ROUTE FIFTY

Embracing the Promise of

The Cloud

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By Dave Nyczepir
News Editor

Cloud computing has been a concept since the late 1970s, though the term didn't become en vogue until Amazon's 2006 release of its Elastic Compute Cloud. Two years later Microsoft announced Azure, and it was off to the races.

With the cloud present in our lives for more than a decade, it's easy to forget that some state and local governments are just beginning to test its waters and, when they do, discovering new applications.

In this special report, *Route Fifty* highlights some of the latest cloud innovations in state and local government, the effects of which are playing out on transit in New York City, on the roadways of Santa Monica, California, and in Virginia's classrooms.

— Dave Nyczepir
News Editor, *Route Fifty*
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How the Cloud Is Making It Easier for States and Localities to Issue Alerts in Seconds

By Dave Nyczepir
News Editor

Time can make all the difference for a kidnapping victim or a family in the path of a tornado.

The Federation for Internet Alerts is increasing the speed at which state and local government agencies can issue storm, natural disaster and kidnapping warnings to citizens with its free, cloud-based Alert Hub.

Amazon Web Services' cloud scalability has allowed FIA to deliver more than 800 million AMBER Alert impressions during 794 abductions and more than 10 million tornado warnings.

Any global ad-serving platform can access FIA's alerts in milliseconds, serving alerts in place of ads where geotargeted, for real-time emergency response.

Plano, Texas-based online advertising company Conversent recognized in 2011 that the same technology used to send automated commercial alerts on the internet could also be used to issue dynamic AMBER Alerts with images and detailed information on kidnap victims. So the company partnered with the National Center for Missing and Exploited Children to form the 501(c)(3) nonprofit FIA.

"The advertising technology we were using to serve real-time advertisements was really the perfect combination when you look at the data you get from state and local governments," Jason Bier, FIA president, told *Route Fifty* in a phone interview.

By 2013, FIA was receiving AMBER Alert and tornado warning data from the National Oceanic and Atmospheric Administration and National Weather Service, and other organizations had begun joining the federation.

MORE THAN
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AMBER Alert impressions were delivered by FIA during 794 abductions and over 10 million tornado warnings.

Expanding alerts and how FIA was alerting the public necessitated a move to the cloud.

The Common Alerting Protocol is a digital format enabling exchange of emergency alerts simultaneously across many communications systems—from those used by the United Nations-chartered World Meteorological Organization down to U.S. states and localities. Leveraging it opened up hundreds, if not thousands, of use cases like flood warnings at the municipal level.

CAP provides a standard schema streamlining the flow of data from alerting authorities to FIA subscribers, who use the data. FIA plugs into state and local emergencies, and because AWS has centers all over the world, governments globally can freely consume relevant alert content.

"We use the cloud because we are volunteers," said Mickey Schwab, FIA's vice president of operations.

With limited IT staff, FIA doesn't need to worry about infrastructure with the cloud or monitoring systems thanks to automatic reboot and auto-scaling. That would've taken months to build out, and even then, FIA would've lacked AWS' global footprint.

Security is paramount with such a system, in order to prevent a nefarious organization or individual from creating a malicious alert to, say, issue a fake evacuation order and make residents vulnerable to a terrorist attack in the process.

"There is a serious push to lock down this system," Schwab said. "I sleep well at night knowing our data is secure."

Traditionally, data like the kind FIA uses is "fetched" or pulled, but that process is too slow when an earthquake early-warning alert—which can relay a warning that an earthquake has been detected ahead to a city faster than seismic waves can travel—needs to go out immediately. Instead, alerting authorities push data.

Alerts are validated using https, matching them to the transmitting authority's feed. And Secure Hash Algorithm encryption tech gets alerts, from sensors and other devices, delivered in 80 milliseconds—that's faster than you can blink—through the cloud.

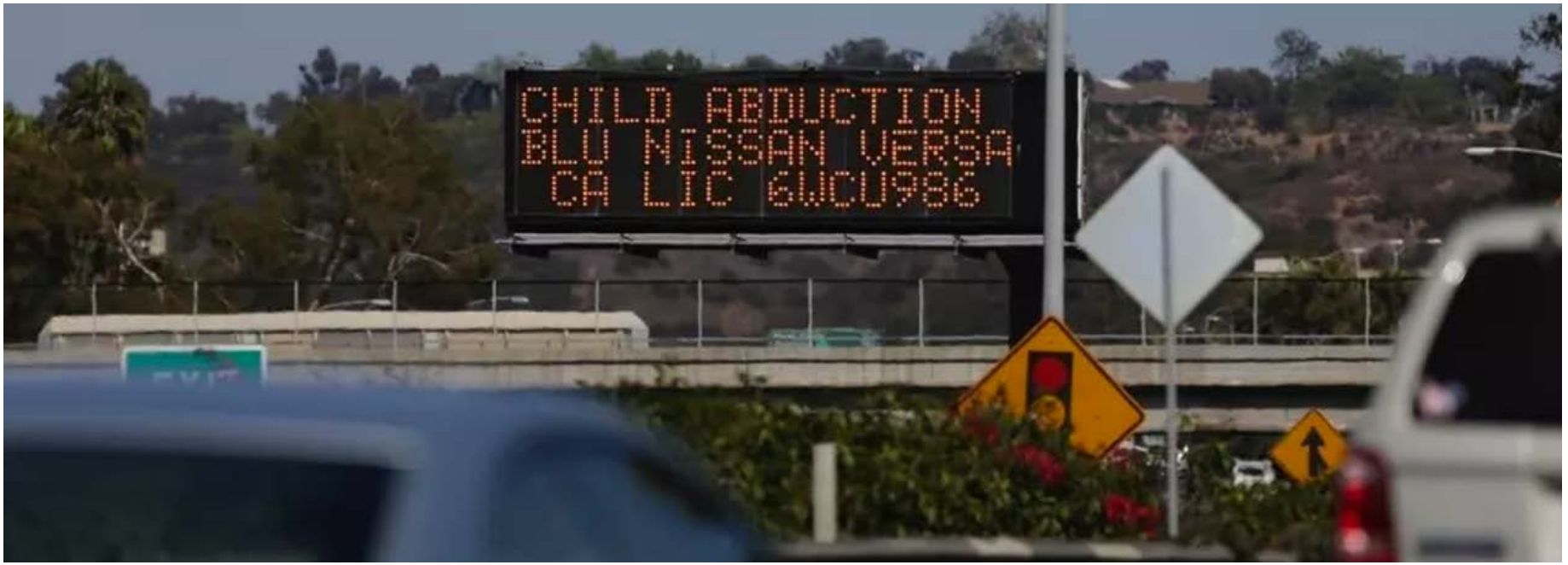
"There is a serious push to lock down this system. I sleep well at night knowing our data is secure."

MICKEY SCHWAB, vice president of operations, FIA

That kind of response time, sending tornado warnings within 60 seconds, saves lives. Everything is automated, and the cloud never sleeps. So alerts will get where they need to go even at 3 a.m.

Many state and local alerts are pushed through NOAA and NWS, when they're weather related, but local agencies can issue warnings in their area that are published through the service using CAP.

As alerting technology gets better, elevators are being built to stop when an earthquake alert is issued for their area, and most building alarms and speakers are CAP-based and can read any



Drivers pass a display showing an Amber Alert, asking motorists to be on the lookout for a specific vehicle, on Aug. 6, 2013, in San Diego. GREGORY BULL / AP PHOTO

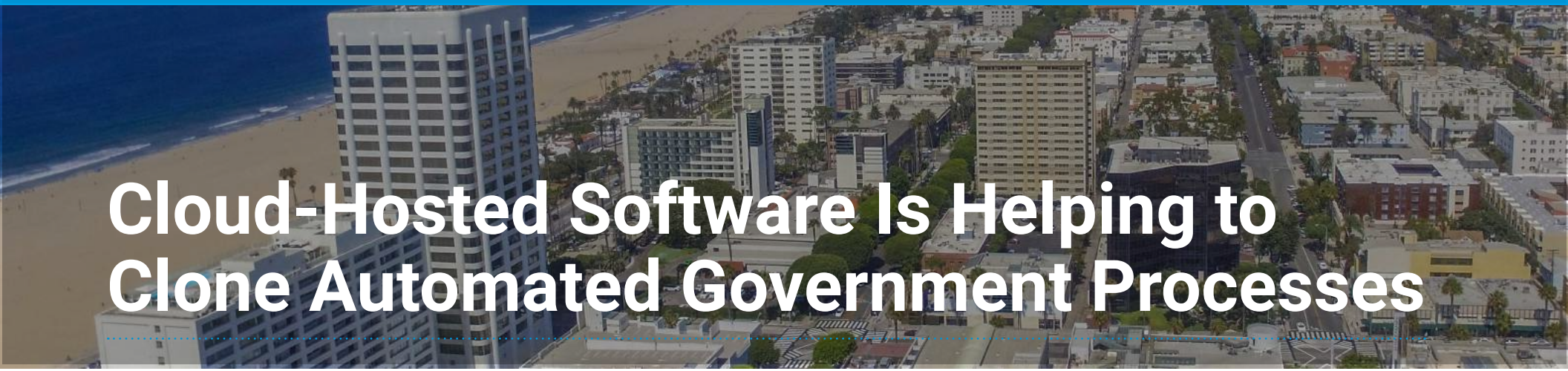
semblance of text. Residents of an apartment may soon get orders to move to a different floor if theirs is in danger.

Digital displays, including billboards and road signs, connected to the internet will soon be activated by alerts. New York state's Metropolitan Transportation Authority, which manages bus, subway, commuter rail in and around New York City, is FIA's latest partner, working together to integrate signage technology that can get alerts to targeted locations when needed.

FIA plans to partner with more transit authorities in the future, using the cloud to expand worldwide. The federation subscribes to hundreds of state and local government alerts, despite not necessarily having working relationships with those jurisdictions, providing information to sources tapping in.

MTA is an FIA subscriber, so, for instance, if the National Weather Service issues a winter weather warning for the New York City area, it will be processed through the Alert Hub and sent to partners like MTA involved in publishing alerts. The alerts could appear internally or be displayed publically on buses.

"It's the government using its own data," Bier said. "How can we grow innovations and expand alerts to save more lives?"



Cloud-Hosted Software Is Helping to Clone Automated Government Processes

By Dave Nyczepir
News Editor

"We want to make it easier for governments to get people to comply with regulations that didn't use to seem important enough to follow," according to the CEO of CityGrows.

All too often, data officers in city governments have only a single point of access to the data they're storing: their work computer.

The cloud has changed that, eliminating the need to host software on site along with related server, IT staff and scaling costs.

Cloud-based software offered by startups like CityGrows doesn't need to be manually updated or backed up on a computer.

"We can truthfully say our program targets the entire playing field of local governments because we're cloud-hosted," CityGrows CEO Stephen Corwin said in a phone interview with *Route Fifty.*

That's a crucial selling point for a product that aims to standardize typical government processes like permitting and licensing by automating them and then cloning templates for other states and localities to use.

Many such processes remain paper-based and fragmented across localities. Every city offers a dog-licensing permit, but the way they go about issuing it differs between municipalities.

Instead of repeating the effort, if New York City's building permit process works, another city can clone it using CityGrows' GitHub-inspired ecosystem.

Corwin started by designing a web scraper that pulled data from the city of Los Angeles and geocoded permits so users could figure out which ones were in their area. Prior to that, the city produced a biweekly PDF listing every permit L.A. provided.

From there, Corwin set his sights on other datasets having to do with development permitting and environmental impact reports.

CityGrows' core product if free to use to map out processes like the hiring of a local government employee in minutes. Where the startup makes

Downtown Santa Monica. raceRouda / istock

its money is payment processing of things like building permit fees on behalf of cities, taking a percentage of credit card purchases through the cloud platform.

About 20 jurisdictions are currently playing around with the platform, Corwin said. CityGrows only launched in 2016, when Corwin entered it in Santa Monica, California's Hack the Beach hackathon competition.

Winning gained Corwin access to Santa Monica's staff. He began working with the Mobility Division of the Planning & Community Development Department on an "operations rewire" of Worksite Transportation Plan submissions.

The plans are an annual requirement for local employers intended to reduce the number of commuters driving alone to work—Santa Monica's largest source of greenhouse gas emissions. CityGrows redesigned the 30-day, paper-based process involving credit card forms into a 7-day affair that tracks each plan's progress, communicates with the public and visualizes the data.

"As a result, we have a simpler, intuitive, cloud-based platform. One based on performance metrics, transparency, and embedding technology expertise within the organization," Jack Moreau, a transportation management specialist with the city of Santa Monica, said in a statement. "The success of our program was made possible through a partnership between the public and private sectors and the specializations native in each organization."

Different cities have different processes they want to automate, Sacramento focusing on RAILS Grant reporting transparency—how grants progress and where the money is spent.

"The biggest problem with the way open data has been approached to date is it's not necessarily connected to a data source, so it takes a lot of maintenance," Corwin said. "It's nobody's job to put it into Socrata, but we can surface data in real time in the same place we're collecting it to guarantee it's standardized." The cloud makes that possible.

"...We have a simpler, intuitive, cloud-based platform. One based on performance metrics, transparency, and embedding technology expertise within the organization."

JACK MOREAU, transportation management specialist, city of Santa Monica

Another process CityGrows is shopping around is managing drone permits.

"We want to make it easier for governments to get people to comply with regulations that didn't used to seem important enough to follow—from permits to manage Airbnbs to drones," Corwin said. "Maybe the fine is not steep enough to make someone want to go through the process, but the easier it is to comply, the more likely the city is to collect revenue that comes from these processes."

The cloning of processes is new to state and local governments, Corwin said, but it's worked well for software and other industries.

"It's not a common practice in government, but we think it will be shortly," Corwin said.

SIMPLIFY MULTI-CLOUD MANAGEMENT

FIND THE RIGHT TOOL FOR YOUR MULTI-CLOUD STRATEGY

Cities, states, and governments face the same daunting challenge in digital transformation — manage more demanding applications across multiple clouds. This can quickly get complicated and expensive, but it doesn't have to.

Cost-effective solutions exist to simplify multi-cloud management for government entities. When looking for the right fit, remember that an automated "do it once, use it many times" approach can save you time and money. It also lets you do a better job at policy enforcement, compliance, and security.

If you want to maintain control across multiple cloud vendors and applications, here are other essential things to consider when choosing the right cloud management solution.

Simplify management, security, and governance

- Set policies for workload placement across multi-cloud environments to ensure compliance
- Create cloud environments that require users to operate within the scope of a defined policy
- Provide activity, service, health, and usage reports for auditing and security

Support the mandate to modernize digital services

- Allow developers to deploy environments to policy and speed up delivery of citizen services
- Build workflows that allow developers to push production changes more rapidly
- Create environments that are well-suited for migration to different cloud service provider(s)

Do more on a fixed budget

- Automate provisioning and lifecycle management to save IT staff time and support costs
- Use any service provider environment to allow for best pricing and/or performance
- Buy and provision GovCloud services against contract vehicles for best pricing

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Cybersecurity Education Heads to the Cloud in Virginia

By Dave Nyczepir
News Editor

Still in its infancy, the Virginia Cyber Range has partnered with Amazon to scale its closed-network training environment to the colleges, universities and even high schools that want it.

A Republican plan taking shape in Congress to repeal the Affordable Care Act threatens to slash the amount of federal Medicaid dollars going to states.

The Virginia Cyber Range, created this fiscal year by Gov. Terry McAuliffe to be a national cybersecurity education resource, is moving to the cloud for closed-network excercises and courseware sharing.

McAuliffe's goal is workforce development through targeted educational investments, and the Cyber Range serves as both a repository for courseware—faculty syllabi and lesson plans from scattered public institutions—and a virtual training ground.

Universities teaching cybersecurity courses have for years required environments closed off from the rest of the internet to run attack and defend simulations without breaking any laws. In the past, some spent tens of thousands of dollars to purchase their own servers and configure their own network.

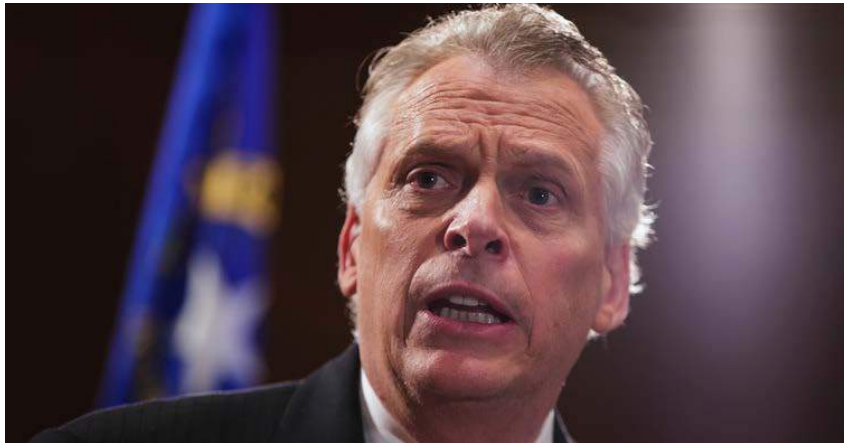
"The cloud is really becoming a great way to scale up network infrastructure quickly without having to purchase a bunch of space for it or find the equipment," David Raymond, Cyber Range director, told *Route Fifty* in an interview.

Think of the closed network like the Danger Room in the "X-Men" comics, in which mutant students practice fighting to hone their powers without any real-world consequences. The cloud is like a room addition, enabling the network to scale to the size the Cyber Range needs it to be over the next 18 months—going from handling a dozen to hundreds of courses.

Amazon Web Services being the largest, most mature player in the cloud space, Virginia Tech Chief Information Officer Scott Midkiff approached their representative about getting credits to use the

resource at no cost. In return, the Cyber Range functions as an AWS trial run for future offerings of its kind.

"Partnerships between the private sector and our academic institutions are critical to solving the cyber workforce challenge. Creation of the Cyber Range is just one example of the steps that the Commonwealth of Virginia is taking to position the state as a leader in cybersecurity," McAuliffe said in a statement. "In Virginia and across the country, businesses, governments, and private individuals are impacted by the growing threat of cyber-attacks. We need a capable workforce that understands these swiftly changing threats and is ready to mount an agile defense against them."



Virginia Gov. Terry McAuliffe J. SCOTT APPLEWHITE / AP PHOTO

The governor likes to talk about 36,000 unfilled cyber jobs in the National Capital Region, and Virginia is geographically well-positioned to close the shortfall. For now, the Cyber Range aims to fill those empty positions with graduates from Virginia colleges and universities, Raymond said, but it could one day be training members of a cyber "fire department" of sorts.

Currently the Cyber Range is using its two-year budget to hire personnel and put cloud infrastructure together.

"We're in a situation where we're building the ship as we sail it," Raymond said. "We've built enough backend and we've got three courses at two colleges in Virginia—two at Virginia Tech and one at George Mason [University] using the Range."

More than 250 students are already involved, and at the end of February the Cyber Range held a "capture the flag" exercise at Virginia's inaugural Cyber Fusion event and Cyber Cup Challenge. Nine universities and community colleges participated with plans to support high school summer camps in the works.

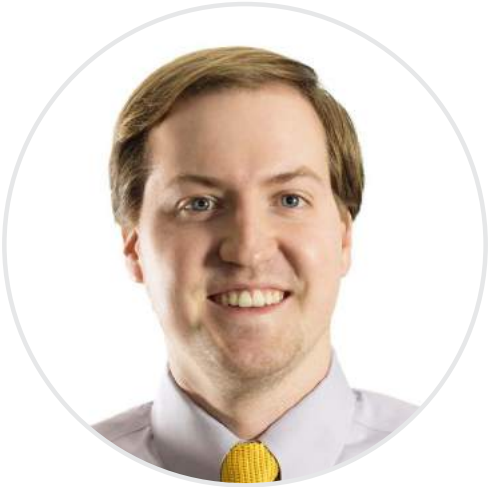
High school teachers with experience could use the Cyber Range as a resource during the academic year, Raymond said, expecting a "much wider use of the Range" by the fall—possibly two dozen schools and hundreds of thousands of students.

The Cyber Range levels the playing field in terms of schools lacking the expertise to assemble their own closed-network environment and teach their students how to secure such networks.

Everyone wants buy own hardware and have control of their own system, Raymond said, but the Cyber Range is both more viable and replicable elsewhere.

"We are thrilled to be a part of this important initiative in Virginia, which is one we hope will spark similar programs across the country," Teresa Carlson, AWS worldwide public sector vice president, said in a statement. "It's critical that we have a skilled cybersecurity workforce to meet the growing demands of the field."

About the Author



Dave Nyczepir

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