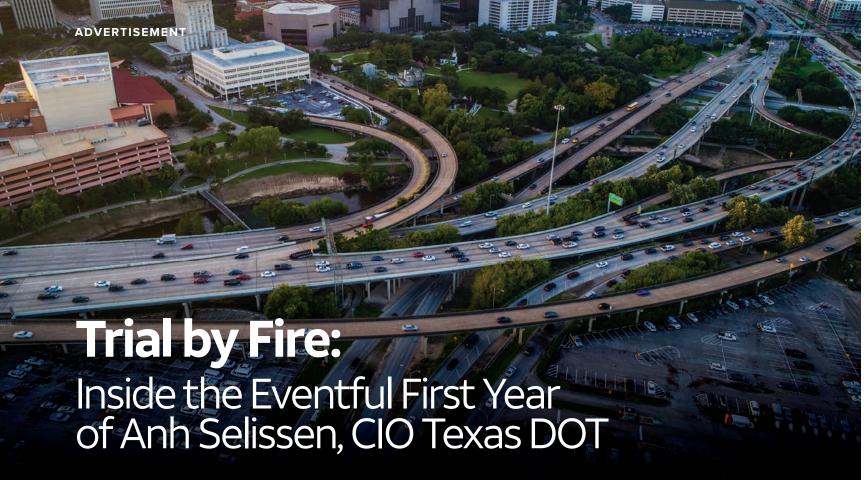
Perhaps the best part of E2E is that it is a concept, not a single product, and multiple companies, researchers and election officials have devised E2E voting systems. And some even have substantial backing — Microsoft, for example, released a free, open source software development kit that developers can use to integrate E2E into their voting systems.

Trust in elections is crucial to a healthy democracy. As election officials know, the purpose of elections isn't to convince people who won, but who lost. E2E is not a silver bullet, and conspiracy theories and misinformation may still take hold among some segments of society no matter how free and fair an election may be. But this should not deter state and local officials from continuing to innovate in elections to make them more secure and trustworthy.



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.



imilar to most things in the Lone Star State, the Texas Department of Transportation (TX DOT) is big. With an annual budget of just over \$30 billion, TX DOT maintains 80,455 centerline miles of roadways, along with 6,500 traffic signals and nearly 36,000 vehicular bridges. The agency also oversees aviation and rail transportation, as well as public transit systems throughout the state, which handle some 29 million rides a year.²

Managing the technology needs of the department—and its employees, which include 12,500 full-time workers plus another 7,000 or so contractors—is a big job too. Anh Selissen began serving as the CIO of TX DOT in September 2019. Selissen had been in office for six months when the coronavirus pandemic hit, followed soon after by a malware attack that shut down her agency's entire network.

"Anh's dynamic leadership has been critical in helping TX DOT navigate the events of 2020," says Brian Troup, Vice President – State, Local and Education for AT&T Public Sector. "It's leadership like Anh's that will play a vital role in reimagining the transportation systems of the future."

Government Technology spoke with Selissen and George Spencer, Sales Center Vice President – State of Texas, AT&T Public Sector, about the pandemic, the cyberattack and what other states can learn from Selissen's approach to leadership.



You had a historic first year on the job. Tell us what stands out most?

Selissen: I started in September 2019 by assessing where we were as an agency in terms of our people and our contracts with vendors. We did a major staff reorganization in October, and then we reassessed the vendor pool. At TX DOT, we have been highly outsourced since 2013. I took the opportunity to see whether the delivery of the contracts we had met my level of expectation, and I made some modifications to vendor support.

That facilitated us bringing in the right people to address some of our security needs and looking at rearchitecting and modernizing our network. Then the pandemic hit.

Given the pandemic, how well did your team pivot to remote work?

Selissen: We worked hard to make the transition to virtual work seamless for our employees. We definitely had your normal challenges in terms of connectivity. But overall, I think the agency has transitioned very well

when it comes to things like laptops, our videoconferencing and collaboration tools, and VPN capabilities. Some of the efforts we made prior to the pandemic to increase our network bandwidth really helped with some of the challenges of shifting to remote work.

Tell us what surprised you the most about the transition?

Selissen: Honestly, there was so much change in the first six months of my tenure that when we did go through the pandemic, I think I was already prepared for at least knowing the lay of the land.

TX DOT is huge. Because I hadn't been there for that long, I was surprised at just how supportive and inclusive the agency was, from IT to construction to engineering to maintenance. For such a large agency, everyone was able to pull together and support each other to get to a good place.

On May 14, in the middle of the pandemic, TX DOT was hit by another crisis: a crippling ransomware attack.

How did that impact your team, and how were you able to manage through it?

Selissen: Within a five-hour period, we had to shut down all our networks. It was very disruptive. We had to scan our entire environment before we could open anything back up to the internet. And then we had to look at how to recover our servers from backups.

The team did a wonderful job executing our business continuity plan to get us recovered in an expeditious manner—and putting together a game plan to make sure we were not re-compromised.

Spencer: Anh communicated very early on that the internal and external stakeholders needed to work together as a single team to get TX DOT operations back online quickly and safely. There were a lot of moving parts, but that was the clear, stated goal.

Selissen: There needs to be a single leader who's in charge. Because TX DOT is so outsourced, you have a lot of vendors in the mix, so you need a very clear game plan. Once everyone is aligned on where they're going, the recovery process is a lot quicker.

Spencer: We all met at least twice a day sometimes more—with the goal of getting everyone together to measure progress against our agreed upon benchmarks and clear obstacles any team player may be facing. Sometimes those calls were at six in the morning; sometimes they were at 10 at night or later.

How did TX DOT's response to the attack differ from past experiences?

Spencer: Anh established a single-team approach at the onset, which created the rapid cooperative environment needed to manage an event of this magnitude. With her transparent and unifying leadership style, she was able to have the resources from several

"With Anh, we know we're not going to just come together and talk about something; we're going to come together and do something." George Spencer

multi-billion-dollar companies at the ready to aid TX DOT and work toward a rapid recovery. Selissen: I'm a CIO who takes a really active role. I was involved in every single meeting until we were fully recovered. You have to own it; you can't hand it off to someone else. **Spencer:** I've been supporting and serving the State of Texas for a long time. Being available 24/7 is an expectation of my role. But in this particular case—the energy and engagement were constant, even on earlymorning and late-night crisis calls. Anh united everyone in a positive way around a shared mission. It was bigger than our individual roles. It was a personal commitment. The environment Anh created had our team enioving the long days and hard work between the calls. Our team was energized and "all in" for this one-team approach.

And although this effort required a lot of hours and hard work, it also had meaning. With the COVID-19 crisis and the cyberattack, Anh was the absolute best person to lead the effort.

In this 'new reality,' what are you planning to focus on in the months ahead?

Selissen: It's very clear from that ransomware event that we've got to bring certain core services back in and have that in-sourced. This next year is going to be about looking at the balance between outsourced and in-sourced. Let's look at that criteria and the risk-benefit when we make each one of those decisions.

In year two, I won't still be trying to figure out my team. We've got a really good team in place, and we know TX DOT. We know what our expectation is. So this year is going to be about, how do we improve our services for the rest of the agency and the state?

What leadership qualities do you rely on most in challenging times?

Selissen: I want to be a leader who's considered thoughtful. I want people to understand that I'm leading with the mission of this agency and the state as a whole. But also, I'm a people-leader: I care about this agency, but I also care about the people that I lead. People will follow along with you when they know you care and clearly understand your focus, strategy, mission and objectives.

What makes Anh such a standout leader, that other CIOs can look to for guidance?

Spencer: Leadership is acting without always having perfect information or the obvious answer. You have to be willing to act, and she does that. Anh builds the team around her, gathers data and quickly makes informed decisions. This approach is what allowed TX DOT to perform so well under such challenging conditions.

She's action- and progress-oriented. With Anh, we know we're not going to just come together and talk about something; we're going to come together and do something.

- https://www.statesman.com/news/20200730/txdot-asks-forslim-cuts-to-budget-despite-grim-predictions http://ftp.dot.state.tx.us/pub/txdot-info/gpa/pocket_facts.pdf







travel. SOURCE: GIZMODO

contract worth up to \$810 million with Uber and Lyft that will provide rides for 4 million federal workers for official



UNDERGROUND:

The thought of earthworms over 1 foot long is troubling, to be sure, but what if those worms were robotic? That's the idea behind a project underway at Cornell University, which aims to make robotic "worms" that can traverse soil and analyze its density, moisture and temperature. Fiber-optic cameras built into the agriculture bots will take pictures of plants' roots and measure microorganism activity.

SOURCE: NEW ATLAS



TRANSITION TEAM:

Twitter and Facebook both announced they will transition all official presidential accounts from the Trump administration to Biden's on Inauguration Day, Jan. 20, 2021. As both social platforms did in early 2017 at the end of Barack Obama's second term, relevant accounts like Twitter's @whitehouse, @FLOTUS and @VP will have all past posts archived and access will be given to Joe Biden's team.



No Smoking

When the Netherlands made smoking at railways illegal last year, railroad owner ProRail removed hundreds of six-foot "smoke poles" that were used as ashtrays from stations. Now, thanks to a company called Lightwell, the smoke poles have had their ashtray centers removed, but 90 to 95 percent of the original design maintained, and have been refurbished into e-bike chargers. The chargers are free to use and can host two bikes at a time. So far, two have been installed as part of a pilot test.

SOURCE: FAST COMPANY



Send Spectrum ideas to Managing Editor Lauren Harrison, Iharrison@govtech.com

SOURCE: THE VERGE

Every day on govtech.com, we explore a question about something new happening in the tech (and tech-adjacent) world. Here's a look at a few recent Questions of the Day. For more, visit govtech.com/QoD, or subscribe to our newsletter to get them daily in your inbox.



What piece of public infrastructure has become 'smart'?

Answer: The public bench.

The smart tech revolution has come to the classic public bench. While very useful for giving people a place to rest, the average public bench doesn't really serve any other useful function. That is, unless said public bench happens to be from Croatian startup Include, which recently announced three new versions of its Steroa smart bench. First up is the Steora Classic, the cheapest of the three, which sports a seating surface cooling system and pressure, temperature and humidity sensors. It's powered by a Li-ion battery, which in turn gets its power from a city's power grid or solar panels in the seat. It also comes with additional optional features including a seat heater, USB chargers, a GPS locator, a Wi-Fi hot spot and air quality and noise sensors.

The two higher-tier options are the Steora City, which comes with additional sensors, LCD displays, and an Al camera that can gather data on passersby, and the Steora Cyclo, geared toward users of electric micro-mobility options like e-scooters and e-bikes and offering charging stations, hand tools and a built-in air compressor, turning the bench into a handy self-service station.



Can the dead send text messages?

Answer: They can now.

Australia-based Memories is using tech to make sure we can all have the last word in our lives. It's newest feature, Future Messages, allows you to send messages to your loved ones after you've passed.

Unlike Facebook birthday well-wishes or LinkedIn job anniversary reminders, which often still get sent out from the accounts of the deceased, the Future Messages technology was designed specifically with the user's death in mind. Users can deposit things like pre-recorded videos, photos and other digital messages, along with instructions of when to share them and with whom after said user has passed.



The Memories platform, founded in 2014, gives its users a virtual place to remember their loved ones who have passed. Users can create digital memorial pages for a person, sort of like a headstone in a virtual cemetery. Users can share memories on a person's digital memorial, like stories or photos, and send virtual condolences with things like digital flowers.

Where are humans replacing robot workers?

Answer: Walmart stores.

It's a refreshing change from the usual story of robots being brought in to do the jobs of human workers.

Walmart has officially given the axe to a slew of robots that were employed in its stores to monitor inventory. The bots, provided through a contract with Bossa Nova Robotics, would autonomously roam the aisles of Walmart stores and scan the shelves to check that items hadn't run out. However, since the pandemic has seen most shoppers transition to conducting their business online, Walmart found that its human workers were perusing the shelves to collect items for online orders as often as the robots were.

The workers, therefore, could easily monitor inventory on the shelves as they were putting together online orders, eliminating the need for robots to do so. The robots were reportedly in use in about 500 Walmart shopping centers across the U.S. "We will continue testing new technologies and investing in our own processes and apps to best understand and track our inventory and help move products to our shelves as quickly as we can," a Walmart spokesperson told the *Wall Street Journal*.



10 Do's and Don'ts for Government Cyberleaders

In an everchanging threat landscape, keep in mind best practices for effective security management.

ffective leadership is never easy.

But for government cyberleaders in the 2020s, the challenge is perhaps more daunting than ever before. From keeping track of exploding cyberthreats to acquiring and retaining talented pros for your public-sector team to championing the importance of cybersecurity to managing budget priorities in tough economic times, the list of responsibilities and expectations is growing steadily.

Add the remote working changes in people, processes and technology that enterprises faced in 2020, along with other pandemic pressures, and it is amazing that security leaders keep coming back each day. So how can cyberchiefs traverse this hectic landscape?

Here are 10 best practices that come from a list of security industry resources, five do's and five don'ts for new and veteran government cyberleaders. Even if you've heard some of these tips before, ask a trusted colleague to help assess how you are doing in each area. I'll start with what not to do:

1. Don't be "Doctor No." Security professionals are infamous for shooting

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 awardwinning technology and cybersecurity programs, serving as CSO, CTO and CISO. down whatever ideas or new technologies business areas propose to improve.
Typical answer: "Can't do that! Not secure!" Instead, get to "yes" on projects. Be known as an enabler of new technologies. Offer alternative solutions that can work at different price points with varying levels of risk that are understood by the business.

If your team is having difficulty coming up with workable options, do more research or talk with similar governments in other parts of the country about how they implemented similar solutions.

- 2. Don't stop communicating. Poor communication is listed as the top hindrance for organizations globally. Many security leaders start off well, but fail to communicate 360 degrees in an ongoing manner via a variety of channels. Instead, security leaders must constantly be providing timely updates and cyberawareness to internal and external clients. Consider regular security "road shows" to customers to articulate threats, describe actions required and show the value that your security organization is providing.
- 3. Don't stay inward-focused. One tendency for gov tech leaders is to just focus on internal audit findings, data breaches or other incidents. The immediate problems may be so overwhelming that it seems there is no time to look outside your organization to get help or give help. Instead, build lasting partnerships. "Security on an island" will fail. You don't know what you don't know, so get involved with groups like the MS-ISAC for collaboration. Also, consider the security committees for the National Governors Association, the Public Technology Institute, the National Association of State Chief Information Officers and vendor partners with helpful case studies addressing your cyberissues.
- **4. Don't become overconfident.** Surprisingly, a significant number of government security leaders report that

everything is fine on the security front. "No data breaches here!" This is often overconfidence in their team's abilities, or perhaps the fruits of a job well done. Instead, stay humble and vigilant. Even if you have been able to successfully navigate your leadership challenges so far, you never know what tomorrow will bring. Bad actors are trying harder than ever to overcome your cyberdefenses.

5. Don't forget to celebrate success. Since securing the enterprise is never complete, some never stop to enjoy project success. Be sure to thank your staff. Throw a party when key milestones are complete.

And here are five more things you should do:

- 1. Do meet with business leaders regularly. Do lunch, and not just with technology or security pros. Discuss their unique business requirements and goals, not just your team's strengths and weaknesses.
- **2. Do have a plan.** Cyberstrategies that work together with wider technology goals are a must. If you are struggling to plan, review peer strategies from government leaders you trust and respect.
- **3. Do practice.** Partner with other governments, criminal justice agencies, nonprofits and others on tabletop exercises surrounding security incident response.
- **4. Do find and/or be a mentor.** The MS-ISAC mentoring program is a great place to start.
- **5. Do persevere.** Become a resilient team. You can do this, and there are many people eager to help. •



UI Modernization:

Building Agile, Citizen-Focused Solutions

In this interview, Thomas Luparello, public sector strategic advisor for unemployment insurance (UI) at NTT DATA, discusses how states can begin to build more modern, flexible UI systems that can stand up to citizen demand in the future.



Thomas Luparello is a public sector strategic advisor, unemployment insurance, at NTT DATA. He has more than 25 years of executive business management and relevant industry experience. Prior to joining NTT DATA, Luparello served as CIO, and subsequently executive director, at the District of Columbia Department of Employment Services. At NTT DATA he supports state workforce agency initiatives. Luparello has also served in a variety of technology-focused positions including president and CEO of a leading provider of software solutions to unemployment insurance agencies.

What are some of the primary reasons state UI systems struggled when the pandemic hit in March?

In some cases, there were system architecture deficiencies that stemmed back decades. State UI systems were primarily developed on mainframes. Some systems that have since been modernized still rely on legacy architecture. Those systems may be hosted in the cloud, but in many cases they were behind firewalls and couldn't scale. They are also fairly rigid, so it was challenging for states to accommodate changes handed down from the federal government. Finally, all these issues came at a time when staffing was at a historic low because of low unemployment rates before the pandemic.

The pandemic prompted new federal legislation around unemployment benefits, some of which is temporary. Why does that make it critical for states to use more flexible technologies?

The old adage is true: The only constant is change. Legislative changes happen all the time, though admittedly not on the scale we have seen during the pandemic. Regardless, being able to accommodate change is a critical component of UI systems and something they have historically lacked.

Citizens depend on government safety net services during tough times.

How can tools like analytics help states better meet citizen needs?

Many states saw rises in fraudulent claims during the early stages of the pandemic. Modern technologies can be used to analyze data and potentially stop fraudulent claims from being paid so more people that legitimately need help can get it.

Some states implemented chatbots and other technologies to fill immediate gaps during the pandemic. While those solutions helped, why is it important to keep longer-term solutions in mind?

Many of those solutions were stop-gap measures, or reactions to core system overloads. During the last recession we saw a similar situation: systems were overloaded; additional programs were deployed; and states were not able to accommodate them. In this case when systems became overloaded some citizens were pushed into other support channels. That was necessary, but it didn't always translate to getting benefits into citizens' hands faster or positive citizen experiences. Addressing those issues is critical going forward and requires longer-term solutions.

What does real progress look like when it comes to UI systems?

A system that has proven itself reliable under strain. The pandemic was an acid test for intelligent design, flexible business rules and a proven cloud architecture. States need a system that's not just deployed on cloud virtual machines, but one that is architected to take advantage of the scalability a cloud-hosted solution offers. A quick modernization strategy is also critical. These are large projects. A solution that can be deployed quickly and where real value can be realized in the short term is vital to all unemployment insurance agencies so they can fulfill their missions and obligations to their citizens.



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