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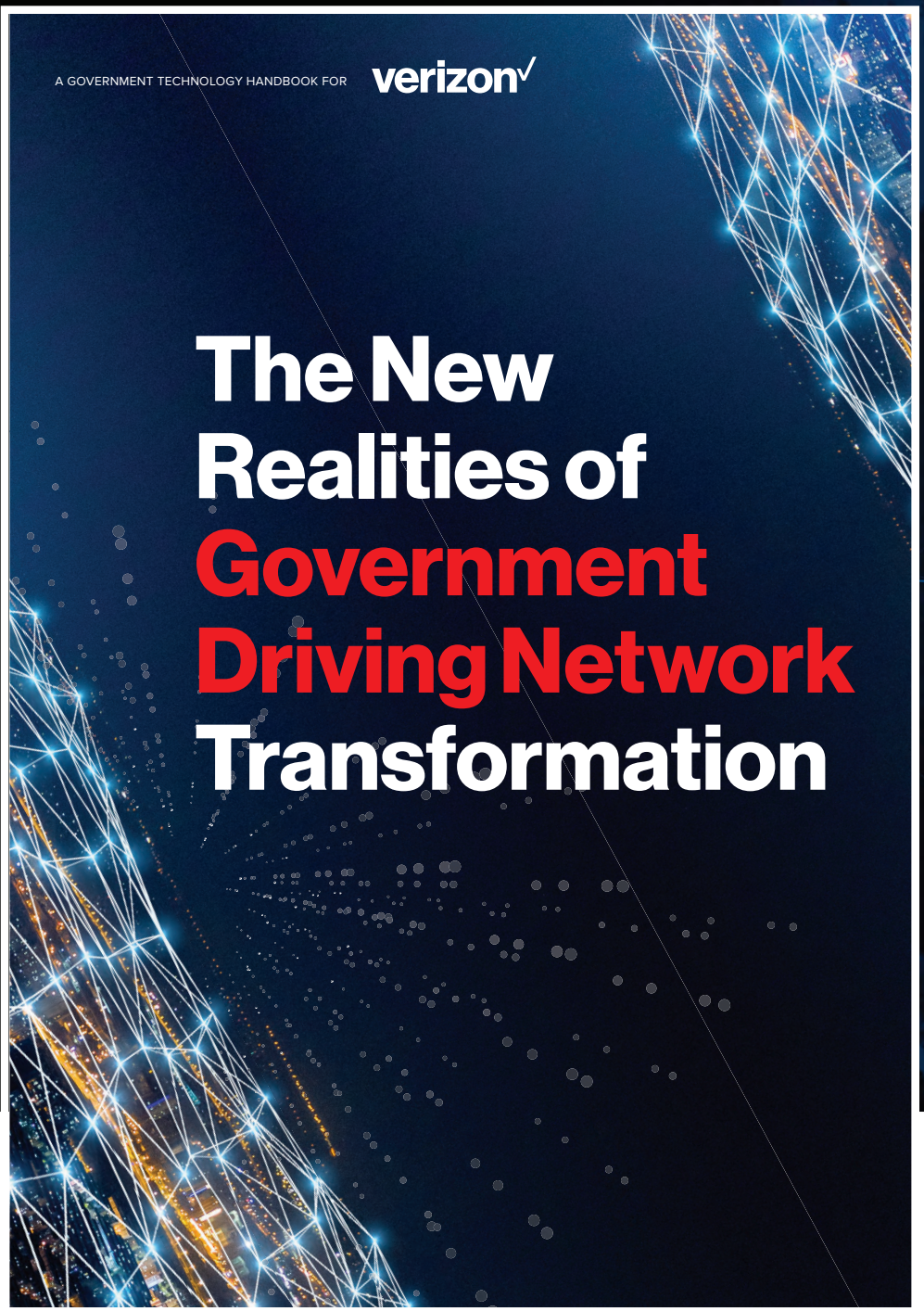

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June 2022

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Vol 35 | Issue 4

ADOBESTOCK

Government Technology (ISSN# 1043-9668) is published monthly except February, May, August, and November by e.Republic Inc., 100 Blue Ravine Rd, Folsom, CA 95630. Periodical Postage Paid at Folsom, CA and additional offices. POSTMASTER: Send address changes to: Government Technology, 100 Blue Ravine Rd, Folsom, CA 95630. SUBSCRIPTIONS: Subscription inquiries should be directed to Government Technology, Attn: Circulation Director, 100 Blue Ravine Rd, Folsom, CA 95630, 916-932-1300.

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government technology

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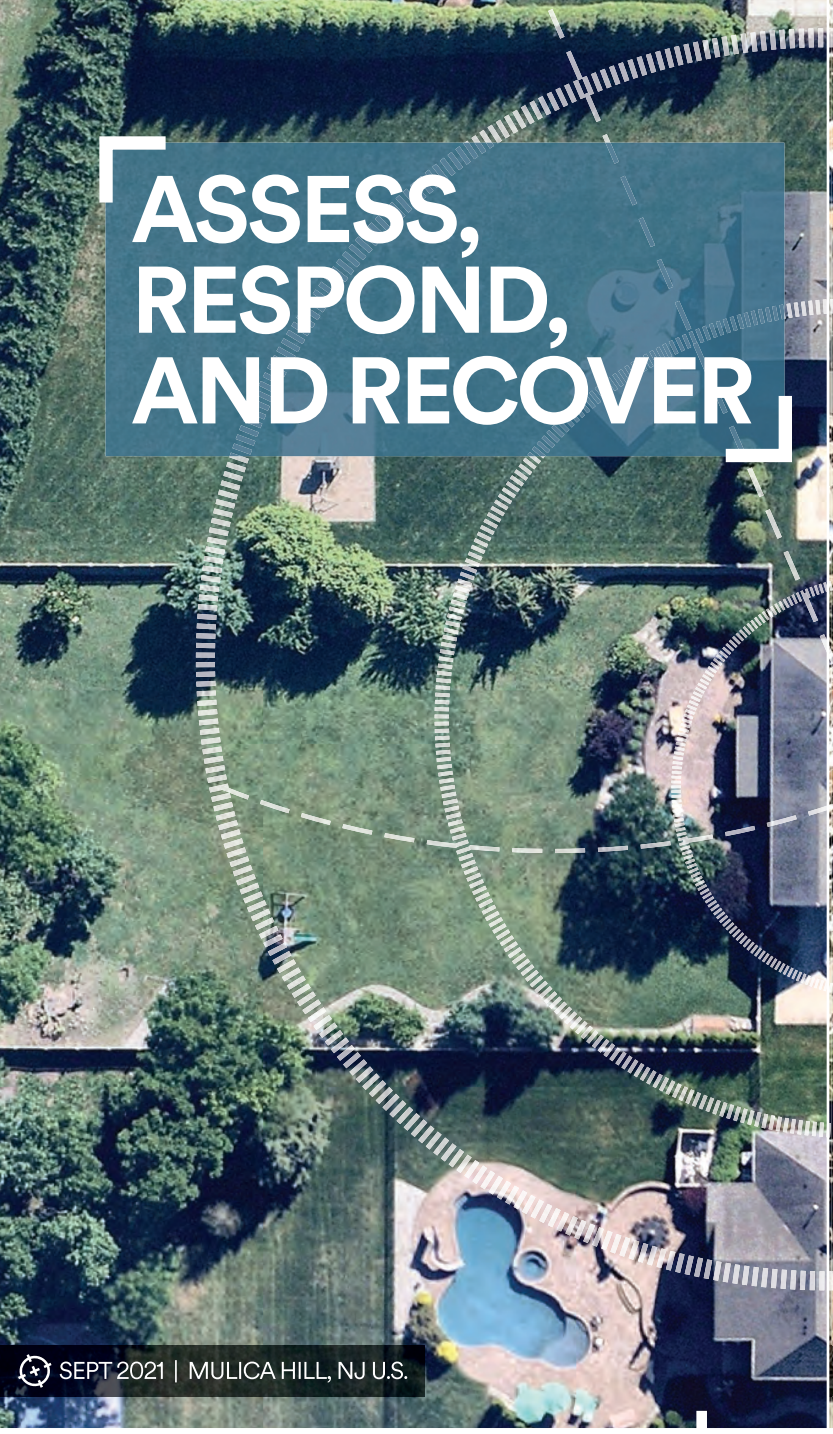
ASSESS, RESPOND, AND RECOVER



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By Noelle Knell / Editor

In Times of Transition, Keep IT Simple

If you're reading this, you probably know that it's an election year. Voters from 36 states will elect governors in a few months. As of this writing, commercials for local contests from where I write in California have just started to creep onto the television airwaves. And depending on your social media platform of choice, you've undoubtedly seen campaign activity surface there too. It will only get more exciting from here.

GT did a pretty deep data dive a couple of years ago on state CIOs, dating back to the mid-'90s. Some of the most interesting takeaways had to do with the likelihood that a CIO would keep their job even if there was a change in governor. Administration changes do in fact have a dramatic impact on the CIO. This fact holds even if the party of the new governor is the same as the previous officeholder. Overall, state chief information officers stay in place across an election cycle only 34 percent of the time. In other words, there will be a lot of new state technology leaders when 2023 rolls around.

This feeling of transition was palpable at the recent midyear conference of the National Association of State Chief Information Officers (NASCIO) in National Harbor, Md. — an event that drew CIOs from 39 states. One state technology leader offered this perspective: "It's an election year for us and the priorities change roughly every 22 minutes." Several others said that with elections and related changes on the horizon, they cannot tell you what their plans will be for the next several years. Instead, they're focused on the next few months.

But a few themes emerged for IT leaders regardless of the looming election. Having successfully steered their operations to the other side of the pandemic, they are equipped with new energy for fine-tuning government services for their residents. And that's a priority that transcends any political shifts on the horizon.

Washington, D.C., CTO Lindsey Parker, on a state Q&A panel with a handful of her peers, told those in the audience, "We spent the last two years just grinding." She was rewarded for her work by an additional title last October to layer on top of her CTO duties: assistant city administrator. Now, she's turning her attention to broader challenges like making sure every digital service the city offers is operating at its peak.

"How do we really rethink government?" she asked. "How do we make sure that our residents have a clean, crisp, fairer, simpler, faster way of dealing with government?"

Predictably, we also prodded a lot of our interviewees at NASCIO for their takes on things like cypto-currency, automation, blockchain and other flashy new technologies. Most, though, smartly pointed us back toward the fact that their work starts with a business need. It may be that an "emerging" tool can help solve a problem, but it could be just as likely that using an existing tool in a new way can achieve the same gains.

West Virginia CIO Josh Spence took issue with the concept of the buzzword in emerging tech, which people tend to confuse as the end goal in and of itself. "So it's not so much that you want to achieve the buzzword or achieve that as the goal; it's making sure you understand the business outcomes that you're wanting to leverage that tool for," he said.

We also heard many times from CIOs that another priority at the forefront of their minds is to support their workforce: Add staff, increase compensation to help communicate the value of their work and give them modern tools to work with.

"People are the most important part," Wyoming CIO Bill Vajda told *GT* in a sentiment that was echoed by many. "And if you don't focus on embracing those great ideas, finding a way to enable them to happen and giving folks the room to run out and do great things, you're wasting your most critical asset." gt

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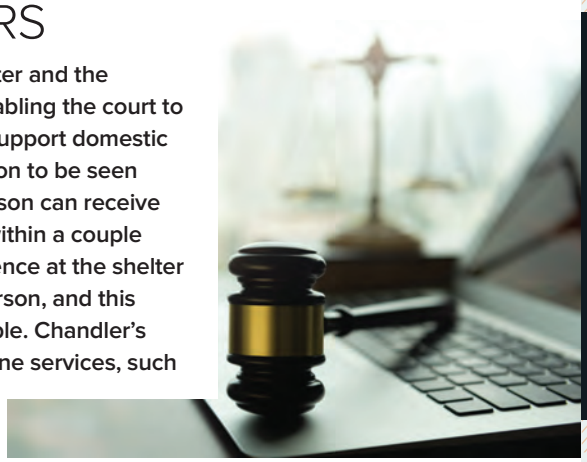
Transit for Telecommuting

Acknowledging the "new normal" of work post-COVID, the Miami-Dade Transportation Planning Organization has begun to formally include telecommuters in its work. This accounts for individuals who can work from anywhere and therefore need a transit system that can serve a flexible community. In practice this means rethinking land use and building more mobility hubs that aren't concentrated in downtown areas.

SERVING SURVIVORS

A partnership between a women's shelter and the municipal court in Chandler, Ariz., is enabling the court to expand its virtual offerings and better support domestic violence survivors. By filling out a petition to be seen by the court on the state website, a person can receive a protective order granted by a judge within a couple hours. Often survivors of domestic violence at the shelter lack transportation to get to court in person, and this makes legal action much more accessible. Chandler's court is planning to further grow its online services, such as virtual civil traffic hearings.



Biz Beat

In a major shakeup for the gov tech market, GTY Technology was acquired and taken private by GI Partners in a deal that values the company at $363 million, according to one source. In 2018, Boston-based GTY spent $497 million to acquire six gov tech companies at once, including CityBase, eCivis and OpenCounter. The purchase expanded GTY's tool set to include permitting, budgeting, procurement, payments and grants. CEO TJ Parass said the move will allow GTY to have "greater flexibility on executing our strategy."

WHO SAYS?

"Do they deserve broadband? You're damn right they do … unfortunately they might end up not getting served. And that's not acceptable.

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37

The number of states with pending legislation related to cryptocurrency and other digital assets in the 2022 legislative session, according to the National Conference of State Legislatures.

$9.8M

The amount raised by emergency dispatch tech company Prepared in a seed funding round.

10%

The power needed to move a person on an e-scooter versus in an electric car.

2,500

The number of Nevada residents who will be trained and certified in cloud computing in a partnership between the state and Amazon Web Services.

By Stephen Goldsmith

Community Service

The San Diego Police Department is improving policing by gathering data on resident feedback.

Advocates for police reform want their input, concerns and suggestions for change to be heard by local police; city law enforcement wants to understand community concerns around crime, trust and the role of the police in their neighborhoods. But in today's hyperpartisan environment, how can police and community members cut through the noise to directly understand each other and make decisions based on respect and nuance? For San Diego Police Chief David Nisleit, the answer was data.

In November 2021, the city and its police department rolled out a tool from Zencity that anonymously surveys city residents. The survey asks if residents believe the San Diego Police Department (SDPD) is effective, how much they trust the police department and if they feel safe in their neighborhoods. There is also an open-ended section where residents can add their own concerns about policing and public safety.

According to Capt. Jeff Jordon, there are three overarching goals for this survey tool. The first is to provide a much broader, more diverse perspective than what is typically surfaced during community meetings; in such a large city, the majority of residents aren't able to or aren't comfortable attending a city meeting and raising issues publicly. Officials need to be able to benchmark and respond to the community pre-emptively and not just based on complaints about crime or a police action. The survey tool expands community outreach and allows the SDPD to proactively seek out ideas and concerns rather than only responding to a meeting or a complaint. The second goal of the surveys is to identify trends, particularly after major events like violent crimes, such as a recent reported home invasion or a police-involved shooting. The third goal is turning the data into action. Capt. Jordon views this as "true community policing," as the department can directly shape its priorities and hold officers accountable based on the real-time responses. As Chief Nisleit explained, the SDPD is "using this as a barometer, to go back in and try to fix that community trust."

Mindful of the need for diverse responses, Zencity utilizes census data to identify demographics like race, age and gender that can be combined with online advertisements for the survey. Chief Nisleit appreciated that an anonymous online survey engages "some of the folks who don't feel comfortable telling you that they're fed up with what's going on" in person.

The department is also aware that some people won't initially feel comfortable utilizing an app due to fears of tracking or community surveillance. However, the data is collected anonymously, and nothing is tracked to a respondent. Similarly, the department needs to help officers in the community become familiar with the tool and data and contextualize why understanding levels and trends of (mis)trust and community concerns is so important. San Diego officials were able to point to similar Zencity work with police departments in Washington, D.C., Chicago and Seattle to demonstrate the value and importance.

The survey operates as a continual feedback tool, which helps the police understand sentiments and concerns in real time, plus include residents in the work. The survey responses can be broken down by patrol command locations, to support understanding where issues are and how increases or decreases in crime impact the level of trust.

Capt. Jordon explained that the micro and macro data from the survey not only give the city patrol officers greater information about neighborhood concerns, but also improves their performance and ability to effectively engage with their communities. "We're bringing in the community," Nisleit said. "This outreach allows us to be a little bit more collaborative. Instead of getting just a small pulse from going to a community meeting, here is a constant feedback tool for us to make impactful changes."

According to Nisleit, the weekly snapshot reports his office receives haven't contained any surprises; most residents express concerns around homelessness, drugs and vandalism. The city is processing the data for the public right now, but reported that many of the main concerns are those "quality-of-life issues." As the SDPD works to translate the data into action, they are also working out a model for policing with nuance — with the community. 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.*

DAVID KIDD

Angelo Riddick

CIO, New York

Angelo "Tony" Riddick was named CIO for New York State Information Technology Services (ITS) in December 2020, presiding over the office amid the ongoing pandemic and all that entails for state government. Riddick talked to GT *about how he has helmed central IT for the state as Gov. Kathy Hochul has approved major investments in broadband and cybersecurity.*

1 How does the cluster CIO structure function in New York? The 50-plus agencies we support have been divided into six portfolios based on similar missions. Each portfolio is led by an executive director and supported by a team of customer relationship managers. The directors are the agencies' central point of contact for all ITS. The portfolio team collaborates with the ITS technical and administrative teams and the project management office to design and implement technical solutions that meet the agencies' business needs. Executive directors serve as my eyes and ears in the field, routinely raising up issues that need to be escalated or simply need attention. This allows us to deal with most challenges before they become full-blown problems.

2 How are you approaching the future of remote work post-pandemic? We're approaching it in a balanced way. We're not returning to the way things were pre-pandemic. Our agency is hybrid now, so most people are in the office 50 percent of the time and working remotely 50 percent of the time. Many state agencies have similar plans. As long as we provide employees with tools they need to work remotely and securely, we know they can be productive and effective. We completed so many COVID-related projects on tight deadlines and under pressure, and we had to shift the way we provided services to New Yorkers in need. Much of that work was done remotely.

On the other hand, we know there is value in working in the office and sharing ideas in person with colleagues. We want flexibility so our employees are happy and engaged, and supporting their agencies in the best way possible. As leaders, remote work has forced us to rethink how we manage, supervise and support people.

3 What sort of work is ITS doing with digital equity and broadband? If the pandemic taught us anything, it's that without broadband it's impossible to stay connected to school, work and our families. In our digital world, it really is as essential as heat, food and water. Gov. Hochul advanced a new $1 billion ConnectAll initiative as part of this year's budget; it's the largest single investment ever. It includes new grant programs and partnerships to expand access, affordability and equity. It also removes state fees and outdated regulations to encourage growth in underserved areas. ITS is not the agency with responsibility over broadband, but we stand ready to support where we can.

4 Why is it important that New York take a proactive approach to helping residents be safe online? It's never been more important to raise cyber awareness and remind state employees and residents about good cyber hygiene and best practices. It starts from the top. Gov. Hochul has been focused on strengthening the state's cybersecurity posture to face these increased threats. She created the Joint Security Operations Center (JSOC) in Brooklyn, a hub for cyber coordination and intelligence sharing. Our partners include NYC and other cities, and ITS has a significant role. It will allow us to respond to threats in real time. In addition, JSOC builds on the cyber funding in the new state budget.

Meanwhile, we are communicating threats to our workforce, local governments and others so they can protect themselves. Information and awareness are key, and we can't communicate too often on an issue this critical. If we know something, we are going to tell those who need to know or need to share. gt

— Zack Quaintance, Associate Editor

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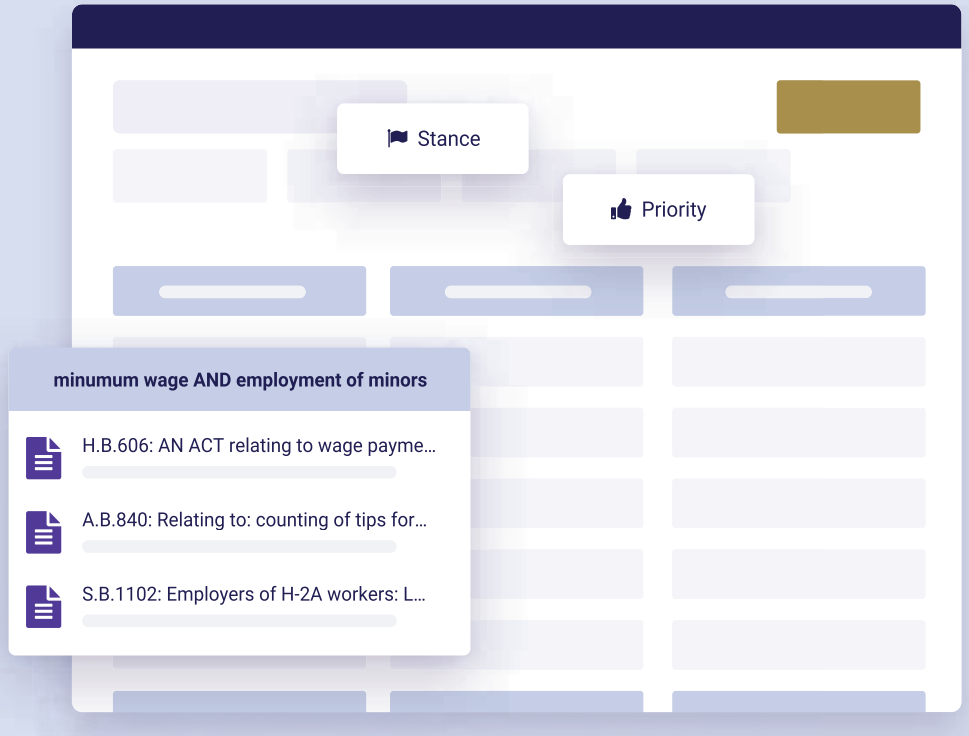

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Swedish Sustainability

While news of the changing climate is full of stories of disaster, there are some bright spots. Cities around the world are finding innovative ways to combat climate change, and in some cases enhancing their skylines at the same time.

In Skelleftea, Sweden, a new 20-story skyscraper is built entirely of wood grown in nearby forests and can capture 9 million kilograms of carbon dioxide from the air around it. It's just the latest building in Skelleftea to be made from local timber, part of a larger effort to move away from traditional construction materials, which the United Nations Environment Programme cited as being responsible for more than 38 percent of energy-related carbon emissions worldwide in 2015. Cement in particular is the largest industrial emitter of carbon dioxide globally, while wood, on the other hand, actually takes it out of the atmosphere and stores it permanently.

The new building, the Sara Cultural Centre, is now the second tallest wooden tower in the world. It also utilizes solar panels to harvest energy and has an AI system that lets it analyze its own energy needs and distribute extra to nearby buildings as needed. The cultural center includes two art galleries, six stages and a 205-room hotel, among other amenities. And while it might seem that fire safety becomes a concern when building with just wood, experts say wood burns in a predictable way, unlike a material like steel, according to *Wood Magazine*. Plus, proper construction and architectural segmenting, as well as systems like sprinklers, enhance fire protection.

SOURCE: EURONEWS

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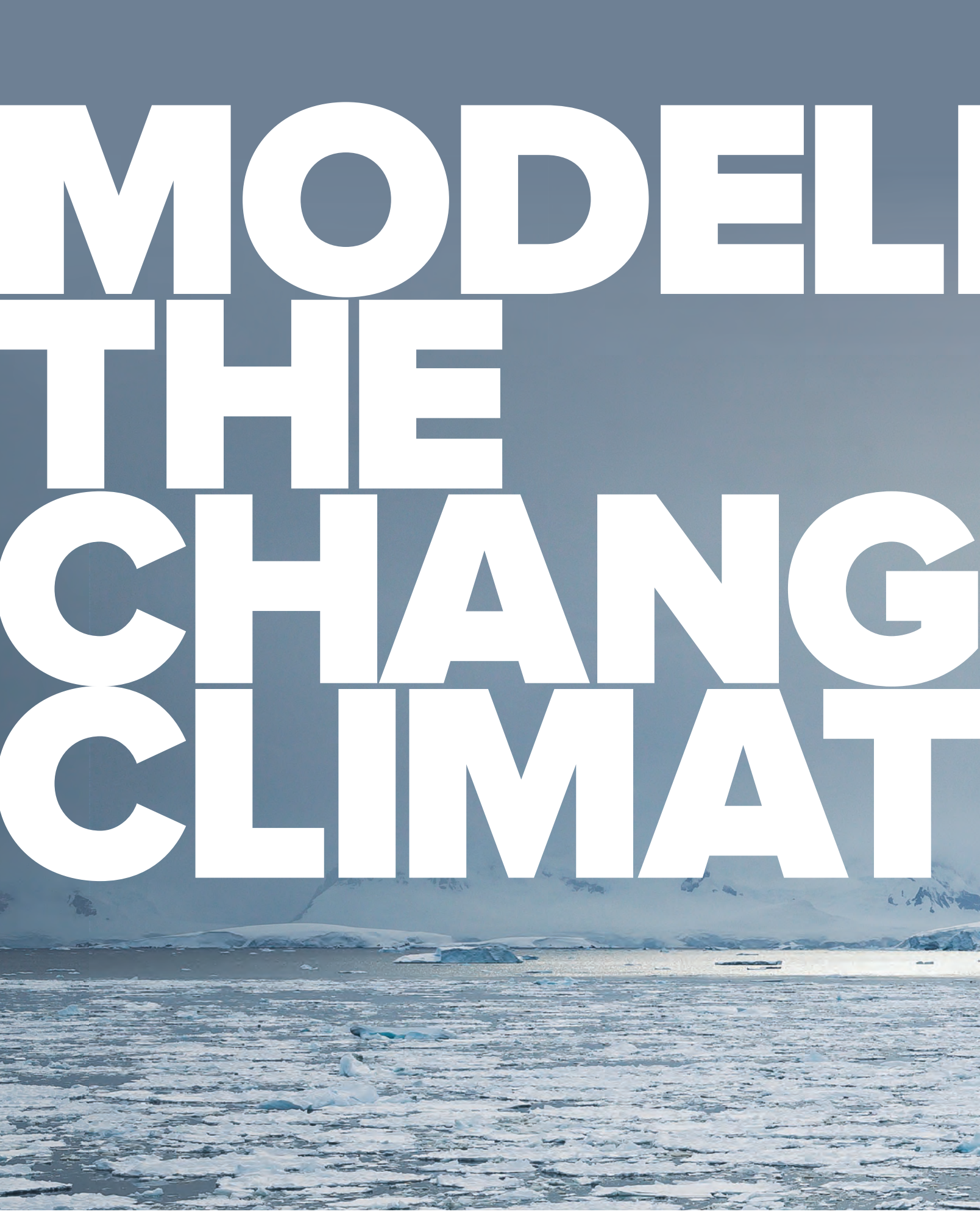

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Prolonged drought, severe sea-level rise, raging wildfires. Climate change is having tangible impacts in regions across the country. Here's what the models are telling us.

By Jim McKay

From sea-level rise on the coastlines to drought and wildfire inland to warmer, wetter weather in the middle of the country, it is clear that the climate is changing, and that the trends will likely continue. In fact, the global climate continues to change rapidly, outpacing the natural variations in climate that have occurred throughout Earth's history, according to an expert interviewed for this story.

Climate change is a global phenomenon, but it impacts different regions of the U.S. differently. But if you're on the coastline — any coastline — you can expect to experience sea-level rise as the West Coast does. The West Coast also is getting warmer and dryer and is experiencing more drought and wildfire, while the Midwest is getting wetter.

The models that project future climates are mathematical representations of interactions between the atmosphere, oceans, land surface, ice and the sun, and they are built to estimate trends but not events. For example, a model cannot predict what the weather will be like in March 2050, but it can forecast a rise in sea level or land temperature at that time.

There are many different indicators or observations that can be used to track how a climate is changing, including temperature and precipitation, Arctic sea ice, snow cover, alpine glaciers, drought, wildfires, lake levels and heavy precipitation. Some of these indicators can be traced back to the late 1800s with continual data. Satellite data goes back to the 1970s.

Models that predict future warming are tested by a process called hindcasting, according to Howard Diamond, United States Climate Science Program manager for the National Oceanic and Atmospheric Administration, via email.

Testing the models involves using the data from the past and mapping past climate change. "If they get the

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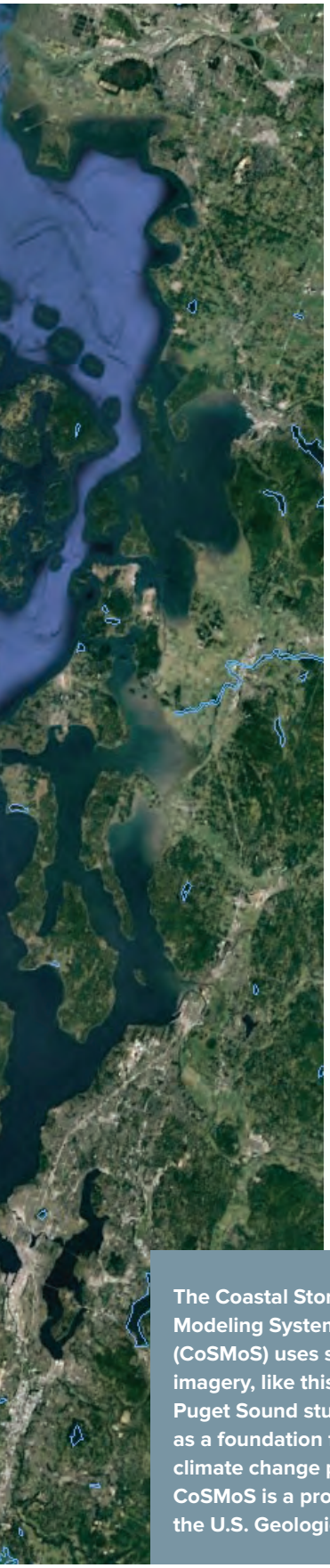
"The volume of data is way too high for a human to manually process."



The Coastal Storm Modeling System project (CoSMoS) uses sateliite imagery, like this of the Puget Sound study area, as a foundation for its climate change projections. CoSMoS is a program of the U.S. Geological Survey.

past right, there is no reason to think their predictions would be wrong," Diamond wrote.

About a decade ago, scientists with the U.S. Geological Survey (USGS) built the Coastal Storm Modeling System (CoSMoS) to look at sea-level rise, flooding and erosion hazards along the California coast. Its use today provides data on future sea-level rise in the U.S.

"It's meant to capture what the future climate will look like in terms of its influence on sea-level rise and storm patterns," said Patrick Barnard, research geologist with the USGS. "It's a physics-based model here, we're explicitly modeling waves, the tides, the storm surge and how it all propagates and sort of combines to drive coastal flooding in that sensitive zone where all these communities are across the country."

The practice of storm modeling, Barnard explained, has come a long way, but the way it's communicated is far behind. The ArcGIS story maps give communities across the country the story on what's happening with weather and the projections for the future.

AI and machine learning is beginning to come into vogue as a way to automate the processing of satellite imagery, since the quantity of data is much too great for manual analysis. "The volume of data is way too high for a human to manually process," he said. "We've been using it [AI and machine learning] for satellite imagery to derive topographic features to identify where the coast is, for example, but it's pretty early days on that."

Barnard added that scientists are trying to enlist augmented reality and virtual reality applications to better communicate the science. "That's another way things are headed. Figuring out innovative ways to communicate because clearly scientists haven't been doing the best job," he said. "We're still arguing about where the trend is with the public and that discussion should have ended 30 years ago."

But many communities don't need further convincing that the climate is changing and that mitigation measures need to follow.

EAST COAST CREEP

"Regardless of what people believe is directly causing it, at the end of the day, it's occurring. It's happening right now," said Jonathan Lord, emergency management director for Flagler County in Florida. "Sea-level rise is going up and for us that means increased coastal flooding events, whether it's a hurricane or our winter nor'easter events or even high tides."

The Northeast

Milder winters and earlier springs are altering ecosystems and environments in ways that adversely impact tourism, farming and forestry. The region's rural industries and livelihoods are at risk as less distinct seasons continue to lead to changes to forests, wildlife, snowpack and stream flow.

Extreme weather events like heat waves and river flooding, along with sea-level rise, will negatively impact the social, economic as well as physical health of residents, especially disadvantaged populations.

Source: U.S. Climate Resilience Toolkit

Coastal properties along the Atlantic Ocean and along the intercoastal waterways up and down the East Coast are flooding during peak tides, Lord said. "We're seeing more frequent flooding episodes with water entering properties."

The higher tides increase coastal erosion, which exacerbates the problem because it erodes the dunes that act as shoreline protectors. "When we have more and more of these increasingly severe events, it quickly chips away at the dune system, a multimillion-dollar protection system for the coastline," Lord said.

There are several projections about what the area will face in 50 years and some have these same properties, which are merely flooding now, underwater.

"Nationwide we see this as well," Lord said. "The fact is that Americans like to live on the coast. Whether it's increased frequency of hurricanes or even non-hurricane storms or potentially stronger storms, we now have a higher population density in that at-risk area and we have to take care of them."

Locally, that means delving into things like planning and zoning and, perhaps, requiring that any new property be elevated. But what to do with existing properties and the people living in them?

It may be a bit more dire in the short term on the East Coast, according to Barnard, who says that East Coast communities lie right at the water, whereas many coastal communities on the West Coast present a different terrain.

"There is much greater short-term risk on the East Coast," he said. "It's a passive margin coast, which means it's not active tectonics — there's not uplift and so it's low-lying very flat gradients and so the people within that coastal zone that are in harm's way are very vulnerable to sea-level rise in the very near term."

These truths dramatically increase the importance of mitigation efforts and also communicate real risk going forward. "Educate them on actual risk today and then when that hurricane or nor'easter is coming, be open and honest with them," Lord said. "When it comes to evacuations, be super clear and blunt that that wall of water is coming on top of already higher tides and although you lived through the last one, don't count on it this time."

WEST COAST

When it comes to the West Coast, climate change is manifesting itself in a few ways, including prolonged periods of drought and more intense wildfire.

A new study published in *Nature Climate Change* suggests that the megadrought that persists in the American West is the new normal as wildfires ravage the Southwest and continue to threaten the West Coast nearly year-round.

But as harrowing as continuous drought and the continued threat of devastating wildfire is, the West Coast is far more threatened by the effects of sea-level rise, economically speaking.

The Southwest

Snowpack and streamflow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture and ecosystems.

The Southwest produces more than half of the nation's high-value specialty crops, which are irrigation-dependent and particularly vulnerable to extremes of moisture, cold and heat. Reduced yields from increasing temperatures and increasing competition for scarce water supplies will displace jobs in some rural communities.

Increased warming, drought and insect outbreaks, all caused by or linked to climate change, have increased wildfires and impacts to people and ecosystems in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.

Source: U.S. Global Change Research Program

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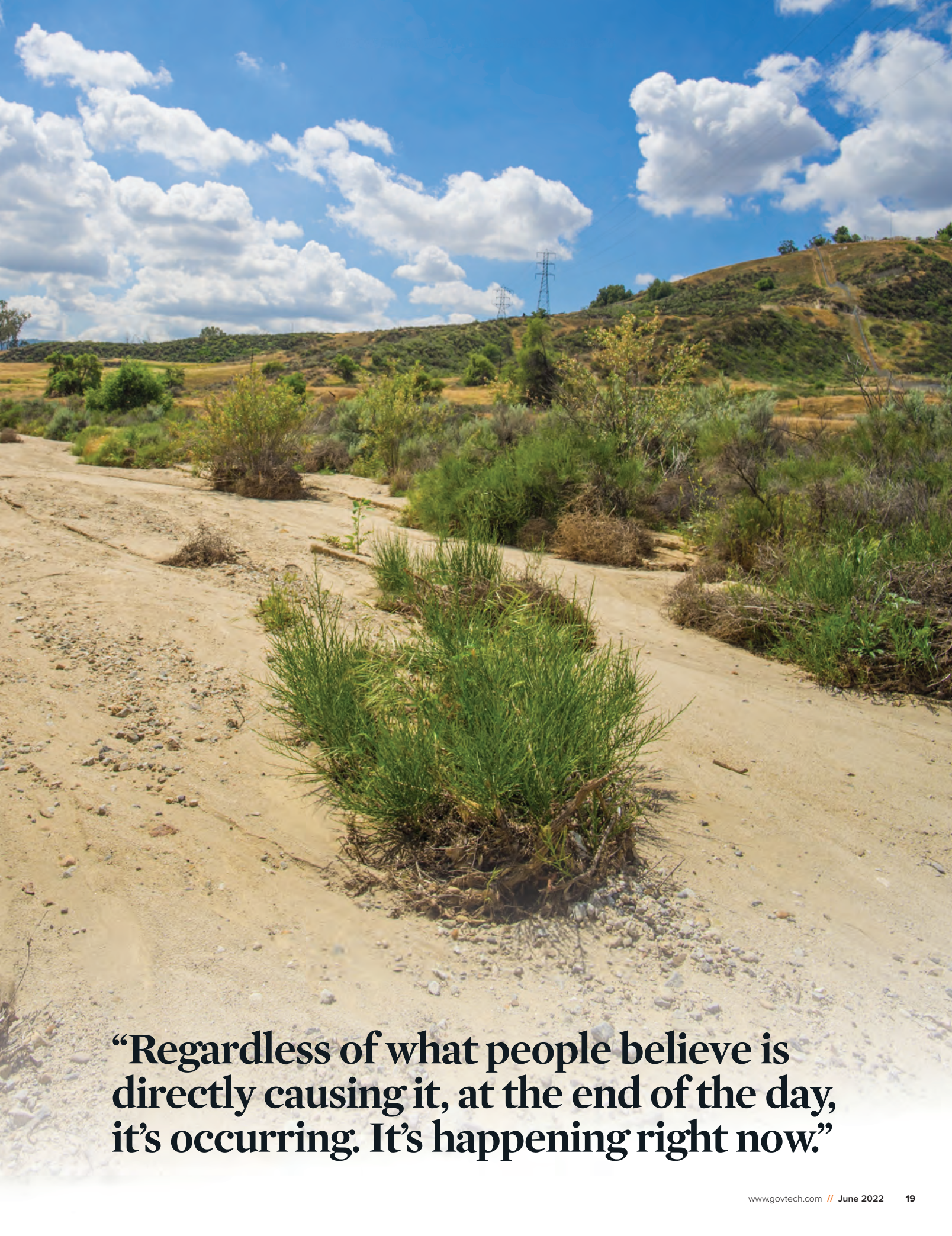

“Regardless of what people believe is directly causing it, at the end of the day, it’s occurring. It’s happening right now.”

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Experts attribute increased flooding in the Midwest, including places like Davenport, Iowa, to fewer but more intense rainstorms than several decades ago.

"What we found in California is that sea-level rise impacts in the future for California are going to likely be far greater than wildfire impacts in terms of dollars," Barnard said.

By a factor of about 10, Barnard said. "The biggest fires, last time I checked cost the state about $20 billion. Looking out at the end of the century at sea-level rise [damage], it's on the order of $200 billion, not factoring in that fires may be more intense and the impacts may be greater than present-day numbers."

Although California has high terrain, there are still millions of people living at sea level along estuaries in San Francisco, San Diego Bay and throughout San Diego and Orange County. These areas are already risky to home dwellers even without sea-level rise.

A similar situation exists farther north, although more of those living at sea level in Oregon and Washington tend to be underserved communities and tribes that are living on very low-lying river delta areas along the coast. These regions are being threatened by salt-water intrusion and more frequent flooding.

California has already experienced about eight inches of sea-level rise over the last century and the expectation is that the rise is going to continue at about the same pace over the next 30 years.

A WETTER MIDWEST

The Midwest has seen warmer, wetter weather over the last few decades, accompanied by unprecedented flooding events, and the projections call for more of the same. The National Climate Assessment projects that the top 5 percent of rainiest days will experience a 10 percent increase in rain quantity by the middle of this century and a 20 percent increase by the end of the century.

So by 2050, the rainiest day will produce 5.5 inches of rain instead of 5, and by 2100 it becomes 6 inches of rain. "That's an additional 33 percent of runoff," said Dr. Larry Weber, from the Iowa Flood Center.

"From the climate change perspective, it's the intensification of rainfall in fewer and fewer storms at greater magnitude that's going to result in more flooding."

What Weber has witnessed over the last 25 years is consistent with what climatologists forecasted 25 years ago, namely more extreme weather. "And that we would see the intensification of rainfall and flood events interspersed with drought events, and that's been true."

"When you look at the average rainfall over the last 30 to 40 years, it's been creeping up slowly," Weber said. "But as it creeps up, what we see is that the average rainfall is coming in fewer but more intense storms."

Pat Guinan, professor of climatology at the University of Missouri Extension, said that period has coincided with an unprecedented warm period. Four of the five wettest years going back to 1895 have occurred since 1970.

In Missouri, the recent unprecedented floods prompted the creation of a hydrology office. A drought in 2018 was followed by floods in 2019 that led officials to the conclusion that the status quo was unacceptable. The office will be a hub for information sharing for stakeholders and the public to glean information about the vulnerabilities and hazards of the area when it comes to drought and flooding.

Education is becoming a theme in Iowa as well, and the public is catching on.

Weber meets with various groups in Iowa, including agricultural groups, and city, state and federal officials. "The biggest benefit has been we've increased the overall literacy or understanding of these issues across those sectors of Iowa," he said. "We used to have to explain the hydrologic process and we don't have to do that anymore. It's water literacy. We can have more meaningful conversations and get more meaningful work done." gt

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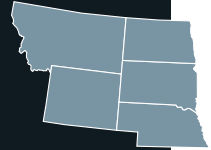
The Northern Great Plains

Montana, Nebraska, North Dakota, South Dakota and Wyoming, home to just 5 million people, are a key part of the nation's food supply as much of the area is used for dry land and irrigated crops and livestock grazing. It's also a central flyway for migratory birds in spring and fall.

Noted for its highly variable climate, temperatures are increasing, producing a wide range of impacts depending on location with some positive results and some negative. In recent years, the region has experienced drought and flooding, both heat and cold waves, and blizzards and extreme weather.

Source: U.S. Global Change Research Program



Weighing the Digitalization of Transportation Infrastructure

Transportation infrastructure is going digital, with sensors, cameras, networks and computers converging to reinvent the ways we travel. Where will digitalization have the biggest impact for transportation technology leaders in the coming years? We put this question to ***Peter Torrellas****, president of Connected Communities for Parsons, a leading technology provider with deep experience in the digitalization of transportation infrastructure.*

Which transportation trends will have the greatest influence on government technology in the next few years?

First, we'll continue to see data emerging as its own asset class. We're also looking at transit priorities like end-to-end journey management — scheduling, routing and fare settlement with cars, bikes and scooters, buses and rail systems. All those systems will have to talk to each other. And as we look to improve transit corridors, we'll need data sharing and governance models for transportation agencies and government jurisdictions.

With more automation of passenger traffic, railways, cars and vehicle-to-infrastructure communications, we'll see a lot of new opportunities. We also expect interesting technology nexus points around electrification, clean power, and hydrogen/EV buses and cars.

What's the biggest deficit in transportation technology infrastructure that government leaders need to address?

We really need to close the cyber gap for resiliency and safety reasons. Just imagine having a million automated vehicles and somebody hacking a car system. As we continue to leverage more data for innovation and automation, the attack surface area will widen. That will create a sense of urgency around cyber.

Another gap is the lack of common policies and environments for collecting and sharing data among governments, transportation agencies and academic institutions.

How will Internet of Things (IoT) sensors reshape transportation infrastructure in the next few years?

Humans get smarter by processing information we can touch and see. The same idea applies to transportation infrastructure, whether it be cameras, air quality sensors, traffic monitors or simple things like Bluetooth sniffers that count people or cars passing by. IoT will be absolutely critical to increase data collection, understand usage, make better decisions and improve operations.Edge computing is another emerging space that will be super interesting for IoT.

What are the most intriguing possibilities of digital twin technology in transportation?

A digital twin is a simulation, and a few important things need to be simulated. One digital twin application is visually connecting the interdependencies among transportation networks, buildings and utilities to our goals for automation, electrification and climate action. This example of digital twin usage will lead to better decisions, risk analysis and deployment of capital.

Also, if you want to optimize a corridor or compare transportation modes, digital twins will be important for seeing the impacts of different capital investments.

Where should technology leaders focus when it comes to sustainability issues?

Climate action — decarbonization, air quality and efficient use of resources are all going to be really important. There's also more emphasis on equity and sustainability within infrastructure. And as the industry evolves, the focus will shift toward leveraging innovation to better respond to things like forest fires, 100-year storms and seismic activity. Technology infrastructure should be resilient enough to respond to natural shocks in a way that allows people to remain mobile.

IMAGE PROVIDED BY SHUTTERSTOCK.COM

BY JULE PATTISON-GORDON

OUTSMARTING DISASTER

CAN AI HELP PREDICT WHERE LIGHTNING, FLOODS AND EARTHQUAKES WILL STRIKE — AND WHEN?

When fires start in Gilpin County, Colo., they burn hot and grow fast. Floods in Texas' San Antonio River basin spill across highways, blocking emergency responders, and Norfolk, Va., sees homes inundated by coastal storms. Earthquakes shaking the Pacific Northwest risk derailing trains, injuring residents and causing power outages at hospitals.

Prediction and early detection tools — as well as automated responses — aim to help local governments reduce the damages of these kinds of natural disasters. Today's tools are warning residents, triggering mitigation and helping first responders react more effectively. As artificial intelligence (AI) advances, sensors proliferate and data collections grow, prediction and detection technologies are likely to become more precise and effective.

Tarek Ghani, assistant professor of strategy at Washington University's Olin Business School, and Grant Gordon, former senior director of innovation strategy at the International Rescue Committee, envision using AI to predict disasters in advance, thus enabling responders to take swifter actions to prevent or mitigate them.

Such tools could also anticipate how the crises would develop, guiding responders to be more effective in their interventions, they write in their 2021 article *Predictable Disasters: AI and the Future of Crisis Response.*

Not all disasters are equally accessible to AI, however, and the technology is most reliable at analyzing events for which the root causes are well understood, plenty of data is available to train the algorithms and instances are recurrent enough that the models' predictions can be

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compared against reality and fine-tuned, Ghani and Gordon write.

Floods are a strong example.

The San Antonio River Authority (SARA) uses a tool to predict floods 12 hours in advance and inform emergency responders, its senior technical engineer Wayne Tschirhart told *GovTech*.

In Bexar County, Texas, where the tool is currently deployed, rainfall can turn into a full-fledged flood within two hours, but the National Weather Service only updates its predictive models twice a day, meaning a flood could come and go before a new alert is out. SARA sought to supplement those services with its own, locally focused projections that it reruns every 15 minutes, giving a picture as close to "real time" as possible.

SARA uses data from the National Weather Service's forecasting products to inform its model. To ensure the system stays accurate, SARA compares its estimates against on-the-ground readings it pulls every 10 minutes from water gauges placed at high-risk areas like dams and low-water crossings.

"WE WANT TO KNOW … NOW THAT THE RAIN HAS FALLEN, WITHIN THE NEXT FEW HOURS, WHAT CAN WE EXPECT FROM THIS CREEK AS FAR AS FLOODING IS CONCERNED? THE FURTHER YOU GO OUT [IN YOUR PROJECTIONS], THE RISKIER IT GETS."

Disaster responders need to balance a desire for early alerts against their need for accuracy.

"We can get up to 12 hours pretty accurately, and it'll go out to 24 hours; that's our maximum prediction horizon," Tschirhart said. "We want to know … now that the rain has fallen, within the next few hours, what can we expect from this creek as far as flooding is concerned? The further you go out [in your projections], the riskier it gets."

The idea is to inform emergency responders quickly so they can route around submerged bridges and roadways when rushing to help, rather than being forced to backtrack. Responders identifying inaccessible areas would also know to call for help from neighboring jurisdictions that may have easier access.

Earthquakes aren't as easily — or feasibly — predicted as floods, however. In fact, the U.S. Geological Survey (USGS) stresses that accurate earthquake predictions are impossible now and in the "foreseeable future," with scientists able, at best, to give the probability of a significant quake hitting an area "within a certain number of years."

Researchers and city agencies seeking to minimize quake damage are instead focused on detecting, and responding to, the first signs of a quake as rapidly as possible.

The San Antonio River Authority uses a forecasting model with data from the National Weather Service to predict floods in near real time.

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USGS offers an early detection system in California, Oregon and Washington known as ShakeAlert. It uses a network of seismic sensors to detect and evaluate the first vibrations of an earthquake (known as primary waves, or P waves) then relay their readings to a data center.

If four separate sensors register shaking, the system's algorithms assume it is a real event, rather than a false positive caused by a hypothetical truck collision with a sensor or other non-quake vibrations, explained Bob de Groot, USGS ShakeAlert national coordinator for communication, education, outreach and technical engagement.

Algorithms then estimate the scope, location and severity of the earthquake's shaking. USGS gives those details to its various message distribution partners — including public transit agencies and companies like Google — which then send out warnings to residents and critical infrastructure operators via cellphone alerts, app-based notifications and other methods.

Messages should arrive seconds before the earthquake's damaging secondary waves hit.

Ideally, residents receiving alerts have time to drop, cover and hold on to something to reduce their chances of injury.

Some cities and institutions also automatically trigger public safety responses when they receive ShakeAlerts. San Francisco's transit system automatically slows trains, for example. Other common automations include activating hospitals' backup generators, opening elevator doors at the nearest floor and shutting water utility valves to avoid risks of reservoirs emptying.

Ghani and Gordon also thought automations could helpfully accelerate post-incident response.

Mitigating large-scale disasters can require extra emergency funding, and automated systems could send financial aid to areas where algorithms calculate a high probability of a serious event occurring. Different levels of funding could be automatically unlocked as crises worsen, ensuring responders have resources at hand to get straight to work, rather than be delayed by the need to seek and wait for aid.

"Instead of an operational infrastructure grounded in post hoc fundraising and service delivery, a future humanitarian system could orient around an operational structure that flexibly increases capacity for rapid response as a crisis worsens," Ghani and Gordon wrote.

ShakeAlert from USGS registers quakes along West Coast fault lines, like the Inyo Earthquake Fault in Mammoth Lakes, Calif.

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EARTHQUAKE WARNINGS, MODELS HIT THEIR LIMITS

ShakeAlert produces analysis within seconds or tens of seconds from an earthquake's start, and in earthquake response, every instant of advance notice counts.

To achieve its speed, ShakeAlert can only collect a "snapshot" of information before analyzing and transmitting findings — otherwise the warning comes too late. What it offers is a rapid-fire best-guess assessment of the situation.

"With ShakeAlert, we have a trade-off between time and accuracy," de Groot told *GovTech*. "We make sure we're as accurate as possible in the short[est] amount of time as possible."

There are other limits, too. People near an earthquake's epicenter are so close that they are likely to feel shaking before receiving a warning, because it still takes time for multiple sensors to trigger, algorithms to analyze and partners to send out alerts.

Residents sometimes say they want to receive ShakeAlerts about any earthquake they can notice, not just those that risk injuring them. But cellular messaging wasn't built with this kind of speed in mind and sending phone alerts to large populations — say, an entire city — uses precious seconds. Adding recipients who don't absolutely need to know slows the message, de Groot said.

"The more people that an app has to deliver to, the harder it is to move it quickly," de Groot said. "Even though the cellphone company has the information within a couple of seconds, it takes time to push it out to the phones just because of their systems."

Instead, USGS and partners only send cellphone-based alerts about quakes magnitude 4.5 or higher and only to people who'll feel at least a weak shaking.

The system faces one other handicap: recognizing the Big One.

ShakeAlert is likely to struggle to accurately calculate the impact of any earthquake over magnitude 8, due to lack of data, de Groot said.

The world has seen only four magnitude 9 earthquakes since 1952, per USGS, and none in the Northwestern U.S. region where ShakeAlert focuses. The last was over 300 years ago.

That leaves scientists trying to build models using synthetic data and extrapolations from events in other countries — until one hits here.

TO FIGHT A FIRE, YOU HAVE TO FIND A FIRE

By the time Gilpin County, Colo., residents see enough smoke to prompt a 911 call, fires are often already out of hand. In remote areas, a tree hit by lightning might smolder for weeks without a passerby to detect it before it ignites into a full-blown conflagration, said Gilpin County Emergency Manager Nate Whittington.

And smoke is only a vague indicator of where firefighters need to go, as shifting winds can create confusion, Whittington told *GovTech*.

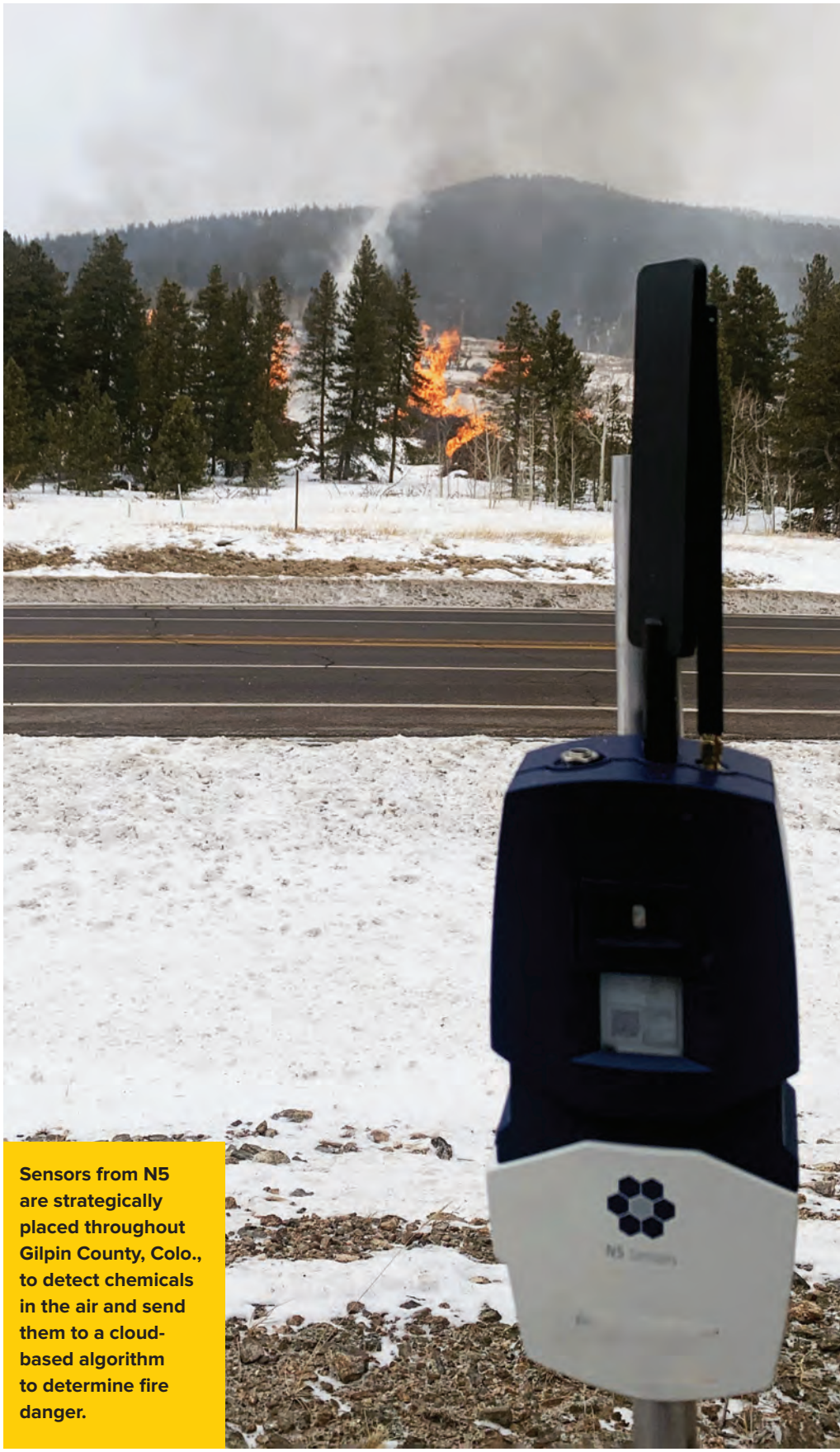
The chase to locate the flames delays response and means that firefighters in the mountainous region may not discover if the fire is up a steep climb until they arrive. Some sites are impassable to firetrucks and unreasonably slow to hike up to on foot, requiring responders to call for helicopter or plane assistance.

The county hopes a tool can help them more rapidly detect and accurately pinpoint nascent fires. That means knowing in advance whether to dispatch an aviation team — saving valuable minutes — and catching lightning-struck trees while they're still only smoldering.

"I'm hoping that these sensors can create it to where we are fighting fires — we are not fighting wildfires," Whittington said.

As of March 2022, the county was early into adopting a fire detection and location system from firm N5. N5's chief revenue officer, Debra Deininger, said Giplin is the first commercial deployment.

That system uses sensors mounted throughout target areas that are designed to detect chemical traces,



Sensors from N5 are strategically placed throughout Gilpin County, Colo., to detect chemicals in the air and send them to a cloud-based algorithm to determine fire danger.

N5 SENSORS26.

"... IF ONE OF MY SENSORS GOES OFF AND I CAN EVACUATE ALL MY PEOPLE BEFORE THAT FIRE EVEN GETS CLOSE ENOUGH TO THEIR HOUSE THAT I HAVE TO WORRY ABOUT IT. THEN I CAN LOOK BACK AND SAY, 'YES, THAT WORKED.'"

smoke particulates and gases in the air as well as take heat readings, CEO Abhishek Motayed told *GovTech*. Sensors relay readings to a cloud-based algorithm that analyzes the data to update digital maps and deliver alerts and coordinates to responders' cellphones.

The algorithms are intended to analyze sensor readings to differentiate between smoke from innocuous situations — home chimneys or campfires — and smoke from dangerous burnings. Seeing whether several sensors light up can also help, with multiple sensor activations more likely to confirm a spreading fire, Motayed said.

Gilpin County will pilot N5's system this summer, and Whittington says one incident during earlier testing was particularly promising.

When the forestry service conducts controlled burns, sensors are brought along to collect data that will help the algorithm learn to distinguish between normal and abnormal air conditions. The evening following one such burn, a pile of vegetation reignited unintentionally; the system detected the unusually hot heat signature. This abnormal reading prompted N5 to call Whittington, who then contacted dispatch about sending someone to check it out. He was still on the phone when a 911 call came in reporting a fire on the pile.

The tool would've given a warning significantly in advance of the 911 caller's, if its sensors had been programmed with the alert metrics being designed at the time, Whittington said.

"If sensors had been programmed to where we needed them, that notification would have come in 36 minutes before that 911 call," Whittington said.

Whittington had several goals when selecting a technology solution, such as being able to withstand severe weather, but said he didn't plan to evaluate its level of effectiveness based on specific metrics.

Instead, he's taking a broad look and judging the investment as useful or not based on whether it helps save lives or fails to detect a fire.

"The best testament that I'm going to have to this technology is if one of my sensors goes off and I can evacuate all my people before that fire even gets close enough to their house that I have to worry about it. Then I can look back and say, 'Yes, that worked,'" he said.

SARA similarly defines the success of its flood prediction tool in terms of lives potentially saved and time and effort spared by helping emergency responders better direct their resources and efforts.

In one instance, too, early flood prediction allowed SARA to warn a federal jet engine facility five hours in advance, allowing the facility to hoist sensitive equipment out of the water's path.

AI FILLS IN THE BLANKS

Technologies are also being used to help get ahead of disasters before they start, such as in Norfolk, Va., where its Office of Resilience uses tools to provide residents with tailored advice about better protecting their homes against flooding.

Messages around flood risks have traditionally been too general, describing all members of a community as facing the same level of risk. This overlooks how differences in home construction and the frequency and depths of the flooding events they're exposed to all influence the risks facing a property, Norfolk Coastal Resiliency Manager Matt Simons told *GovTech*.

The elevation of property grades and elevation of the home matter, as do factors like the building's age, foundation type, and the existence of a basement or flood vents.

Blanket advice about flood preparation may not feel urgent to residents, either. Simons hopes to provide more meaningful guidance and better encourage residents to take action through a tool that offers recommendations personalized for their individual situations.

Norfolk offers an online Flood Risk Learning Center tool that allows renters and homeowners to plug in their addresses and a few other details, then view information on their chances of experiencing a flood and how high the waters might reach. The tool also suggests mitigations residents can take to lower flood insurance premiums and reduce total damages, such as filling in basements and relocating utilities out of crawl spaces.

The flood risk system draws on FEMA flood zone information, elevation data collected when Norfolk takes lidar readings of the city and housing records held by the city Real Estate Assessor's Office to inform its calculations.

But data gaps remain that can make it harder to accurately assess flood risk for some areas. That's especially the case for lower-income communities where residents are less likely to engage in activities like refinancing homes or seeking building permits that can result in elevation certificates being shared with City Hall.

Norfolk is hoping machine learning models can fill in those gaps and

Norfolk, Va.'s Flood Risk Learning Center shows risk of flood and suggests mitigations residents can take by street address.

1455 Bayville Street 23503
Resident Type: Renter

According to FEMA, your property is in the **VE (Coastal High Hazard Area)** Flood Zone.

Based on the elevation of your property above Mean Sea Level, this image shows anticipated flood heights expected to occur for your home based on a storm with a **1-in-10** annual chance. In a storm like the one shown in the image, water levels are expected to reach **2.5 feet** above ground-level here.

produce estimates about homes' first-floor elevations and other data that isn't otherwise already available.

"Usually, homes do very well at handling damage in the crawlspace, but once a flood enters that first floor of living space, each additional inch starts to dramatically scale up the amount of damage. And so that's a kind of a mystery data point," Simons said. "The pilot is doing things like filling in data gaps that are very difficult and expensive to get."

Norfolk piloted the machine learning tools in 2021 on communities for which plenty of data was available. That made it easier to check and verify — or correct — the AI's predictions.

FEMA's Hazus Program supports emergency response, preparedness and recovery activities by modeling an area's potential damages from natural disasters. It can make basic projections drawing on "generalized national databases" or users can feed it local specific information to get more accurate estimates.

Norfolk hopes the machine learning tool will provide data it can use to produce more accurate Hazus damage models. With those results in hand, the city could give its "most vulnerable and risk-exposed populations" better information on reducing risks, Simons said. As of March 2022, Norfolk was testing the tools across all its neighborhoods.

"USUALLY, HOMES DO VERY WELL AT HANDLING DAMAGE IN THE CRAWLSPACE, BUT ONCE A FLOOD ENTERS THAT FIRST FLOOR OF LIVING SPACE, EACH ADDITIONAL INCH STARTS TO DRAMATICALLY SCALE UP THE AMOUNT OF DAMAGE. AND SO THAT'S A KIND OF A MYSTERY DATA POINT."

LOOKING AHEAD

As scientists amass more data over the years and as data-collecting technologies like camera-equipped drones and satellites become cheaper and more widespread, algorithmic predictions are likely to become more precise and applicable to new areas.

AI systems haven't always had enough good data to assess lightning strikes, for example. But University of Washington (UW) researchers announced in late 2021 that enough information had accumulated. They created a machine learning algorithm to anticipate where lightning would strike in the southeastern U.S. It reportedly predicts strikes two days sooner than a popular physics-based prediction method could.

"Machine learning requires a lot of data — that's one of the necessary conditions for a machine learning algorithm to do some valuable things," researcher and UW Associate Professor of Atmospheric Sciences Daehyun Kim told UW reporters. "Five years ago, this would not have been possible because we did not have enough data, even from [the World Wide Lightning Location Network]." gt

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The Best of What's New in Cybersecurity

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Centralizing Cyber

States and localities increase coordination with the federal government

Mounting threats to critical infrastructure and vital services are remaking the cybersecurity relationship between states and localities and the federal government.

Two pieces of legislation approved over the past six months point toward a more centralized and coordinated approach to addressing cybersecurity vulnerabilities in the name of national security.

In November 2021, federal lawmakers approved dedicated funding for state and local government cybersecurity efforts, a move long sought by NASCIO and other groups. The new State and Local Cybersecurity Grant Program — included in the massive Infrastructure Investment and Jobs Act — provides $1 billion for cybersecurity improvements over four years.

Then, in March of this year, President Biden signed into law the Cyber Incident Reporting for Critical Infrastructure Act of 2022 as part of the Consolidated Appropriations Act of 2022. The law will require providers of critical infrastructure services to report cyber incidents to the federal Cybersecurity and Infrastructure Security Agency (CISA) within 72 hours.

Details for both measures are still being worked out. The Federal Emergency Management Agency is working with CISA to develop rules for awarding and distributing the new cybersecurity grants, which are expected to begin flowing to states late this year.

CISA is also responsible for figuring out how the new incident reporting law will work, including determining the thresholds for incident reporting and which organizations are subject to these requirements. This process will take longer. The law gives CISA two years to develop proposed rules and another 18 months to seek comment before finalizing them.

A More Active Federal Role

Taken together, these laws point toward significant changes in the nation's historically decentralized approach to cybersecurity.

"I think this is step one toward much more active federal involvement in state and local government cybersecurity programs," says *Government Technology* cybersecurity columnist Dan Lohrmann, former chief security officer and chief technology officer for the state of Michigan.

It's likely that state and local agencies will receive additional federal cybersecurity support going forward, along with greater federal oversight, Lohrmann says. "We're moving toward more involvement from national law enforcement and intelligence agencies, more funding and more mandates from the federal side."

He views the new cybersecurity grants as an important down payment on years of cybersecurity underinvestment and perhaps a template for ongoing federal funding for state and local cybersecurity protections. Although previous federal funding programs could be used to finance cybersecurity upgrades, those projects often lost out to competing priorities. The new grant program directs money specifically toward cybersecurity initiatives, enabling agencies to address what Lohrmann calls a "national debt in cyber" consisting of outdated systems, insecure software code and vulnerable networks.

"The grant program is significant. It's creating a new road for us," he says. "I think there will be more money in the future, and this is a model we'll be coming back to."

The incident reporting law will also trigger big changes. Although it doesn't take effect for a few years, Lohrmann expects the measure to drive new requirements for state and local agencies, particularly those providing services like electricity and drinking water.

"I believe mandatory reporting of cyber incidents will be coming to state and local governments, especially when they are performing functions that are deemed critical," he wrote in a *Government Technology* column published shortly before the legislation was signed into law. "My advice: Start getting ready for this now, if you haven't already built these scenarios into your

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planning for business disruptions caused by a cyberattack."

Facing New Threats

New cybersecurity legislation is being driven by a threat environment that seemingly grows more menacing by the day. The nation has weathered a wave of highly disruptive cyber events, including the Colonial Pipeline attack that threatened fuel deliveries to much of the southeastern U.S. in 2021.

Russia's invasion of Ukraine adds new uncertainties. Security experts worry Russian cyber operations will attempt to disrupt critical state and local government services in retaliation for U.S. support of Ukraine. "There's a belief that Russia may start causing us pain here," former CISA Director Christopher Krebs said during a recent *Government Technology* webcast.

Citing "evolving intelligence," President Biden issued an urgent warning in March that the Russian government may launch malicious cyberattacks in response to crippling economic measures imposed on the country by the U.S. and its NATO allies. "It's part of Russia's playbook," Biden said.

Picking Up the Pace

In response to these threats, government jurisdictions need to up their game on cyber. If they haven't already, agencies should be assessing their current cyber risk and designing strategies to address vulnerabilities and strengthen security posture, Lohrmann says.

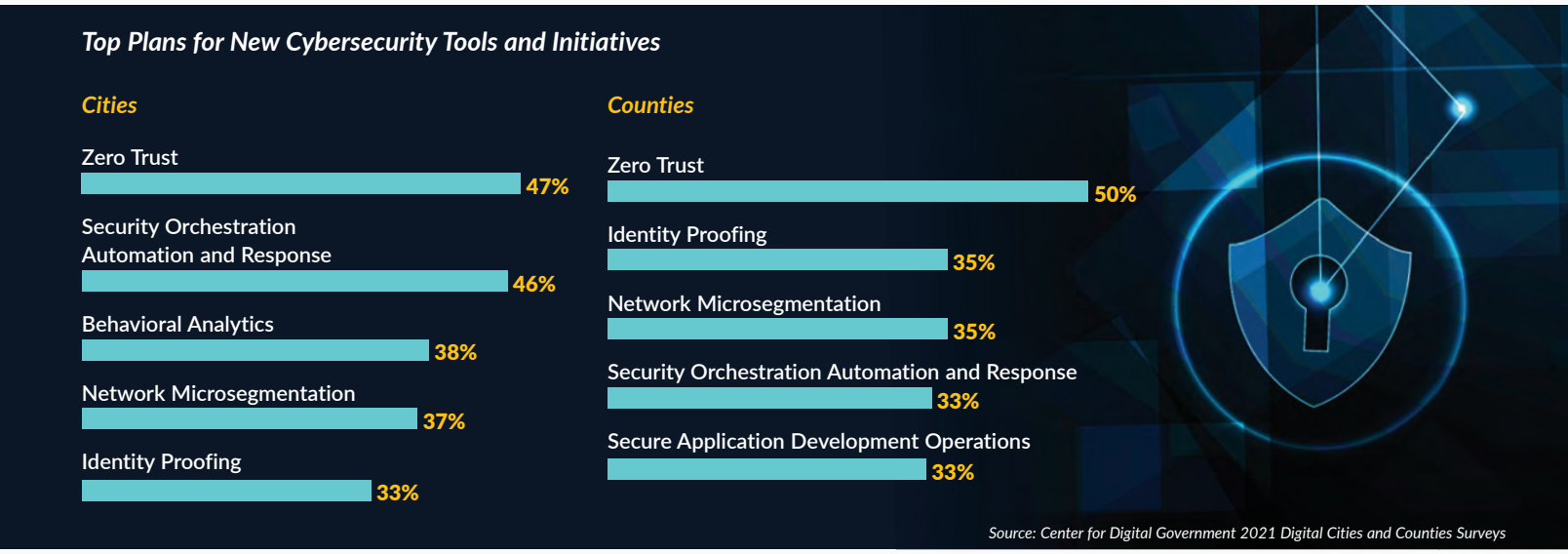
Some organizations have in-house resources to perform cybersecurity vulnerability assessments, but many others will need to consider working with partners. Organizations like CISA and the Center for Internet Security offer free resources. Commercial security vendors may also provide assessments for little or no cost, Lohrmann says.

In addition, agencies need a faster refresh cycle for cybersecurity strategies. Gone are the days when strategies remained effective for four to five years, he says. "My recommendation would be to comprehensively update your strategy every few years, at least, with smaller refreshes in between. Vulnerability assessments need to be refreshed regularly, too."

Having a firm grasp on current cybersecurity needs and clear plans for addressing vulnerabilities will push agencies toward a stronger security posture. These moves also position agencies to compete effectively for upcoming cyber grants.

Successful grant applicants will show detailed plans for projects that move them toward Zero-Trust security environments, Lohrmann says. "The better you can quantify your gaps and lay out the case for filling them, the better your chances of getting the funds you need."

Top Plans for New Cybersecurity Tools and Initiatives



Source: Center for Digital Government 2021 Digital Cities and Counties Surveys

Navigating Security in a Fast-Changing Environment

Hybrid work, multi-cloud deployments and increasingly vulnerable software supply chains are just a few of the cybersecurity challenges that organizations face today. ***Brandon Shopp****, group vice president of product for SolarWinds, discusses cybersecurity trends, threats and solutions organizations should keep top of mind as they move into the future.*

The cybersecurity landscape has changed significantly in the last two years. Where should organizations focus as they assess their risk posture?

Folks are no longer working solely in offices sitting behind an enterprise firewall, so environments are increasingly perimeterless. In addition, workers are using their home wireless networks and cable providers to access the internet, which increases the number of risk points. In terms of threat actors, we're seeing an uptick in cyberattacks from foreign governments and the general hacking community — that is, civilians or organizations often motivated by money.

What challenges do organizations face when managing IT security across multicloud hybrid environments?

The cloud makes it easy to spin up new resources, but it also creates new risks. Many data leaks happen because somebody rolls out something quickly in the cloud but doesn't realize they have to configure it further to properly secure it. Additionally, organizations are using multiple clouds from multiple vendors on top of on-premises architecture. Securing multicloud hybrid environments requires a new level of skills and technology. Each cloud provider also tends to have its own tools and procedures, which the organization's IT team must learn.

What strategies can help protect data in today's complex environments?

We're seeing more organizations adopt Zero Trust and least privilege strategies instead of relying on legacy technologies like VPN. With Zero Trust, agencies can make data and applications accessible to the right people, no matter where they are without funneling those resources through a VPN. With the least privilege model, agencies can make sure people only have access to the resources they need. These strategies limit the potential damage to an organization if someone's credentials get compromised.

How can organizations — especially those with limited resources — simplify management of IT security?

Organizations with limited resources usually can't afford the high salaries cybersecurity professionals command, so many of them use managed security services providers (MSSPs). MSSPs can hire top security professionals and distribute their cost across multiple customers, which creates economies of scale. In addition, we see organizations leverage software-as-a-service (SaaS) and cloud service providers. Agencies still must configure the software properly for usage in their environment, and they must manage and maintain configuration settings. But they're not running the software and infrastructure on premises, so they don't have to secure it or patch software. It's a shared responsibility model to some degree.

How should organizations secure their supply chain from highly sophisticated cyberattacks?

Threat actors are constantly devising new attacks and methodologies, so organizations must stay on top of trends and constantly evolve how they build and secure their software supply chain. It isn't a "set it once and you're good" kind of thing. President Biden's executive order on improving the nation's cybersecurity and some bills going through Congress will help address some of the issues. Among many things, the executive order mandates service providers disclose security incidents or attacks. It's also important to establish a community where security professionals across the nation can exchange security and threat information. You don't want to solve these things in a vacuum. We're stronger as a community than as individual organizations.

Quantum computing is on the horizon. How will it impact cybersecurity, and what can organizations do to get ahead of the curve?

Quantum computing will enable the storage, processing and analysis of data at rates unfathomable today. A password that normally takes years to crack will be decrypted in a matter of minutes or hours with quantum computing, so the encryption technologies and techniques in place today will all be at risk. Using the full range of standard cybersecurity best practices — including credentials, least privilege and Zero-Trust strategies — can help organizations stay ahead of the threat. Even if they can't keep the bad actors out, these practices can help limit the scope of the damage.

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User Identities in a Zero-Trust World

A key pillar of Zero Trust is identity, which uses capabilities such as multifactor authentication (MFA) to continuously verify the identity of a person or device. ***Hanna Wong,*** *director of public sector marketing for Keeper Security, discusses how organizations can modernize their identity security approach to move toward a Zero-Trust model.*

What's driving interest in Zero Trust?

State and local governments — which have become top targets of phishing, data breaches and ransomware attacks — must be able to prevent cybercriminals from accessing all endpoints, including those associated with a distributed workforce. Prior to the pandemic, employees primarily accessed databases, applications and constituent data from within the secured network perimeter of an office. Now users are connecting from their home networks or unknown networks — even cafes — that don't have the security protections that exist within a physical office. That heightens the need for Zero Trust, which has "never trust, always verify" as a main tenet.

Why are some user provisioning solutions inadequate for government?

A lot of modern solutions cannot provision users or verify credentials for certain legacy systems, so it's important to have a solution that can meet cybersecurity needs throughout the modernization journey. As governments transition from legacy systems, they need to invest in a solution that protects employee passwords and credentials in those old systems and integrates with modern identity and access technology like single sign-on (SSO).

What is a zero-knowledge platform and how does it help organizations strengthen security and compliance?

A zero-knowledge platform means the provider of your credential management solution can't decrypt the information stored there. In terms of security and compliance, that means even if the solution provider's system is breached, the attacker cannot steal your user identities, passwords and other sensitive information and use them to break into your infrastructure.

What capabilities should organizations seek in a credential management solution?

Zero Trust, zero knowledge and the enforcement of MFA are critical. One of the Zero-Trust pillars is identity, and the adoption of identity functions like MFA is central in the Zero-Trust security models developed by CISA and the Office of Management and Budget (OMB). Solution simplicity is also vital. Zero-Trust technologies need to be intuitive to use and easy to roll out — both for IT and non-IT teams. If it's too complicated, it lowers adoption rates and increases security risks. The solution should also support secure intra and interagency collaboration, including the capability to securely share documents, records and resident data.

How can organizations maintain strong security while improving user experience?

Government organizations are in different stages of their modernization journeys, so it's important to have a solution that can integrate with the existing identity stack and security stack — for example, security information management solutions that let IT teams view and aggregate data across their cybersecurity and identity solutions. In addition, having a platform that can secure the user credentials for legacy applications while working in sync with SSO is becoming more important. It is a single vault where each user can store credentials for all their systems.

The OMB recently released a memorandum specifying requirements and a 2024 deadline for federal agencies to implement key features of a Zero-Trust model. Where can state and local governments start their own Zero-Trust journeys?

Partnership with industry is always one of the best places to start for this type of implementation and requirement. The leading vendors have already implemented Zero Trust in their architecture strategies internally as well as in their solution offerings, so they can share best practices and lessons learned. Given that organizations have already invested a lot in identity and access solutions, a tangible and easy place to start is by implementing solutions that seamlessly enforce MFA policies across the organization and allow you to receive security audit reports and dark web monitoring alerts. Finally, as mentioned, a solution that is easy to adopt and enables secure collaboration across agencies or departments will make a big difference when it comes to Zero-Trust models.

Secure Collaboration for the Work-from-Anywhere Future

The massive shift to remote work highlighted the need to modernize the way state and local governments protect content used in collaboration and workflows. ***Murtaza Masood****, managing director for state and local government at Box, discusses how government leaders can secure content while making it seamlessly available to workers and constituents.*

How have the past few years impacted collaboration, content sharing and the security of content workflows?

In response to the pandemic, CIOs had to immediately enable secure employee workflows that were available anywhere, anytime, and on any device or network. They also had to enable constituent services on demand, so people could reliably and securely engage with their state or local government to do things like pay fees or apply for permits, benefits and jobs — regardless of their location or device. This shift in demand patterns required a rethink of traditional collaboration and content management strategies. Collaboration had to be on demand with frictionless security and provide a great user experience.

With multiple people collaborating and sharing content, what's the best way to protect data?

There's no silver bullet. As government organizations move to cloud-enabled platforms to empower their workforce and deliver constituent services, they need to invest in foundational cloud technologies and capabilities that form a comprehensive ecosystem to secure data and content while powering seamless workflows. They need a roadmap to address the entire spectrum of capabilities — identity management, device security, application modernization, re-imagining case management and other related issues.

What should organizations look for when considering a Zero-Trust solution?

Zero Trust is a comprehensive strategy, not a specific solution. To enable cross-platform or cross-application identity management, Zero Trust must include device security and multifactor authentication to establish who is logging in with single sign-on. Then you have to consider content access, privileges and control lists, which often exist across multiple platforms. Once you adopt the right tools, you get to a more comprehensive state where you can securely log in anytime, anywhere, with any device and have the right workflows and content surfaced for you.

How can artificial intelligence (AI) and automation help organizations protect against threats and alleviate IT staffing burdens?

The last two years have taught us that the business of public service must operate beyond brick-and-mortar boundaries. AI and machine learning let organizations secure content and augment the user experience by automating malware detection on the delivery end, automating encryption throughout the content life cycle, automating threat removal within business workflows and more. Work can continue seamlessly while these advanced technologies automatically enable a real-time security posture.

How can organizations meet compliance requirements as they share content with diverse users?

The first step is to look at your content governance model. What does that content life cycle look like from ingestion or creation to consumption and archive? Compliance must be part of that entire process. Then, it comes down to your platform and tools. Are you selecting a platform like Box, where your entire content repository is unified and ensures compliance from the point of entry to the point of disposition — all while offering a seamless user experience? Or are you signing up for a disparate and disconnected strategy where you are now responsible for tracking and making sure that different data sources are compliant? Content fragmentation, even in the cloud, can introduce unnecessary exposure and a compliance risk.

Where can state and local governments start their journey toward more secure content sharing and collaboration?

User experience should take a primary seat in planning and strategy. Start with your governance model. Then seek platforms and tools that match user expectations, can achieve key criteria — for example, a seamless user experience, frictionless security, and built-in compliance and security protection — and provide the content management features and benefits that you would expect of a modern platform. Finally, stay ahead by educating yourself through your ecosystem and participating in thought leadership groups such as those within the National Association of Counties and the National Association of State Chief Information Officers.

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What High-Performing Security Organizations Do Differently

*Organizations that implement a range of best practices are better at closing IT security gaps and making the most of their cybersecurity investments. HPE executives **Joe Vidal**, master technologist in the company's Office of North America CTO, and **Allen Whipple**, server security and management solutions business manager, discuss key strategies for improving and simplifying IT security.*

What trends are impacting IT security in state and local governments?

Vidal: State and local governments are still trying to get a handle on remote access. At the beginning of COVID, most agencies didn't have a 1:1 ratio of devices to send home with people, so they were forced overnight into a bring-your-own-device support model and virtual desktop infrastructure (VDI) implementation. In many cases, the VDI implementation wasn't very secure, nor was it optimal. Now agencies are asking how secure their setup is, and they have to go backward to address that, which can cause some real challenges.

How do high-performing organizations close IT security gaps?

Whipple: When we say "high-performing" in this context, we mean organizations that leverage a range of key best practices related to IT security. They've adopted MFA and implemented Zero-Trust policies throughout; backup and recovery are key components of their strategy; they've trained their people to recognize threats; and so on. We've found high-performing organizations can reduce the average dwell time — that is, the average time to detect a bad actor — from 240 days to 24 hours.

What do agencies need to know about Zero Trust and its implementation?

Vidal: Zero Trust means the system continually verifies the identity of internal and external users. It's not a one-time verification process, and nobody is exempt. It starts internally because more than 60% of cybersecurity attacks happen from within an organization, where bad actors find a weakness and take advantage of someone or something. So organizations must physically secure their internal borders, boundaries and access points first. Then, they have to use artificial intelligence (AI) to look at user behavior and the way people are accessing data. Only then can they determine whether users are legitimate and authorized.

How AI and automation can improve protection?

Vidal: Many cybersecurity organizations, including the FBI, suggest that investments in AI bring the best "bang for the buck" in terms of catching and stopping breaches as they happen. Zero Trust gives you this multifactor, continuous authentication process. But more importantly, AI analyzes the user's behavior. If their activity differs significantly from previous behavior, the system alerts the security team and immediately cuts off the user — whether that's a person or an application. Unless you're using AI, you're not going to catch these things.

AI and automation are also important for regulatory compliance. There are more than 150 regulatory compliance agencies today. If you're still using manual processes to do regulatory compliance checks and reporting across those agencies, there's no way to keep up with it. It's no longer acceptable to say, "I don't know whether we're compliant; we're not scheduled to do another compliance check until June." Organizations should be using AI and automation to do that for them.

How can government organizations improve backup and recovery to combat ransomware?

Vidal: They can use immutable backups. That means standing up a network connection, creating the backup to a remote facility or remote device, and then tearing down the network connection so the backup is air gapped and immutable. It's not connected to the network, so bad actors can't access, alter or delete the backup even if they manage to get into the organization's production environment. In addition, organizations can run heuristics against that copy to detect malicious activity.

How can organizations get the most value from their cybersecurity investments?

Whipple: In one word, the answer is education. There are many wonderful tools out there, but just because an organization buys equipment does not mean security features are enabled and they're taking advantage of the security capabilities of that equipment. Suppliers can't turn on all features by default because the features require user-specific information. The organization's staff needs to understand what these tools can do, how to enable them, and how to fully utilize their features — like AI and automation — to simplify security and compliance and make life easier for everyone.

ISSUES TO WATCH

Growing Threats and Changing Relationships

Mark Weatherford has led information security organizations at multiple levels of government, as well as the private sector. He was the first deputy undersecretary for cybersecurity at the Department of Homeland Security under President Barack Obama. He served as chief information security officer (CISO) for the states of California and Colorado. And he was vice president and chief security officer at the North American Electric Reliability Corp., a regulatory authority that oversees reliability of the power grid.

We talked to Weatherford about emerging security threats and the changing cybersecurity relationship between states and localities and the federal government.

What is your perception of the cyber threat environment right now, and what does it mean for states and localities?

I try to avoid using fear, uncertainty and doubt in this business. But I also think it's important to be honest. We are living in a precarious threat environment. When a single person with a laptop and internet access who lives halfway around the world can create chaos for state and local governments that are responsible for large numbers of constituents, this is a threat we need to pay attention to.

Most of the cybersecurity people I know in state and local government are devoted and professional, but far too often, they are working with limited resources. They're not in a fair fight. You have little cities that are going head-to-head with nation states.

We're beginning to see direct federal funding for state and local government cybersecurity, along with new incident reporting requirements. What's your take on this changing intergovernmental relationship?

I think it's getting better, but the federal government still too often acts like the older and smarter sibling. In reality, the feds don't understand the challenges of working with residents and running a small security operation on incredibly limited resources. So some of their pronouncements come off as high and mighty. I will say, however, that CISA has come a long way. They are actively working with state and local agencies on a daily basis with funding and a variety of other resources.

One thing I worry about with the new State and Local Cybersecurity Grant Program, however, is that organizations will buy shiny new tools without considering the resource tail that comes with them. You need to train your people and update and maintain these technologies. I've been advising small jurisdictions to consider managed security services instead of buying one-off solutions that will require more work than they can do.

What cybersecurity issues should state and local officials be paying more attention to?

One is managing supply chain risk. We used to think of supply chain from a logistical perspective — how do I get a product from point A to point B. Cybersecurity has changed that concept. Now we need to understand the components that go into our technology, how it's being updated, who has access to it and how it's being managed across its entire life cycle. That's why efforts like the Software Bill of Materials initiative, which was included in President Biden's 2021 executive order on cybersecurity, are getting a lot of attention.

Another important issue is the convergence of physical security, IT security and operating technology (OT) security. Traditionally, these have been viewed as separate disciplines. It's more important than ever to see the relationships between these security disciplines because bad guys don't care which they compromise. And if these disciplines are siloed, it's much easier for an attacker to pivot to other parts of the organization once they're inside.

What advice do you have for CISOs and their bosses?

CISOs need to get out more often. Technical people tend to live in a technical world, but security doesn't exist in a vacuum. CISOs need to build relationships — sometimes really close relationships — with others in their organizations. For executives, I would say, know who your CISO is and talk to them regularly. I've seen some pretty embarrassing conversations where government executives were asked, who's responsible for security in your organization? And you get this blank look; they don't even know who the person is.

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Resilience Rules

Communities are beginning to focus efforts on resilient infrastructure in the face of climate change.

By Thad Rueter / Staff Writer

The latest Intergovernmental Panel on Climate Change report warned that humankind was running out of time to reduce greenhouse gas emissions and avoid the worst impacts of a warming planet — that is, massive, costly and fatal flooding, heat waves and other punishments.

At about the same time that report was issued, an Associated Press analysis of U.S. Department of Energy data found that over the past 20 years, power outages have doubled — a result of more destructive storms and aging infrastructure, and a foreshadowing of what public agencies face as climate change becomes the new reality.

"The electric grid is our early warning," University of California, Berkeley grid expert Alexandra von Meier told the AP. "Climate change is here, and we're feeling real effects."

Even so, local and state governments — many still dealing with the changes brought about by the pandemic and facing the usual hurdles of limited revenue and slow-moving policymaking — are generally just waking up to the fact that climate change is here, now, requiring immediate mitigation plans.

But as officials shift attention to those immediate needs, they will find a variety of technologies designed for specific climate change scenarios, which vary greatly depending on geography, population, land use and other factors. A beach town must worry about the rising ocean, for example, while some inland areas will suffer most from catastrophic heat waves.

"We are starting to see more communities think about climate change and how it impacts them," said Tad McGalliard, research and development director for the International City/County Management Association (ICMA).

Long- vs. Short-Term Thinking

But as McGalliard pointed out, many of those efforts concern longer-term thinking about climate change.

Ann Arbor provides a good example.

The Michigan college town is often held up as an example of leading-edge action on climate change, given its "climate emergency declaration" in 2019 and its subsequent moves to

make the city a net-zero producer of carbon — efforts that have included a host of municipal activities, including building affordable housing.

Much less common are spending money and deploying technology to deal with today's climate change impacts rather than trying to reduce emissions and taking other steps meant as a brake on global warming.

"We are not seeing much of that yet," McGalliard said.

Reason for Optimism?

Thinking about climate change can easily lead one to pessimism. That holds especially true when one considers that — according to ICMA data — the U.S. has some 38,000 general purpose local governments, many of them tiny agencies with scant resources in the best of times. How can such towns prepare for historic levels of flooding if they can barely afford a fire department?

But reasons for optimism do exist.

Experts on climate change mitigation and disaster preparedness point to the federal level.

In late 2021, FEMA awarded $171,700 to the Minnesota Department of Public Safety in the first Building Resilient Infrastructure and Communities (BRIC) program grant award. The money will pay for updated hazard mitigation plans for the Minnesota counties of Jackson, Kittson, Marshall, Pope and Red Lake.

BRIC grants are designed to "shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience," FEMA said in a statement.

BRIC-funded projects have included relatively low-tech but vital work such as wetland restoration, raising levees, and new flood pump and electrical systems — along with moving affordable housing away from flood zones and making sure that hospitals have reliable power grids. FEMA says BRIC will award $1 billion in its second year, helping communities deal with the ongoing and looming impacts of climate change.

That money is allowing communities to take on bigger mitigation projects,

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said Craig Fugate, chief resilience officer at One Concern, a California-based firm whose software helps with planning for the consequences of climate change.

People focused on those immediate impacts also can point to the latest proposed federal budget from the Biden administration, a spending plan the *New York Times* called "an extreme weather budget." That proposal in early April included at least $1.8 billion for a Department of Agriculture program to make rural homes more resilient to climate change, for instance — another signal that at least some governmental thinking is shifting toward immediate needs.

Beyond Building

But home upgrades will go only so far when it comes to planning needs for local and state governments.

Fugate, who was FEMA administrator under President Obama, said that grasping the complexities of climate change requires sophisticated software, machine learning and even artificial intelligence so that officials have a full picture of what's to come and can plan accordingly.

"It's no good if the hospital doesn't flood but all the roads leading there do," he said.

Indeed, when it comes to cutting-edge but relatively realistic technology that can help jurisdictions prepare now for climate change, he supports using AI in hazard risk modeling to help determine where and how to build before and redevelop after a disaster.

Such planning, however, is not just about structures or power grids or things. It's about people: first responders and other members of the local

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workforce, for instance, or the service industry workers without whom a local economy cannot recover after a disaster.

"Resiliency is not just about rebuilding," Fugate said. "Stuff is great, but people are more important."

Already, he said, local and state governments are making use of GIS and mapping tools to display risk, and lidar — that is, light detection and ranging, a remote sensing method that when combined with other data generates precise, three-dimensional information — to build high-resolution topographic maps, which he said are key for flood risk.

> **"It's no good if the hospital doesn't flood but all the roads leading there do.**

Not Just Software

Preparing now for climate change involves more than digital maps and AI, however.

For instance, Fugate urged officials to consider bidirectional charging of electric vehicles, which can provide backup emergency power to residences and battery backup to the grid.

Other examples of mitigation technology come from a variety of sources in the U.S. and abroad.

The high-tech, wealthy and equatorial country of Singapore, for instance, has produced an in-depth guide that offers guidance about how to ease some of the impacts of climate change. That guide serves almost as a preview of the technology that is sure to find its way to more than a few U.S. locations — that holds especially true for urban heat islands or places prone to flooding.

For instance, it mentions "water retentive and porous pavement systems, which include additional voids compared to conventional pavements, [allowing] water to flow into the ground or into water holding fillers." Such technology can help store runoff and prevent flooding, and also "enhance water evaporation" and contribute to cooling.

Meanwhile, according to that guide, governments can employ "phase change materials (PCMs)," which are substances that "store and release massive latent heat during phase transition within a certain temperature range by increasing the building inertia and stabilizing indoor air temperature."

And as the guide notes, existing and relatively low-cost transportation technology promises to play its own

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The 6 Trends Driving Transportation in the 2020s

As state and local governments work to modernize and enhance transportation networks in the coming years, they must answer several key questions. What are the most important goals for transportation in the 2020s? Which ones deserve the most attention? How will technology help achieve those goals? In this Q&A, Geo George, industry strategy and GTM executive at Salesforce, shares his thoughts about the biggest factors that will impact transportation through the rest of the decade.

Which trends are driving transit and transportation in this decade?

We see six key themes emerging:

1 / Equity. Equity is an imperative to eliminate transportation burdens for low-income communities, people with disabilities and other disadvantaged groups. The key focus is connecting communities and access to resources and opportunities.

2 / Resilience and security. Recent floods, storms, fires and hurricanes have disrupted the lives of millions and caused hundreds of billions of dollars in damage. Public officials face the challenge of making highways, bridges, railroads, transit stations, waterways, airports and ports more resilient to climate change and other threats.

3 / Safety. Ninety-five percent of transportation fatalities result from routine highway travel. It will be critical to provide a safe and secure system designed to eliminate transportation-related fatalities and serious injuries.

4 / Technology. All around the globe, companies and government organizations are testing automated transportation technologies. These are exciting innovations and elements of transportation. It is critical to look at how technology can help modernize and drive efficiencies for state DOTs, transit authorities, airports and seaports.

5 / Sustainability. Transportation accounts for the largest share of U.S. greenhouse gas emissions – 28.5 percent. Drastic reductions in greenhouse gas emissions are needed in the coming decades.

6 / Infrastructure. Maintaining a high-quality transportation system is important for safety and economic development. Deteriorating roads and bridges increase travel times. These problems translate into higher costs for businesses to manufacture and distribute goods and provide services.

If you were advising a state department of transportation to tackle a few of these trends, which would you choose?

I'd start with infrastructure and sustainability. That bridge collapse in Pittsburgh on the day President Biden was giving a speech amplifies how critical infrastructure is — highways, roads and bridges; and transit stations, tracks and rails. Sustainability must be incorporated into every investment and decision. Technology cuts across all these elements, providing tools to help drive efficiencies.

What's the No. 1 thing a DOT can do to better manage the ecosystem of agencies, jurisdictions, private contractors and private strategic partners it takes to complete a transportation project?

Implement a collaboration platform for all stakeholders. For example, New York City's Metropolitan Transit Authority uses Slack to manage incidents internally and s hare real-time updates with riders and key partners. One MTA leader said that before Slack, incident information was essentially an endless stream of noise that took years to understand. A powerful collaboration platform can drive a lot of efficiencies and increase public participation in the planning process.

small part in easing some of the effects of climate change.

"Using electric scooters for short trips (or for the first and last mile of longer trips) is a viable option for reducing heat generation from the transport sector. Such modes of transport do not produce significant emissions," according to the guide.

Which Lessons?

But will such lessons and advice take hold as officials try to craft policies to deal with the immediate effects of climate change?

That's one of the important questions — one that can be as important as the available technology. After all, case studies and examples are vital for any complex (and costly) issue, and climate change is about as complex (and costly) as they come.

"American governments tend to be a little bit xenophobic," said McGalliard, of the ICMA, when asked if studies from Europe and Asia would influence thinking in the U.S. around mitigation efforts. "And places like L.A., Chicago and New York are aberrations in the United States. And it's hard sometimes for the rest of the country to learn from California, because that state is more aggressive than most."

But lessons will come one way or another — whether via case studies and technology guides or the harder experiences of storms, droughts, floods and heat waves.

Forethought rather than improvisation, however, will almost certainly be easier and cheaper. The National Institute of Building Sciences, for instance, estimates that every dollar spent on disaster preparation saves an average of $6 down the road.

The key to dealing with this challenge is to have a wide view, to think holistically.

As Fugate put it: "You cannot plan for what's just inside the wire." gt

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BRICK BY BRICK

Eight communities were chosen by FEMA for technical assistance through the Building Resilient Infrastructure and Communities (BRIC) program, aimed at supporting local hazard mitigation projects. Work began this spring, and more cohorts will be added each year.

Thomasville, Georgia

Located in South Georgia near the Florida border, the city and FEMA are working on building capacity to run benefit-cost analysis, prioritizing mitigation projects, and developing best management practices for planning for future growth and protection of community lifelines.

Pittsfield, Vermont

A small community in central Vermont, the town and FEMA are looking to build Pittsfield's grant application capabilities, identify ways to mitigate future flooding and prioritize mitigation projects.

DePue, Illinois

The village of DePue, situated on the Illinois River, is working with FEMA to address mitigation concerns for the local wastewater treatment facility and identify solutions for relocating a flood tunnel.

Kamiah, Idaho

The town of Kamiah, on the Clearwater River, is engaging FEMA to help identify viable mitigation projects as well as funding sources. They plan to prioritize projects that address floods, wildfires and landslides.

Iowa Tribe, Kansas and Nebraska

The Iowa Tribe is located in northeast Kansas and southeast Nebraska. The tribe and FEMA are working to conceptualize a microgrid project that would create a Tribal Utility Authority, decrease the tribe's environmental impact and increase their energy resilience.

Morongo Band of Mission Indians, California

The Morongo Band of Mission Indians, covering areas of Southern California, is working with FEMA to help address emergency access to the reservation, enhance flood and wildfire mitigation, and assist with mitigation project application development.

Railroad Borough, Pennsylvania

Railroad Borough, in southern Pennsylvania, is engaging FEMA to help maximize limited resources, build capacity in competitive mitigation grant development and come up with ideas for projects to address reoccurring flooding.

Northern Cheyenne Tribe, Montana

The Northern Cheyenne Tribe in southeastern Montana is working with FEMA to build grant management capacity, develop local hazard mitigation plans, engage and coordinate with stakeholders, and identify and manage mitigation projects.

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Smarter Roads and a Safer Transportation Future

Road systems are getting smarter, with sensors and networks helping transportation agencies manage congestion and improve safety for drivers and pedestrians. How will these changes affect the people in charge of transportation technologies? We put this question to ***Daniele Loffreda****, senior advisor for industry and solutions marketing with Ciena, a networking systems, services, and software company.*

How is the evolution of transportation influencing governments' technology needs?

Collisions and accidents are still increasing, despite everything departments of transportation (DOTs) have done to try to address that. So I expect more technology to be put to work on things like traffic congestion, speed limit enforcement, and disaster notifications.

Change is coming in two arenas. The first is commercial. Trucking may see more drone convoys, with a human driver leading unmanned vehicles. The second arena is motorists and passengers. I expect there will be an ongoing data flow among vehicles, roadside devices, and roadside services. We could also have true multi-modal transportation, with personal vehicles, buses, light rail, and subway stations providing an end-to-end mobility solution coordinated through a single portal.

How will 5G networks help support transportation initiatives?

Devices and sensors deployed along highways help reduce congestion and accidents. And technology like artificial intelligence (AI) and analytics allow for real-time decisions. But all of these solutions require robust network connectivity.

5G will provide the bandwidth to enable edge connectivity, smart technologies, and vehicle-to-infrastructure communications that will improve the transportation experience.

How should government transportation leaders prepare for the mainstreaming of vehicle-to-infrastructure communications?

There will always be data going from vehicles to devices to data centers and then back again. And that's going to require connections to current fiber networks that will connect to 5G cell towers. Governments have to get this network right ahead of time before they get into deploying intelligent transportation applications.

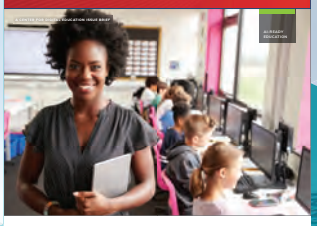
How can governments tap underused fiber to improve connectivity for underserved people?

Today's technology can maximize the traffic going over fiber. This allows more use of fiber along DOT right-of-ways. DOTs can use this extra fiber connectivity to provide broadband access to municipalities and counties. This can extend broadband to remote and underserved communities. Agencies also can monetize those fiber assets, doing things like public-private partnerships to create additional revenue streams that can be invested in improving the passenger and motorist experience.

What are the greatest network security concerns for transportation leaders in this decade?

Many intelligent transportation devices are not necessarily monitored 24/7. That's a physical security vulnerability. There are also network vulnerabilities because those devices don't necessarily have strong passwords. They're certainly not updated or patched as often as they need to be. It's the same with the network devices, routers and servers along the roadside. Agencies should constantly upgrade, patch, and replace those devices.

Leaders really need to start to think of how to push out those security patches and upgrades from a central location. With software-based security, they can do that in an hour or two versus what might have taken a month to physically visit each of those individual devices.



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Better Together

Tamarac, Fla., is a small city that makes the most of limited resources to shore up public safety by working with Broward County.

By David Raths / Contributing Writer

Small jurisdictions are just as vulnerable to earthquakes, wildfires, floods and tornadoes as their larger counterparts, but often don't have the budgets to invest in high-tech interventions. Some, however, are being creative with less expensive innovations. Roanoake, Va., for example, is using sensors that monitor water quality and flow in storm drains and tunnels and is developing an app that would alert downtown property owners of potential flooding. The city also has purchased a drone to help with emergency response for stormwater control and flood preparedness, and to assess damage after an event.

The city of Tamarac, Fla., in the Miami metropolitan area, has learned how to use technology and partnerships to get the most out of its emergency preparedness budget. Last year, the Center for Digital Government* recognized Tamarac as one of the top digital cities in the up-to-75,000 population category. As part of Tamarac's Smart City and Technology Strategic Plan, new fire stations are highly integrated with the city network for 24/7 systems monitoring, and smart parks are powered by an expansion of the city's underground fiber network that was completed in fall 2020. The fiber also makes the city better able to withstand disasters like hurricanes.

Levent Sucuoglu has been the IT director in Tamarac for the past 27 years. In November, he was promoted to interim assistant city manager. *Government Technology* recently talked to him about how working closely with Broward County has enhanced public safety and emergency preparedness in Tamarac.

GT: Smaller jurisdictions often don't have the budgets to make investments in new technology infrastructure to support public safety and emergency management. I understand that Tamarac put an interlocal agreement in place with Broward County for public safety radio systems and dispatch services. Can you describe that?

Sucuoglu: We have a long-term partnership with the Broward County Sheriff's Office for public safety that has multiple layers. They provide law enforcement services for the city. We have our own Fire Rescue Department, but they both use the same public safety radio for communications. Our partnership has evolved to such an

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

Technology Acquisition Trends and Strategies for 2022

Malinda Lindsey, *HP's general manager for the public sector, Mid-Atlantic region, discusses how device needs are changing and what state and local government organizations should consider as they plan technology acquisitions.*

How have the COVID-19 pandemic and other developments impacted technology acquisition?

Before I start, I want to express appreciation for IT leaders and their staffs. They've been unsung heroes during these unprecedented times. With a day's notice, they had to move everyone from the office to a remote environment. Now they're dealing with the challenges of enabling a hybrid workforce. In this new environment, state and local governments must ensure they have secure, high-performing mobile technology solutions. Video quality, ease of content creation and collaboration features will all be important. In addition, some organizations may need to right-size their technology to better fit a hybrid environment.

How is device/endpoint security changing? What should organizations consider when acquiring devices?

Every device decision is a security decision. With a larger percentage of the workforce working remotely, security cannot be an afterthought. Remote work increases security vulnerabilities, and reports of attempted and successful attacks are on the rise. Organizations should look for technology that is designed and built with security as a priority. That results in devices that can better protect against, detect and resolve attacks. I encourage organizations to learn how their preferred technology providers prioritize security and how that aligns with the organization's security and privacy policies.

How can organizations better manage supply chain disruption?

Technology providers are working hard to mitigate supply challenges by increasing capacity at our facilities, diversifying suppliers, working closely with carriers to accelerate logistics and reworking processes to be more efficient. Organizations should frequently communicate their specific needs to providers to reduce lead times. This is also a perfect opportunity to reach out to other agencies and peers for their best practices. Finally, these times require a change in mindset. We need to devise creative solutions to ensure our workforce has what it needs. I advise organizations to put something out there. If it doesn't work in a pilot, don't be afraid to adapt and change immediately.

What should organizations consider when they use short-term funding sources to acquire technology?

First, I would encourage organizations to leverage the funding that's being made available to them. Bring in internal or external experts for guidance on best practices for purchasing. Second, these funding sources may not always be available. Determine a long-term strategy that positions your agency to continue these acquisitions. This can include leasing options, strategic refreshes and using devices-as-a-service to provide analytics that help ensure you have the proper mix of technology. Finally, know that technology providers are here to support you and provide guidance and best practices.

extent that Fire Rescue is dispatched by the Sheriff's Office. We use the same communication system to make sure that our responses are coordinated and we have mutual connectivity. It's a much more evolved partnership than just using the radio system.

We also provide some services for the Sheriff's Office. We have a local district office for the sheriff, which serves Tamarac residents as the local law enforcement agency. Because we're the closest technology house to that group of about 110 people, we provide their telephone service through the city's infrastructure; we provide the infrastructure for their body cameras, so that they transmit the video information over our network. It's a very mingled relationship when it comes to infrastructure, in emergency and public safety services.

GT: How do the city and county work out who pays for the systems? Do you estimate cost savings for not having two separate systems?

Sucuoglu: The county's 911 dispatch and public safety systems are funded through the county taxpayers, so our share of the designated revenues goes to fund these services, instead of keeping our share of those revenues for Tamarac and trying to build our own system for radio dispatch. For 911 communications, we have this mutual system that provides the service to not just Tamarac, but also to some other cities in the county as well. Obviously, this saves a huge amount of effort for smaller communities like us, because we don't have to build this modern technology, the infrastructure, and exert the effort to manage it. It's all done by these local agreements.

GT: Are there other things that Tamarac has done to be more agile in emergency response and disaster recovery?

Sucuoglu: We have done a number of things, and our cloud presence is just one of them. We have been preparing for emergencies for quite some time, and the pandemic definitely expedited this transition almost overnight. The majority of our data and systems are in the cloud. Most critical communications — like Microsoft Office and Teams and our storage for SharePoint and OneDrive — all of those are in the cloud. We make sure that all our new systems, including our ERP system, which we're in the process of implementing right now, are cloud-based.

> “Our partnership has evolved to such an extent that Fire Rescue is dispatched by the [county] Sheriff's Office. We use the same communication system to make sure that our responses are coordinated and we have mutual connectivity. It's a much more evolved partnership than just using the radio system.

GT: Did the pandemic accelerate that work because you have so many employees working from home?

Sucuoglu: We had been preparing with what I always call "cloudification" for a long time. But in March 2020 it just happened overnight. We had to shut down our offices and make sure that we were still able to operate remotely. That worked out great for us. All the investment that we've done in the cloud has really paid off. Now there's no going back.

GT: Have you had to respond to an emergency such as a hurricane that has knocked out power or severely affected residents or the city's capabilities?

Sucuoglu: In South Florida, that's routine. In the last couple of years, we've been lucky enough that we haven't had any major events. But we still have had a number of smaller events that caused damage to our neighborhoods, to our grid, and to our communication infrastructure.

GT: Does that test the capabilities that you and the county have set up to make sure that communications and emergency response responds well?

Sucuoglu: The last part of our testing is during an actual emergency. But we also regularly test our systems, relationships and connectivity. One of our connected systems is called EOC, which is a web-based system that allows us to communicate with the Emergency Operations Center of Broward County. All communities have our own emergency operations centers, and we have our representatives at the county's Emergency Operations Center. We all follow an emergency operations structure to communicate, to request resources, to report our status and to provide resources to the appropriate place in a joint effort during those events.

GT: It sounds like Florida has strong partnerships between the state, counties and cities on emergency response.

Sucuoglu: Yes. We always had a mutual response system, but after the most recent significant hurricane in 2005, everything evolved so much more, including standard operating procedures and education for all the localities, and the establishment of a partnership in the southern part of Florida. I think our systems have evolved to a great extent, so now we have a great joint effort in dealing with these nature events, or any kind of emergency. gt

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Leveling the Playing Field

Strategies for recruiting and retaining women in IT

Women make up nearly half the U.S. workforce, but only about 34 percent of the tech workforce.[1] When you look at the number of women in IT senior leadership roles, the figure is even smaller — 24 percent.[2]

This echoes trends in the workforce overall, as women remain underrepresented across the corporate ladder, gaining only 3 to 5 percentage points in representation in senior leadership positions from 2016 to 2021, according to the McKinsey & Company report, Women in the Workplace 2021, the largest study of its kind.[3]

There are multiple reasons for this continued disparity in IT and the broader workforce, including gender bias, discrimination in hiring and recruitment, caregiving responsibilities that cause women to on-ramp and off-ramp at different points in their careers, and workplaces that don't have the right structures in place to foster optimal work-life balance.

Nurturing more diverse IT talent will drive growth in both the private and public sectors, but state and local governments, in particular, could benefit from addressing this challenge. As governments embrace hybrid work and digital innovation, they may become more attractive workplaces for women to start or advance their IT careers — especially for professionals who seek work tied to a meaningful mission.

Current Barriers for Women in IT

Achieving gender parity remains a struggle in many industries. Women still face visible and invisible barriers largely driven by gender, as well as implicit bias and even outright discrimination.

Research shows most women in science, technology, engineering and math (STEM) jobs work in predominantly male environments. One Pew Research study indicates women in STEM jobs believe discrimination is more common in these fields and that their gender is a roadblock to success. In fact, 78 percent of women in majority-male technology workplaces say they have experienced discrimination at work and 48 percent say their gender has made it harder to succeed at work.[4] These numbers far exceed what women in non-STEM fields say they've experienced.

There are a variety of potential causes behind these experiences, particularly in the tech industry. The sheer imbalance of men to women in IT is one main reason. Without more women in leadership positions, in peer roles or serving as mentors, the workplace culture may not reflect women's unique concerns or foster an environment that is inclusive of their needs.[5] For example, studies have shown women are interrupted more often

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than their male colleagues during meetings.[6] When a woman strongly advocates for herself in the workplace or expresses her opinion, she may be perceived as overly emotional or difficult. These sentiments can become invisible roadblocks as women try to share innovative ideas and make meaningful contributions to their organizations to climb the IT career ladder.

Women also may not have the same opportunities as male colleagues to foster collegial relationships outside of work due to perceived differences in shared interests, family responsibilities and the delicate gender dynamics that are at play in these situations.

"We need to create communities where women can come together to support other women," says Melonie Parker, chief diversity officer at Google. "But this is also where allyship is critically important. Having men as allies to women and to non-binary people is critically important to make sure women have that support and advocacy."[7]

Parker spoke on a recent webcast dedicated to improving diversity on government IT teams, along with Sandra Beattie, first deputy director of the New York State Division of the Budget, and e.Republic CEO Cathilea Robinett. Implicit bias about the types of roles and job duties women fulfill in the workplace is another factor. Too often, organizations pigeonhole women into "soft skill" roles like communications and marketing instead of technical or analytical positions. In some studies, women in IT say people assumed they were a secretary or held a less technical role solely because of their gender.[8]

In addition, women often have more caregiving responsibilities than their male colleagues, which forces them to divide their time differently. Parker says this has been especially true during the pandemic, with women more often serving as caretakers and supporting their children through distance learning. Recent statistics show at least 1.8 million fewer women are in the workforce today than before the pandemic. Also, women have returned to work at a slower rate than men largely due to childcare and family responsibilities.[9] Sick and family leave rules in many organizations don't align with the realities of family life, so existing workplace policies are likely driving this disparity, as well.

It's clear achieving gender parity is a challenge in both the private and public sector, but as government agencies look to become future-ready, they'll need to implement a holistic approach to foster more inclusive workplaces. Several strategies can help them get there.

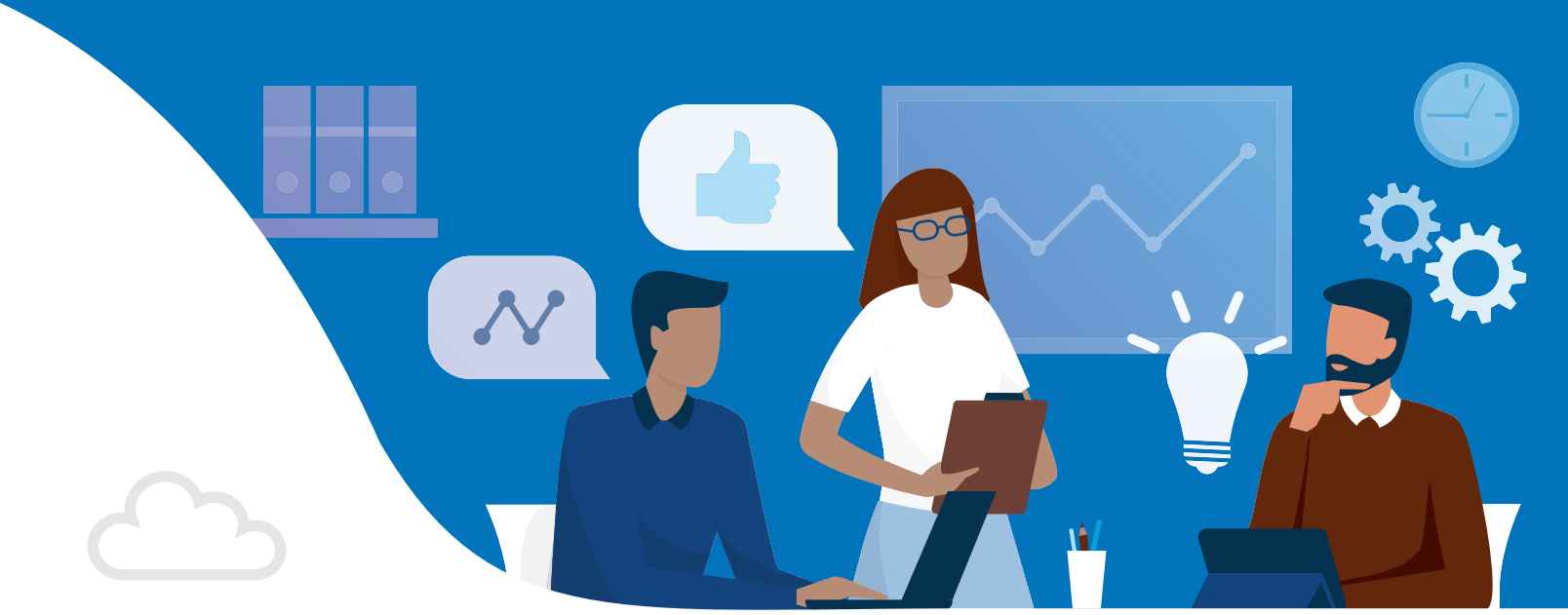
Actionable Strategies for Advancing Women in IT

Expand access and opportunities: Parker says women need more access to key decision-makers within their organizations. IT managers and leaders also must make a concerted effort to diversify their networks beyond people who look, act and think like them. Fostering effective allyship is the key to this. Leaders should regularly make outreach efforts to employee resource groups and participate in diversity, equity and inclusion (DEI) events both within and outside their organizations, such as conferences, speaker panels and job fairs — all of which can drive more holistic recruitment.

"Who are we championing at the tables where we sit? Who are we opening up those doors to? That's something that we each can do," Parker says. "If you think about allyship, as allies we're lending our privilege to folks who are in different spaces or different communities."

Increase mentorship activities: Formal and informal mentorship is another critical factor. Beattie notes that she's learned a lot throughout her career by observing others in their roles, which further highlights the importance of having more women in IT leadership positions. And she has continued to seek advice from her mentors throughout different phases of her career, proving these relationships are valuable over the long term.

"On the formal mentor side, I've participated in different levels of mentorship, either being assigned to a mentor or choosing one because I identified with them for various reasons," she says. "There are pluses and minuses to both approaches in formal mentorship programs — they can enable opportunities to learn from others who are not like yourself."



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Google's Parker says she greatly benefited from a white male mentor early in her career who shared a different perspective with her. The relationship was also symbiotic in the sense that it allowed Parker and her mentor to learn from each other and break down potential stereotypes they may have had.

Establishing or revamping existing mentorship programs present an opportunity for government agencies to foster connections between female team members and colleagues across age, experience levels and cultural backgrounds. Female employees should also actively seek and select mentors with different backgrounds to benefit from their diverse perspectives, networks and access.

Embrace remote work as a recruitment and retention strategy: Promoting remote and hybrid work can enable agencies to broaden their talent pool and support modern work-life standards.

The pandemic drove state and local government organizations to make digital investments that support flexible work arrangements. Continuing and expanding these arrangements could significantly benefit women. Remote work may also let agencies recruit employees from outside their local area and find talented female candidates who may want to explore public sector IT careers.

"We quickly had to make investments in our tech infrastructure for the continuity of government and continuity of services," Beattie says. "Individuals have learned to work remotely from all different generations in all different levels within an agency. That's important because when you see leadership working remotely — and it's successful and you're having team meetings, you're attaining specific deadlines and the whole team is able to do it remotely — that proves individuals can perform."

Build a pipeline: Both public and private sector organizations must do a better job of normalizing IT career paths, especially in marginalized communities.

Some studies have shown that girls lose interest in STEM subjects as early as age 15, which may be due to gender norms, societal expectations or a lack of role models in these fields.[10]

Beattie says governments should invest in building pipeline programs in schools, whether it's through public-private partnerships focused on STEM, grant support to create STEM programs for nonprofits that serve young women and minorities, workforce development initiatives or government-run educational programs.

"The more exposure and access we can provide children, adolescents, college kids or people entering the workforce for the first time, the better," Beattie says. "Because if you do not have exposure and access to careers or industries in technology, how do you know to dream that dream?"

Create community: Developing opportunities for women in IT to connect and learn from one another can also advance their careers.

To that end, Google Cloud has created the Public Sector Women's Collective, a forum for women in public sector organizations to get together, learn from each other and strategize to grow their careers. Parker says the goal is to "build a platform of women supporting women across the public sector workforce, through conversations with experts, training and a connection to a network of peers and mentors."

Cultivating a modern, highly skilled and diverse workforce is key to transforming government agencies into digitally driven organizations.

Community-building efforts like these can improve gender parity on government IT teams — and it may be worthwhile for governments to launch their own online communities internally or even regionally. Other resources, including NASCIO's Women in State IT Forum,[11] can also provide valuable networking and fellowship opportunities. Agency employers can support employees by building awareness for and sharing these online communities as part of their career development programs.

Championing Gender Parity

To recruit and retain women in IT, government organizations must be more intentional in their efforts. They must develop holistic strategies that create a pathway for women to enter their organizations, thrive and become leaders who reach back to nurture the careers of the next generation of female IT professionals.

Cultivating a modern, highly skilled and diverse workforce is key to transforming government agencies into digitally driven organizations that deliver better, more responsive service to constituents.

Women represent a deep well of talent to support this transformation. But visible and hidden barriers often stand in their way — whether it's workplace bias, caregiving responsibilities or lack of allies to champion their unique skills and value with key decision-makers.

Hybrid work models, mentorship and pipeline programs, and leaders making a dedicated effort to give talented women more access to opportunities can help agencies create more inclusive workplaces where women can meaningfully contribute, and lead the future of digital innovation in public sector IT.

Join the Women's Collective forum by signing up for our Public Sector Cloud Community — to connect, learn, strategize and grow!

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

Endnotes:

1. https://builtin.com/women-tech/women-in-tech-workplace-statistics
2. https://www.cio.com/article/3516012/women-in-tech-statistics-the-hard-truths-of-an-uphill-battle.html
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6. https://www.theatlantic.com/magazine/archive/2017/04/why-is-silicon-valley-so-awful-to-women/517788/
7. Quotes from throughout this piece are from the *Government Technology* webinar: https://webinars.govtech.com/Access-Granted%253A-How-to-Flip-the-Script-on-Recruiting-and-Retaining-Women-in-IT-139538.html
8. https://www.pewresearch.org/social-trends/2018/01/09/women-and-men-in-stem-often-at-odds-over-workplace-equity/
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Project Zero, a security research team at Google, has been tracking exploited zero-day vulnerabilities in software worldwide since 2014. 2021 was notably the biggest year yet, with 58 "in-the-wild" zero days recorded. Zero days are bugs that hackers can take advantage of to stage cyber attacks, and last year's attacks included major targets like Apple iOS and Microsoft Windows. The previous record for zero days was 28 in 2015.

SOURCE: GIZMODO

ROBO RAT:

Robot dogs get a lot of hype, and we've even seen robotic bugs designed to travel into tiny spaces. But a team at the Beijing Institute of Technology is exploring the utility of a different kind of animal robot: rats.

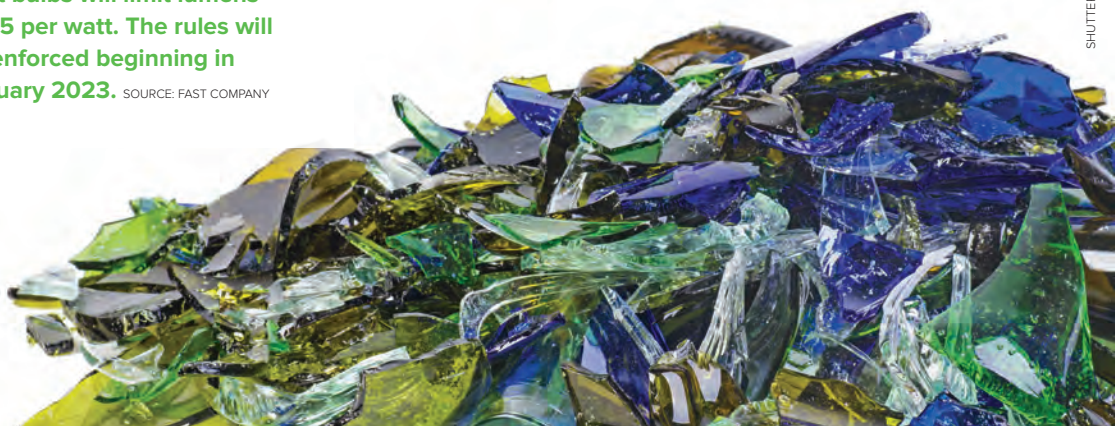
SQuRo, which stands for "small-sized quadruped robotic rat," is being developed to fit through tight spaces and also carry small objects. Designed to replicate a rat's flexible spine, SQuRo weighs just under 8 ounces, can recover quickly from falls and can negotiate passages as narrow as 3.5 inches. Researchers hope that the robot rat could one day be used for tasks like searching for survivors in disaster sites. SOURCE: NEW ATLAS

That's the amount of carbon emissions experts believe could be reduced over the next 30 years following new laws from the Department of Energy preventing sales of many incandescent light bulbs. While Americans have begun to buy more alternatives to traditional bulbs, such as LED or fluorescent lights, incandescents and halogens comprised 30 percent of light bulb sales in 2020. The DOE's new stricter standards for light bulbs will limit lumens to 45 per watt. The rules will be enforced beginning in January 2023. SOURCE: FAST COMPANY

Upcycling

While materials like wood are increasingly being used to construct buildings sustainably (see p. 12), concrete remains a popular way to get large structures off the ground. But one of concrete's essential components — sand — is in short supply. Scientists at Nanyang Technological University in Singapore are looking into how glass that would otherwise be left in landfills (while glass can be recycled, it often is not) can be crushed and used to replace sand in 3D-printed concrete structures. In the study, researchers 3D printed a concrete bench that they concluded was similar in strength to traditional concrete and used less water to create.

SOURCE: NEW ATLAS



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

THE TECHNOLOGIES MAKING TRANSPORTATION SMARTER AND FASTER

*Smart cities projects, IoT-connected sensors and edge computing have the potential to accelerate the reinvention of transportation in the 2020s. How will these trends shake out? In this Q&A, **Kevin Tunks**, chief architect and national technical advisor at Red Hat, discusses the role of containers, DevOps, APIs and process automation in personalizing the transportation experience.*

How is the evolution of transportation affecting governments' technology needs?

There's an explosion in the need for personalized experiences for consumers and employees. Younger employees are typically not as comfortable using legacy technologies and approaches. This is driving a change toward something that is much more visual, web-based and fast-moving.

How does containerization help agencies accelerate the adoption of next-generation transportation initiatives?

Large legacy systems have been slow to adapt to the changing needs of business, consumers and employees. Containerization breaks down the components of systems into smaller and more nimble services or microservices. These smaller components allow for much faster changes to be made without risking the stability of the overall system. Immutable containerized applications enable the secure management of technologies resting on the network edge. This allows government agencies to quickly evolve, adapt and innovate when it comes to initiatives like smart cities or technologies like connected autonomous vehicles.

The data that can now be ingested via multiple sensors becomes a valuable asset only once it has been processed and actioned. When vehicles are talking to roadways and sharing updates on issues like potholes, personalization to location becomes a powerful thing. Insights from the data must be relevant, meaningful and responsive to evolving consumer experiences.

Why are DevOps methodologies so helpful to government agencies planning to revitalize transportation?

Containers need a pipeline for continuous integration and deployment. DevOps makes that possible because you're doing left-to-right development: When you deploy something, you build it, test it and secure it. You know what something is before you ever move it to a production environment (whether that's in a data center or at the edge), and you replace whatever was there before. So updates and changes aren't creating vulnerabilities from potential hygiene leaks. You can replace those components knowing you have a good state every time you push out a new capability.

How can APIs help government agencies take advantage of opportunities in 5G, edge computing and IoT sensors?

APIs let all these individual components talk to each other in a highly secure and performant way. They enable an architecture that lets you align technology with business use cases in a really fast, really secure, really smart way. When you're trying to do things like 5G, edge computing, IoT sensors and CAV [connected autonomous vehicle] initiatives, APIs give you a distributed architecture that allows those individual pieces to do smart things in different locations. APIs can also connect to old systems and make that data relevant.

How can process automation help transportation leaders grapple with some of their most pressing challenges?

Process automation means bringing automation to things that had previously been manual — allowing us to encapsulate business logic at the edge and run smarter decision-making tools that are tailored to the problem we're trying to solve. And now we have platforms where we can run these automations safely and consistently. This means we can really focus on solving business problems as opposed to solving low-level technology problems. That's going to be a really big play.

Red Hat

About Red Hat

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Here's a look at a few recent Questions of the Day from govtech.com. Subscribe to our newsletter to get them daily in your inbox.

Why would a drone shoot off its own propellers?

Answer: To take down suspicious drones.

Anti-drone systems are almost as popular as drones themselves, but there's always a way to improve them, right? That was the thinking behind the Interceptor Drone.

One of the easiest ways to take down a suspicious drone is to hit it with a net, but this presents its own set of problems. The target must either be close enough to the earth to be hit by a ground-based launcher, or you have to send a drone large and powerful enough to carry a launcher, which can be cost-prohibitive.

The Interceptor Drone solves both those problems. Designed with the same chassis, motors and propellors as racing drones, the Interceptor is light, sleek and swift. The pilot can use onboard cameras to determine if a suspect drone is friendly or hostile. If the latter, the drone is positioned beneath the target and then shoots off its propellors, which are connected by a Kevlar net. The body of the Interceptor Drone then deploys a parachute to carry it safely back to earth, so the whole thing can be quickly reset and used again once the propellors are retrieved.

Can tech prevent cheating in Major League Baseball?

Answer: The league is going to try to find out.

Major League Baseball (MLB) has had enough of people attempting to steal pitching signs, and it's turning to technology for a solution. Starting this season, all teams in the league will have the option of using the PitchCom system instead of using traditional hand signals when pitchers and catchers communicate.

The PitchCom system is fairly simple, involving a transmitter that the catcher wears on their forearm and a receiver that the pitcher wears tucked inside their cap. The catcher presses buttons on the transmitter to indicate which pitch to throw, and the pitcher hears the call through the bone conduction tech in the receiver. Teams will be able to program the system to use code words rather than the actual names of the pitches for an added layer of secrecy.

Each team will receive three transmitters and 10 receivers, though the system is optional for now. They will be allowed to use one transmitter and five receivers at any given time during a game, and they can only be used by players on the field. ESPN reported that the system was well-received by players who tested it during spring training, and about half of all MLB teams have expressed interest in using it.

Why are people taking the screens off of MacBooks?

Answer: For the computing power without the price tag.

There's a new tech trend making the rounds on the Internet, and hopefully Apple doesn't find out about it. People are reportedly removing the displays from their MacBook laptops.

Why, you ask? Well, these tech entrepreneurs have decided that they want the computing power of a Mac but don't want to pay an arm and a leg for it. Like many other decent pieces of computing technology in this day and age, sparkling new Mac computers have gotten pretty darn expensive.

However, you can often find MacBooks with broken displays, but with the rest of the computer still working nicely, at a much lower price. A little wizardry to connect your own external display and violà! You now have a Mac desktop computer. Plus, there's a certain level of street cred that comes with having a functioning headless laptop on your desk.

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Where Workflows Meet Traffic Flows

Smarter vehicles and the data they generate are reshaping the future of transportation. That will have significant implications for government transportation planners. In this Q&A, we spoke with ***Chris Dilley****, chief technology officer for government and education at ServiceNow, whose cloud computing platform helps organizations manage their digital workflows. Dilley discussed how data management will affect transportation planning in the years ahead.*

What are the most important transportation trends influencing government technology in this decade?

It starts with our vehicles. They're getting smarter and more data intensive, and the types of data they're capturing is incredible. As we understand more about data and smart vehicles, issues such as vehicle security and privacy will become ever more critical.

How will government agencies' workflows have to change to adapt to these trends?

A lot of government business processes are manual, so agencies need to think about streamlining processes to make them more efficient.

A great example is the automation of the Amber Alerts process. State departments of transportation have automated those alerts across radio, digital street signs, and cellular and data communications. Having the right technology to support those multiple channels – with quick and minimal approvals – is key.

As agencies look at that example, they'll need to figure out how to automate real-time responses to situations like traffic changes.

How will data and analytics come to define issues like traffic flow management and smart transportation?

Smarter vehicles can help transportation agencies make roads safer and optimize traffic flows, so we need to understand the data and apply that knowledge to long-term planning, safety and scalability.

The data from smart transportation initiatives, whether they are about parking, wrong-way driving or drunken driving, can all work together to help us make transportation safer and optimized for a better experience.

How will the evolving transportation landscape impact revenues and budgets?

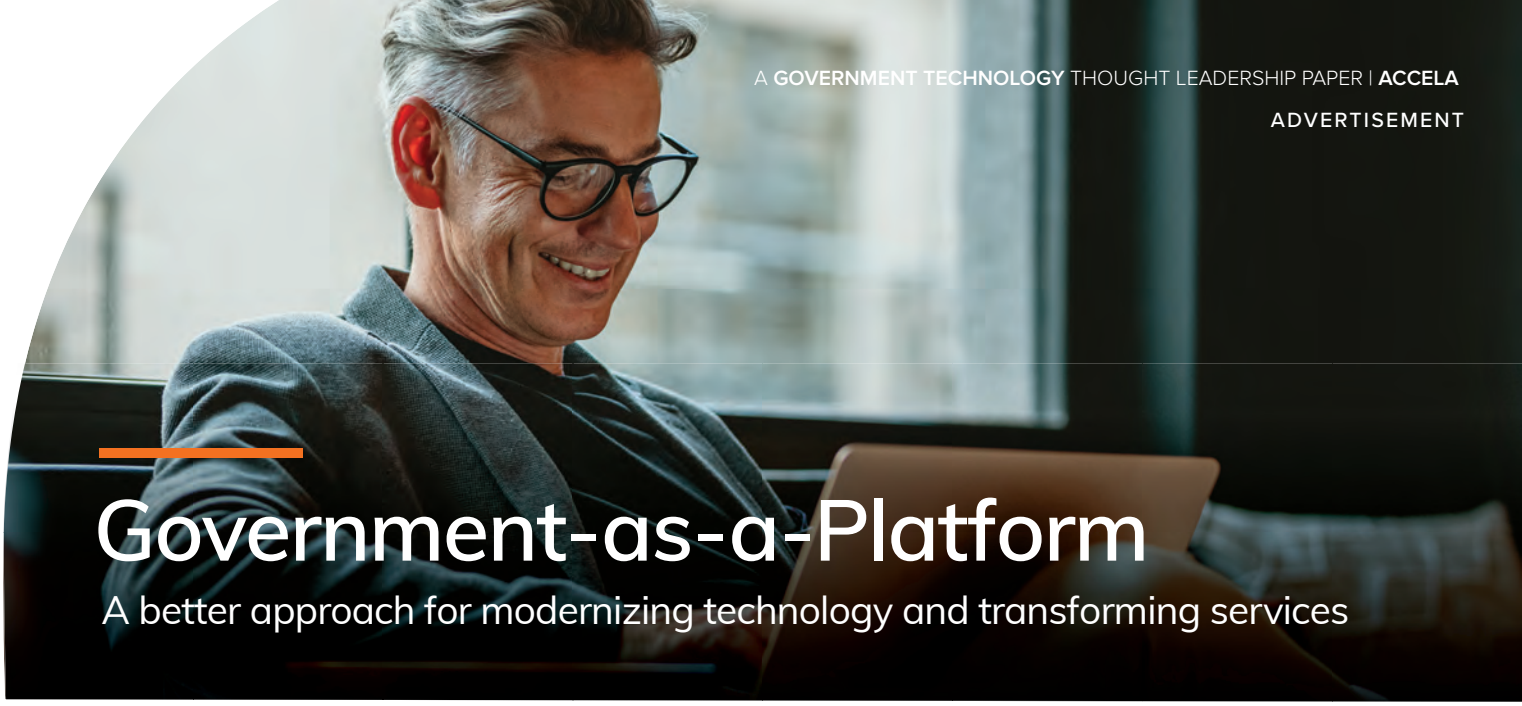
Roughly 50 to 60 percent of transportation budgets come from fuel-tax revenue. With the rise of electric and alternative-fuel vehicles, agencies need to understand how to capture that lost revenue in the future.

As transportation organizations look at traffic patterns, perhaps they can tie them back to revenue. For example, commercial and industrial vehicles might see a different tax rate based on the time of day. Could we incentivize over-the-road truckers or autonomous vehicles by taxing them differently to ease rush-hour congestion? I think there's a huge opportunity here.

What should agencies be doing right now to prepare for changes in the transportation landscape?

When you think about the amount of data vehicles can capture, then the push for broadband expansion is huge, especially on interstates and highways. And then there's safety and privacy. As we think about the technology operating vehicles, buses and airliners, the last thing we want is for them to be compromised or hacked.

Government agencies also need to be looking at the roles and skillsets they will need on their team. As data becomes such a source of what we do now — and what we do next — we need to understand that data-related roles are really going to be needed in government, so we can take data and turn it into usable information.



Government-as-a-Platform

A better approach for modernizing technology and transforming services

Government agencies are embracing cloud solutions to deploy new services and capabilities quickly and efficiently. But some of the same qualities that make the cloud attractive — like ease of deployment and low upfront investment — can also lead to proliferation of fragmented and disconnected cloud services.

There's a better way for public agencies to leverage the power and flexibility of the cloud: government-as-a-platform, a new generation of software that provides a unified, enterprise approach to delivering services, leveraging data and creating a connected government. This platform software — hosted in the cloud and delivered as a service — puts a broad swath of government-specific capabilities in one package, which helps organizations move faster on deploying new solutions, integrating with existing ones or replacing them altogether.

Tapping the Value of Government-as-a-Platform

The concept is simple: A single, built-for-government platform delivers cloud solutions that elevate user experiences across multiple departments, disciplines and jurisdictions. Anyone who uses and delivers government services reaps the benefits of a unified and easy-to-use software suite.

What's propelling these solutions to the forefront? It starts with data. A platform portfolio of applications spans disciplines — from permitting to planning to occupational and business licensing — and creates a central data hub that can break down silos and encourage data sharing. This enables analytics and reporting to provide a holistic view of community issues and program effectiveness. It also provides a single entry point for constituents.

Moreover, the broad transition toward cloud-based, pay-as-you-go solutions has IT leaders looking for software-as-a-service technologies that spin up quickly and adapt easily to changing conditions.

"Their ultimate goal is to drive outcomes, not simply deploy technology," says Tom Nieto, chief operating officer for Accela, a leading government-as-a-platform technology provider. This focus on outcomes underscores much of the appeal of a connected government approach.

Nieto recalls a business seeking permits in one large municipality that waited a year for approvals simply because of a breakdown in communications between city departments. A platform approach helps cities address these issues by standardizing technology, processes and data sharing across departments. Purpose-built platform applications for tasks such as issuing building permits and conducting fire inspections help agencies quickly implement service improvements through digitization, while providing configuration options to accommodate jurisdiction-specific requirements or preferences.

> "By getting to a more standardized and centralized technology model, you can focus your staff on delivering better outcomes."
>
> — *Tom Nieto, Chief Operating Officer, Accela*

Government-as-a-platform also has broad benefits for government IT operations. Many jurisdictions struggle to attract and retain skilled IT staff. In addition, government IT teams often spend too much of their time managing existing applications and infrastructure, and not enough on driving improvements and launching new capabilities.

"By getting to a more standardized and centralized technology model, you can focus your staff on delivering better outcomes versus trying to make sure the latest patches are in place," Nieto says.

Changing Your Technology Mindset

Government-as-a-platform is a new way for agencies to think about their technology stack, and navigating this change typically requires agency leaders to overcome certain hurdles. The primary concerns will be choosing a provider and managing institutional resistance.

Traditionally, agencies think of software providers as vendors that supply a product or service. Nieto instead advises seeking a technology and services partner that will grow and scale with you over the long haul, as these relationships can last 10 years or more.

Questions to ask potential partners: Do they embrace an open ecosystem approach that offers a wide choice of applications that can be easily integrated with their platform? Or do they rely on walled-garden tactics that narrow your options?

Also, what's their track record for evolving and growing with government customers? "Your IT partner should be able to rapidly get you to a great outcome today and continue to enhance those outcomes and deliver new ones in the future," Nieto says.

In addition, agencies will need to address institutional resistance to change as they move toward a platform approach.

"A lot of this comes back to leadership," Nieto says. Strong leaders who have a vision and a mindset for achieving it have the most success in encouraging change. Taking a resident- or community-centered approach also helps break down barriers. "If you can help people and groups genuinely understand how the new technology generates better outcomes," he says, "you can get people excited about change and break down their instinctive urge to maintain the status quo."

IT leaders also need to build internal support among elected officials and department directors. This means engaging in outreach and education to help them understand how the new technology makes their lives easier and drives impact for the communities they serve.

Best Practices for Implementation

These suggestions will ease your transition to government-as-a-platform:

Look for easy wins. Establish your priorities and find opportunities to manage risk. "Don't try to do everything at once," Nieto says. Consider functions that need transformation but don't have the mandate for always-on service like 9-1-1 response or police dispatching.

Permitting can be a useful starting point. Think about those elected officials under pressure to speed up the processes for opening new businesses. You can hand those officials an easy win by streamlining permit processes with new software. Nieto says one of Accela's city government clients reduced permitting time from weeks to hours using the company's government-as-a-platform suite.

Optimize for people. Assigning strong leadership and collecting resident feedback can help ensure your technology has enough impact to justify the investment. The traditional waterfall deployment methodology will slow your progress, while Agile and incremental approaches will accelerate your time to value.

"You have to ask how this will show up to the people who we are ultimately trying to help, and then design off the back of that," Nieto advises. "That's a very different way than how governments have historically designed their processes and implemented their technology."

Modernize processes. For all its advantages, government-as-a-platform is not a panacea. "If you have a broken process that you're just trying to replicate with automated software, the process is still going to be broken," Nieto cautions. Agencies must analyze their operational processes, target logjams and inefficiencies, and dovetail reforms with the implementation of new technology.

Consult with your partner. You can't anticipate every roadblock. But your technology partner probably has dealt with similar issues in the past and will know how to address them. Avoid the temptation to force new technologies to fit your current processes. A better tactic, Nieto says, is to leverage best practices from your partners who have seen hundreds of similar challenges and can help your organization meet specific requirements.

What to Look for in a Government-as-a-Platform Solution

Ecosystems with interoperability. You may sign a contract for as long as 10 years. This length of commitment requires a platform that can easily adapt to changing conditions and technology needs. The platform must also integrate well with other government systems.

Data and analytics. The platform must have robust data standards and powerful dashboards that help your organization drive measurable impact.

Outcome-oriented features. Look for applications and capabilities that help produce improvements rather than merely replicate current processes.

Specialization and focus. The tools should be easy to configure to your agency's precise goals and requirements.

Conclusion

Government-as-a-platform helps create a more connected and responsive public sector. The key for government leaders is understanding which apps hold the most potential for proven impact — and partnering with a technology provider that can align their capabilities with your agency's distinct needs.

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

Produced by: government technology

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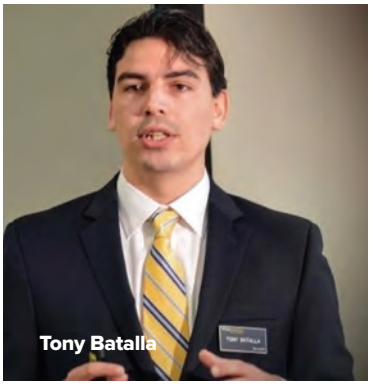
Read full reports and breaking news about career changes across tech-driven roles in government at govtech.com/people.

Oakland Names New CIO

Tony Batalla was named CIO of Oakland, Calif., as of early May. He previously spent eight years as chief technology officer and head of innovation and IT for the nearby city of San Leandro.


Tony Batalla

Chicago Selects Acting IT Commissioner

Chicago has named Sandra Blakemore as acting commissioner of the city's Department of Assets, Information and Services. Blakemore takes over the role from David Reynolds, who held the position for 11 years.

New Mexico Appoints New Cybersecurity Adviser

New Mexico appointed Annie Winterfield Manriquez as the governor's senior adviser for cybersecurity and critical infrastructure. In that role, Manriquez is slated to create standards and practices for cyber incident communications and response.

WaTech CISO Departs for Fortune 500

Washington CISO Vinod Brahmapuram has departed his role for a job in the private sector. In his place, state CIO Bill Kehoe is temporarily taking on CISO responsibilities along with his current position.


Santiago Garces

Boston Appoints New CIO, Chief Digital Officer

Boston has appointed Santiago Garces as the city's next CIO. Garces previously held tech leadership positions for Pittsburgh and South Bend, Ind. Julia Gutierrez was named chief digital officer and will oversee the city's website, the Boston311 mobile app and other citizen-facing products.

San Jose, Calif., Selects CIO

San Jose, Calif., has tapped Khaled Tawfik as its next CIO. He brings 25 years of both public- and private-sector experience to the role, most recently as CIO of Irvine, Calif.


Khaled Tawfik

Virginia Appoints Newest Chief Data Officer

Virginia named longtime finance security executive Ken Pfeil as the state's next chief data officer. Pfeil's background includes data governance and security positions at various private-sector firms.

Colorado Names New CISO

Colorado has named Ray Yepes as its next chief information security officer. Yepes spent five years as CISO for the Texas Department of Family and Protective Services, and has also held a number of private-sector leadership roles.

San Mateo County Taps Insider for CIO Spot

San Mateo County, Calif., has named Mike Wentworth as its next CIO. Wentworth — who has worked for the county dating back to 1996 — has held the position on an interim basis since May, after previous CIO Jon Walton departed the job.


Mike Wentworth

Minnesota IT Appoints Chief Business Technology Officer

Minnesota IT Services has tapped Kimberly Maturo-Hilt as its new chief business technology officer. Prior to this role, Maturo-Hilt was CIO of the Minnesota Lottery.

North Dakota Selects Deputy CIO
Greg Hoffman will serve as deputy CIO for North Dakota, working with CIO Shawn Riley. Before this position, Hoffman served as the finance director for the state's IT department.

San Diego County Names New CIO
San Diego County has named David Smith as its next CIO. Smith, who was formerly with the Office of the County Counsel, replaces Susan Green, who departed the position in March.

Former NYC CIO Tisch Tapped to Lead Sanitation Department
Former New York City CIO Jessica Tisch has taken over the city's department of sanitation.


Jessica Tisch

Tisch stepped down as CIO in February, after a stint that dated back to December 2019.

Virginia Appoints New CIO
Robert Osmond will serve as Virginia's next chief information officer after being appointed by the governor. Osmond most recently led tech work for Virginia's Department of Transportation, having also previously served as a partner with IBM for 15 years.

Canellakis Joins USDR
Gov tech veteran Krista Canellakis has joined the nonprofit group U.S. Digital Response (USDR), heading the organization's Digital Service program. Most recently, Canellakis was deputy secretary for general services for the California Government Operations Agency, and previously she served as chief innovation officer for San Francisco.

Delaware Names Broadband Manager
Tammy Shelton, who initially joined the Delaware Department of Technology and Information (DTI) in September, was promoted to broadband infrastructure grant manager. She will act as the primary contact for broadband stakeholders in the state's efforts to expand connectivity.

By Paul W. Taylor

The Beauty and Utility of Text

Mobile-first digital services mean rethinking government website design.

Three things have come to define the public-sector IT community: consolidation, modernization and simplification. Consolidation acknowledges that you have too many of something, modernization acknowledges that those things have outlived their serviceable lives and simplification acknowledges that things have become too complex.

The Internet and email were both still new when digital government first emerged in the 1990s. Government adopted them as they came, embedded assumptions and all. Over time, some of the early HTML excitements fell out of favor and some legislatures sought to outlaw cookies, but most public agencies went with the web flow — adding heavy graphics, photography (including requisite headshots of the elected officials in charge) and even animation. Often by benign neglect or to accommodate organizational structures that made little sense outside of the bureaucracy, navigation was allowed to become complex and inconsistent.

But compared to standing in line, online saved time and effort in getting stuff done with government. Now, thanks in no small part to the ubiquitous use of mobile phones to navigate the web, many of these decades-old design conventions are being rethought. According to analytics.usa.gov, which tracks the federal government's web traffic, at the time of writing, 53 percent of the 5.4 billion visits to federal sites in the previous 90 days were done on a mobile device.

Paul Taylor is the executive editor of e.Republic, *Government Technology's* parent company.

Luke Fretwell, CEO of the civic engagement platform ProudCity, said in a conversation about the aesthetics of government websites that acknowledging the mobile majority — together with a government obligation to make information and services readily accessible and widely available — is central to designing and building sites for the public's use. Old-school graphics and a "more-is-more" approach born from a team of developers and designers get in the way of that. "Government websites aren't really ours, right?," Fretwell asked rhetorically. "If you want to be an artist, you know, take a painting class."

The answer in these mobile times is simplification and reimagining these public sites through plain text. Text can be beautiful — witness harvardlawreview.org — and optimally functional, as boston.gov shows. Text combined with .gov domains and iconography connotes official government status and conveys confidence to users. Such a combination on a light-to-the-touch site was the design criteria for covid.gov, a site that scaled well; received positive notice from users, policymakers and the press; and provided much-needed information and assistance during the pandemic. The Social Security Administration is working on a text-only site too at beta.ssa.gov — the page is attractive, short, fast and optimized for mobile.

The Lone Star State has introduced Texas by Texas (TxT). The wink and nod to the South by Southwest (SXSW) festival aside, TxT moves communication and transactions between public agencies and residents from email to text messages — instant, uncluttered and responsive. The text-based digital assistance service is in its infancy, but its operators hint at big plans and transformational potential. Text messages differentiate themselves from email in a couple important respects — almost all are read (98 percent) and a Gartner analysis indicates almost half (45 percent) elicit a response. In a world of communication burnout and fatigue, the beauty of text is its ability to penetrate and engage where other channels do not.

Add artificial intelligence to the massive amount of text generated by government and you have a new and potentially powerful approach to modernization. The *MIT Technology Review* reports on researchers at Salesforce who have trained software to accurately summarize lengthy texts, including that which is created and held by government. According to the *Review*, "It uses several machine-learning tricks to produce surprisingly coherent and accurate snippets of text from longer pieces. And while it isn't as good as a person, it hints at how condensing text could eventually become automated."

There is much promise in all of this to make government information usable and useful. And text is literally and figuratively the lingua franca of the digital world. We are just a little late in decluttering digital government to realize its full potential to serve all. gt

Simplifying Identity Verification for Constituents

Password fatigue is growing as online users maintain dozens of unique online accounts. In addition, people often must prove their identity every time they access government benefits and services. Pete Eskew, general manager for public sector at ID.me, which simplifies online identity verification and increases digital trust, recently discussed how state and local governments can improve the user experience and make digital services more accessible. The following conversation has been edited for length and clarity.

How has government benefits delivery changed over the past few years?

McKinsey & Company estimated that the share of interactions on digital platforms jumped from 41% to 65% during the pandemic, and public sector services increased even more, reaching about 90% in April 2021. Even now, we haven't seen a reset in terms of people going back into government offices to apply for benefits in person. Digital platforms are here to stay and the use of these platforms will continue to accelerate in the coming years.

What identity verification challenges do agencies face as a result of that shift?

For too long, agencies have used passive identity proofing that relies on either credit bureaus or data brokers. However, about 45 million Americans don't appear in credit records. Beyond that, an untold number of individuals' data is wrong in records. Without a method that allows all Americans to prove their identity, many can be locked out of accessing their government benefits.

Identity theft is another monumental challenge. In 2021, the Federal Trade Commission reported that identity theft tied to government program benefits increased by 2,920% year over year. Despite that, many government and private sector organizations still rely on knowledge-based authentication (KBA) — the question-and-answer process — for identity verification.

The Government Accountability Office and the National Institute of Standards and Technology (NIST) advise against KBA for identity verification because attackers can easily discover answers to KBA questions, resulting in unacceptably high risks. Those attacks have been repeatedly demonstrated.

How can modern solutions help overcome those challenges?

A strong digital identity verification solution helps agencies securely and seamlessly connect constituents with their government benefits and services.

Identity verification should meet the federal standards for consumer authentication (NIST 800-63-3) and should include two simple components. The first is offering multiple pathways for people to prove who they are. Those pathways include an online self-service channel, a channel with video chat capability, and an in-person capability at the agency or at a retailer in the person's neighborhood. Multiple pathways greatly expand access for a greater portion of the population.

The second component is portability. If someone needs to access additional government programs or services, there should be no need to sign up for a new account, create a new password and reverify. Offering a portable login makes it more likely people will have an existing credential that gives them a streamlined experience.

What types of use cases do you see digital identity verification supporting now and in the future?

Digital identity verification use cases include: streamlining the way people apply for and receive unemployment, health, and disability benefits; securely accessing tax-related information; ensuring protected health information doesn't fall into the wrong hands; simplifying access to rental and housing assistance programs while reducing fraudulent applications; streamlining access to food programs and other critical family benefits; and preverifying documents for driver's license and REAL ID appointments.

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