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COVER STORY

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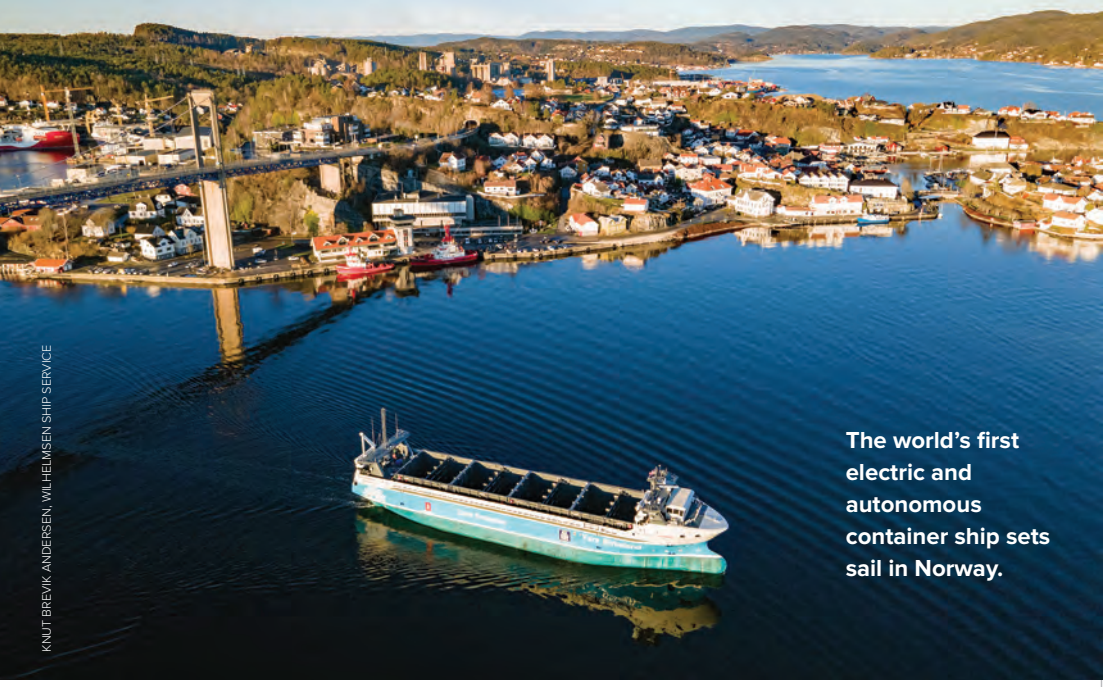

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Publisher: **Alan Cox**, alanc@govtech.com

EDITORIAL

Editor: **Noelle Knell**, nknell@govtech.com
Managing Editor: **Lauren Harrison**, lharrison@govtech.com
Web Editor & Photographer: **Eyragon Eidam**, eeidam@govtech.com
Senior Copy Editor: **Kate Albrecht**, kalbrecht@govtech.com
Copy Editor: **Kali Tedrow**, ktedrow@govtech.com
Associate Editor: **Zack Quaintance**, zquaintance@govtech.com
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Managing Editor, Education: **Andrew Westrope**, awestrope@govtech.com
Assistant News Editor: **Jed Pressgrove**, jpressgrove@govtech.com
Staff Writers: **Skip Descant**, sdescant@govtech.com
Julia Edinger, jedinger@govtech.com
Katya Maruri, kmaruri@govtech.com
Jule Pattison-Gordon, jpgordon@govtech.com
Brandon Paykamian, bpaykamian@govtech.com
Thad Rueter, trueter@govtech.com
Web Producer: **Andi Wong**, awong@govtech.com

DESIGN

Chief Design Officer: **Kelly Martinelli**, kmartinelli@govtech.com
Senior Designer: **Crystal Hopson**, chopson@govtech.com
Production Director: **Stephan Widmaier**, swidm@govtech.com

PUBLISHING

Senior Vice President:
Kim Frame, kframe@govtech.com

Strategic Account Directors:
Carmen Besirevic, cbesirevic@govtech.com
Lisa Brown, lbrown@govtech.com
Katie Dunlap, kdunlap@govtech.com
Lynn Gallagher, lgallagher@govtech.com
Karen Hardison, khardison@govtech.com
Charles Hughes, chughes@govtech.com
Kristi Leko, kleko@govtech.com
Andrene Potts-Dierkes, apotts-dierkes@govtech.com
Rebecca Regrut, rregrut@govtech.com
Lara Roebbelen, lroebbelen@govtech.com
Kelly Schieding, kschieding@govtech.com

Bus. Dev. Manager:
Sheryl Winter, swinter@govtech.com

Director of SMB Sales:
Ron Avneri, dravneri@govtech.com

SMB Account Director:
Katrina Wheeler, kwheeler@govtech.com

SMB Account Managers
Dana Kansa, dkansa@govtech.com
Lisa Blackie, lblackie@govtech.com

Director of Sales Administration:
Jane Mandell, jmandell@govtech.com

Sales Administrators:
Janaya Day, jday@govtech.com
Ayesha Faiz, afaiz@govtech.com
Tara Holm, tholm@govtech.com
Lien Largent, llargent@govtech.com
Sharon Penny, spenny@govtech.com

Chief Customer Success Officer: **Arlene Boeger**, aboeger@govtech.com
Dir. of Content Studio: **Jeana Bigham**, jbigham@govtech.com
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Executive Chairman of the Board: **Dennis McKenna**, dmckenna@govtech.com
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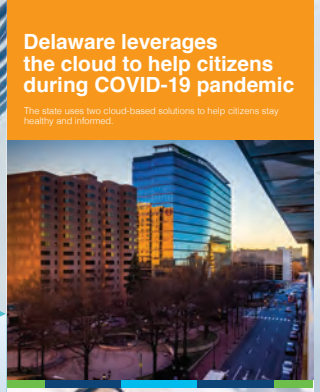

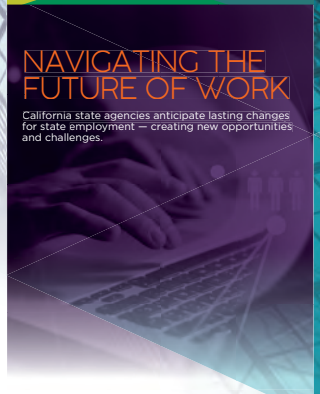

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By Noelle Knell / Editor

Another Silver Lining

One million people with disabilities lost their jobs as the pandemic took hold in 2020. That's one of the major negative impacts that lockdowns and the general economic downturn had on the disabled community. For a sense of scale, there are 1.9 million individuals with disabilities of working age (18 to 64) in just the state of California alone.

But there's much more to it.

As we've discussed many times in the pages of this magazine, pre-pandemic, telework was a tough sell for government. A few jurisdictions had limited pilot programs in place. Fewer still had a formal, limited remote work allowance for certain kinds of jobs. But the shuttering of buildings forced large-scale telework, and while an adjustment, most employers, even governments, had to admit that remote work was a viable option for the long term.

According to RespectAbility, a nonprofit advocacy group, before remote work enjoyed the broad acceptance brought on by necessity by the pandemic, it was not considered a "reasonable accommodation" under the Americans with Disabilities Act. But that might be starting to change.

A pretty big reason for that is the incredible advances in so many assistive technologies — the technologies themselves and the widespread availability we now see due to the value they offer. What used to be "assistive" is now, in a lot of cases, mainstream. Take live captioning, for example, which has gone from an expensive add-on of inconsistent quality to a mainstream offering available by default on most commonly used platforms. This evolution opens up new opportunities in the workforce for people who are deaf or hard of hearing.

Similarly, speech-to-text has matured leaps and bounds in recent years, and has now become a mainstream technology used, and even relied upon, by a significant portion of the population on a regular basis. Think Siri, Alexa and Google for a few quick examples.

"What initially started out as an accessibility accommodation for people with disabilities has now become something that everybody uses," said Philip Kahn-Pauli, policy and practices director for RespectAbility, in a conversation with *Government Technology*. "When that accommodation becomes normalized, it creates greater inclusion for workers with disabilities to participate in the workforce, to be able to contribute and to collaborate with others."

It's unlikely that the fastest typist can match the output of someone composing their memo or other office communication using speech-to-text. Consider the possibilities that presents for people unable to type.

Kahn-Pauli points out that several favorable government policies in recent years are enabling greater inclusion of people with disabilities into the workforce. A provision of the federal Workforce Innovation and Opportunity Act of 2014 directed federal contractors to hire and train people with disabilities. Many state and local jurisdictions also have explicit programs aimed at greater inclusion in employment.

And all of these forces are moving the needle in a positive direction: The labor force participation rate for people with disabilities is nearly 3 percent higher today than it was before the pandemic.

There's an opportunity here for people in state and local government IT who struggle to recruit talent. While many technology leaders support and are actively engaged in partnerships with local schools, secondary and post-secondary, they should also consider how they can support this underutilized talent pool. With all the recent talk of considering candidates with nontraditional backgrounds for hard-to-fill cybersecurity and other IT positions, people with disabilities should be on that list.

Disability advocates like Kahn-Pauli smartly describe their clients as problem-solvers by nature who are constantly confronted with completing tasks able-bodied people can do without a second thought. He suggests they're ahead of the curve, asking for remote work for years when many thought it was impossible.

"The very thing that people with disabilities were saying was the solution that everybody else now realizes, 'Oh, that's what we should do,'" he said. "I think it really demonstrates the talent and value that workers with disabilities bring to the table that can drive change. And when change is being driven by people with lived experience, I think we can all see the transformative results that come from that." gt

Zero Trust: A Potent Weapon Against Cyberattacks

HOW TO MODERNIZE OUTDATED SECURITY APPROACHES TO ADDRESS ESCALATING THREATS

Zero trust security has broad implications for state and local governments — giving them a potent weapon against escalating cyber risk.

Cybersecurity has been a top government concern for years, but the COVID-19 pandemic made the problem even bigger. Rapid growth of remote work and digital government services in response to the pandemic expanded the threat surface for cyberattacks. And cybercriminals have shown no mercy for public sector organizations, often targeting state and local government offices and schools with increasingly disruptive exploits.

How does zero trust security help solve this relentless challenge? Proponents of the strategy often point to an analogy of a castle and moat. Traditional security controls like firewalls, intrusion detection and endpoint management secure the castle's perimeter. But sophisticated attackers keep crafting digital drawbridges and getting inside anyway.

A zero trust approach considers intrusions inevitable. It locks every door inside the castle, requiring every user, device and transaction to be authorized. In the old paradigm, anybody inside the castle was trusted to avoid places where they didn't belong. This ends under zero trust, which controls where users can go and what they can do through specific access privileges. Zero trust limits network users' access only to the data and applications they require to do their work.

This brief is drawn from a recent webinar convened by *Government Technology*, which brought together experts from the Center for Digital Government (CDG), Google Cloud and the New York City Cyber Command. We explore the core challenges zero trust addresses, lay out the benefits of this approach and provide best practices for getting started — especially in cloud environments.

How We Got Here

Before we delve into the advantages of zero trust, it helps to review why this approach came to be.

Historically, network access controls gave people broad authority to navigate through networks once they were logged in. In essence, network administrators trusted people not to misbehave inside their networks. Given that users had strong incentives to keep their jobs, it made sense to trust them — especially when authorizing every user, device and transaction on a network was a daunting prospect.

Relentless cyber intrusions make the trust model untenable. Firewalls, intrusion-detection algorithms and endpoint management software are essential. But a single successful bot attack can still infect an enterprise network. It's impossible to completely prevent employees from accidentally giving away their log-in credentials in a phishing attack, for instance.

Today, it makes more sense to verify every user, transaction and device. Fortunately, advances in automation make this option increasingly viable.

It can't happen soon enough. The evolving threat environment gives state and local governments little choice but to embrace the protections of a zero trust environment to secure sensitive data and critical IT assets.

Core Challenges

Multiple factors are pushing agencies toward zero trust:

Changing work arrangements. Since the arrival of COVID-19, many more public sector employees are outside the traditional network perimeter. "The rapid adoption of remote work and virtual services dramatically altered and expanded the risk landscape for public organizations," says Deborah Snyder, former chief information security officer (CISO) for the state of New York, who is now a CDG senior fellow. CDG surveys of state and local government officials consistently show that hybrid work schedules — where employees work remotely at least part time — will be permanent for many agencies going forward.

Rising expectations. Residents and staff alike want more from government applications — better interfaces, smoother user experiences, more automation —

without added risk to personal data and IT assets. "Constituents expect a level of service that's a lot higher than what government agencies have been prepared to deliver," says Chris Hein, head of customer engineering for public sector at Google Cloud. Although the private sector notion of "move fast and break things" isn't acceptable for government, agencies still must move faster to launch convenient and secure digital government services.

Expanding threat surface. Device varieties and quantities grow every day with the addition of IoT sensors, smartphones, web-native applications and dedicated mobile tools for jobs like inspections. "You have more things connecting to more things," says Colin Ahern, deputy chief CISO for security sciences with New York City Cyber Command. "It really does create this attack surface that is much richer and harder to defend."

Shifting attack tactics. "Threats are increasing in complexity and velocity — basically by any measure," Ahern says. It's becoming more difficult to distinguish between cybercriminals and nation-state actors, which complicates diagnosing anomalous activity on a network. "You have nation states conducting activities that are untargeted and look a lot like cybercriminals; you have cybercriminals that are getting much more sophisticated," looking more like nation states, Ahern says. This means government agencies need every available tool and tactic to secure their networks.

Aging technologies. Governments often use a mishmash of old hardware and new software-as-a-service (SaaS) capabilities. Legacy systems, mainframes and application frameworks that support critical systems are often out of step with current needs. "When these systems were designed, they mostly reflected paradigms that are just not what we're seeing today," Ahern says.

Hein adds: "You're doing this amalgamation of enterprise services, some of which were built for cloud and some of which were built for the 1970s, and you're still dependent on them. You have to really figure out the right way to do this."

The advantage of zero trust is that it gives agencies a path toward a more secure future despite all these challenges.

Moving Toward Zero Trust

Zero trust security adds a critical extra layer of protection because it does not presume any user has a right to be on a network. It always asks, always checks.

"What zero trust implies is that I don't trust you just because you happen to be on my network," says Hein. In action, zero trust locks valuable services or data behind doors. When a user tries to open the door, algorithms correlate data from multiple sources to determine whether they should be granted a key to get in.

Thus, implementing zero trust controls makes it much more difficult for intruders to do damage or discover valuable data. And it encourages them to pursue softer targets.

When configured correctly, zero trust applications give intruders little room to maneuver. They can wander the castle halls, but they can't pick the locks on secure doors. "Even if an attacker gets access to one person's credential, it won't let them go across the network to everything else that might be there," Hein says.

Google uses a zero trust approach to protect its own operations, Hein adds,

> **"The rapid adoption of remote work and virtual services dramatically altered and expanded the risk landscape for public organizations."**
>
> ***Deborah Snyder,** former CISO, State of New York*

> **"You have more things connecting to more things. It really does create this attack surface that's richer and harder to defend."**
>
> ***Colin Ahern,** Deputy Chief CISO for Security Sciences, New York City Cyber Command*

and requires every employee to use a hardware-based security token to access critical data and services. "That in and of itself reduced our attack threats by a considerable amount," he says.

At the New York City Cyber Command, zero trust was implemented before the COVID-19 pandemic hit. With the amount of network devices growing rapidly in the city, the Cyber Command needed a security approach that would enable it to work safely in this evolving environment. Like Google, NYC also shifted to multifactor authentication.

"Our primary purpose as cyber defenders is making sure our incident-response team, which is 24/7/365, is able to continue their work unimpeded," Ahern says. This requires ingesting, normalizing, processing and storing vast amounts of telemetry and security data about who is accessing what, for what reason, and where. "We built a high-velocity data pipeline in the cloud that helps us accomplish that task," Ahern adds.

As a result of adopting zero trust, the Cyber Command was prepared when the pandemic forced city agencies to work from home in March 2020. The organization did not need to make configuration changes. Incident-response experts stayed on the job uninterrupted. "We're very proud of that," Ahern says.

Best Practices: Tips for Adopting Zero Trust Security

Zero trust is not a technology purchased from a vendor. It's an approach applied across a technology ecosystem. Zero trust has three core components: vision, cloud strategy and technology selection.

Creating a zero trust vision: Success with zero trust requires a focus on outcomes. Don't dive into it because it's the security topic of the week. "Do it because it is the only provable way to accomplish your goals," Ahern says.

Ahern suggests starting on a specific application or service with well-defined stakeholders who care deeply about it. "You want to find something big enough to be relevant, but small enough to be doable."

Once you've identified a starting point, establish security operations metrics to help document what's working. "Oftentimes, that comes too late in the process," Hein cautions.

It's also crucial to maintain a sharp vision of what you aim to accomplish. Create clear objectives in areas like recovery times and enforce them with service level agreements. And make sure the vision is adaptable, with baked-in agility and scale.

Building a cloud strategy: A zero trust approach requires provisions for cloud-based software, public cloud services and hybrid cloud infrastructures. Hence, a sound cloud strategy is essential.

As-a-service offerings for platforms, infrastructure and identity management often support zero trust principles.

Cloud services also are central to backing up and recovering data and applications if a cyberattack brings systems down. A cloud strategy requires provisions for capacity management, demand forecasting and incident response.

"You want to think very carefully about capacity planning because if something isn't reliable, it can't be considered secure," Ahern says. He warns that no plan survives contact with the public or an adversary, so you need to be prepared to adapt on the fly.

In addition, it's important to test disaster recovery programs to ensure everything works properly. "Unless your plan has been tested, it is not a real plan," Hein says.

Choosing the right technologies: Hein and Ahern share these tips for picking technologies and vendors that support zero trust.

- Build relationships with experienced, trusted vendors.
- Document everything you hope to accomplish.
- Assess total cost of ownership and the opportunity costs of technology choices.
- Invest in identity management upfront. Clarify identity policies and standards — including the life cycle of onboarding, rights, delegations and offboarding.
- Clarify endpoint security. Define a good configuration and how to assess it.
- Establish how to mediate deviations and how to deploy and update security tools. Clarify who manages everything.

> **"[The cyberattack threat] won't just go away on its own. You have to change something."**
>
> ***Chris Hein,*** *Head of Customer Engineering for Public Sector, Google Cloud*

Trusting the Zero Trust Approach

The cyberattack threat will only get worse. "It won't just go away on its own," Hein cautions. "You have to change something."

For starters, it's time to rethink the castle-and-moat model. After all, today's security perimeter is nothing like a wall — it's more like a mosaic of devices, applications and users.

Zero trust principles give government agencies an opportunity to safeguard this mosaic. With a carefully considered strategy and implementation, zero trust can help agencies improve public services while securing sensitive data and applications.

To learn more about cybersecurity, check out on-demand sessions from the Google Cloud Government and Education Summit.

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

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Discouraging Disinformation

In the ongoing battle against spreading disinformation online, the Aspen Institute released a report that outlines 15 recommendations for state and local governments, and other organizations, including investing in local journalism, boosting election security and building community empathy. "Information disorder is a crisis that exacerbates all other crises," said Rashad Robinson, president of Color of Change, during a panel discussion on the report, "because it prevents us, in so many ways, from being able to discuss important issues with facts."

LICENSED

In October, the Wisconsin Department of Safety and Professional Services (DSPS) announced a contract with Google Cloud to digitize its occupational licensing process. The platform will help automate data entry and free up DSPS employee resources, and ultimately aims to reduce time spent troubleshooting by the agency's call center, which currently responds to about 4,500 calls per week. DSPS issues about 500,000 occupational licenses annually.

Biz Beat

Procurated, a Washington, D.C.-based startup, is working to bring a new kind of experience to public procurement: Yelp-like reviews. The company's vendor performance management software is designed to help government agencies find the best suppliers for their needs. Procurement officials rate and review vendors, creating a database to inform other agencies' purchase decisions. Suppliers can list for free and pay for upgrades to provide more information, like case studies, to customers.

WHO SAYS?

"If you feed machine learning algorithms historical data and try to make a decision based on that past data, you're going to reinforce the traditional biases we see in the world."

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$450M

Funding raised by digital ID firm Socure, which recently expanded to work with government, bringing its total valuation to $4.5 billion.

2

PETABYTES

The amount of data Oklahoma has migrated to its new secondary data center.

$7.1M

The total Miami has generated in cryptocurrency since it launched MiamiCoin, its open source protocol that allows people to hold and trade in currencies like bitcoin.

70

The number of local governments registered to participate in a November meeting of the Coalition of City CISOs, a new professional organization.

By Stephen Goldsmith

Health Hub

Data-driven COVID-19 response in San Bernardino County, Calif.

These past two years, as COVID-19 swept the globe, municipal residents have needed to know infection and immunization rates, deaths, hospital capacity, and more in order to make healthy, informed decisions.

Fortunately, for residents of San Bernardino County, Calif., the local health department's Research, Assessment and Planning (RAP) team was up to the challenge of pulling together insights from disparate data sources. GIS analyst Serene Ong and her RAP associates understood the power of combining data that originated in different agencies and within communities, a task that also required building and maintaining a platform that facilitates this data sharing.

Ong and her team were hired around August 2019. When COVID-19 hit the San Bernardino region, the county relied heavily on various technologies like Tableau, Smartsheets, Excel and Qualtrics for data synthesis; GIS technology from Esri's suite of tools; and programming languages like SAS and Python for automation. Their work made data more useable and accessible, and the team fielded questions from county officials and the media, so that key decision- and policymakers could lead the COVID-19 response, informed by the data.

With the pandemic ongoing, the San Bernardino County COVID-19 Dashboard Hub has continued to grow and expand. The Hub includes data for various stakeholders interested in having easy access to vaccine information, hospital resources, contact tracing and mortality rates. All this data is formatted in a way that makes sense to non-data experts and is dynamically communicated to match the speed with which pandemic trends are changing and emerging. Ong hopes to enhance user functions by including features like time-enabled maps to show changes in data, trends and patterns over space and time.

RAP, in collaboration with the Communicable Diseases Section and the Preparedness and Response Program in the Department of Public Health, is also creating a dashboard to monitor and surveil influenza-like illnesses. Traditionally, data on respiratory and flu-like illnesses is collected from local hospitals manually, and then compiled into reports that are uploaded and shared online. The reports can include other data from incidental sources like the California Department of Public Health and vital statistics records of deaths due to influenza illness. Since so much of this process was manual, it was inefficient and not very timely. To improve the process and increase data transparency, RAP leveraged automation and mapping technology to enhance not just the overall data collection and reporting process, but to deliver crucial public health information to the public in a timelier manner. According to Ong, the Influenza-like Illness Dashboard will provide "important metrics on demand including confirmed cases, deaths, and vaccinations due to influenza-like illnesses."

> **"Part of the challenge to gaining a broader buy-in in terms of usage is how the information is visualized and shared.**

The RAP team is also assisting the county on a pilot program that will use mapping and GIS for an asthma intervention program. They are breaking down the demographic characteristics of city neighborhoods, specifically looking at race and examining the correlation between poor air quality and asthma incidences. Spatial location data is key to identifying asthma health risks, environmental or otherwise; San Bernardino County is utilizing the technical data, mapping and GIS to not only analyze, but also synthesize the information to inform policy. Ong's team wants to expand the number of public employees and community group leaders that can understand and utilize the county's data, which requires some level of GIS understanding.

Ong recognizes that part of the challenge to gaining a broader "buy-in" in terms of usage is how the information is visualized and shared. The number of people who benefit from the data shared on the GIS digital platform depends not only on the quality of the data, but also on how it is visualized, and how a multilayered frame of reference supports an up-to-date narrative. San Bernardino is leading the way in this work, taking on crucial resident questions and providing them with easy-to-understand information that they need to make healthy, informed decisions. gt

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 *The Responsive City: Engaging Communities through Data-Smart Governance.*

SEIZING THE MOMENT: Strategies to Accelerate Digital Transformation

The pandemic jumpstarted digital transformation in many state and local government organizations. To meet urgent needs, IT leaders procured laptops, workstations and other printing and computing devices for at-home use. They pivoted to emerging technologies and processes that were years out on their IT roadmaps. In taking these steps, they enabled thousands of employees to work remotely, expanded call center capabilities, created digital customer journeys that allow constituents to serve themselves, automated complex workflows and more. And they did it all in a matter of days or weeks.

While these use cases have demonstrated the power and potential of digital government, they have also clarified and validated which tools and strategies are central to rapidly transforming operations and constituent services. The cloud, artificial intelligence (AI) and process automation, and endpoint security are at the top of the list. When used strategically, they enable organizations to build on and protect their investments and move rapidly into a digital future.

Given the CARES Act extension (which gives state and local governments until December 2021 to spend funds) as well as the $1.9 trillion stimulus passed in March 2021, states and localities have a unique opportunity. Instead of raising bonds or turning to other traditional avenues to fund modernization, they can use some types of stimulus funding to build on the momentum of recent successes. The key is to seize the moment and use technologies such as the cloud and intelligent process automation strategically to further digital transformation goals.

Keeping Pace with "Faster, Better, Less"

The following trends and challenges are driving the need for digital transformation in state and local government:

☑ **Massive shift to remote work.** According to research, government workers who telecommute are 16 percent more engaged, 19 percent more satisfied and 11 percent less likely to leave their agencies than employees who don't telecommute.[1] Many organizations will permanently adopt remote and hybrid work scenarios to attract and retain workers, save taxpayers' money and boost resilience in the event of future disruption. As they do so, they will need to replace stopgap measures with secure, sustainable solutions for employee devices, endpoint management, collaboration, data sharing and more.

☑ **Constituent demand for digital government.** The pandemic forced agencies to roll out or expand digital offerings to provide urgently needed unemployment services and medical consultations as well as day-to-day

services such as driver license renewals, marriage licenses and building permits. Prior to the pandemic, constituents expected an efficient, convenient and personalized digital experience. Now the stakes are higher, as they expect even more services to be available digitally.

☑ **Inefficient manual, paper-based processes.** Many government offices are mired in manual processes that introduce errors and redundancies, create workflow backlogs as employees struggle to keep up, and prevent organizations from easily sharing and leveraging the valuable data contained in paper-based documents. Simple tasks, such as reviewing a job applicant's basic qualifications or a retiree's eligibility for benefits can consume hours over the course of a year. This work could easily be done using intelligent scanners and other modern technology.

☑ **Siloed, legacy systems.** Many agencies depend on legacy mainframes that contain decades of data and records. They need quick, easy, cost-effective ways to integrate these siloed systems with modern applications, IoT devices and other enterprise architecture to leverage the valuable data these legacy systems contain.

☑ **Uncertain budgets.** Although fiscal conditions are improving (with forecasted revenue trending upward in more than 30 states),[2] many lawmakers enacted conservative budgets for 2021. To balance budgets, state and local governments are looking at ways to cut costs and maximize their existing investments in technology. When they do spend, they must allocate resources carefully and make every dollar count.

☑ **IT staffing/skills gap.** IT and cybersecurity personnel are in short supply in both the private and public sector. To maximize the IT team's time, organizations need to offload some work to third parties, reduce time spent on repetitive manual tasks, and implement solutions that build in management and maintenance features that lighten the IT staff's load.

Strategies for Accelerating Transformation

The following strategies are fundamental to accelerating digital transformation.

Leveraging the Cloud

Instead of investing in their own data center hardware, organizations can use cloud-based services to flexibly scale storage, compute, bandwidth and other resources on demand for high-quality video chats and collaboration, rapid website loading, data analytics and resource-intensive workflows.

Hybrid cloud architectures and software as a service (SaaS) in particular played a vital role in enabling organizations to transition swiftly to remote work, digital constituent services and other necessities of the pandemic. Hybrid cloud architectures allow organizations to blend the best of on-premises environments and cloud environments. They also make it easier to share data across disparate systems and environments. This includes legacy mainframes and SaaS applications, private and public clouds, remote workers' disparate networks and devices, and the organization's physical office.

At the same time, organizations can maintain tight control of systems, applications and data that must remain on premises due to government regulations or internal policies. This centralized control provides greater visibility to help ensure all workers are using the same regularly updated (i.e., patched) software versions, tools and security policies.

Embracing Intelligent Automation

Intelligent process automation uses AI, machine learning and other advanced analytics to reduce manual, paper-based processes; optimize and streamline workflows; improve decision-making and planning; and consistently replicate institutional knowledge and best practices via standardized workflows.

Organizations are using intelligent process automation today to:

☑ **Provide rapid, personalized and relevant call center services.** When a constituent contacts a call center via

X AS A SERVICE (XAAS)

XaaS refers to anything that can be delivered as a service. One example is managed print services, where a provider delivers all of an organization's printing needs, including hardware, supplies, maintenance and data analytics (e.g., for insights into printer usage and optimization). Another example is devices as a service (DaaS), which allows organizations to flexibly scale provisioning, management and maintenance of smartphones, laptops, workstations, printers and other devices to meet workforce demands. These managed solutions equip organizations with energy-efficient state-of-the-art technology that eliminates many performance and security issues associated with outdated technology fleets.

To protect endpoints, organizations must go beyond traditional approaches such as firewalls and antivirus software. They must protect the devices themselves using built-in security features, encryption and advanced access control.

voice, email or text, AI-enabled natural language processing (NLP) analyzes voice and written text to route calls according to the caller's statements, perceived emotional state and other data. Back-office systems use the caller's phone number or other provided information to access additional information (e.g., jury duty records, recent billing or payment information, or Medicare eligibility) to further inform, personalize and expedite the call. Depending on the complexity of the call, chatbots (i.e., virtual agents) draw on content libraries to answer routine questions, or human agents intervene to resolve more intricate issues.

☑ **Enable digital self-service.** Constituents increasingly want the option to complete transactions, apply for permits, schedule appointments and conduct other government business without going into an office or engaging in in-person interactions. AI-enabled digital self-service allows users to digitally fill out, sign and submit applications and other forms anytime, anywhere and on any device; automatically routes documents through the proper workflows for authorization and fulfillment of requests; and often returns an immediate response about the status of a request. Throughout the process, intelligent automation technology analyzes data (e.g., about the constituent or about a particular agency program) to take or recommend the best next step and expedite the service as quickly and efficiently as possible.

☑ **Support digital communities/smart cities.** Intelligent process automation enables agencies to use data collected from IoT sensors, mobile devices, centralized databases, policy configurations and other sources to analyze, predict and dynamically orchestrate smart city processes. These processes range from safely routing autonomous vehicles and managing traffic more efficiently to detecting failing bridges and roadways and then automatically scheduling repairs based on equipment and workers' availability.

Tightening endpoint security

Endpoint security is only one aspect of an overall cybersecurity and risk management program. However, it's gaining more attention as remote work; borderless networks; and the increase of laptops, workstations, printers and other devices expand the threat surface. Ransomware, phishing and other threats exploit endpoint vulnerabilities to gain entrance into the organization's network and wreak havoc. Even outdated network printers have become a potential attack vector. Hackers can inject malware into unprotected printers and copiers to intercept printing jobs as they travel over the network or to gain entrance into the network itself.

To protect endpoints, organizations must go beyond traditional approaches such as firewalls and antivirus software. More advanced strategies include:

☑ **Built-in security tools.** Modern laptops, workstations and printers often come with pre-installed encryption, access control and other security features that simplify security deployment across fleets and add layers of protection. Built-in tools can also protect against firmware threats by checking the integrity of underlying device code at startup and forcing an immediate restart if the device is compromised. Industry-leading devices also have mechanisms to protect against phishing attacks and operating system infection by opening untrusted browser links in a virtual container that simply disappears (along with the malicious code) when the user closes the link.

☑ **Multifactor authentication, Zero Trust access control and data encryption.** Combined, these controls provide a layered defense. Multifactor authentication is stronger than user name/password combinations because it requires users to have multiple independent credentials, such as something they know with something they have. In the event of a breach, encryption of data at rest and data in transit helps ensure that data cannot be read. Meanwhile, Zero Trust access control helps prevent cybercriminals from accessing data by limiting what users can do once they are in the system and applying behavioral analysis to detect suspicious activity.

Accelerating Transformation and Future-Proofing Investments

To ensure successful digital transformation initiatives, it's important to:

☑ **Gain executive sponsorship.** Seek executive sponsors who understand the value of transformation and can

support it via funding, well-coordinated communications and firm directives. At the same time, recognize that the turnover for CIOs and other IT leaders is high and identify other champions who can carry the vision forward regardless of who is at the helm.

☑ **Engage IT and business stakeholders.** To encourage adoption, understand stakeholders' processes and align digital transformation to their needs, capacity and capabilities. Address their views and concerns while also painting a realistic picture of the changes ahead and how the organization will prepare staff to be successful.

☑ **Do outside research.** Attend webinars, read industry reports and sit down with potential vendors. Talk to public and private sector peers who have undertaken their own modernization efforts. People are often eager to share their lessons learned, recommendations and wins. They can also provide insight into the vendors and solutions they have worked with.

☑ **Perform workflow discovery.** Consult with potential vendors to evaluate paper- and document-intensive processes, identify inefficiencies and learn about potential solutions to streamline and optimize workflows.

☑ **Prioritize goals.** Develop a clear roadmap and prioritize goals. Focus on doing a few initiatives well instead of overwhelming people with dozens of programs. Include some quick wins that address immediate challenges, demonstrate the solution's impact and help maintain program momentum.

☑ **Train IT and business staff on new technologies.** Offer online courses and take advantage of vendor-provided trainings. Arrange intensive training for highly motivated learners with the expectation they will share skills and use cases with others; be sure to adjust their workload to account for the time they spend mentoring peers.

When used strategically, tools like the cloud, AI, process automation and endpoint security enable organizations to build on their investments and move rapidly into a digital future.

☑ **Choose the right vendor.** Look for vendors that have proven technology, deep expertise, real-world experience working with government organizations and the vision, commitment and financial resources to invest in innovation and continuous improvement of their products over time.

The Future Won't Wait

The pandemic has brought state and local governments to a turning point in their modernization efforts. How they proceed will shape the way they operate and serve constituents for years to come. With the new administration and recent legislation focusing on investments in IT modernization, forward-looking organizations will act now to take advantage of current funding and lay a foundation for whatever funding opportunities arise in the future.

This paper was written and produced by the Center for Digital Government, with information and input from HP.

Endnotes:
1. Deloitte. Location Liberation. March 2021. https://www2.deloitte.com/us/en/insights/industry/public-sector/government-trends/2021/location-liberation-adaptive-workplaces-government.html
2. National Conference of State Legislatures (NCSL). State Budget Update: Winter 2021. March 2021. https://www.ncsl.org/research/fiscal-policy/state-budget-update-winter-2021637511555.aspx

Produced by: CENTER FOR DIGITAL GOVERNMENT

The Center for Digital Government, a division of e.Republic, is a national research and advisory institute on information technology policies and best practices in state and local government. Through its diverse and dynamic programs and services, the Center provides public and private sector leaders with decision support, knowledge and opportunities to help them effectively incorporate new technologies in the 21st century. **www.centerdigitalgov.com.**

For: hp

HP creates new possibilities for technology to have a meaningful impact on people, businesses, governments and society. With the broadest technology portfolio spanning printing, personal systems, software, services and IT infrastructure, HP delivers solutions for customers' most complex challenges in every region of the world. More information about HP (NYSE: HPQ) is available at **www.hp.com**

Araceli Guerra

Managing Director of Internal Services, El Paso, Texas

Araceli Guerra oversees the IT department for El Paso, Texas, working as managing director of internal services to handle everything from cybersecurity to the tech needs of city departments. Plus, a 2020 restructure also put the human resources department as well as the performance office under Guerra's purview. That consolidation — along with the city's location along the Rio Grande just across from Ciudad Juarez — creates an interesting set of circumstances for El Paso.

1 Can you describe the city's new user design and development adoption program?

We're always interested in obtaining user feedback and finding out whether what we're developing and deploying is really working for our customers. After attending some workshops through Bloomberg Philanthropies and the Stanford d.school, we talked a lot about designing for humans in all of our applications, as well as in the software and hardware we deploy throughout the city, but we really didn't have a set program or division that took care of that. Thankfully, through some restructuring and converting vacancies, we were able to stand up a user experience division.

We like to take the voice of our customer and put that back into development and deployment. We also filled new positions for user experience developers, who work on doing the research and applying the learning aspect to how we're developing applications. We've also reached out to our university, and we have some interns that are in the same user experience program who are able to apply the methodologies to the development of our software.

2 How important is collaboration for your work?

We have strong partnerships. We participate in Communities of Excellence, and it includes the university, El Paso Community College and many of the school districts. We know we have to tie in to our talent pool and make sure we don't lose talent that's growing here with our young people. We also have efforts within our budget office, where every year they have a youth academy and they run through the process of creating a budget alongside the city. They're able to see how we are using those dollars and present it to the mayor and council with the different ideas that they have. In terms of partnering with the university, we're currently working to revamp our volunteer program so that the process is seamless. We partner with the county of El Paso as well.

3 How does El Paso's location make your work unique?

Being a border city, we have partnerships that cross over into Ciudad Juarez and Mexico. With international bridges, it's making sure that the data they're collecting — and they do a fantastic job with the tools available to them — is able to provide updates in different council meetings. For example, what does the data show for border crossings? It impacts the economy here and the businesses.

Additionally, we have pandemic response. How can we help facilitate our brothers and sisters in Ciudad Juarez to get vaccinated, making sure they're able to come over and do that in order to continue their own business? There are a lot of business owners that live here and commute between Ciudad Juarez and El Paso. I think one of the more open conversations we have because we're a border city is how we use technology in those ways.

4 Looking ahead, what are some of your top priorities?

We're working on a refresh of our strategic plan with our mayor and council, and that will shape our priorities for the coming year. Of course, as the American Rescue Plan funds are being distributed and approved, we're focusing on broadband expansion, and how we work with our local agencies and partners to provide Internet service. With the user experience division, we're looking at how we can continue to innovate and pivot with what's new in technology for our customer base, internally and externally. Then, of course, cybersecurity will always remain a top priority. We just recently received a risk assessment and we're working on making sure we're able to implement the recommendations. gt

— Zack Quaintance, Associate Editor

ADOBE STOCK

Wildfire smoke rises above vineyards in California's Napa Valley.

Heating Up

It's always fire season on the West Coast, or so people say of the uptick in the last several years of severe wildfire activity that has burned whole towns and blanketed major regions of Oregon, California and Washington in thick smoke.

A number of startups aim to stop those blazes before they start — or at least before they get out of control — with artificial intelligence, and fire departments are taking all the help they can get. While even big players like Amazon are getting involved, partnering with university researchers and using machine learning to analyze tens of thousands of aerial images for signs of fire activity, smaller companies like Illumination Technologies are working directly with fire agencies to monitor targeted areas.

Napa County, Calif., has contracted with Illumination to deploy three cameras at $6,000 each per month that can spot fire activity via optical detection and identify heat and gas using sensors. Not only can the tech identify a fire as it gets going, but it can also help the county target its response to potentially deadly situations.

Illumination believes AI is a key component of continuing to battle wildfires in the face of limited crew.

"You could not hire enough firefighters," Brent VanKeulen, deputy director of the Western Fire Chiefs Association, told *Government Technology*. "You can't fly enough planes. You can't get enough dozers on the ground to meet the challenge of what we're facing now." gt

100 GOVTECH

THE MARKET FOR TECH COMPANIES SERVING GOVERNMENT HIT RECORD M&A HIGHS IN 2021 — AND IT'S JUST GETTING STARTED.

GAINING

BY THAD RUETER

ADOBE STOCK


STEAM

To get a sense of how hot things have become in the government technology space, turn to Ron Bouganim, the managing partner of the Govtech Fund, which since its launch in 2014 has invested in 30 companies.

"It's intense," he said in late October at a conference in Austin where entrepreneurs, investors and government officials networked as they took stock of recent industry growth. "These past six months, I've never seen anything like it. There are more citizens every day who are digitally native and expect a certain level of service. COVID just dumped gas on the fire."

Data from *Government Technology* supports his view: An analysis from Jeff Cook, a managing director at Shea & Co. and another industry expert, suggested that in the third quarter of 2021, transaction volume for gov tech deals hit approximately $2.2 billion, with strategic acquisitions driving much of the activity.

That's hardly the whole story.

Earlier in the year, for instance, came the blockbuster $2.3 billion Tyler Technologies acquisition of NIC — combining two of the most established companies in this space — along with CivicPlus winning a $290 million investment from private equity firm Insight Partners, a deal that not only underscores the amount of capital flowing around in gov tech, but the increasing importance of digital citizen engagement tools.

The new year will bring a continuation of such investment and merger-and-acquisition activity, though with changes both subtle and potentially significant. The gov tech market will stay hot, responding to a variety of factors, but market experts are already anticipating the shifts to come — and all this as public-sector buyers of technology figure out what it means for them.

According to a *Government Technology* count, 2021 had seen more than 30 mergers and acquisitions as of mid-November, outpacing previous years, according to investors.

As for transaction activity, the Q3 figure of $2.2 billion is down from $4.5 billion in Q2, with Q1 transaction activity reaching $3 billion. According to Cook, the number of announced transactions in the third quarter of 2021 was comparable to prior quarters, but these more recent deals lacked large transactions like Tyler-NIC.

"In the second half [of 2021], businesses were turning their attention further down market," Cook said. As he looks toward 2022, Cook says he anticipates a continuation of that trend: a high volume of deals, though with lower average deal sizes. "The acquirers who've been active will continue to be active."

But buyers of gov tech, along with investors, should be on the lookout for a new class to rise, so to speak. Fresh consolidators are certain to emerge, and the example of perhaps the biggest deal yet in gov tech — Tyler's acquisition of NIC — could help steer activity in the near future.

"The big ones are almost trying to be the next Tyler," said Steve Ressler, a gov tech adviser who recently took on the role of strategic adviser for Clariti, a permitting and licensing company that sells to state and local governments. "As long as the macro-economic [climate] continues, even in a slight downturn there will be a lot of folks investing in government technology, in large part because of its stability."

DRIVING FACTORS

It pays to take a step back and review the factors that have fueled this growth so far, and how they will play a role in how the gov tech market develops over the next year or more.

One of them, as Ressler indicated, is that governments, for as slow as the bureaucracy can be, are often more stable sources of sales and returns than other areas of the economy. Governments cannot stop operating.

100 GOVTECH

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

120Water
120Water offers cloud-based water management software.
Est. 2016 / 120water.com

3AM Innovations
3AM's mobile command platform helps improve firefighters' situational awareness and safety during emergencies.
Est. 2015 / 3aminnovations.com

Accela
Accela software helps government agencies automate transactions and services 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

Aclima
Aclima offers a platform and network of sensors that collect detailed data on air quality and emissions at hyperlocal levels.
Est. 2007 / aclima.io
Fast Fact: *Aclima holds early patents for wearable air quality sensors.*

Airspace Link
Airspace Link helps local governments manage drone use.
Est. 2018 / airspacelink.com

Aurigo Software
Aurigo makes software for managing capital projects from planning to maintenance.
Est. 2003 / aurigo.com

Automotus
Automotus uses video technology to improve urban curb management and reduce traffic congestion.
Est. 2017 / automotus.co

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 body-worn 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

Binti
Binti's software streamlines the approval process for prospective foster parents.
Est. 2016 / 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

Camino
Camino makes permitting, licensing and remote inspections software for government.
Est. 2015 / camino.ai
Fast Fact: *Camino raised a $3 million funding round from investors in early 2021.*

Cardinality.ai
Cardinality.ai is an AI-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

CITYDATA.ai
CITYDATA.ai uses an AI platform to locate mobile users, enhance customer profiles and study geo-behaviors to help improve citizen service offerings.
Est. 2020 / citydata.ai

CityGrows
CityGrows' software automates government workflow processes like permitting and payment processing.
Est. 2015 / citygrows.com

CivicActions
CivicActions uses open source tools and agile methodologies to help government develop digital platforms and large-scale software deployments.
Est. 2004 / civicactions.com

CivicPlus
CivicPlus builds digital services for local government, including custom websites, scheduling and civic engagement tools.
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

195

TOTAL NUMBER OF ACQUISITIONS BY THE 2022 GOVTECH 100

Source: Crunchbase

Another major reason for all this activity is pretty simple, and similar to changes happening in the broader economy in such industries as health care, insurance and B2B commerce.

"There is a lot of under-penetration of tech and a lot of old business models," said Chris Grizzard, director of Bayshore Capital, of the gov tech market, highlighting one of the main reasons that the space is attracting so much money and so much entrepreneurial interest.

He made his comments at the event in Austin — the inaugural InState GovTech Summit — where speakers and participants talked in depth about how the demands of the pandemic accelerated digital efforts among public agencies. The general theme is that those efforts were already ongoing, but the need to quickly set up remote workforces, or virtual public meetings, or web-based citizen engagement, added steam to that push.

Even as the pandemic fades — hopefully — its influences will continue to be felt, according to Meredith Ward, director of policy and research for the National Association of State Chief Information Officers (NASCIO), in comments made to *Government Technology* independent of that conference.

"Many procurement processes were streamlined last year as COVID-19 governor emergency orders were in place, but most of these orders have since expired," she said. Still, "there are many practices put in place during these emergency orders that have the potential to have a lasting impact on state IT procurement processes."

"THERE ARE MORE CITIZENS EVERY DAY WHO ARE DIGITALLY NATIVE AND EXPECT A CERTAIN LEVEL OF SERVICE. COVID JUST DUMPED GAS ON THE FIRE."

BEYOND THE PANDEMIC

How gov tech develops over the next few years depends on much more than the pandemic, of course. Among the other main factors that will shape investment, M&A activity and how public agencies deploy and buy technology is the broader move toward cloud computing and software as a service.

One recent example of the trend's importance — and how it could play out in 2022 among state and local governments — came from Google.

The search and online advertising giant is not exactly a gov tech firm, but in early November it announced the launch of a cloud-based "sandbox" called the RAD Lab that could help public agencies test and develop their own tools.

The lab offers an open source environment where governments, along with laboratories and universities, can quickly set up cloud environments for research projects, develop and test new technologies through trial and error in a secure environment, and receive support from Google professionals.

ADOBE STOCK

Clients pay on a subscription basis, which Google says reduces the risk of cost overruns, a prime concern for new technology deployments.

"For state and local governments, the pandemic has driven an upsurge in innovation, and that shift is here to stay," said Emma Fish, head of education programs and business development of public-sector cloud at Google. "Many [of those agencies] are thinking about how to upscale and support technology teams."

Of course, direct sellers of cloud-based and SaaS tools will try to gain more governmental clients and more market dominance in the coming year as the market further develops. The opportunity is lucrative, at least going by the priorities mapped out by state and local governments themselves.

The Center for Digital Government's* 2021 surveys of both cities and counties indicate a lot of movement to the cloud. About one-third of cities report that at least 30 percent of their systems and applications are already in the cloud. The percentage for counties at that same stage of cloud migration is about 26.

More interesting still is what the data reveals about the future: namely that there is still much more opportunity in the cloud. More than three-fourths of city technology leaders report that 30 percent or more of their IT infrastructure can eventually move to the cloud. And that number holds for counties as well.

And while digital surveys tend to attract responses from leading jurisictions, for investors and entrepreneurs, such data shows how important the cloud is and will become in the government technology space in the coming years.

"The market is going through a big change, crossing that chasm into the cloud and into software as a service in a big way," said John Thomson, founder and CEO of PayIt.

The Kansas City, Mo.-based company sells digital payment and other services to governments and continues to expand while using technology from Amazon Web Services. Amazon,

* *The Center for Digital Government is part of e.Republic,* Government Technology's *parent company.*

100 GOVTECH

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

Clariti
Clariti offers cloud-based government permitting and licensing software.
Est. 2006 / claritisoftware.com
Fast Fact: *Clariti was originally called BasicGov. The company rebranded in 2020.*

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

Column
Column's platform streamlines public notification processes and compliance.
Est. 2019 / column.us
Fast Fact: *CEO and founder Jake Seaton learned the importance of public notifications working as a paper boy and then a reporter for his family's local newspaper business in Kansas.*

Conduent
Conduent provides solutions to streamline services like child support payments and Medicaid benefits.
Est. 2017 / conduent.com
Fast Fact: *Conduent reports it has delivered $150 billion in child support payments.*

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

Daupler
Daupler's software simplifies customer service and response for utilities.
Est. 2017 / blog.daupler.com
Fast Fact: *Daupler customer Oakland, Calif., reports $2.25 million in annual savings using the system.*

EasyVote Solutions**
EasyVote Solutions delivers a software-as-a-service platform to city, county and state election offices to help manage the election process.
Est. 2013 / easyvotesolutions.com

Edmunds GovTech
Edmunds GovTech provides ERP solutions for local government.
Est. 1972 / edmundsgovtech.com

Esper
Esper offers cloud-based technology to help state governments digitally centralize policymaking.
Est. 2013 / esper.com
Fast Fact: *Esper raised an $8 million Series A funding round led by Cota Capital in August 2021.*

Esri
Esri provides a geospatial platform and related tools for public agencies.
Est. 1969 / esri.com

First Arriving
First Arriving provides tech solutions for emergency services and public safety.
Est. 2013 / firstarriving.com
Fast Fact: *First Arriving specializes in large-format digital dashboards to improve communications for first responders.*

Forensic Logic
Forensic Logic's COPLINK platform allows law enforcement agencies to search, analyze and share data.
Est. 2003 / forensiclogic.com

GCOM
GCOM offers SaaS technologies to support health and human services.
Est. 2005 / gcomsoft.com
Fast Fact: *GCOM has customers in at least 24 U.S. states.*

Government Brands
Government Brands offers cloud-based contactless payment services for government.
Est. 2017 / governmentbrands.com
Fast Fact: *Government Brands reports processing more than 27 million payments annually.*

GovPilot
GovPilot is a web-based management platform developed exclusively for local government.
Est. 2014 / govpilot.com

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 smaller startups: Bonfire, CityBase, eCivis, Open Counter, Questica and Sherpa.
Est. 2016 / gtytechnology.com

gWorks
gWorks' software solutions include platforms for municipal asset management, GIS and payroll.
Est. 1999 / gworks.com

HAAS Alert
HAAS uses mobile data to alert drivers (and cyclists) of approaching emergency vehicles through vehicle-to-vehicle notifications.
Est. 2015 / haasalert.com

Hayden AI**
Hayden AI puts cameras on city vehicles to gather data and spot traffic violations.
Est. 2019 / hayden.ai

$4B

TOTAL FUNDING RAISED BY 2022 GOVTECH 100 COMPANIES

Source: Crunchbase

like Google, is also striving to capture more of this market, another illustration of how big tech is trying to realize more revenue from the gov tech space, a trend that is certain to hold.

SPECIFIC PAIN POINTS

As the PayIt example suggests — the company recently expanded into Canada, and Thomson envisions a range of digital tasks that the firm can provide citizens, such as citation and ticket payments — the next year or two promise to showcase more tech providers widening their product offerings.

Indeed, as Cook, the investment expert, pointed out, citizen engagement and digital services enjoyed most of the M&A focus just a few years ago. But now the activity covers a much wider range of public services, thanks in large part to the cloud and SaaS.

One area is public safety — law enforcement, fire protection and medical response, along with an increasing focus on disaster response as wildfires, hurricanes and other natural events turn more severe. Tech providers are offering more products with real-time data and video feeds, platforms that can be integrated by multiple agencies and even artificial intelligence.

According to Stewart Lynn, a partner at Serent Capital who leads its gov tech practice, a startup called First Due helps to illustrate how the market is evolving.

"AS LONG AS THE MACRO-ECONOMIC [CLIMATE] CONTINUES, EVEN IN A SLIGHT DOWNTURN THERE WILL BE A LOT OF FOLKS INVESTING IN GOVERNMENT TECHNOLOGY, IN LARGE PART BECAUSE OF ITS STABILITY."

The five-year-old company's goals seem ambitious: give firefighters more intelligence about fire calls while improving other IT systems those emergency responders rely on when they aren't on a call. First Due also aims to serve emergency medical services agencies and police.

The company has won funding from Serent, and for Lynn, that decision boiled down to a few points that offer examples of how investors are thinking about gov tech going into 2022.

"First Due was started to solve a specific pain point in the market that other record management software players weren't addressing: pre-incident planning," he said. "Before First Due, most agencies had binders that sat in fire trucks that provided information about each building in their jurisdiction. First Due digitized that information and pulled in additional data sources to provide fire crews with critical information before arriving at the scene."

CHANGING OF THE GUARD

As investors seek out more young companies that address specific pain points and offer end-to-end platforms, the government sector itself is shifting, a trend that promises to play a role in buying and deployment decisions, according to experts such as Lynn.

He called it the changing of the guard.

"Many private-sector folks are finding new roles within government and have understood that the current systems in place are very antiquated and in need of an upgrade," he said.

Related to that, he said, are changes among residents served by new technology — another trend likely to catch speed over the next few years.

"As citizens have become more active online, you're seeing governments being responsive to their citizens' needs," Lynn said. "Citizens today want the ability to go online and buy their permit, process their payment, understand what's going on with budget spending. And governments are responding to that demand by investing in digital solutions."

PARTNERS, NOT JUST SUPPLIERS

None of that means the ongoing growth in the gov tech market has every area perfectly covered. Hurdles and holes always remain.

For one thing, better gov tech means much more than new software or cloud-based applications, according to Rita Reynolds, chief information officer for the National Association of Counties.

Similar to what investors and entrepreneurs were saying at the Austin conference in late October, Reynolds talked about how

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

IPS Group
IPS Group globally delivers smart city tech within an Internet of Things framework.
Est. 1994 / ipsgroupinc.com

Itron
Itron offers technology and services focused on measuring and controlling energy and water use.
Est. 1977 / itron.com

ITsimple
ITsimple provides no-code platforms for government websites and social media channels.
Est. 2017 / itsimple.io
Fast Fact: *ITsimple is based in Alpharetta, Ga.*

Kofile
Kofile digitizes government services so information is secure, accessible and scalable.
Est. 2009 / kofile.com

Kountable
Kountable's platform helps governments work securely with local small businesses.
Est. 2015 / kountable.com
Fast Fact: *Kountable has offices in the U.S., Kenya, Rwanda and the Netherlands.*

Lacuna Technologies
Lacuna helps local governments manage public transit and transportation.
Est. 2018 / lacuna.ai
Fast Fact: *Lacuna has raised $33.5 million since its launch.*

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

mySidewalk
mySidewalk's platform allows cities to use aggregated demographic and socioeconomic data in planning and operations.
Est. 2010 / mysidewalk.com
Fast Fact: *mySidewalk was originally called MindMixer.*

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

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

Optimere
Optimere comprises a merger between ArchiveSocial, Next Request and Monsido to support government compliance around public information online.
Est. 2021 / optimere.com
Fast Fact: *Optimere subsidiaries ArchiveSocial and NextRequest were former GT100 companies.*

Passport
Passport specializes in enterprise business applications and payments for parking and transportation.
Est. 2010 / passportinc.com

Paylt
Paylt simplifies doing business with federal, state and local governments through its mobile transaction and payment platform.
Est. 2013 / payitgov.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

PowerDMS
PowerDMS is a policy and compliance management platform to help reduce risk and liability.
Est. 2001 / powerdms.com
Fast Fact: *PowerDMS merged with former GT100 company NEOGOV in 2020.*

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

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

515

TOTAL INVESTORS IN 2022 GOVTECH 100 COMPANIES

Source: Crunchbase

attracting the right talent will play at least a short-term role in technology development and deployments.

"Counties are faced with resource [people] limitations as well as learning new skills and knowledge to maintain and support the newer approaches to technology," she said.

That would seem to speak to at least one reason behind the launch of that Google cloud-based sandbox. But a public agency — much like a startup — can only do so much without the right people.

Security also stands as a prime concern for public agencies as the gov tech landscape expands and takes in more startups. According to Reynolds, technology sellers need to do more to ease the concerns of clients.

"Government technology vendors must be willing to update their terms of service and contracts to accept their responsibility and ensure that baseline essential security practices are in place to secure what they are hosting and providing to counties," she said.

Reynolds said counties increasingly are moving email, finance, budget, payroll, assessments and other applications to the cloud. Those units in government are also looking for ways to better sustain remote workforces, which will lead to more technology sales, especially for video, security and communication tools.

"THE MARKET IS GOING THROUGH A BIG CHANGE, CROSSING THAT CHASM INTO THE CLOUD AND INTO SOFTWARE AS A SERVICE IN A BIG WAY."

As for Ward, from NASCIO, she said that technology is a part of just about every government project these days — from the study of so-called "murder hornets" in Washington state to the ongoing fight against opioid addiction in Pennsylvania, to name just two recent examples.

But states could do more to get more technology — cutting-edge technology — into play, moves that could add more fuel to the growth of the market, she said.

Those moves include pre-approved vendor pools; master contracts; increased use of cooperative agreements; digitization and automation of procurement processes and procedures; streamlining of approvals and rapid purchasing; and discontinuing "outdated" policies like unlimited liability and performance bonds.

Like Reynolds, Ward also urged gov tech vendors to do their part to ensure even more growth in the years to come.

"Vendors must continue to work with states on more flexible terms and conditions and other procurement-related aspects," Ward said. "It is true that states have several mandatories and laws in place that can make doing business with state government challenging. However, states are working towards modernizing the acquisition process and are looking to the private sector for partners, not just a supplier of things or services." gt

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GOVTECH 100

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

Replica
Replica uses "synthetic" location data to analyze urban transit patterns without compromising privacy.
Est. 2018 / replicahq.com
Fast Fact: *Replica was born out of the Google-affiliated SidewalkLabs.*

Ride Report
Ride Report gives cities micromobility data from private companies like scooter-shares.
Est. 2014 / ridereport.com

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

2

AVERAGE NUMBER OF FOUNDERS OF A 2022 GOVTECH 100 COMPANY

Source: Crunchbase

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

275

TOTAL NUMBER OF FUNDING ROUNDS FOR THE 2022 GOVTECH 100

Source: Crunchbase

SimpliGov
SimpliGov automates government workflows to help agencies work more efficiently.
Est. 2018 / simpligov.com

Smarking
Smarking lets clients own or manage a holistic view of their parking assets and data through a variety of technology systems.
Est. 2014 / smarking.com

SOMA Global
SOMA Global offers a public-safety-as-a-service platform for systems like computer-aided dispatch and agency interoperability.
Est. 2017 / somaglobal.com

Spatial Data Logic
Spatial Data Logic's municipal management platform automates government workflows.
Est. 1997 / spatialdatalogic.com

Springbrook Software
Springbrook Software supports local government financial systems, including budgeting and utility payments.
Est. 1985 / springbrooksoftware.com

SST
SST develops ShotSpotter gunshot detection and location technology to help reduce gun violence in cities.
Est. 1996 / shotspotter.com

StreetLight Data
StreetLight Data delivers geospatial business intelligence to support critical decisions and improve return on investment.
Est. 2011 / 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

TrueRoll
TrueRoll helps maintain property tax rolls by identifying unclaimed and unqualified homesteading exemptions.
Est. 2018 / trueroll.io

Tyler Technologies
Tyler provides end-to-end information management solutions and services for local, state and federal government. It wholly owns NIC, a former GT100 company.
Est. 1966 / tylertech.com

Ubicquia
Ubicquia makes hardware and software for smart streetlights.
Est. 2014 / ubicquia.com

UrbanFootprint
UrbanFootprint compiles municipal data and uses AI to help developers make informed decisions.
Est. 2015 / urbanfootprint.com

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 / asterra.io

Varuna
Varuna's dashboards gather water utility data and make predictions and recommendations for improvement.
Est. 2018 / varuna.city

14%

PERCENTAGE OF 2022 GOVTECH 100 COMPANIES FOUNDED BY WOMEN

Source: Crunchbase

Verra Mobility
Verra Mobility offers smart transportation solutions like tolls and traffic cameras.
Est. 1987 / verramobility.com

VertexOne
VertexOne provides on-premise and cloud-based customer management software for utilities.
Est. 1996 / vertexone.net

Visionary Integration Professionals
VIP makes business strategy software for governments and corporations.
Est. 1996 / trustvip.com

Waterly
Waterly's software manages water and wastewater data and operations.
Est. 2017 / waterlyapp.com
Fast Fact: *Waterly was part of the CivStart startup accelerator in 2020.*

Whyline**
Whyline offers software to help government agencies virtually manage customer wait times.
Est. 2015 / whyline.com

Zencity
Zencity's platform aggregates and analyzes citizen feedback for local government.
Est. 2015 / zencity.io

*** Disclosure: The parent company of* Government Technology *is an investor in EasyVote, Hayden AI and Whyline through e.Republic Ventures.*

JUSTICE FOR ALL

The pandemic caused many courthouses to pause or limit in-person sessions, forcing staff to get creative. Those struggles proved a breeding ground for innovation and turned new focus on digital equity.

BY JULE PATTISON-GORDON

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AS THE PANDEMIC swept in during spring 2020, many courts temporarily suspended jury trials and postponed nonemergency hearings, limited access to courthouse facilities and sent home nonessential workers. Judicial teams around the country scrambled to find ways to translate their processes beyond the courthouse doors and ensure they could still serve both tech-savvy residents and those with little digital access. Courts couldn't afford to leave residents unserved while officials searched for the ideal digital tools, so one lesson emerged: When navigating these new waters, don't wait on finding the perfect answer — just start trying something, see what works and make changes from there.

This point of view comes from Judge Clemens Landau of the Salt Lake City Judicial Court, speaking at the National Center for State Court's (NCSC) Court Technology Conference (CTC) in late 2021. "If you get the minimum viable product out, you will eventually get the maximum out," he said. " ... There's always flaws, but let's get something out and work toward something."

This spirit of experimentation has taken hold in many courts. And a lot of this has produced what may become permanent changes.

Judge Landau's court postponed thousands of cases during its four months of closure in early 2020. As the team readied in June 2020 for reopening, orders poured in calling for accelerated processing on many of them.

"[Those cases] were all going to crush us starting July 1," Landau said. The solution? Pick a common online scheduling tool, link it on the court website and see what happens. Utah State Judicial Branch CIO Heidi Anderson suggested using Doodle to allow site visitors to schedule hearings. Rather than a protracted search for the perfect, tailored tool, Landau said they decided simply to try it.

"It did not go smoothly at the beginning," Landau admitted, "but it was a way of interfacing with thousands of people who needed to get their cases moving along."

The court spent roughly $60 on two accounts, and customized settings so constituents would be asked to provide details like contact information, need for interpreter and whether they had an attorney. Adopting a general-use software proved to have added benefits: Many residents were already familiar with how it worked. And above all, selecting a tool let the court start making progress against the daunting scheduling problem. The virtual schedules quickly filled, and Landau's court continues to use the tool.

Not all residents can easily access video conferences, however, and taking hearings remote can mean physically bringing court to them. Landau said efforts to serve homeless constituents have involved judges and public defenders taking their laptops and setting up in pop-up canopies and vans in parking lots near encampments, out of which they offer services.

This isn't the only mobile court effort, either. Landau said court officials periodically set out in canoes and kayaks to reach the unsheltered population living along the riverbanks. Judicial staff bring hot spots and laptops to let other participants join virtually.

Adopting new methods is only one part of the battle — ensuring constituents are aware of them is another. Along with finding different ways to hold court, judicial teams have had to find different ways to communicate with residents. Courthouse closures also forced staff to adopt new methods for getting the word out about new digital methods and other updates. Judges couldn't assume residents would be regularly checking court websites. For Landau, one answer was joining social media, where his posts reached attorneys who would spread the word to their own clients.

Still, relying on the Internet alone would overlook those without easy access, and Landau said his team also resorted to duct-taping printed information sheets to the courthouse windows to reach a wider audience. Court personnel also set up an unused police RV outside the courthouse during the early days of the pandemic to talk with anyone who hadn't heard about the closures and still showed up for hearings.

Adopting new technology has allowed some courts to expand their work, too. The Pima County, Ariz., Family Drug Court (FDC) program, for example, switched to remote, Microsoft Teams-based hearings and found this allowed personnel not only to continue supporting parents, but also to serve more and different participants than they had pre-pandemic, said case and recovery specialists during an NCSC-coordinated dicussion.

Pima County's FDC offers a voluntary program for parents who have lost legal custody of their children due to struggles with alcohol or other drug use. The Department of Child Safety requires parents to attend one session, after which they can choose whether to go through an intake interview and enroll. If they do, they'll attend regular court sessions as they progress through goals designed to help them recover and win back custody.

The move to digital didn't just change how the court met — it shifted the entire flow of the day, said Linda Perry, lead recovery support specialist at the Pima County FDC. "Our format prior to COVID was we had three hearings throughout the day," Perry said. "Now it's chunked out to 20-minute blocks scattered throughout the day."

Allowing participants to connect in from anywhere helped parents who otherwise might need to secure child care and make long treks into court, said Pima County FDC case specialist Heather Armstrong. "So that's essentially a half day to come to a short hearing," Armstrong said.

HYBRID JUSTICE

AS THE "COURTROOM" BECAME A MORE FLEXIBLE CONCEPT DURING THE PANDEMIC, HEARINGS TOOK ON NOT ONLY VIRTUAL BUT ALSO HYBRID FORMS. The latter model brings together both in-person and remote participants and must ensure that individuals connecting from smartphones at home and groups joining from often acoustically unfriendly courtrooms can all see and hear each other. Making these blended experiences run smoothly requires serious work. The hearings themselves are the most visible piece of the puzzle, but plenty more preparatory and behind-the-scenes effort goes into allowing everyone to securely and smoothly connect, share evidence and more.

At the NCSC Court Technology Conference 2021, Snorri Ogata, CIO for the Los Angeles County Superior Court, shared how Los Angeles County outfitted courtrooms for hybrid sessions.

Finding the right videoconferencing tools was a key concern, and Los Angeles County at first launched several types of trials on a custom videoconferencing system, made in partnership with a vendor. This allowed the court to design features around unique judicial requirements. For example, unlike most users, judges needed to be able to easily manage what could be dozens of participants. Features letting judges mute members without their permission may seem small but turned out to make a big difference, preventing hearings from getting disrupted should one individual struggle to mute themselves.

The court system also sent individuals automated reminders about upcoming hearings and had them authenticate themselves with a unique court ID and PIN, helping judges be certain who was joining, according to Ogata and L.A. County Superior Court Executive Officer Sherri Carter. It also let judges view more useful details about users. Commercial platform displays often show phone numbers, rather than names, of individuals who connect by dialing in. But Ogata said it was important for judges to be able to quickly know the individual's name, role in the proceedings and the associated case number. Integrating a platform with the court's case management system delivered that level of detail.

But despite all these features, the county's custom system fell short, with courts discovering the audio and video quality suffered under the high volume of use. "[We] had this really wonderful, highly tailored capability that unfortunately … couldn't deal with a scale of 5,000 participants a day," Ogata said. This led to a switch to a commercial solution that could better accommodate high traffic. Another benefit? The tool was already familiar to many users, reducing training needs.

Still, that change hasn't been without bumps; it required forgoing the customized features and has left the court caught off guard when the company updates its software to change features — which in turn impacts training for staff of the county's 585 courtrooms. Ogata said the team is now looking to blend the two approaches, by working with the APIs underpinning the commercial platform to modify it and add back in court-specific features and new capabilities.

Making hybrid work means not just getting the right software, but also the courtroom hardware so that everyone at home and in person can see and hear each other. Ogata said courts had to deal with a slew of practical concerns, from determining where to add cameras to finding the least echoey method for capturing courtroom audio (digital signal processing — or DSP — microphones, proved helpful). The resulting equipment setups also led to cables snaking all over the courtroom, creating tripping hazards, Ogata said. The team ultimately had modular flooring installed that encases the wiring, keeping it tucked away below foot level.

Plenty of work also had to be done to prepare participants for hybrid sessions. Attorneys who were no longer visiting the courthouse to pick up case files needed digital ways to access them, and participants needed to be trained on the videoconferencing technology. The county pushed out training materials advising best practices and offered regular time slots during which judges and lawyers could play around in and test out the videoconferencing platform, while staff were on hand virtually to answer questions. Once attorneys got comfortable, they'd teach their clients how to use the technology, too.

As Ogata and Carter charted the technology transformations, they became aware of hardware and software setups that can impact people with translation needs or hearing difficulties. Courtroom cameras need to capture speakers' faces to support participants who read lips, for example. Deaf and hard-of-hearing individuals also need videoconferencing platforms to allow for pinning ASL interpreters' videos to the first page of the display, a capability Carter said will be added in the future.

Courts also need to be sensitive to different participants' comfort with and access to technology, but L.A. County so far hasn't found lack of device access to be an issue for participants, in part because most residents own a smartphone and those without can dial in from regular landlines.

The court's review of trends between September 2020 and August 2021 turned up an interesting finding: Remote participants often joined hearings with audio only, despite widespread access to videostreaming via smartphone. That trend may demonstrate a need for low-cost services as much as for low-tech-friendly ones: L.A. County initially funded its technology adoption by charging participants fees to join, with video costing more than audio, Carter said. (Fee waivers were also available.) The county saw the rate of video use rise once the two prices were equalized. One-time pandemic relief funds now allow the court to offer remote hearings for free, as of early September 2021.

Given those benefits, she'd like to continue offering virtual attendance as a perk for participants who've been keeping up well with the program requirements. The flexibility and brevity of remote sessions also lifted barriers that had stopped people from joining the program at all. The now-digital FDC saw a surge of enrollment from employed men, for example, whose work schedules often prevent them appearing in person, Armstrong said.

There were other surprise successes, too: The percentage of people who make their appointments for intake interviews also rose over pre-pandemic levels after the court started conducting them by phone — a practice Armstrong said the FDC intends to continue.

But at the same time, the new schedules and virtual format has meant weakening the sense of community and camaraderie that comes from being in a room with other participants going through similar journeys. "It's a big difference being on video when they're getting kudos for a milestone reached .... It's a different feeling than when you've got a roomful of peers behind you also joining in on that," Perry said.

Retaining an emotional connection with participants is also important for court staff trying to encourage parents to discuss details of their situations, said Pima County Juvenile Court Commissioner Ken Sanders, who presides over the FDC program. "You have to try even harder ... to get them to open up and talk about their successes as well as their struggles," Sanders said.

There won't be a one-size-fits-all answer to this. Some participants are actually more inclined to speak up at remote meetings, finding them "less intimidating," according to a currently unpublished study conducted by NCSC.

Principal Court Management Consultant Teri Deal added that this same study showed widespread support for the view that certain sensitive processes — like termination of parental rights — should only be conducted in person. Eighty-three percent of 1,919 caseworker respondents and 66 percent of 111 attorneys held this view, Deal told *Government Technology*.

Courts trying to find ways to connect well remotely have plenty of practical questions to consider, and Deal said her observations of child welfare hearings have found each court — and even courtroom — puts its own spin on the practices. Some courts' virtual hearings relied on security camera footage that showed the top of the judges' heads, while others had judges using laptop cameras that recorded their faces, for example. Courts also varied over whether all participants, just the judge or a mix of the two were made visible on camera.

Overall, though, many judges prefer having participants on video, allowing judges to read facial expressions and contextual clues, Deal said. But the nature and quality of the videos could potentially influence how participants are regarded, Deal warned. Many parents told NCSC that they use smartphones to join hearings, but mobile device footage is often shakier than that from stationary laptops, which court personnel are more likely to use, for example.

Courts must be sensitive to how unconscious biases might arise if only one attendee joins without video, while everyone else can see each other's faces. "Does that cause us to think and feel differently about a person because they're in one box with their name on it compared to all of us having our cameras on?" Deal said.

Judicial teams also need to respond to constituents' different levels of technological familiarity. Nicole Evans, court administrator for a district court in East Lansing, Mich., said during the NCSC CTC event that her team didn't just make hearings virtual but also clerks' office hours. Personnel who normally would be on-call at a counter in the physical facility instead began staffing a virtual "court counter" on Zoom, to meet one-on-one with residents. This allowed clerks to keep answering questions about everything from how to contest a traffic ticket to how to make payments, while also giving residents a taste of the platform in a lower stakes situation than an official hearing.

These creative approaches to conducting court operations in new ways suggest tech has a strong role to play in broadening access to judicial proceedings and programs, and underscores the importance of approaching these adoptions with digital equity in mind. gt

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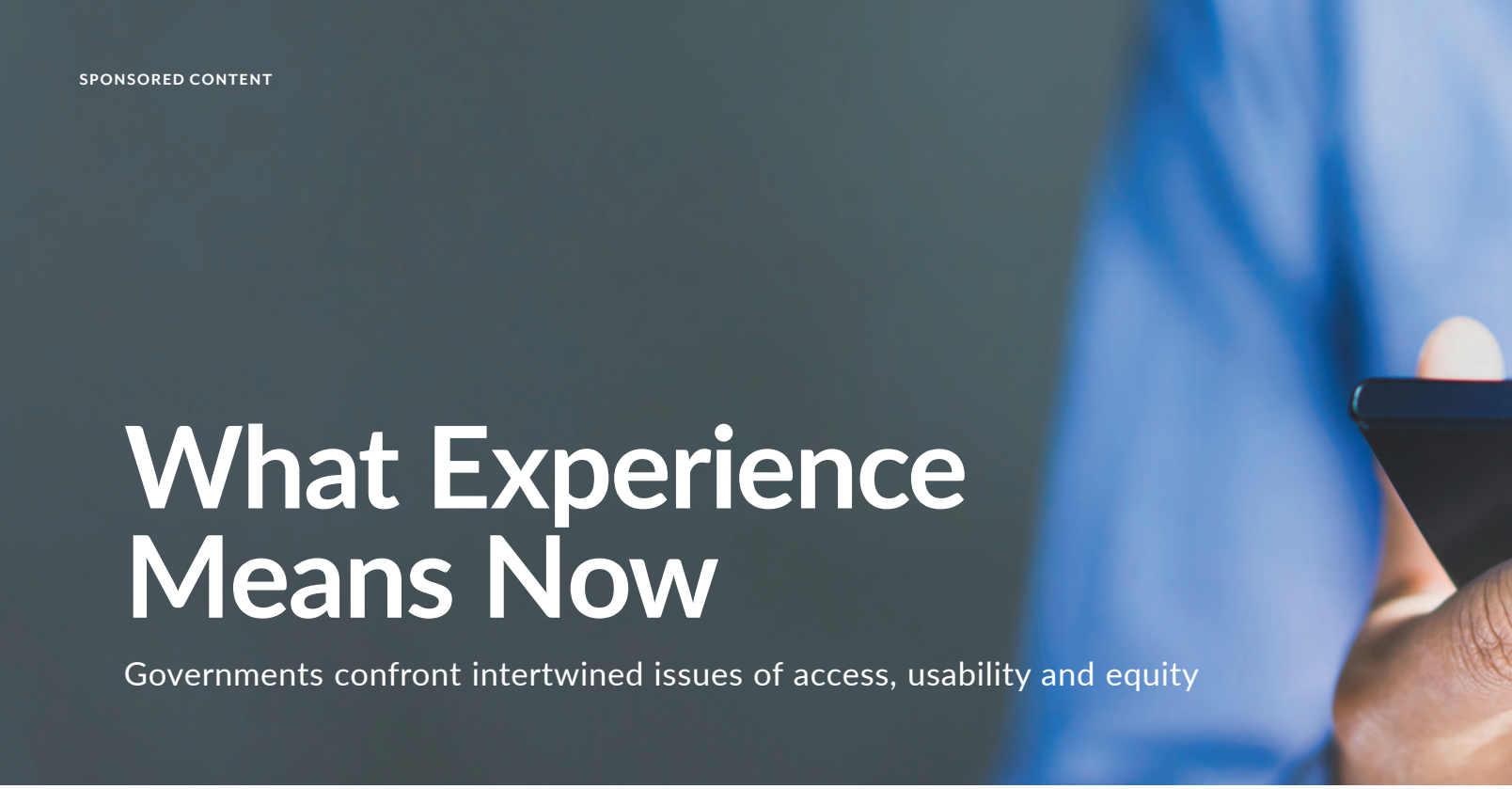

What Experience Means Now

Governments confront intertwined issues of access, usability and equity

State and local governments faced a perfect storm of challenges at the outset of the COVID-19 pandemic. Public offices closed to slow the spread of the virus and public employees went to work from home, often making it impossible to deliver services or hold meetings in person.

Agencies responded to the crisis the only way they could: They shifted services and public events to digital channels at a break-neck pace. But as governments scrambled to put important transactions and eligibility forms online, they surfaced other issues.

In too many parts of the nation, broadband internet coverage was spotty or even non-existent. Constituents who needed help the most often lacked desktop or laptop computers, as well as the technology skills needed to access digital services. Many people had smartphones, but clunky processes and bloated government forms didn't translate well to five-inch screens.

All of this is now driving a more serious commitment to usability, accessibility and equity of government digital services. City and county officials ranked improving constituent experience and engagement as a top priority, trailing only cybersecurity, in the Center for Digital Government's (CDG) 2021 Digital Cities and Counties surveys. And states ranked expanding and improving access to services as their top priority in CDG's most recent Digital States Survey conducted in late 2020.

"In response to the pandemic, everyone hit the gas on digital services because they had to," says Phil Bertolini, CDG vice president and former deputy county executive and CIO for Oakland County, Mich. "Now we're seeing governments confront the question of which services should remain digital and what should this new constituent experience look like. They're asking themselves, 'How do we package this the right way and do it methodically so that we know we're getting the right services to the right people at the right time?'"

Expansion of Experience

One impact of the pandemic has been to broaden the definition of experience. Before COVID, the term commonly equated to convenience. But now it encompasses more fundamental concepts such as digital access and equity.

Multiple jurisdictions — often backed by big new federal government funding streams for broadband improvements — are addressing connectivity gaps that became magnified when government offices, schools and other public facilities were shuttered.

Delaware's New Castle County, for example, expanded public WiFi connectivity in parking lots of libraries and other public buildings during the pandemic, giving residents a vital link to online services.

"With support from Verizon and others, we rolled out 22 sites in eight business days. And we stood up a website so people would know where to go for access," county CTO Michael Hojnicki told *Government Technology* in September. "Anyone who needed to get online for school, for work, they could come and sit outside of any of our public buildings."

The county won a 2021 Government Experience Award from CDG for its efforts to connect residents to the internet and rapidly deploy a new digital platform to support community-wide COVID testing.

Another award winner, the city of Mesa, Ariz., used federal COVID relief funds to create a private cellular network to improve internet access in underserved areas. The city worked with Mesa Public Schools, Arizona's largest public school system, to analyze census tract data and identify locations to deploy new equipment.

"We were going up on poles and putting up cellular antenna arrays," Mesa CIO Travis Cutright told *Government Technology*. "The folks in these communities can

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apply for internet connectivity, and we give them a hot spot to access internet off of our private cellular network."

An Omnichannel Future

Connectivity is just part of the equation, however. Jurisdictions are also moving toward omnichannel strategies that provide equal access to services — and an equally good experience — to constituents regardless of whether they're contacting agencies using a traditional voice call, accessing services from a desktop computer or mobile device, or visiting a government office in person. These efforts include more options for unbanked residents, too, such as kiosks located in government buildings and retail locations that enable users to complete digital transactions using cash payments. In addition, agencies are expanding their use of artificial intelligence (AI) to power user-friendly web and app-based self-service capabilities and augment human call center agents.

This shift is pushing governments to address technical debt. A growing number of jurisdictions are looking to replace old systems that often struggle to deliver services in these new ways.

In Michigan state government, for example, these pressures helped drive a series of initiatives meant to simplify and streamline government interactions for constituents. Those efforts included moving to a new SaaS-based identity and access management platform that standardized log-in processes for constituent services across state agencies. The state is also migrating its Michigan.gov web portal off 20-year-old legacy infrastructure to a modern web content management system and implementing a digital design framework to ensure usability and uniformity across state government applications, websites and social media platforms.

"It should feel very seamless to people as they traverse our digital environment," eMichigan Director Suzanne Pauley told *Government Technology*, adding the framework embraces a range of design elements including color palette, typography, iconography — and especially accessibility. "We have put a huge focus on making sure that our services can be used by everyone."

An Opportunity for IT Leaders

This new environment offers a huge opportunity for government IT and business leaders to remake the way agencies serve constituents.

Current federal COVID relief programs provide significant funding for broadband expansion, IT system modernization and other necessary upgrades — and more is on the way through the recently signed Infrastructure Investment and Jobs Act. At the same time, there's never been more executive attention on these issues and support for addressing them.

Tackling the intertwined issues of connectivity, access, equity and usability will be complex. It's a long-term effort that demands perseverance from IT teams and sustained support from elected officials and business leaders. What's more, the solutions implemented by states and localities to meet new experience goals must be sustainable long after temporary federal funding streams run dry.

But the results — giving more people easier and more meaningful access to government services and information they need — could be monumental.

Customer Experience Moves Up the Priority List

State Priorities

1. **Expand, simplify and/or improve access to services available to residents and businesses**
2. Expand economic development opportunities for residents and businesses
3. Address or increase responsiveness to crises affecting residents and businesses

City Priorities

1. Cybersecurity
2. **Customer engagement/experience**
3. Disaster recovery/continuity of operations

County Priorities

1. Cybersecurity
2. **Customer engagement/experience**
3. Business process automation

Source: CDG 2021 Digital Cities and Counties Surveys; 2020 Digital States Survey

Empathy Is Key to Exceptional Experience

Contact centers have rapidly modernized the constituent experience in response to the pandemic. ***Christina Angel****, senior solution consultant for U.S. public sector at Genesys, discusses self-service, AI, and other trends and strategies to deliver empathetic service experiences with technology.*

What trends are impacting state and local government contact centers?

Internet-savvy constituents are raising contact center expectations. They want more contact channels, self-service capabilities, texting and chats with agents, and better customer experiences overall. We also see state and local governments requiring FedRAMP- or StateRAMP-authorized cloud solutions. Security teams understand their agencies are a target for cybercriminals, and they want to mitigate risk by adopting these established best practices.

How can organizations provide better experiences for callers and agents?

Organizations need to focus on empathy — which really means understanding the situation of a resident who's reaching out for help or information and responding appropriately. We have to put ourselves in their shoes. Yes, contact centers should be efficient and effective. But without empathy they can't deliver exceptional customer experience. Empathy in digital government services is critical because human workers cannot scale to meet the increased demand for services during the pandemic.

How do you bring empathy into digital government services?

At Genesys, our vision is to deliver the power of empathy in every service experience. To do this, we focus on technology to enable four key actions: listening, understanding and predicting, acting, and learning. Our technology accesses and captures data from many sources in real time. We use AI to understand and predict the service need, and then respond with the right action on the right channel. Empathetic service does not always require human engagement. Sometimes a chatbot is the most empathetic option: Password resets are a great example. Agencies use insights derived from the data to proactively guide customer journeys, optimize self-service and chatbot capabilities, and help human agents focus on the most complex requests. The results are then fed back into the system to help drive continuous service improvement.

What IT capabilities enable the ideal customer experience and how can organizations achieve them as rapidly, scalably and cost-effectively as possible?

Key capabilities include a cloud-based customer experience platform for collecting and using customer experience data; AI tools for understanding the next-best action to take; and orchestration, chatbots and intelligent agents that can deliver automated responses in the right circumstances. The end goal should be that engagement between the agency and customer happens via the customer's preferred channel, with every channel allowing intuitive self-service and rapid escalation to an agent if needed. Low-code/no-code options are part of implementing this effectively.

AI-powered bots help organizations quickly scale services without adding headcount. Integrating these bots with contact center solutions allows for escalation to an agent — including the context of the conversation between the customer and the bot, so the customer doesn't have to repeat what they need.

What's your advice for effectively integrating AI and machine learning to modernize customer experience?

When organizations explore adding AI, they may initially try an FAQ — frequently answered question — style of bot. Agencies can deploy FAQ bots very quickly as they typically have no backend system integrations. However, we've seen much higher ROI when AI and ML are given secure backend integrations to help provide targeted capabilities.

How can organizations prepare for increased demand during crises without overspending on unnecessary capacity during more "normal" times?

Migrating to cloud-based solutions should be a priority for organizations that are still using on-premises systems. As we've seen during the pandemic, cloud-native services let organizations respond, support remote work, scale and add new capabilities much more quickly during crisis situations. Gone are the days of hoping the next emergency doesn't exceed your on-premises or hosted hardware's capacity.

AI and ML use cases will vary by organization, but the end goal is those who are able to use self-service can do so easily, those who opt out or have more complex needs can reach a representative, and representatives have the context they need to engage and resolve issues with empathy.

Learn more at **Carah.io/GT-CX-Genesys**

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Digital Workflows That Empower Constituents

The pandemic redefined public-facing services, creating an urgent need for better digital experiences. ***Tom Yeatts,*** *global head of state, local and regional government solutions at ServiceNow, and* ***Chris Dilley,*** *CTO/ chief architect of state and local government and higher education at ServiceNow, discuss how a unified service management platform helps organizations meet these new demands.*

Why is a great workflow essential to a great customer experience?

Constituents are looking for a consumer-grade experience when they interact with their state and local governments. They expect government services to meet them where they are — meaning they want omnichannel 24/7 services in a seamless delivery format. They want answers in real time, as well as tools to help them find answers themselves. A great workflow allows rapid delivery of government services with intelligent case routing and automation. It reduces costs by enabling self-service, proactively answering common questions and providing automated service responses. Finally, it provides a single system of government engagement that supports digital transformation efforts to improve overall customer experience.

What common workflow challenges do state and local governments face?

Siloed systems and operations hinder many organizations. Efforts are often uncoordinated so residents must visit multiple websites, make numerous phone calls and drive to various government offices to receive service. Proactive case resolution is almost non-existent; agencies are either reactive to situations or on recurring schedules only. Lack of cooperation and data sharing limits agencies' ability to use advanced analytics and glean valuable insights.

How can digital workflows take organizations beyond traditional CRM?

Agencies often use customer relationship management (CRM) systems to record case information. However, these systems don't typically offer the level of workflow management required to track and resolve complex cases. A service management platform can automate workflows; track progress; and engage everyone who needs to handle, approve or respond to a request. It offers governments an economical way to give employees and residents a common experience across departments and programs.

How does a unified service management platform help improve customer workflows?

These unified platforms help in multiple ways. For one, they enable an omni-channel customer service solution that delivers consumer-like experiences at each touchpoint. Residents can quickly find answers and complete simple tasks — for example, pulling permits or requesting an address change — in the way that is most convenient for them. By connecting people, systems and workflows on a single platform, agencies can break down silos and automate processes for efficient, end-to-end service operations. A single, intuitive workspace allows everyone to work as one team, providing visibility into case history and cross-channel, interdepartmental communications, so organizations can solve problems fast; improve outcomes; and deliver efficient, seamless experiences. A unified platform also provides complete visibility into resources and enables dynamic scheduling so organizations can send the right people and equipment to complete work the first time and in the most efficient way possible.

How can AI, analytics and automation help agencies deliver a better customer experience?

Government agencies can leverage these capabilities to deliver reliable and satisfying experiences to their internal customers and constituents. Automation and predictive intelligence enable more personalized self-service and help customer service agents anticipate their customers' needs. They also help optimize resource usage, including cloud resources. These technologies let agencies identify usage trends and precisely predict where they're going to run into resource constraints. In the same way, they can assess when and where resources are underutilized and flexibly reallocate them as needed.

What practices will make organizations successful as they modernize their customer workflows?

Digital workflows are key to boosting efficiency. Automating repeatable, low-level tasks can free up employee time and resources for higher impact activities. And providing self-service options improves the experience constituents have when they interact with government. By customizing applications and workflows to provide better constituent experiences, agencies can lower administrative costs and proactively identify ways to improve existing services. It's also vital to implement resilient security operations. A unified platform lets agencies align security and operations teams, creating more visibility into their networks.

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Modernizing Document Workflows to Improve Service and Equity

Electronic document signing is one discrete task in a chain of events that occur within a modern contract life cycle. ***Michael (MJ) Jackson****, vice president and global head of industries for DocuSign, discusses how modernization improves user experience for residents and creates efficiencies and other tangible returns for government agencies.*

How have electronic signatures and modern contract life cycle workflows improved government services since the pandemic began?

In the most basic way, they enabled government agencies to continue their mission-critical operations. The pandemic underscored how reliant many organizations were on manual, outdated, error-prone processes. Besides enabling virtual interactions, modern contract life cycle management includes automating, where possible, document generation and routing. It can also automate tasks that typically occur after document signing, such as payment collection or distribution of new employee packets.

What social barriers should agencies consider when optimizing document signing workflows?

One big challenge is the digital divide. Not everybody has access to a laptop or desktop, but many people have access to a smartphone. With this in mind, organizations can build mobile-first solutions, understanding that many users will apply for benefits, find a job and validate eligibility through a five-inch screen. Organizations can then add a layer of omnichannel experiences. Regardless of the screen size, connection speed or where somebody enters the engagement, organizations must deliver an equally intuitive and immersive experience across all channels. It's also important to prioritize accessibility so individuals with disabilities can access services. The third piece is sustainability and reducing the carbon footprint by transitioning to electronic workflows and legally binding digital signatures.

What are the main components of an empowering customer experience?

The resident experience has a number of components. The first is engagement. Experiences should be immersive and intuitive and on par with user experiences in private sector companies. The second element is efficiency. The experience on the backend should be as functional as it is beautiful, meaning it reduces errors, optimizes workflows, automates processes and quickly delivers tangible value for the agency. The third aspect is effectiveness. Agencies must be able to measure and evaluate, almost in real time, how effectively they are engaging users and realizing a return on investment, and then adjust accordingly. The final component is trust. Organizations must demonstrate that they can protect mission-critical workflows and satisfy rigorous government and industry standards.

How does modern contract/document life cycle management expedite processes and services once documents have been signed?

Besides providing a repository for millions of signed documents, modern solutions enable agencies to aggregate, analyze and pull insights from signed documents. For example, they can use artificial intelligence to identify trends, assess risks and manage obligations. One of our state government customers — a health authority in the Northwest — improved its contract processing time by 93 percent. That enabled Medicaid agency clients to receive potentially life-saving services more quickly.

What do organizations and residents need to better understand about digital signing?

Digital signing streamlines the document-signing experience and enables residents to do business online. Organizations and residents need to understand that it's secure, legally binding and proven. The E-Sign Act became law in 2000 and has been widely adopted by the public, government organizations and the private sector. Most residents have already encountered digital signing technology if they've recently gone through a home buying process.

What types of use cases are emerging to improve the resident experience?

There are many. One city in Southern California has established a digital city hall. The pandemic essentially forced the city hall as well as all external stakeholders who interacted with it to go fully digital, which enabled a level of resiliency that nobody expected. The city did a study and found that it saved 122,000 staff hours and $3.5 million.

Learn more at **Carah.io/GT-CX-Docusign**

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Find out more carah.io/docusign

Reinventing the Customer Journey

Delivering outstanding resident experiences is easier said than done. ***Jill Leyden****, Qualtrics government industry advisor, discusses technologies, strategies and key tenets for raising the bar on the resident experience in state and local government.*

Tell us about your vision for the ideal resident experience or customer journey.

An ideal experience is equitable and fosters trust at every turn. It anticipates a resident's needs and provides a visible path to fulfilling them. Information is consistent across the entire customer journey, and residents don't need to become a navigator to get what they need. The information technology systems that residents use are intuitive and reliable. Government staff members are equipped with the right tools, information and resources to serve residents. Their employee experience is top notch, and they feel valued.

What stands in the way of delivering outstanding resident experiences and services?

Creating an experience of trust between an individual and their government is powerful, but it's difficult to do. Organizations without a resident-centered approach often stand in their own way when it comes to delivering outstanding experiences. Unless they bring residents or customers to the center of all they do, governments will inevitably fall short of serving them well. Government organizations must listen to "see" experience beyond organizational boundaries and empathize with residents throughout an experience, not just at a point of service. Then, leaders must be equipped with the right tools to act on these insights. All too often, governments collect data but don't see trends clearly enough to tackle root causes and solve problems effectively. They need a system of action to help them focus on the right improvements, make the most of resources and see tangible results.

What is a typical pain point in the resident experience?

Residents often lack government information that is easy to find, understand and use. They can spend hours looking for the right service or program. It's frustrating to know the government provides something you need, but not be able to access it efficiently. Industry and government leaders cannot let complexity stand in the way of creating equitable experiences. Well-crafted communication and human-centered design at scale can help remove artificial barriers to entry that residents and customers face.

What technologies help agencies personalize, orchestrate and scale user experience?

It's critical to have a powerful, all-encompassing experience management platform that ties together operational and experience data to get a complete picture of the resident and employee experience. The right platform uncovers insights beyond the narrow view of individual program/service touchpoints. Capitalizing on this perspective lets organizations better orchestrate resident experiences at scale.

What's the most important thing organizations should consider when personalizing customer experiences?

It's listening to people and the frontline employees who serve them. Designers and CX professionals cannot always sit down with customers, but reviewing data through the right platform can make them feel like they are. You need the right technology — including "listening" tools, predictive intelligence, analytics and full closed-loop actioning capabilities — to gain a holistic understanding of your residents' experiences and take the right actions that drive meaningful impact.

Don't overlook employee experience. Engaged employees are 4.6 times more likely to be customer-centric compared to disengaged employees. Part of engagement is feeling heard and valued. Always-on collaboration tools, where employees can submit and comment on ideas and feedback related to the resident experience, put the people closest to residents at the heart of your CX program and help you build a more resident-centric culture.

How can state and local government agencies get started on improving the resident experience?

Resist the urge to take on everything at once. Keep the big picture in mind, but select a few key projects or priorities that, when accomplished, will provide case studies and tangible results that help build organizational momentum. Don't forget to showcase the value that focusing on residents has "inside the building." For example, did listening, understanding and acting on resident insights save employees time? Were you able to more efficiently allocate resources? Capture these insights with an advanced experience management platform to jumpstart progress and get a quick win under your belt.

Learn more at **Carah.io/GT-CX-Qualtrics**

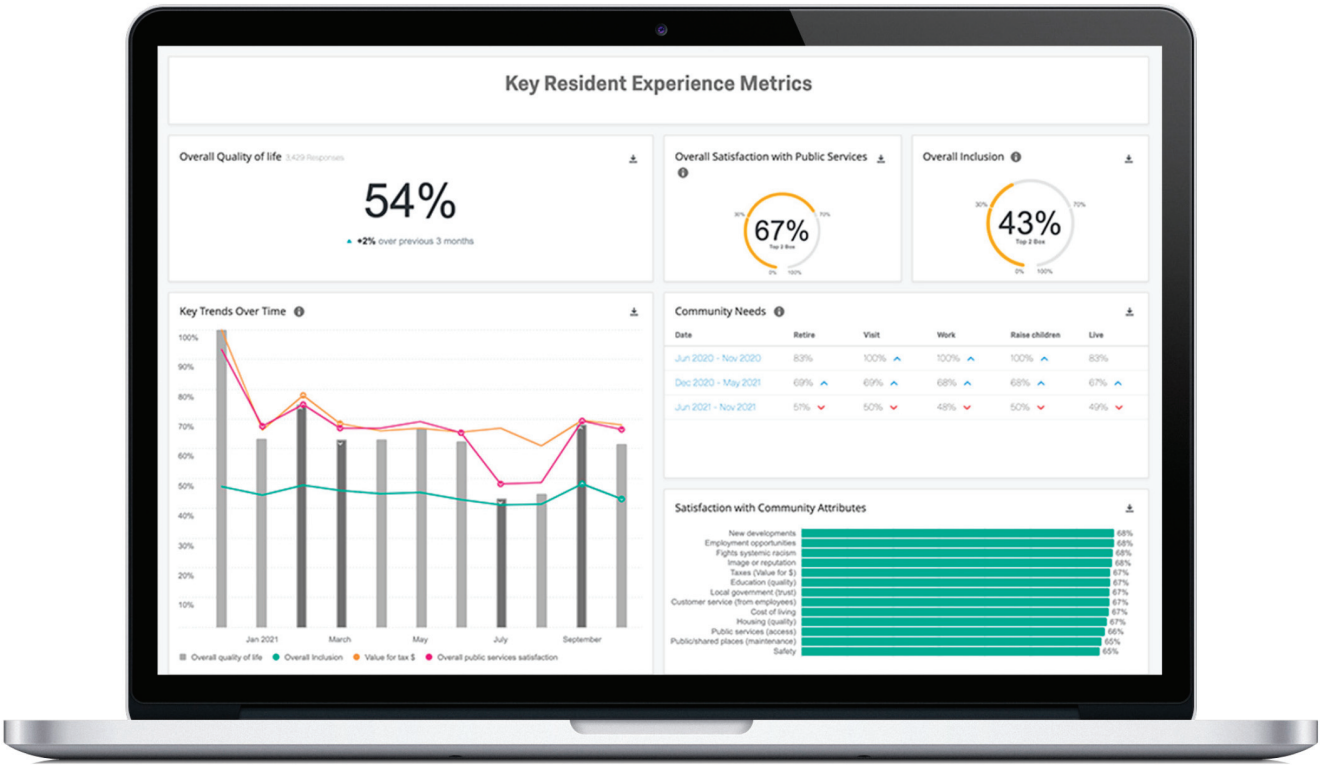
Act on what matters most to your community

Make smart, resident-driven decisions by quickly taking insights to action with Qualtrics XM Community Pulse.

Community Pulse Overview

Government agencies engage communities so they can understand what matters most to residents. But too often, leaders have to rely on static data that's cumbersome to analyze and costly to update. Community Pulse is a holistic engagement program that makes analysis simple, affordable, and timely. It empowers leaders to understand resident needs, in real time, so they can swiftly identify impactful actions.

- **Listen to resident experience** across your community
- **Understand resident needs**, satisfaction, and priorities
- **Identify core drivers** that impact quality of life
- **Act on what matters** most to your residents
- **Prioritize data protection**, privacy, and sovereignty with a solution that's purpose-built for government and FedRAMP authorized



Visit qualtrics.com/government to schedule a demo to see Community Pulse in action.

Adapting to New Customer Behaviors and Expectations

The pandemic has created new needs and expectations around customer experience. ***Joshua Smith,*** *digital transformation leader for public sector at Acquia, discusses tools and strategies for creating great content and personalizing constituents' digital interactions.*

How have constituent expectations for customer experience changed since the pandemic?

One way our society has responded to the pandemic is by moving even more of our interactions online. This was a trend before the pandemic, but in the past two years it has gone into hyperdrive. Every organization in the commercial and public sphere has been forced to evaluate how to replace or supplement in-person activities with online interactions. As a result, constituents now expect their online government interactions to match consumer experiences more commonly found with big brands in the commercial sector.

Where should organizations focus to successfully shift their constituent experience strategies?

Responding to the pandemic was an all-hands-on-deck event, where a lot of new ideas were introduced and a lot of innovation was approved for implementation. As organizations envision a post-pandemic world, they will need to review the past two years of initiatives to determine which ones really worked and which ones may have been appropriate for the moment, but are not needed long term. Tools with robust analytics and reporting can help organizations identify the important trends in their customer data. Organizations may be surprised by what their data and analysis tells them.

What is a digital experience platform and how can it improve constituent experience?

A digital experience platform is an integrated set of technologies that supports the composition, management, delivery and optimization of contextualized digital experiences. It supports modernization efforts by providing a broad set of solutions for engaging constituents online. The digital world offers many possible touchpoints for residents. Trying to independently solve for each desired touchpoint can lead to a scrambled web of conflicting technologies, but taking a tech-first monolithic approach will lead to disappointing engagement. A digital experience platform offers proven patterns for providing meaningful engagement, while also allowing flexibility to architect each touchpoint according to the organization's preferences.

How can organizations create content more efficiently?

Smart organizations understand constituents come for the content, not for the technology. However, technical tools can help maximize the reach and reuse of great content. In terms of pure efficiency, content syndication is the answer. Drupal as a content management system (CMS) is great at the publish once, use everywhere approach for a single website or application programming interface (API) endpoint. With the right tools you can expand to syndicating content across many websites, API endpoints and transactional applications. You can manage your best content in one place, and automatically distribute updates across your entire digital ecosystem.

How can organizations employ personalization to deliver more engaging experiences?

Government agencies may not have click-through targets or shopping cart goals like online retailers, but personalization is an incredible tool to reduce friction and streamline the user experience. Employing meaningful personalization requires careful thought, but getting started is easy if you adopt a "crawl, walk, run" approach. A simple example is differentiation between first-time and repeat visitors to a section of a website. Bypassing irrelevant content reduces friction on the interaction and improves the experience. When applied at scale, small optimizations like this can build trust in government services.

What advice do you have for fostering trust and encouraging digital engagement among constituents?

Improving digital experiences is the best way to encourage digital engagement. Constituents aren't generally opposed to interacting online, they just want easy-to-use experiences. Government agencies wanting to improve their experiences have many examples to draw from the private sector, and companies like Acquia are ready and able to share tools and best practices to bring those experiences to life.

Learn more at **Carah.io/GT-CX-Acquia**

Video Teleconferencing Puts Humans at the Center of Interactions

*Video teleconferencing plays a vital role in helping organizations get closer to the communities and constituents they serve. **Jennifer Chang,** head of U.S. state and local government for Zoom, discusses how organizations can effectively bridge the gap between in-person and virtual engagements.*

How has video teleconferencing changed due to the pandemic?

Video teleconferencing offers a new way for community members to contact and interact with their government. It has gone from a nice-to-have to a must-have. Government organizations are re-imagining how they leverage collaboration tools to deliver more efficiently on their mission, whether it's enabling remote or hybrid work, accelerating the delivery of services or increasing the equity of access for constituents at city council meetings and other functions.

What are the key tenets of a good teleconferencing experience? Human-centered design is important for bringing parity to in-person conversations and virtual engagement. It's all about creating an equitable, simple-to-join and simple-to-use human experience for everyone. Important features include an immersive view so meeting hosts can arrange participants into a single virtual background as if everyone is in the same room. Hosts should also be able to manage the meeting flow effectively and efficiently — for example, by enabling nonverbal cues so attendees can exchange information without interrupting presentations. Another key capability is extensibility and integration into existing applications so organizations can share applications in real time. Finally, solutions should include options for live translation and closed captioning.

What technology capabilities are essential to support video teleconferencing for constituents?

Government organizations must be able to scale large meetings while also maintaining security and control over the materials and the audience. Features such as live streaming, Q&A moderation and polling help expand reach and enhance control over how content is shared and viewed without interrupting the flow.

Security is a concern on collaboration platforms. What rules of thumb should organizations follow?

Education is absolutely critical. Organizations and individuals must understand how to properly leverage the features that protect information exchanged over a collaboration platform. Privacy and security tools should include capabilities to prevent participants from joining via multiple devices at the same time or from a different device after being removed from a meeting. Tools should also require all meeting participants to be authenticated; gather consent from meeting participants for when a host unmutes them; and dictate whether attendees can screen-share, change their name or use the chat function.

What types of video teleconferencing use cases are proving to be valuable?

We're seeing a lot of success with court applications. One great example is the Texas judiciary, which announced in February 2021 that more than 2,000 state judges had hosted a combined total of more than one million virtual hearings via Zoom since the pandemic began in March 2020. We anticipate courts and justice systems will continue to leverage videoconferencing in lieu of, or in combination with, in-person hearings due to the benefits it brings to witnesses, judges, jurors and other participants. In the social work realm, video teleconferencing helps increase access and care between in-person visits.

What's next for video collaboration and the user experience? How can organizations prepare?

The future of the government experience is hybrid. Organizations can prepare by reimagining what the hybrid workplace is going to look like and how they can leverage technology to create a future where both the organization and its constituents can thrive. When government organizations contemplate modernization goals, we encourage them to put the constituent at the heart of the process. We suggest they ask questions such as how they can drive parity between the in-person and online user and how they can use the same tools that constituents use in their personal life — text, chat and so on — to increase a constituent's confidence and engagement.

Learn more at **Carah.io/GT-CX-Zoom**

Expanding Utilization of Collaboration Technology for State and Local Government

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- Offering more robust and comprehensive training
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- Streamlining emergency response
- Empowering government employees with flexibility for remote work

To learn more about the Zoom platform, visit zoom.us

ISSUES TO WATCH

Moving Toward a Better Experience

Phil Bertolini spent almost 15 years as deputy county executive and CIO for Oakland County, Mich., earning a reputation as one of the nation's most innovative local government IT leaders. He now advises state and local government officials as vice president of the Center for Digital Government.

In this Q&A, Bertolini shares his thoughts on potential roadblocks to improving government experience and offers insights on how public sector leaders can move forward on transforming the way agencies interact with constituents.

What are the biggest challenges to transforming government experience?

I think the biggest challenge is the digital equity side of things. To truly transform into this new digital experience, governments have to manage the digital divide and digital equity issues. And part of that is also digital literacy. People may have access to digital services, but they also need the skills to use them.

Technical debt is a big issue, too. Governments have numerous old technologies that aren't easily updated and can't morph into this new model for service delivery. A related challenge is the lack of internal resources for technology modernization. Governments struggle to compete with the private sector for the talent needed to run these projects, so they'll need help from industry partners. I think this is where you can make a good argument that industry partners need to step up their game.

What technologies are key to transforming government experience?

Experience certainly includes all the technologies that support e-commerce — the tools that enable you to do business through a portal instead of being there in person. Emerging technologies like AI are increasingly part of this discussion, too. During the pandemic, we've seen great examples of using chatbots, intelligent agents and other smart technologies to enhance government services. People used to worry that AI would take people's jobs, but now governments are struggling to find employees. If governments can't find enough people, they need to augment their staffs with technology. AI is going to be embedded in almost everything they do going forward.

Many newer technology platforms will have these capabilities built in. That's why I believe governments will need to move toward a platform approach as they modernize. Instead of cobbling together bits and pieces, they should be looking at an underlying platform that will help them implement new capabilities in a way that's more efficient and sustainable.

What's your advice to government IT leaders on the best way to move forward?

I believe now is the time to take both a retrospective and prospective look at service delivery and experience. Jurisdictions deployed multiple services over the past 20 months. To some extent, governments were throwing things out there to see what worked. You really need to inventory and assess all those things to see what constituents really found valuable. Then you need to start looking at how to pull those one-off services into sustainable and resilient programs going forward.

Sustainability and resilience will really be key. Right now federal money is flowing, but eventually that spigot will be shut off. Governments have to deploy these services in ways that can live beyond this infusion of money. The worst thing you can do is roll out this enhanced constituent experience and then shut it down because of budget reductions.

Finally, even though we've talked a lot about the challenges, I want to say all of this is doable. On the technology side, everything you'll need already exists — it's just a matter of applying the tools in the right way. There are, of course, people and change management issues, but we can overcome those, too.

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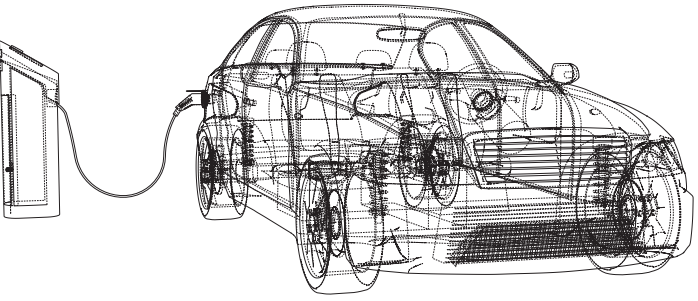
MAIDEN VOYAGE:

The world's first electric and autonomous container ship set sail in fall 2021 off the coast of Norway in the Oslofjord. The *Yara Birkeland* will reportedly replace 40,000 trips by diesel trucks annually and cut 1,000 tons of CO_2 emissions, according to Yara CEO Svein Tore Holsether. Set to go into commercial operation in 2022, the ship will transport mineral fertilizer while its technology is tested during a two-year period to become fully certified as autonomous and all-electric. SOURCE: YARA

$17.6B

That's how much Nissan will invest in electric vehicle development as part of its "Ambition 2030" plan. By the end of the decade, the automaker plans to roll out 15 new EVs, which will then comprise half its vehicle offerings. The money will in part go toward developing new battery technology that would reduce charging times and bring down the cost of battery packs.

SOURCE: ENGADGET



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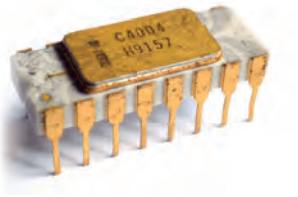
META GOVERNMENT:

Move over, chatbots — Seoul, South Korea, is taking digital services to a whole new level. The city's government has announced the creation of "Metaverse Seoul," an immersive online experience that aims to create not only an online city hall, but also a virtual reality one. The project is valued at a U.S. equivalent of $3.9 million (3.9 billion in South Korean won), with plans to develop the metaverse platform by the end of 2022. In 2023, the city hopes to open the "Metaverse 120 Center," where avatars will be available to handle resident concerns. Full operation of the system is anticipated in 2026, although citizen access to virtual reality headsets may be a barrier to broad adoption. SOURCE: QUARTZ



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The Big 5-0

November 2021 marked a major milestone in personal computing: Intel's first commercially available computer chip, the 4004 processor, turned 50. The chip premiered in an ad in *Electronic News* magazine that announced "a new era in integrated electronics." It was the first time a complete CPU was put onto a single chip, and the 4004 was as powerful as the first-ever room-size computers built in the 1940s.

SOURCE: NEW ATLAS

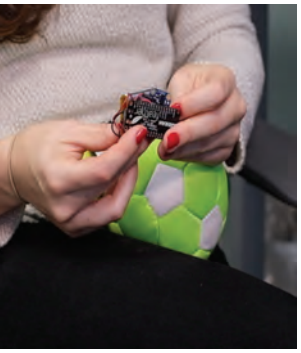
Send Spectrum ideas to Managing Editor Lauren Harrison, lharrison@govtech.com

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.

Can dogs make phone calls?

Answer: They can if they have a DogPhone.

There's so much technology out there today that lets us check in on our dogs when we're away, but what if we could make that go both ways? That was the thinking of a research team at Scotland's University of Glasgow when they built the DogPhone.



It's a pretty simple setup, really. The team put a sensor inside a ball toy and when the dog moved the ball, the sensor would activate a video call on a nearby laptop with the pup's owner. The team then conducted a weeks-long test period with team member Dr. Ilyena Hirskyj-Douglas' 10-year-old labrador Zack.

"It was very exciting to get calls from him initially," Hirskyj-Douglas said. She commented that by the end she had come to expect him to call at certain times of the day and would start to worry if he didn't. It's unclear whether Zack actually figured out that playing with that particular ball was what initiated the calls or not, but the team still considers the experiment a resounding success.

Is it possible to slingshot satellites into space?

Answer: It looks like it.

Why strap a satellite to a rocket and ignite all those fossil fuels to get it into space when you could just throw it up there with a big high-tech version of a slingshot? That's the thinking behind the new Suborbital Accelerator from SpinLaunch.

The accelerator uses an electric-powered centrifuge instead of explosives to launch objects skyward by spinning them inside a vacuum chamber before releasing them through a launch tube. In the scaled-down version that SpinLaunch is currently testing, the centrifuge spins at up to 5,000 mph and the launch tube is about the height of the Statue of Liberty without its pedestal. The team behind the Suborbital Accelerator says that the current version is only one-third the size of what the full-scale one would need to be in order to get satellites into space. And this machine would definitely not be suitable for human use. An object spinning at 5,000 mph experiences forces of more than 10,000 Gs — human beings can easily pass out at 3 Gs, and can only survive as high as 9 Gs for about a split second.

What caused a 20 percent drop in cheese prices?

Answer: A cyber attack.

You'd think the hackers might have gotten bored of disrupting U.S. supply lines by now, but they're here to remind you that they haven't. Schreiber Foods, based in Wisconsin, revealed that it was the victim of a cyber attack in fall 2021, and cheese prices felt the heat.

Schreiber is one of the country's largest dairy producers, with about 75 percent of the bulk yellow cheese that goes on burgers and sandwiches, also known as barrel cheese, coming from their buildings. On Oct. 23, a group of malicious actors locked down access to the computer systems responsible for the movement of milk and cheese at its facilities. Production and shipping were shut down for five days while a "specialized response team" sorted things out.

Unlike previous cyber-related supply chain disruptions, though, this one appears to have led to a drop in the price of the affected product. An industry analyst estimated that the 20 percent price drop in barrel cheese was due to the backlog caused by the incident.

Resilient and Responsive Government

States use Google Workspace to strengthen collaboration, security and services

The global COVID-19 pandemic drove innovation and modernization at unprecedented speed and scale within government. Whether it was creating a remote work infrastructure from the ground up, developing public self-service applications or transitioning traditional in-person services to virtual, the innovations put in place helped agencies foster inclusive engagement, greater accessibility and more equitable delivery of government services.

Two states — Maryland and Wyoming — demonstrate how governments can build on what they've learned during the pandemic and leverage consumer-driven applications to improve enterprise security, business continuity, organizational collaboration and constituent experience.

State of Maryland: Balancing Enterprise Collaboration and Security

Like many state governments, Maryland quickly pivoted to remote work during the pandemic, which was no small feat considering the state has 50,000 employees.

To ease its transition, the state relied on Google Workspace, a collaborative digital workspace platform that integrates with Google Cloud applications and third-party applications, including email, calendar, videoconferencing, and attendance tracking solutions that streamline communication and collaboration.

Fifty-three Maryland state agencies now use Google Workspace, according to Tracia Sherman, assistant director of access management services at the Maryland Department of Information Technology.

For example, Maryland's Department of Juvenile Services uses Google Meet to hold secure, HIPAA-compliant live hearings for juvenile offenders. Maryland also uses Google Voice to improve its contact center and help desk operations for state police and emergency management teams, Sherman says.

Several state agencies also have gained efficiencies by digitizing paper-based processes. Maryland State Police

improved accessibility and productivity by adapting many of its paper reporting processes to Google Drive, a cloud-based document management solution that lets agency staff store, access and collaborate in files from any device and any location. This enables officers to create accident reports in the field and gives supervisors easy access to daily report logs. In addition, the agency used this solution to develop a new reporting process for timekeeping, schedules and certification renewals.

Secure by Design

Maryland not only digitized multiple business processes, it did so securely — which is critically important as state and local governments face more ransomware attacks. The Google Cloud platform is secure by design and incorporates industry-leading privacy and security standards. Administrators have enterprise control over system configuration and application settings, and an internal dashboard lets them manage user authentication and access. Multi-factor authentication and security keys provide an additional layer of protection, and regular independent audits ensure the Google Cloud platform continues to safeguard operational and resident data stored by government agencies.

> “We’re able to go out and see where we have those security risks and tackle them.”
>
> *Tracia Sherman, Assistant Director of Access Management Services, Maryland Department of Information Technology*

Maryland conducted a security audit with Google last year prior to moving to the enterprise version of Google Cloud. The audit helped the state take full advantage of security features in the platform and use the appropriate compliance, routing and security settings.

“My team would discuss and review [the security features] each week and provide a written response for why we did or did not have a particular feature or setting enabled,” Sherman says.

Learnings from the audit are also informing Maryland’s long-term security strategy. The state hired a chief security officer who leads a 30-person team. The team — along with security support services from Google Cloud — will create enterprise-wide security policies to support hybrid work and telework options for state employees.

“We now have a whole security team at the state that is reviewing settings and making recommendations,” Sherman says.

Moving to Google Cloud and adopting an integrated digital workspace gives the state more visibility into its IT environment, she adds.

“We’re able to go out and see where we have those security risks and tackle them,” Sherman says. “There have been a lot of ransomware attacks across the country, but luckily, they have not hit us in this Google domain.”

Better Onboarding and Training

Adopting cloud-based collaboration tools and document sharing solutions increased operational efficiency and improved knowledge transfer throughout Maryland state government, Sherman says.

“My team has been evangelizing shared drives for teams, projects and as an offboarding procedure,” she says. “This makes it much easier for employees and IT staff. If employees know they can move any files from their drive to a shared drive that their teams or supervisors will need prior to them vacating, it makes the process of knowledge sharing more efficient.”

To promote adoption and drive value from these new solutions, the state was laser-focused on guiding employees through the transition. Ongoing training was crucial to Maryland’s change management efforts, since a significant portion of its workforce was older and unfamiliar with cloud-based collaboration tools.

“Training is always important, especially when moving to a new platform. We have many employees who never or rarely used computers for their jobs, or only used them for email. Until the pandemic, we had staff that never used a laptop and certainly never attended virtual meetings,” Sherman says.

Sherman’s team uses Google Meet, a videoconferencing solution, to get employees comfortable with the new technology and screen share to teach them how to access their files at home. Employees also can view recorded training videos Sherman’s team produced and uploaded to Google Sites, which serves as a central information repository for current employees and new hires alike. Sherman says the repository largely replaces paper-based employee welcome packets.

“With the large amount of turnover and hiring, I believe it is imperative to have information readily available for new employees when they are onboarded,” she says.

"The [Wyoming Hunger Initiative] uses Google for everything from email to calendar to videoconferencing with their rural entities. The technology makes it easier for WHI to connect with constituents ..." *Carrie Gernant, Google Cloud Administrator, Wyoming*

State of Wyoming: A Platform for Innovation and Continuity

Google's cloud-based collaboration tools also prepare governments to deliver responsive service and achieve business continuity in times of crisis.

Wyoming had used Google Workspace for a decade before the pandemic hit, replacing multiple departmental email systems with one enterprise cloud-based solution within its executive branch. This modern platform made it easier to transition many of the state's 11,000 employees to remote work when the public health emergency arrived.

"It was pretty much plug and play for us," says Carrie Gernant, the state's Google Cloud administrator, who was also part of the team that migrated Wyoming to Google Workspace in 2011.

Because the state already used Workspace, IT resources could be deployed to help in other areas, such as setting up and troubleshooting VPN connections as Wyoming worked to establish a robust remote work infrastructure.

Improving Education and Social Services

Wyoming state agencies have used Google Workspace in multiple ways to optimize their operational processes over the last 10 years. For example, the state's IT team developed live and recorded training sessions for all new employees, which are offered remotely via Google Meet. Remote training options are crucial in a rural state like Wyoming where the population is widely dispersed.

Wyoming also offers a "Wyo For Life" state domain with unlimited cloud storage for school districts. Schools can enroll students, who receive an email address they can use for life. Typically, as students go through grade school, they lose projects and content they produced during previous school years. Wyo for Life lets students store content they've created through their primary, secondary and higher education experience, even after they graduate.

Google Workspace supports key social services programs, as well. The Wyoming Hunger Initiative (WHI), which addresses childhood hunger and food insecurity, uses this solution to serve vulnerable communities.

"The WHI uses Google for everything from email to calendar to videoconferencing with their rural entities. The technology makes it easier for WHI to connect with constituents and get its message delivered to every county across the least populated state in the nation," Gernant says.

In the last year, for example, WHI used Google Maps to deliver program communications to seniors and other populations in need, which helped to maintain service continuity.

Wyoming drove this innovation even amid budget constraints. Wyoming's licensing costs for Google's Workspace platform only have risen $5 over 10 years, enabling the state to increase its agility in the most cost-effective way possible.

Many strategies have contributed to Wyoming's success with Google Workspace, but Gernant says training is crucial for any government entity that wants to benefit from cloud-based collaboration tools.

"Train employees as early as possible and make sure you keep them involved in updates and new releases," she says. "This isn't a set-it and forget-it situation. Train within the agency, train at the enterprise level and offer as many resources as possible."

Best Practices for Implementing a Cloud Collaboration Platform

As state and local governments look to embrace remote and hybrid work environments, they should consider the following best practices:

Understand your business needs: Perform an internal assessment to identify how Google Workspace can help your organization address service gaps and business continuity challenges. Agencies may not need to adopt every solution within the platform right away. But all features will remain accessible via the platform when they're ready to incorporate them.

Prepare your team: Train employees before they migrate to Google Workspace and offer ongoing education. As Wyoming and Maryland indicate, training is vital for effective change management. Using the same cloud-based collaboration tools for training that employees will use in their daily work — like Google Meet and Google Drive — can accelerate adoption and show employees the value of these solutions early on.

Seek feedback: Continually gather user feedback to improve how your organization uses cloud collaboration tools. As Gernant mentioned, this isn't a one-and-done process. Government agencies may find new use cases for these tools — whether it's adopting a collaborative whiteboard solution to facilitate continuing education courses or using Google Forms to collect information from constituents. Agencies should seek feedback and look for opportunities to consistently improve how they deliver services both internally and externally.

Put security first: Google Workspace is secure by design, but organizations also should perform a security audit and ongoing security assessments, especially as they increase use of the platform. State and local governments can consider building out their internal security teams or working with existing IT teams to establish enterprise-wide security policies as they use more applications and tools within Google's integrated platform.

Connect with other users: As an administrator, leverage Google's Public Sector Connect community. This lets administrators share information, learn tips for maximizing Google Workspace capabilities and gather best practices from other public sector colleagues across the country.

Creating Empowered Governments

Maryland and Wyoming exemplify how innovating with the cloud can make governments more efficient, resilient and responsive.

In Maryland, Google Workspace enables greater collaboration and productivity as the state embraces remote and hybrid work. Maryland also strengthened its security posture by performing an independent security audit and taking steps to strengthen governance, privacy and data protection.

Wyoming's 10-year partnership with Google dramatically improved experience for employees and the public. Achievements include lifetime student accounts to preserve work and maintain connections with the state, as well as solutions that address childhood hunger and food insecurity — all while continuing to optimize the state's IT resources and budget spend.

Maryland and Wyoming both demonstrate the return governments get from investing in cloud-based collaboration tools. Whether it's during routine operations or a global pandemic, cloud innovation is invaluable for empowering governments to achieve their mission.

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

Produced by: government technology

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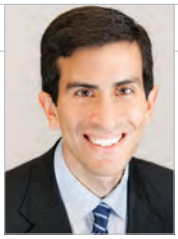
For: Google Cloud

Google Cloud accelerates organizations' ability to digitally transform their business with the best infrastructure, platform, industry solutions and expertise. We deliver enterprise-grade solutions that leverage Google's cutting-edge technology — all on the cleanest cloud in the industry. Customers in more than 200 countries and territories turn to Google Cloud as their trusted partner to enable growth and solve their most critical business problems.

By Daniel Castro



Dude, Where's My Car's E-Title?

It's in everyone's interest to digitize vehicle titles.

Buying and selling a vehicle has always been somewhat complicated. Unlike most goods that consumers purchase, vehicles come with a title — a legal document issued by a state that details the vehicle's unique identifying information. Many states only offer titles as paper documents, but some offer e-titles, a digital version of these ownership documents, and more states should follow.

There have been a couple of attempts to digitize vehicle titles. One initial motivation to do so was to combat vehicle theft — the No. 1 property crime. Congress passed the Anti-Car Theft Act in 1992, and then amended it in 1996, to address issues like thieves selling stolen vehicles in different states under new titles by authorizing the U.S. Department of Justice to establish a national system for exchanging information about vehicle titles.

This system, the National Motor Vehicle Title Information System (NMVTIS), is designed to prevent the sale of stolen vehicles, protect consumers from fraud and keep unsafe vehicles off the roads. While NMVTIS remains a DOJ program, it is operated by the American Association of Motor Vehicle Administrators, a nonprofit organization representing states, provinces and territories in the U.S. and Canada that administer and enforce driver and motor vehicle laws. Various public and private entities are required to report information to NMVTIS, including state vehicle titling agencies, insurance companies, and junk and salvage yards, and law enforcement agencies and others can use the database to address vehicle crime.

Unfortunately, while states have digitized the process of sharing vehicle title information electronically through NMVTIS, most still maintain and produce the actual vehicle titles as paper records. Only approximately 20 states offer e-titles where the title itself is fully digital, and even in most of these cases, its use is often voluntary and states will revert to paper titles for many transactions.

As with many other efforts to digitize previously paper-based processes, e-titles offer a number of benefits. For one, e-titles can reduce administrative costs for all parties — including dealers and state agencies — because they do not have to process, file, store or mail paper documents. In addition, using e-titles can streamline document handling, allowing faster processing instead of tedious paperwork, and decrease the risk of forgeries, reducing the risk of fraud.

For example, when a consumer buys a car at a dealer, and uses dealer financing, the dealer puts a lien on the vehicle until it has been paid off. In the past, this task might require a fair amount of paperwork, with the dealer mailing documentation to the state agency, the state agency processing these documents, sending back a notice, and then when the buyer pays off the loan, repeating the process all over again. Not surprisingly, mistakes are common, which wastes time and money for all parties. E-titles streamline this process, so that with a few clicks, a state can issue a title to the lender electronically and then, once the buyer has paid off the loan, the lender can notify the state to release it to the buyer. No more lost mail, no more rooms full of file cabinets.

Unfortunately, e-titles are not always as convenient when consumers want to buy and sell their vehicle themselves. Instead, most states offering e-titles provide consumers a paper title upon request that they can then use to transfer ownership. While the process is not terribly complicated, it is unnecessarily slow and expensive (mainly for the owner who must pay printing and processing fees). Moreover, given that the title is already available in a digital format, owners should be allowed to transfer it electronically. However, to make this possible, especially for out-of-state vehicles, state agencies will need to focus on building a secure, consumer-friendly digital experience and working across state lines to ensure interoperability.

Unless states force themselves to innovate, consumers will find in the coming years that the transition to connected vehicles will have modernized virtually all aspects of owning and operating a vehicle except for the old-fashioned paper titles. gt

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

6 Keys to Success with Hyperconverged Database Platforms

IT leaders in public sector agencies and higher education crave a simpler way to manage their high-availability databases. One path to simplicity is the hyperconverged database platform, which virtualizes compute, network and storage on a device fine-tuned to improve database performance.

Familiar examples of hyperconverged database platforms include the Exadata, which Oracle introduced in 2010, and its smaller cousin the Oracle Database Appliance, which arrived in 2011. These tools represent an evolution of hyperconverged infrastructure (HCI), which uses software virtualization to give developers and IT leaders vast improvements in scale, speed and agility.

Hyperconvergence yields faster time-to-value and a firmer competitive footing in normal times. In extraordinary times like the COVID-19 pandemic, however, the landscape is much different. IT leaders know they can pivot quickly to implement new technologies. Now could be the right time to explore the potential of migrating to hyperconverged database platforms.

With most of the engineering already done, deployment timeframes can shrink dramatically. “Instead of taking weeks or months to bring up a new database system, we’re doing it in hours and days,” says Kevin Ort, Director of Infrastructure and Open-Source Technology at Mythics, a leading integrator of Oracle solutions.

Moreover, a tool like the Exadata has a simplicity advantage because it puts all Oracle database technologies in the same place, making it much easier to resolve the inevitable challenges of getting software, hardware and databases to cooperate. Everything gets better: troubleshooting, resiliency, stability and overall performance.

“You have one go-to vendor for your hardware issues, software issues and bugs. You almost get to where you take it for granted,” says Steven Crowder, a senior database administrator at Liberty University, an early adopter of Exadata systems.

Randy Hardee, Vice President for Technology at Mythics, shares a favorite anecdote: A customer in Florida grew fed up with the costs of mixing and matching vendors and suffering two or three outages every month. A hyperconverged database platform retired those problems. “They didn’t have an outage for the next three years,” he says.

This underscores the value proposition of hyperconverged database tools. “It’s just the whole life cycle-cost equation: faster implementation and much less time and energy in the operations and maintenance,” Hardee says.

For all the potential of these innovations, success is not a sure thing. Following are six keys to getting wins with hyperconverged database platforms:

1 **Start with a strategy.** Moving to hyperconverged database platforms requires a well-thought-out plan that assesses the full IT environment, especially when IT leaders are moving workloads and databases to the cloud. “It’s really important to understand how your applications relate to one another,” says Scott Dickson, Enterprise System Architect with Oracle North America Cloud and Infrastructure Solutions.

2 **Move carefully on cloud migrations.** Many enterprise customers have public and hybrid cloud architectures on their minds. Dickson advises against trying too much at the outset. “I don’t have to go all in right

now," Dickson says. "I can figure out how these technologies benefit me on my premises while I'm maintaining data sovereignty as I look for the best place for different applications at different points." Another critical point: Some applications have latency issues when moved to the cloud. These kinds of challenges cannot be overlooked.

3 **Get stakeholder buy-in.** Look for data points that can sway decision-makers. For instance, many large institutions have lost control of their database licensing because it's so easy to download software that generates financial obligations. Oracle made simpler, more economical licensing central to its Exadata offering, for instance.

"The key to getting stakeholder buy-in, in my experience, is asking how are you handling your licenses — is your license spending a concern to you?" says Ort. Many stakeholders respond well when shown specific cost savings, he says.

4 **Confront vendor lock-in concerns.** A unified database platform has vendor lock-in issues that are bound to raise questions. Don't ignore them. "There is a high degree of vendor lock-in because you're buying your entire stack from one vendor," Ort says. "When we can show customers how much more simply their environments will operate, they usually embrace that and then move forward."

5 **Don't go it alone.** Strong partners are essential. "When customers tend to have problems, it's because they try to do it on their own and get frustrated when it takes longer than they expected, or they run into issues they don't know how to deal with," Ort says. Working with experienced system integrators is essential to avoiding these kinds of issues, he says.

Crowder, the Liberty University DBA, advises IT leaders to embrace the knowledge of people who implement these systems every day. "Let the vendor's experts do what they're good at. Let them manage the project. Let them walk you through the steps of getting it implemented."

6 **Consider services packages**. Systems integrators often provide service packages that ensure smooth transitions and strong support after the migration. Services examples might include cloud migrations, taking systems online and moving data over properly. On-demand services could connect customers with an expert engineer for a set quantity of hours.

"Always take the services," Ort advises. "It might be an additional cost that you'll be thankful for later."

What to Look for in a Hyperconverged Database Solution

The experts from Oracle and Mythics say vendors of hyperconverged database technologies should be able to deliver:

- **Integration.** Hardware should be engineered to integrate with the vendor's database software.
- **All-in-one simplicity.** The end-to-end solution should include hypervisors; database management; and virtualized compute, networking and storage.
- **Cloud readiness.** Platforms should easily adapt to hybrid and public cloud architectures.
- **Licensing management.** Software should limit redundant licensing and enable cost controls.
- **Cost savings.** Specific economies over the platform's life cycle should be spelled out.
- **Compliance.** Automation and scripting should enable adherence to patching and regulatory policies.

Crowder says IT leaders pulling all the pieces together in a hyperconverged database platform need to maintain a long-term, big-picture perspective: "Really think critically about the environment you're putting it in and try to make sure you're looking ahead three to five years."

For more information on this critical topic, download the paper, *"Succeeding with Hyperconverged Database Platforms,"* at papers.govtech.com.

This piece was written and produced by the Government Technology Content Studio, with information and input from Mythics and Oracle.

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Maryland Selects Chief Privacy, Data Officers

Maryland has for the first time appointed a chief privacy officer and a chief data officer. **Laura Gomez-Martin** is the inaugural privacy officer while **Patrick McLoughlin** is Maryland's first data officer. The appointments were made by Gov. Larry Hogan.

New Mexico Appoints Broadband Office Adviser

Following New Mexico's creation of a state Office of Broadband Access and Expansion, Gov. Michelle Lujan Grisham has now named its broadband office adviser. **Matt Schmit** will lead that effort, bringing with him experience as the director of the Illinois Office of Broadband.

Simon Huang Named Chief Technology Officer of St. Louis, Mo.

St. Louis, Mo., has tapped **Simon Huang** to be its next chief technology officer. Huang — who was appointed to the position by the city's mayor — will take over for CIO Cindy Riordan, who had been managing the duties of the role ahead of Huang's appointment.


Simon Huang

Nevada CIO Resigns Citing Role Changes, Barriers to Success

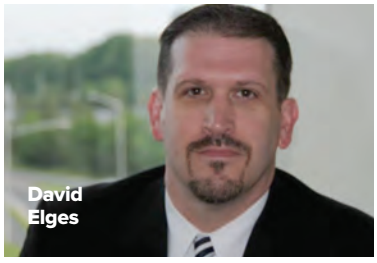
Nevada CIO **Alan Cunningham** stepped down after holding that position since August 2020. Cunningham, who cited the limitations of the job as his reason for departing, is currently searching for his next role. Nevada has not yet named his successor.


Alan Cunningham

DAVID KIDD

Boston CIO to Depart Amid Administration Change

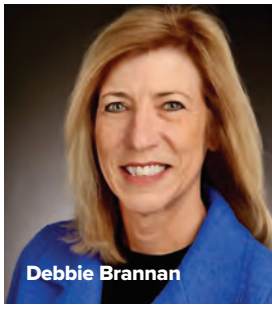
Boston CIO **David Elges** left the job he has held since late 2018, doing so following the election of Mayor Michelle Wu. In place of Elges, the city has appointed **Alex Lawrence** as interim CIO. Lawrence previously spent seven years working within the city's Innovation and Technology Department. In other Boston news, former CIO **Jascha Franklin-Hodge** will be returning to City Hall as chief of streets, having spent the past several years as executive director of the nonprofit Open Mobility Foundation.


David Elges


Jascha Franklin-Hodge

Former Cabarrus County CIO Retires

Debbie Brannan, area manager of innovation and former CIO of Cabarrus County, N.C., retired after 29 years leading the county's technology efforts. She took a regional role with Paylt, a software company offering digital payment services to state and local governments.


Debbie Brannan

California CIO Moves to Innovation Role

Amy Tong is leaving her position as California CIO to take a new role within the state: director of the Office of Digital Innovation. Tong has been California's CIO dating back to 2016, and as of press time a successor had not been named.


Amy Tong

By Dan Lohrmann

Charting a Course

Why you need a new cybersecurity plan — right now.

President John F. Kennedy once said, "Effort and courage are not enough without purpose and direction." I believe we can apply this to our current cybersecurity challenges in 2022 and beyond. But when it comes to cyber planning, there is a lot of work to do.

A Ponemon Institute survey conducted in 2019 found that 77 percent of enterprises don't have a cybersecurity incident response plan. Perhaps even more surprising, a poll taken in late 2021 by Symantec found that nearly 85 percent of business owners have not developed a cyber plan, while most believe they are safe from cyber criminals. Among state and local governments, the numbers are not much better, with surveys suggesting that most public-sector entities do not have updated enterprisewide cyber plans. Why?

No doubt, many governments are struggling to address ransomware attacks, react to daily cyber incidents, and keep track of the growing number of patches and other fixes that need to be applied. Sadly, in numerous cases, new technology that could help reduce enterprise cyber risk is never deployed because of an inability to fill vacancies, or attract and retain cybersecurity and technology professionals. Put simply, there are too many cyber fires to extinguish to even think about building a better firehouse and/or adjusting wider priorities.

Daniel J. Lohrmann is an internationally recognized cybersecurity leader, technologist and author. From 2002 to 2014, Lohrmann led Michigan's technology and cybersecurity programs, serving as CSO, CTO and CISO, and has advised senior leaders at all levels of government.

Despite these daunting challenges, I'd like to offer three reasons that state and local government organizations need to take a step back and build strategic and tactical cyber plans that offer pragmatic answers that go beyond short-term fixes.

First, our cyber threat situation continues to evolve and get worse. Not all of the cyber incident numbers are in yet from 2021, but one thing is already clear: Cyber attacks are growing by every possible measurement. Not only were the number of incidents much higher in 2021 than ever before, but the business impact of these cyber incidents was also greater. The costs associated with remediation after a major incident are rising fast. These costs are not just measured in dollars and staff time, but also in the political impact and in the delivery of digital services to citizens. Put simply, the digital transformation of governments can be undone by a lack of trust in online security and privacy.

Second, cybersecurity communication and emergency coordination are vital for the continuity of government services. State and local governments have been responding to fires and floods for hundreds of years, but the vital importance of the cyber emergency component is new in the past decade. Your cyber response plans must be consistent with other "all-hazards" approaches to emergency response because many emergency situations now contain a blended cyber component. Your emergency response plans need to include the business and technology leaders from all parts of government to ensure that everyone is on the same page regarding system protections and restoration priorities. Planning must address actions before, during and after cyber incidents.

Third, and some may say the most compelling reason to build a new plan right now, the federal government's new state and local cybersecurity grant program requires comprehensive cybersecurity plans to get cyber funding grants. The detailed requirements for submitting these plans were not yet available at the time of this writing, but items mentioned in the law contain 16 different elements of cybersecurity. These include how the government will:

- Manage, monitor and track information systems, applications and user accounts owned or operated by the jurisdiction.
- Monitor, audit and track network traffic and activity traveling to or from information systems and applications.
- Enhance the preparation, response and resiliency of information systems, applications and user accounts against security risks and cybersecurity threats.
- Implement a process of continuous cybersecurity vulnerability assessments and threat mitigation practices prioritized by degree of risk. gt

Training as a Service Tackles Government's Professional Development Needs

Across the nation, communities and local governments are hurting financially as they fight back from the devastating effects of the pandemic years. It takes the ingenuity of experts, collaboration across departmental lines, and cooperation from the private sector for public officials to restore governments' finances and operations to pre-pandemic levels. The promising news? With more innovative approaches, governments can achieve new, greater levels of success.

But for remarkable success to occur, public officials must do a better job of leveraging their best resource: their people. The need to create and nurture sustainable-wage jobs for residents looms pervasive; and subsequently, professional and technical training has never been more important. Professional development refers to many types of educational experiences related to an individual's work. Doctors, lawyers, educators, accountants, and engineers participate in professional development to learn and apply new knowledge and skills that will improve their performance on the job. But what about other essential employees? What about the unemployed? For government institutions needing to address skill and outcomes gaps for those people they represent, Training as a Service provides an ideal solution.

What Is Training as a Service?

Early in 2020, fast-changing software and the move to remote and hybrid work dramatically increased the need for relevant and adaptable user training. To facilitate governments' professional development requests, SHI created a new type of government learning platform that is integrated with a customer's software deployments, delivered in the cloud, and managed by SHI. This Training as a Service solution recognizes that learning is a never-ending cycle and that to truly resolve training issues, the solution must narrow the skills gap for government customers and their constituents.

Leveraging the power that comes from great collaboration, SHI's Technical Training and Public Sector teams gleaned insight from rich customer-centered conversations with state, local, and education organizations before creating a curriculum designed specifically for government entities. To overcome procurement hurdles, the SHI Grants team assisted customers with funding requests, and the contracts team ensured SHI's 500+ contract vehicles and cooperatives were employed thoughtfully and beneficially.

All key stakeholders agreed that a Training as a Service program must have the following requirements:

- **Quality content** – training modules must be short and focused for maximum impact. Most modules are two to five minutes, and content is updated weekly.
- **Usability** – learners have flexibility and access modules at their own pace from anywhere. Managers can view progress every step of the way.
- **Seamless integration** – training platform is housed on a government's website, allowing access to new content created through SHI's system.
- **Accessibility** – residents living in the community can access training modules and gain vital professional development skills by logging in from libraries and training centers.

The Training as a Service concept aligns seamlessly with the National Governors Association (NGA) State Roadmap for Workforce Recovery. The roadmap was created when more than 100 state and industry leaders from 32 states participated in Creating an Agenda for Workforce Recovery: A Workshop Series for States, and offers a framework for organizing

State Roadmap for Workforce Recovery Framework

Source: State Roadmap for Workforce Recovery, National Governor's Association Center for Best Practices

state workforce response and recovery activities. Recognizing four critical objectives necessary for a stronger and more equitable post-pandemic future, the NGA concluded that governments must (1) expand access to essential support services; (2) rapidly connect jobseekers to work; (3) advance digital access and skill development; and (4) enhance job quality for all employees.

For business and community leaders, the quality of a community's education system relates directly to the economic success of the community. School success translates into tax revenues, real estate values, and community satisfaction. And that same success applies to professional development as well – the quality of the training platform correlates directly to the success of the community it serves.

How SHI's Training as a Service Solution Supports Government Professional Development

SHI understands this correlation. Because their employees are regionally aligned, working and raising families in the communities they serve, they know the significant and urgent need within their own neighborhoods for residents to enhance their professional skills.

SHI's solutions-based New Jersey team, for example, set out to enable community members to adapt to swiftly changing digital skill demands and become empowered users and learners of new technologies. Recognizing that digital resilience improves our capacity to solve problems, learn new skills, and navigate digital transformations – especially as most of us pivoted to work- from-home environments – SHI enhanced its Training as a Service platform to include a citizen-facing eLearning portal prototype.

With a focus on Microsoft Office, Virtual Collaboration Tools, and Cyber Security Awareness trainings, residents can now augment their current capabilities with newly harnessed skills, allowing them to further their careers in desired fields while helping small businesses in the community enhance operational efficiencies through a better understanding of tools available to them.

Worried about Funding?

If you're worried about funding, consider this: it may not be as difficult as some government leaders believe. With an array of grant programs available, including CARES for education entities, costs are often significantly offset. In addition, various procurement vehicles and government cooperatives offer competitive and affordable pricing for training services! The SHI Grants team regularly works with public sector customers on funding requests, and their contracts team leverages SHI's contract vehicles and cooperatives to ensure you get the most value with the least worry.

Professional and technical training has never been more important, and the Training as a Service model works for government institutions that need to address skill and outcomes gaps with employees and the citizens they represent. SHI invites you to consider how you can help employees and residents do better. If you would like to learn more about the benefits of Training as a Service for your government organization, please contact SHI for more information.

Founded in 1989, SHI International Corp. is a global IT solutions provider to Corporate, Enterprise, Public Sector and Academic customers. From software and hardware procurement, cloud and data center integration, to professional and technical training services, SHI delivers custom solutions to 17,000 customers. SHI has over 5,000 employees worldwide and a revenue of $11 billion. Engage with us today and learn how to make your professional development needs a reality.

 By Dustin Haisler

Gov Tech's "App Store Moment"

On June 29, 2007, the iPhone was released and quickly went on to revolutionize the mobile phone market and create an altogether new category for revenue. What is important to remember is that when the iPhone was originally released, it did not include a store, as the device came with all the applications you needed — a web browser, calendar, mail and so on. It was an experience that was completely defined and controlled by Apple.

This all changed on July 10, 2008, when Apple launched the App Store as a way for third parties to bring new applications to your iPhone. Users no longer had to settle for the capabilities their phone came with out of the box, but were able to add new functions quickly and easily. Apple's endeavor catalyzed a wave of market activity and established a new source of annual revenue that reached $64 billion in 2020.

This business enterprise is a fitting analogy to illustrate what is taking place in the government technology market today. The government-industrial complex of the past has given way to an open market where agencies can pick the best solution for each problem ... even if they are not all from the same vendor. This is the gov tech "App Store moment."

The Ingredients for a Movement

The gov tech App Store moment is being fueled by a collision of disparate forces that were already accelerating independently, which together have created the perfect storm for market innovation and progress. These include:

Democratized cloud infrastructure: The rise of cloud as infrastructure and new as-a-service delivery models have enabled every city, county and state government agency across the country to access world-class infrastructure at a price point based on their needs. In addition, this same technology has made it possible for eager entrepreneurs to securely provide new capabilities in government-optimized and pre-certified services, avoiding the costly path of building it themselves. Some of these cloud providers have also leaned in on the App Store dynamic by launching their own dedicated government marketplaces and incubators. Notable examples include those from AWS, Azure, Oracle Cloud, Salesforce, Google Cloud and more.

Loosening procurement rules and regulations: Many legacy rules and regulations have begun to evolve — a process accelerated by COVID-19 — enabling technology to be applied in new use cases that were not possible before. Software subscriptions and new startup-friendly procurement models have made even the most complex layers of government accessible to new innovations (and gave us Lawyer Cat as a byproduct!).

New wave of government leaders and thinking: New government leaders in both business and policy have made technology a priority for their administrations and have embraced new external thinking regarding the ways tech can be used to solve problems. Government employees, as consumers in our everything-as-a-service culture, have also continued to reimagine and innovate their existing operations into more effective government delivery models. We recognize that technologies like broadband and connectivity have also become important policy priorities for public officials across the country — and there's no sign of this slowing down.

Changing citizen and stakeholder expectations: Citizen and stakeholder expectations for the public sector are conditioned by their interactions with private-sector companies. As consumers interact with frictionless and anticipatory digital experiences, they increasingly expect the same sophistication in their engagements with government. *Government Technology*'s parent company, e.Republic, has benchmarked the evolution of government experience for decades through programs such as the Government Experience Awards and has seen amazing progress and adoption of new technologies to provide human-centered delivery of services.

Entrepreneurs looking to tackle complex challenges: Gov tech was once a market that entrepreneurs were told to avoid attempting to build a business within. Today, the market has given rise to countless new startups and ideas looking to tackle the most complex public-sector challenges. From new platforms modernizing the ways government agencies communicate to a company that detects leaks from space, gov tech has no shortage of new market innovations.

Available capital for companies at all stages of growth: As a market, gov tech has attracted many new investors that are now covering all stages of company growth. According to Crunchbase, U.S. gov tech companies raised more than

Dustin Haisler is the chief innovation officer for *Government Technology's* parent company, e.Republic.

$1 billion in 2021 as of early December — one-quarter of which was dedicated to companies in the pre-seed stage of funding. The strong performance of the gov tech market during the pandemic has also encouraged many investors to focus on dedicated gov tech funds, following in the success of the market's first dedicated fund founded in 2014.

Existing company and market maturity: Gov tech is not a new industry, but it is an industry going through rapid transformations accelerated by the events of the last two years. As the market has matured, there have been increased consolidations and movements from existing firms. We've been cataloging this momentum through our GovTech 100 for the last six years (see who's on the 2022 GT100, starting on p. 23); our market partners like Jeff Cook from Shea & Co. have also done a great job analyzing this market activity on a regular basis.

Increased available funding: This year at the Center for Digital Government, also part of e.Republic, we anticipated state and local agencies would spend approximately $118.4 billion on information technology and services. Those were conservative estimates based on pandemic uncertainties, but the end of 2021 saw governments exceed those numbers — and will continue that forward momentum in 2022. The rise of new direct federal aid for state and local agencies, including the American Rescue Plan Act and the Infrastructure Investment and Jobs Act, have provided once-in-a-generation opportunities for state and local leaders to upgrade their infrastructure and reimagine the way they deliver services with technology.

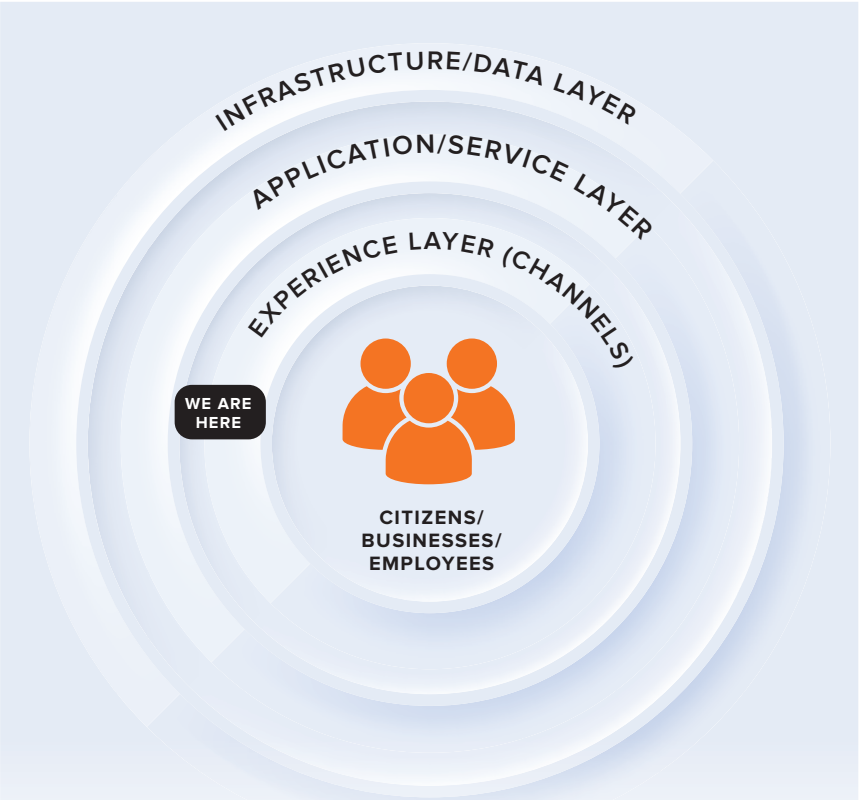
Leveraging This Moment

While state and local government agencies are now able to procure "best of breed" solutions to tackle their most complex problems, there is still more work to be done to take advantage of this unique "App Store moment." There are more than 19,000 cities, 3,000 counties, 51,000 special districts and nearly 7,000 departments across the 50 state governments all in need of new technology and partners to help them execute on their visions.

As the gov tech market has matured, service delivery has gradually moved closer to constituents. Most recently, we've seen digital transformation initiatives enable infrastructure to be abstracted by modernized applications — but now we must ask, what comes next? The answer is the experience layer of government.

To anticipate the future of the gov tech market, one only needs to look to the evolution of Apple's App Store — an API marketplace of capabilities not bound by siloed applications or standalone delivery models. It's one where services and applications are connected and interoperable, even if they are made by different companies.

Here's how this could work: Today, when a citizen or visitor wants to interact with government services, they must have the right application and credentials to make that experience useful. In the future, what if you were able to obtain information using your voice or a text message without having any application pre-installed? What if your phone could query any government law or service based on the context you provide through your decentralized identity, location, time of day and other contextual inputs? The application and services are abstracted from the user — similar to how the infrastructure layer acts today, providing the right capability at the right time.



Building the Future

Many companies in the gov tech market talk about platforms, but it's important to understand that a true platform in gov tech isn't a proprietary set of locked-in capabilities — it is an open ecosystem that enables data, services and transactions to flow seamlessly, anticipating the needs of users along the way. The gov tech platforms of the future are open ecosystems that embrace interoperability, data standards, service marketplaces, portable identities and accessibility-as-a-default. Companies must leverage all the drivers catalyzing this "App Store moment" to build the right foundation necessary to support the not-too-distant future of gov tech. Today's market activity is just the tip of the iceberg. gt

Redefining Smart Cities with Cloud Technologies

It's time to redefine "smart" cities and what some people like to call "smart government." The original concept of smart cities was that interconnected devices could gather data in real time. Trash cans with sensors, "intelligent" buildings with energy saving devices and seamless transportation experiences were core to the smart city concept.

Today, the definition of what makes a government entity "smart" extends beyond sensors and 5G networks. Effective smart government applications integrate data, analytics and security to produce holistic insights that benefit everybody: residents, workers and visitors.

Cloud technologies are essential to redefining smart government because they establish a firm foundation for the practices and policies that produce useful business intelligence. This brief explores the central role of cloud technologies in smart government applications and offers guidance for successful smart initiatives.

Where to Start when Redefining Smart Government

Think about the construction of a home: "You don't build a house from the roof down," says Celeste O'Dea, managing director for strategy and business development at Oracle. "You build a house from the foundation up."

In O'Dea's analogy, digital infrastructure based in the cloud forms the foundation of an effective smart government initiative. Cloud-based platforms provide containers that frame up the house. "The windows might be your low-code application development tooling," she says. "The walls might be your data warehousing. And the roof might be your analytics and visualization."

Thus, the data and sensors that traditionally define smart government are more like the home's bedrooms: essential components of the greater whole.

Transit provides a useful example: A smart application dovetails data from sensors in streetlights, crosswalks, buses and bus stops. "I want to bring those pieces together holistically at scale to get a better picture of what's happening within my city," O'Dea says. This kind of high-level intelligence helps a city achieve goals like fighting traffic congestion and ensuring low-income people have transportation to work.

Redefining smart government with cloud technologies helps agencies build a firm foundation in four key areas.

Data and security. Analytics mines data from disparate sensors, devices and applications. The data flows from multiple locations in different constructs and frames: structured and unstructured; relational and non-relational.

Smart government applications converge data insights in a new home in the cloud. This poses a challenge underscored by the relentless tide of cyber intrusions and ransomware attacks.

"We need to do all this in the most secure way possible," O'Dea says. Cloud providers go to great lengths to lock down their technology, but they are only half of the equation. The shared security model of the cloud requires strong protections from the customer as well.

This is where a zero-trust security model proves its value. Zero-trust security does not assume anybody has the right to be anywhere on a network. Every transaction, user, device and application on a network must be authenticated and approved.

Even if intruders sneak in with stolen credentials, for instance, zero-trust controls ensure they cannot move up, down or sideways. "You cut them off at the knees and eliminate them from being able to spread throughout the network," O'Dea adds.

Agility and resilience. Smart applications depend on speed, scale and the ability to survive a crisis — all core advantages of the cloud.

Cloud environments typically virtualize the three-tiered data center, using software to replicate computing, storage and networking. This enables developers to rapidly spin up new development environments and replicate data center resources. Functionally unlimited storage allows robust backup, recovery and business continuity.

Let's say a city or county wants more precise estimates of the costs of building and maintaining roads and sidewalks. In a smart application:

- Sensors throughout the city stream real-time data on pedestrian and vehicle traffic.
- Archival data allows historical comparisons of user patterns and maintenance expenses.
- Third-party databases packed with weather and demographic insights deliver context on road and sidewalk life cycles.
- Analytics software pulls everything altogether to find correlations and relationships that were previously invisible.

"We need to bring these data points together at scale to really get full value out of the component parts," O'Dea says.

For most government entities, the cloud provides the only practical path to the scale, speed and resilience that enable smart applications.

Staffing and automation. In the traditional, hardware-centered data center, IT people devote most of their time to care-and-feeding activities. Far less time goes toward using their training and experience to build better outcomes.

The cloud helps IT leaders reverse this model, freeing their staff to drive more tangible value. Cloud providers provision the hardware, update the software and hold up their end of the security relationship. Cloud environments are excellent places to use tools like infrastructure-as-a-service, low/no-code applications and robotic process automation to eliminate repetitive tasks.

Eliminating rote processes gives your IT people:

- More opportunities to strengthen their technical skillset, making them more valuable to your organization
- More work they find interesting and challenging; this can help governments retain skilled talent

"When they spend more time on interesting stuff that has direct, meaningful impact on the organization and constituents they're serving, then your ability to retain and attract good people is going to be higher," O'Dea suggests.

Equity and transparency. Cloud environments centralize and standardize. They also enable access on any internet-connected device. Given that almost everybody has an internet-linked phone, the cloud can be an engine of equity for residents, workers and visitors.

"No matter where people fall on the spectrum of diversity, revenue or income, and no matter which pocket of your city or county they live in, you can have equity across service and resource availability," O'Dea says.

Smart applications hosted in the cloud can also make data-driven insights available to the entire population. Transparency helps people understand the impact of the choices their government leaders make. Residents can make up their own minds on the value of government initiatives rather than nurse suspicions that decisions are happening behind closed doors.

"People can see that government initiatives are being undertaken for the greater good," O'Dea adds.

Conclusion: Tips for Driving Success in Smart Initiatives

Ultimately, redefining "smart" government means integrating apps, data and security into a program that produces better outcomes for residents, workers and visitors. To improve their chances of success, government entities should keep these strategies and tactics in mind:

Strategies

- Plan for the inherent complexity of integrating multiple apps and data sources.
- Think about integration from the beginning: Make sure you'll have the agility to add new features and services in the future.
- Architect everything from a strong foundation.

"You really have to think architecturally about making sure you have laid a foundation that is stable, secure and scalable," O'Dea says.

Tactics

- Take a multi-cloud approach. Different cloud vendors offer different workload options.
- Spend time learning the subtleties of contracting in the cloud and establish strong procurement policies.
- Extend an on-premises workload with a chatbot for quick constituent engagement.
- Start with low-hanging fruit: Layer low-code development on top of an existing application for mobile phone access.

The smart way forward for governments is to ensure their home in the cloud has the right foundation to scale quickly and easily when it's time to remodel and add new rooms.

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

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