HOW CLOUD POWERS BETTER CONSTITUENT SERVICES WITH DATA

WHAT YOU NEED TO KNOW

GOVLOOP
POCKET GUIDE
2019

CLOUD CAN HELP STATE AND LOCAL GOVERNMENTS DELIVER BETTER SERVICES TO CONSTITUENTS BY ENABLING AND IMPROVING ACCESS TO DATA.

FOREWORD FROM AMAZON WEB SERVICES

People nationwide are demanding better services from their state and local governments. Across the U.S., these agencies hear that the people they serve expect the same level of customer experience (CX) that they receive from the private sector.

The cloud is helping state and local organizations innovate for and with their constituents. By freeing agencies from their expensive legacy IT, the cloud reduces costs and provides the flexibility, scalability and security they need to execute their missions.

Most importantly, the cloud provides state and local governments better access to data that will drive decisions.

Data ranks among a government's most precious resources. For example, data can improve infrastructure programs or modernize public safety tools, keep the public better informed and help agency leaders make wiser decisions.

Unfortunately, many agencies now realize that their legacy systems cannot provide the data access they need. These systems become more expensive as they age, and they are also too rigid for the opportunities data provides.

Cloud can overcome these obstacles with greater agility, efficiency and speed than legacy technology.

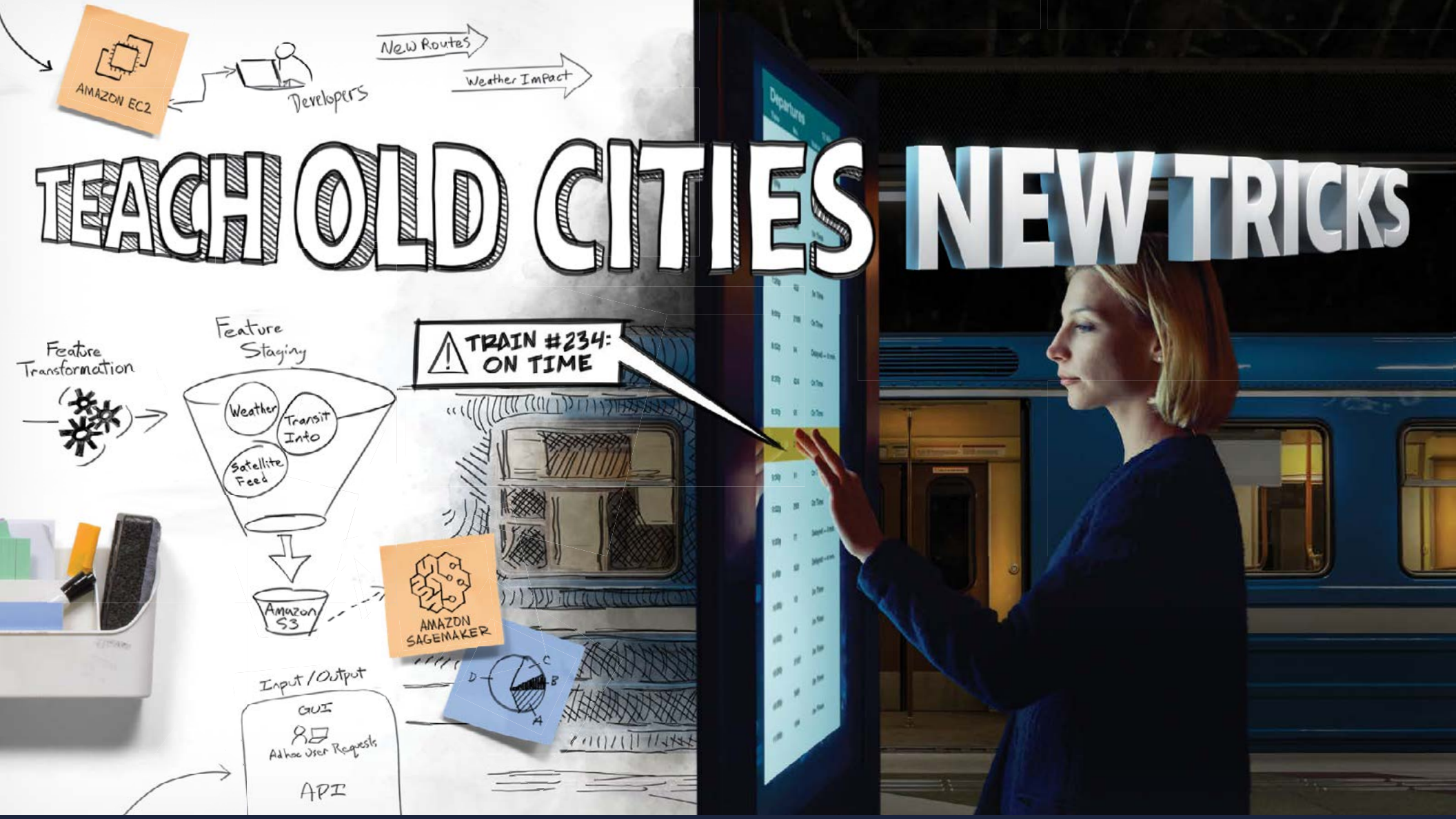
At Amazon Web Services (AWS), we are committed to helping agencies realize their data's true value. Our cloud solutions enable agencies to maximize their data use and improve the services and programs they deliver.

Cloud-driven data matters as it makes agencies smarter and more adaptive. Agencies utilizing cloud understand their own data better, and they also gain a better grasp of information from external sources. Eventually, public information becomes more transparent for constituents and government employees.

The cloud's status as a data-neutral platform, meanwhile, means that it can handle information from multiple state and local segments. Cloud-driven data powers insights for agencies about health and human services, elections, public safety, justice, smart cities enabled by the internet of things (IoT), and more. IoT networks consist of any devices that can collect, store and transfer information, while smart cities are those that manage their assets and resources with IoT data. Ultimately, the cloud's role in powering these tools means that it will be a valuable technology for years to come.

AWS is here to help agencies grappling with the complexities of cloud migration. Our expertise means that we can help deploy cloud-driven data at your agency. We strive for state and local agencies to reap the best returns from their data using cloud, and we're eager to join you and your agency on this journey.

John Stephenson
Senior Manager, Public Policy, AI



Governments around the world trust the cloud with the most functionality, innovation, and experience.

aws is how

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EXECUTIVE SUMMARY

There are many reasons agencies adopt the cloud: agility, cost savings, reliability, and scalability. But one of cloud's biggest benefits is improved data access. Agencies that can access the right information at the right time can deliver more impactful programs, improve existing services, and make better decisions. For instance, quality data access can improve elections, emergency resources and other public services.

For example, King County, Washington has experienced cloud's usefulness firsthand. The county switched to the cloud in 2015 after using legacy technology for a decade. The impact was immediate. King County saved $1 million in its first year of using the cloud. King County estimated that after 2015, using cloud would save the county $200,000 annually.

This new pocket guide gives an overview of how the cloud enables better services, why this issue matters to state and local governments, how agencies can improve in this area and provides case studies and how-tos that will help at any stage of cloud adoption.

KEY CLOUD EVENTS AND STATISTICS

Cloud's benefits are making the technology a cornerstone of IT modernization efforts for state and local governments. Recent legislation and statistics show how these agencies are using cloud to maximize the returns from their data.

600 State and local governments issued 600 cloud POs monthly in 2017.

Source: DiscoverOrg

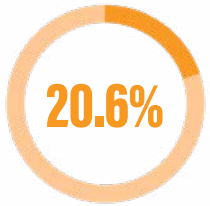
BY THE NUMBERS

1ST State CIOs ranked cloud first on their top 10 technologies for 2018.

Source: NASCIO

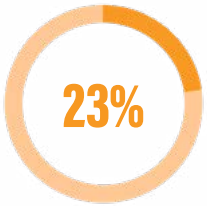
2ND State chief information officers (CIOs) ranked the cloud second on their list of their top 10 priorities for 2018.

Source: NASCIO



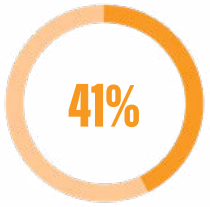
Local governments spent 20.6% of their IT budgets on cloud in 2018.

Source: Gartner



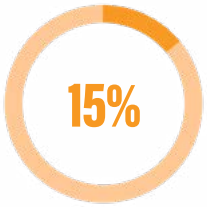
Twenty-three percent of state CIOs said in 2018 that their agency has migrated its open data to cloud.

Source: NASCIO



Forty-one percent of state CIOs said in 2018 that their agency has a cloud migration strategy in place.

Source: NASCIO



Fifteen percent of state CIOs said in 2018 that their agency planned on migrating its data to cloud.

Source: NASCIO

LEGISLATION LANDMARKS

THE FEDERAL RISK AND AUTHORIZATION MANAGEMENT PROGRAM (FEDRAMP)

FedRAMP debuted in 2012 to standardize authorizations, security assessments and continuous monitoring for federal cloud products and services. Although FedRAMP is a federal initiative, state and local governments frequently use the program's security requirements to select cloud vendors.

CALIFORNIA'S "CLOUD FIRST" POLICY

Introduced in 2014, this policy from California's Department of Technology (CDT) directs state agencies to shift toward the cloud for all new reportable and non-reportable IT projects.

TEXAS' SB 532

Created in 2017, SB 532 required Texas' state agencies to consider any cost savings and security benefits associated with the cloud when making purchases for a major information resources project under applicable law.

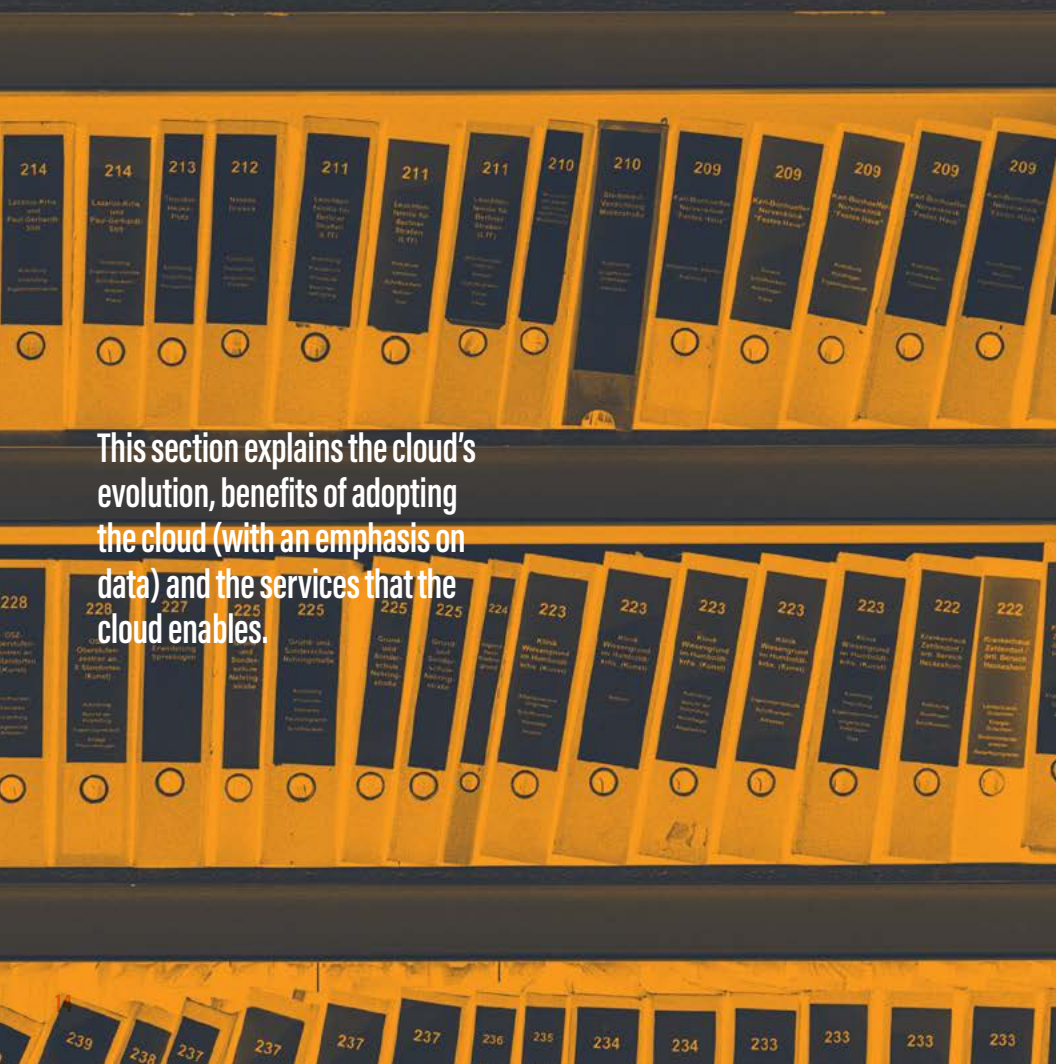
VIRGINIA'S EXECUTIVE ORDER NINETEEN

Gov. Ralph Northam signed Executive Order Nineteen in 2018, directing Virginia's agencies to use the cloud for the state's IT services.

FLORIDA'S SB 1570

Florida state Sen. Ed Hooper introduced SB 1570 in 2019. If passed, the bill would require Florida agencies to manage their data storage using the cloud from private vendors. HB 5301, legislation that's identical to SB 1570, passed in Florida's House earlier in 2019.

TODAY'S CLOUD ADOPTION LANDSCAPE



This section explains the cloud's evolution, benefits of adopting the cloud (with an emphasis on data) and the services that the cloud enables.

A BRIEF HISTORY OF CLOUD

Cloud adoption has happened slowly at some governments, as it is a process that takes energy, time and money.

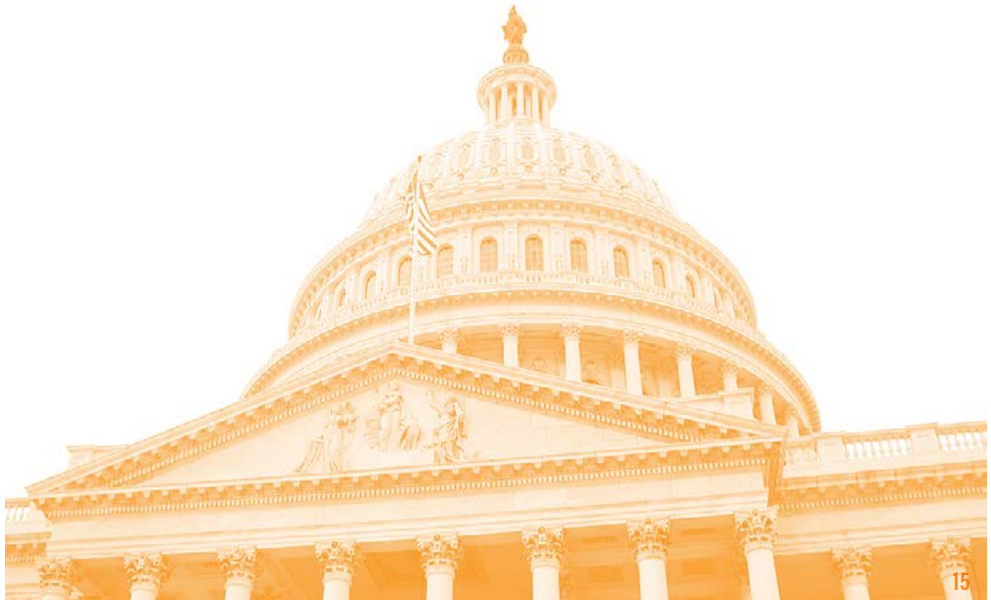
Despite this, new pressures are pushing holdout governments toward the cloud in recent years. Users are one factor, with many people demanding the same cloud-based CX from agencies that they receive from the private sector. Legacy technology is another motivator; agencies are realizing cloud is less costly and more reliable than older tools.

And a third driver is data, the force powering today's interconnected world. As more devices collect, exchange and store information, more powerful tools – such as the cloud – are necessary for handling information.

Although it's a federal policy, the national government's Cloud First initiative marked a milestone for agencies at every level. Published in 2011, Cloud First urged federal agencies to adopt the cloud whenever possible. Cloud First has since inspired multiple imitators at the state and local levels. The program has also influenced scores of IT modernization efforts nationwide.

In 2018, the federal government issued an updated version of their cloud strategy titled Cloud Smart. This policy offered guidance to agencies about how to approach procurement, security and workforces during cloud adoption so that they implement the technology more efficiently.

The cloud's elasticity, meanwhile, suggests that the technology will play a major role in future tools. For example, the cloud's scalability makes it an excellent platform for emerging technologies, such as artificial intelligence (AI) and machine learning. The cloud's ability to store and analyze large amounts of data also serves many needs associated with smart cities and IoT. The possibilities these technologies present make the cloud pivotal in powering the cities of tomorrow.



THE CLOUD AND BETTER DATA ACCESS

Cloud technology supports cheaper, faster and more reliable IT services for agencies than older IT solutions. Although these traits are valuable, data access is one of cloud's greatest benefits to governments.

Much like cars need roads to reach their destinations, state and local agencies need the cloud to collect, store and share their data. With the cloud, state and local governments can enable more data access to their agencies. Data access produces the following gains for organizations:

1 DATA-DRIVEN DECISION-MAKING

Fluid data access produces intelligent, real-time information for agencies. Ultimately, this information helps organizational leadership stay up to date and make the most informed decisions possible.

2 BETTER DATA USE

Agencies often generate so much information that making sense of their entire store proves difficult. The cloud assists agencies with storing and tracking their preexisting data, providing more clarity into where that information is and what value it has.

3 DECONSTRUCTING DATA SILOS

Many agencies have multiple components, and the cloud helps foster better collaboration and cooperation between them. The cloud's reliability allows departments to easily communicate with one another and share their unique data agencywide.

4 INCREASED DATA TRANSPARENCY

Data is only useful if people can access it. By improving data access without sacrificing security, the cloud increases transparency at organizations and delivers data to the people who should have access. Through Identity Access Management (IAM) tools and user roles, data can be shared with the users who need to see it, allowing for improved inter-agency collaboration and transparency to constituents.

THE CLOUD, DATA AND STATE AND LOCAL SUCCESS STORIES

Agencies can take data in nearly infinite directions, with the only limits being what information they collect and how they access it. The cloud provides organizations with a framework to help them reach more of their data goals.

CLOUD-DRIVEN DATA IN ACTION WITH PUBLIC SAFETY

The cloud can help power insights for governments on public safety issues including crime, drug abuse, transportation, and weather.

Consider Chicago's data efforts using the cloud. In 2016, Chicago launched OpenGrid, the city's interactive, open-source map based in the cloud. OpenGrid uses Chicago's event-based information to provide residents and visitors with real-time and historical data about their surroundings. It's an agile, multi-purpose tool that uses Chicago's cloud to assist the public.

"Citizens benefit from OpenGrid becaus e it allows them to see what's happening around them," said Tom Schenk, former Chicago Chief Data Officer (CDO). "There's a natural curiosity of a building that looks like it's under construction. What's going to go in there? What potholes are in my area? What streetlights are out? What crime is happening in an area?"

OpenGrid provides people with timely information about ongoing trends such as business license applications, weather updates and 311 calls. The program is mobile-friendly, meaning that people can use it on their preferred device wherever they are in Chicago. The result is that people have more situational awareness of the city they live and work in.

"The key thing for us was making sure that the application was available and that we didn't experience any scaling issues or any performance issues," Schenk said of why Chicago chose the cloud for OpenGrid.

Situational awareness isn't the only place where the cloud can help agencies make a positive impact with data, however. Cloud-driven data is flexible enough to touch every aspect of peoples' lives. Using the cloud, agencies can improve disparate concerns such as justice, public safety and transportation all by using data.

CLOUD-DRIVEN DATA IN ACTION WITH HEALTH SERVICES

Washington, D.C. offers proof of how cloud-driven data can assist residents with healthcare and human services. These public services are especially critical, as they directly impact constituents' lives.

In 2015, the DC Health Benefit Exchange Authority (HBX) began moving the district's state-based online health insurance marketplace to the cloud. HBX is a public-private partnership that was established to create and operate this exchange, which is called DC Health Link.

HBX's decision to move DC Health Link to the cloud has dramatically improved the program for the agency. Since 2015, HBX has saved $1.8 million by using cloud hosting and services; the agency also saves $250,000 annually, which it would have otherwise spent on space to house its previous data center for the 10 years necessary under federal law. The agency additionally deploys weekly updates to DC Health Link without disrupting the program.

The switch also had a direct impact on the program's recipients. During DC Health Link's fourth open enrollment period ending in January 2017, nearly 24,000 residents selected private healthcare plans – more new customers than either of the two previous years. As of 2018, DC Health Link had cut the district's uninsured rate in half, with more than 96% of residents having coverage. DC Health Link offered more than 150 individual and small-group health plans that same year.

CLOUD-DRIVEN DATA IN ACTION WITH JUSTICE

Cloud can also assist agencies with enforcing justice, and in turn, reduce crime, prevent violence and protect order.

Take Richmond, California's Police Department, for example. Before switching to the cloud, the department struggled with managing daily crime reports using its records management system (RMS). Its RMS wasn't user-friendly and accessing information about crimes was often time-consuming for the department's 250 users.

"Using our previous RMS, I would have to print our reports, copy them and then scan them as PDFs and send them to my email if I wanted to look at them offsite," said Timothy Gard, who was then a department sergeant. "A typical homicide report can be 80 pages long, so that would take many hours to do."

The cloud, meanwhile, now allows officers to access entire reports by clicking one button, saving the department manpower hours. Information is also more remotely accessible, meaning that officers are using smartphones and tablets to stay informed in the field. These data access improvements help the Richmond Police Department protect the city's 102,000 residents.

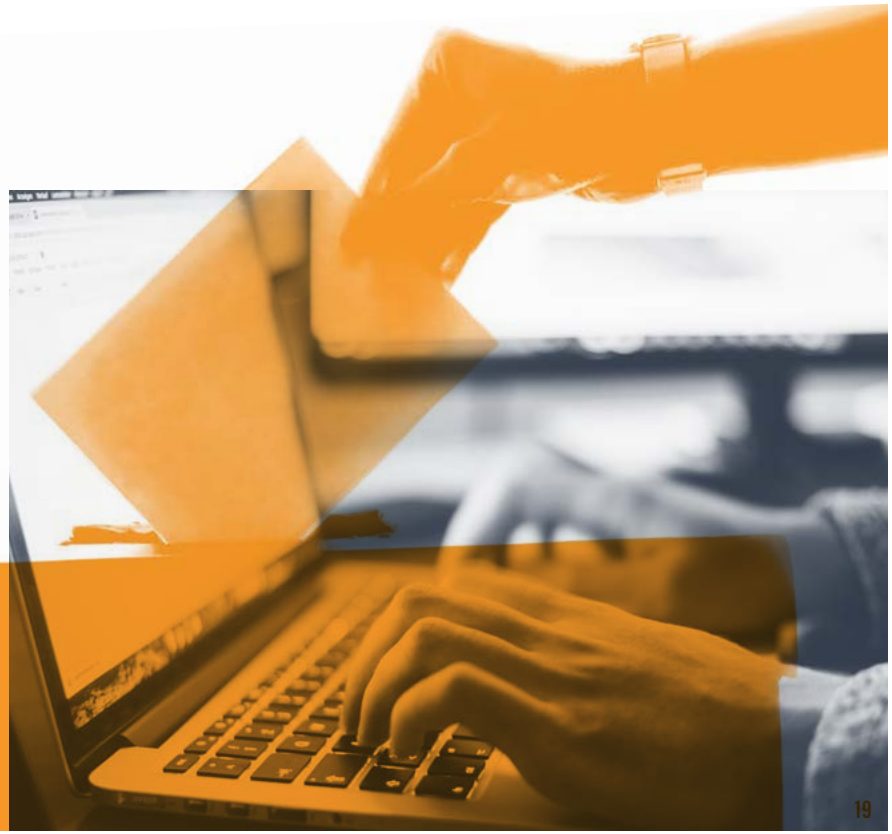
Data access is not the cloud's only benefit, however. The cloud also creates significant cost-savings for agencies by reducing their reliance on legacy IT. Legacy infrastructure overtime becomes outdated, making it increasingly expensive to maintain as updates are needed.

CLOUD-DRIVEN DATA IN ACTION WITH ELECTIONS

The cloud can additionally elevate elections by helping report the results in a cost-efficient, quick and reliable manner using government data. In turn, elections that run smoothly inform constituents about their governments and make them invested in the results. Later in this pocket guide, GovLoop will explain how cloud services from AWS helped Alameda County, California boost its ballot box reporting with cloud-based data.

CLOUD-DRIVEN DATA IN ACTION WITH SMART CITIES AND IoT

The insights that smart cities find in data from scores of devices is difficult to analyze without the right technology. The cloud is well-suited for smart cities because the technology can scale for growing data. Given the cloud is not overwhelmed by the rise in IoT devices, it is a tool that seems poised for smart city and IoT operations going forward. Coming later in this guide, GovLoop will show how Kansas City, Missouri used the cloud to become a thriving smart city based on IoT data.



INDUSTRY SPOTLIGHT

MAKING DATA MATTER FOR AGENCIES' MISSIONS

An interview with John Stephenson, Senior Manager for Public Policy, AWS

Regardless of their mission, all state and local agencies want the public to be satisfied with the services they provide. But it is an increasingly difficult goal, as the private sector can often deliver daily services faster or potentially better. People now expect this quality customer experience (CX) from businesses, and they are frustrated when their agencies cannot keep up.

Thankfully, the cloud can help state and local agencies innovate and evolve at the same rate as any private company. This is because every government stores unique data, and cloud helps government agencies to leverage their information to deliver valuable insights.

GovLoop spoke with John Stephenson, Senior Manager for Public Policy at AWS, a leader in providing public sector cloud platforms, to learn more about the cloud's role in improving services and specifically, how AWS helps governments. Stephenson said the cloud can help agencies harness data to make their CX dreams a reality.

Agencies must often overcome two obstacles, however, before the cloud can transform their CX. The first is their reliance on legacy IT to analyze and handle data.

"Agencies haven't been able to get to their data, grant access to it, easily share it and reap the benefits from it because of their technology," Stephenson said. "Unfortunately, because of this legacy technology, we probably aren't gaining more insights into this information."

The second obstacle, meanwhile, is data policies that have not been updated for the cloud. Stephenson said that many agencies have data strategies that came before the cloud changed CX.

"Many data handling policies were written prior to the cloud-ready world," he said. "We didn't think that data was meant to be shared. We have laws, policies and governance that don't reflect the potential we could get from data that we mesh with others."

An example of this trend is the evolution from data warehouses to data lakes. Data warehouses are databases that are defined and structured in advance to analyze relational information from transactional systems and business applications. Although useful, these data repositories are increasingly outdated for the needs of modern agencies.

In contrast, data lakes are centralized hubs that store all an organization's structured and unstructured data at any scale. Data lakes save agencies time by letting them store their information as-is rather than structuring it. Subsequently, data lakes are immediately ready for analytical methods such as machine learning, real-time analysis and information visualization.

"State and local governments have lots of data, but it's traditionally been locked up," Stephenson said. "Data lakes can take what you've always had and derive value from it."

Cloud-based data lakes are now helping state and local governments tackle multiple issues, Stephenson said. These organizations' clouds are generating insights for reducing such problems as homelessness, opioid addiction and traffic congestion. Cloud's adaptability makes imagination the only limit to the services that agencies provide. This flexibility saves governments money while letting them experiment with better ways of achieving their missions.

"The big thing that governments tell us is that cost is a major issue," Stephenson said. "With AWS's cloud, you can have the economy of scale. We've seen customers from Arizona to Texas that have saved huge sums of money using our cloud."

Stephenson concluded that the AWS cloud constantly adds new tools and solutions for agencies to serve the public. For example, AWS launched 1,957 services in 2018 and remains on pace to add more in 2019.

"You can take advantage of the breadth of functionality in AWS," he said. "There's no need to deploy, migrate to or upgrade to new services in conjunction with our cloud; it's just there."

> ***"With AWS's cloud, you can have the economy of scale. We've seen customers from Arizona to Texas that have saved huge sums of money using our cloud."***
>
> *—John Stephenson*
> *Sr. Manager for Public Policy, AWS*

LEARNING FROM OTHERS: CLOUD-DRIVEN DATA CASE STUDIES

This section recounts how state and local agencies have used the AWS cloud to boost their access to data and enhance their service delivery.

CLOUD MAKES KANSAS CITY A SMART CITY

Kansas City, Missouri shows how communities can thrive by using cloud to handle IoT networks generating vast amounts of data.

Now boasting a population of 2.1 million people, Kansas City has grown dramatically over the last decade. Then-CIO Bob Bennett said that a major factor in that growth is Kansas City's push to become a smart city using cloud.

"Ten years ago, we had fewer than 5,000 people living downtown," he said. "We have seen a 520% growth in the number of residents downtown and a 400% growth in development investment. I believe our smart city project has played a prominent role in getting people excited about living here."

The cloud contributed to this expansion by helping dramatically transform Kansas City's downtown. A two-mile corridor there now contains 328 Wi-Fi access points, 178 smart streetlights, 25 video kiosks, pavement sensors, video cameras, and more. It is a booming IoT network with multiple data insights waiting to be found.

These devices generate heaps of data, and Kansas City uses the cloud to make sense of this information. For example, city officials used datasets about road conditions and traffic patterns to predict where potholes were most likely to occur. Bennett said that the city expects the analysis to save 50% it would have spent on emergency repairs.

The cloud is also helping Kansas City understand and prevent crime patterns with datasets. The city now combines crime statistics with educational, transit, weather, and other data to predict future trends.

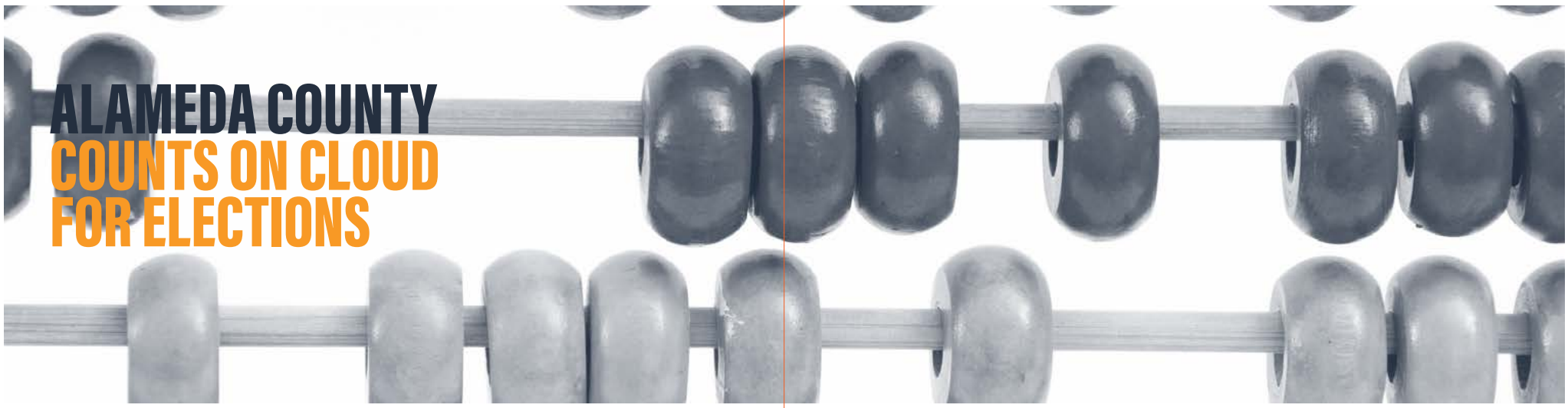
"We want to show correlations among conditions that lead to crime and the interventions that work," Bennett said.

Kansas City is additionally using cloud-driven data to pinpoint the location of vacant buildings in the area. By using permit and traffic data, city officials can find empty structures with 85% accuracy.

Cloud supports initiatives such as these by scaling to meet the size of any government data. Kansas City, for instance, had more than 4,200 existing datasets before launching the city's urban analytics and intelligence platform on cloud.

The city's successes are starting to impact neighboring communities. For instance, Kansas and Missouri's state governments are now providing the city with more than 4 million vehicle records daily.

"From a digital perspective, we're getting to a single data lake for regional data, turning this from a smart city into a smart region," Bennett said.



ALAMEDA COUNTY COUNTS ON CLOUD FOR ELECTIONS

It is a democracy's worst nightmare: Election Day ends, and the people who voted cannot see the results.

That outcome was a real possibility for Alameda County during the 2016 election cycle. Its election-reporting viewer crashed in 2014, leaving officials scrambling for a more reliable tool.

The county's original election-reporting viewer used outdated, on-premise technology. Before the 2016 election, a contractor estimated that replacing this legacy application would cost $20,000, plus the cost of any servers for meeting extra demand. Ultimately, county leadership considered the cloud as an alternative.

"We started going down that road, but we ended up spinning our wheels," said Tim Dupuis, the county's CIO and Registrar. "We had never used cloud services before, but since the traditional approach wasn't really getting us anywhere, we decided to give it a try."

County officials then tested a proof of concept for a cloud-based election-reporting viewer before any votes were cast. By Election Day 2016, Alameda County had about 88,000 registered voters potentially finishing ballots. Ultimately, the tool behaved flawlessly once the polls closed. "We were hit with more than 3,000 concurrent users on election night," said Sybil Gurney, the county's Assistant Director of Application Services.

"There were no performance issues, and 80% of users accessed election maps on mobile devices." The new election-reporting viewer also displayed voting results faster. The old system needed up to 90 seconds to load an election results request; in contrast, the new version required two to three seconds for initial asks, a time that shrank for follow-ups.

> **"If we had gone the traditional route, we would have spent tens of thousands of dollars with no guarantee that it would even work."**
>
> *—Tim Dupuis*
> *Alameda County CIO*

Alameda County's fresh tool, meanwhile, cost significantly less than replacing the older one. Once election night ended, the reporting viewer's operating total was $25.

"If we had gone the traditional route, we would have spent tens of thousands of dollars with no guarantee that it would even work," Dupuis said. "And we would have been paying for that infrastructure all year long."

Ultimately, Alameda County's election success inspired leaders there to examine other cloud solutions. For instance, the county has since explored integrating a real-time feed of public-works projects with a navigation app.

"This was a very successful implementation because it was of manageable size – meaning we could get it working quickly – yet its impact was highly visible," Dupuis said of the election-reporting viewer. "It has been a springboard for us to show the value we can bring to constituents with cloud services."

CHEAT SHEET

This section provides quick tips for adopting the cloud for better data access that improves services delivered to constituents.

What factors should your agency consider before adopting cloud?

- The cost of replacing your agency's legacy technology
- Whether any legacy technology is too mission-critical for your agency
- What services can benefit from cloud and how to deliver them
- What cloud model fits your agency's data
- What contract costs and terms your agency needs for cloud
- What secuirty your agency has for cloud, particularily regarding data
- What skills your agency's workforce needs for cloud and how to get them

Key questions to ask about how cloud improves data access for your and your coworkers:

1. Where are there silos around information at your agnecy without cloud?
2. How would removing information silos without cloud help your agency's mission?
3. Where does your agency need more data transparency and how can the cloud help?
4. What data would help you deliver better services using the cloud?
5. How could your agency make smarter decisions using the cloud and data?
6. How could your agency use the cloud to deliver data to constituents?
7. How would using the cloud for your agency's data differ from using legacy technology?

Topics worth considering about how the cloud improves data access:

1. Can the cloud deliver data more consistently and reliably?
2. How secure is personal data in the cloud?
3. How fast can people access data using the cloud?
4. How does the cloud help with data from mobile and IoT devices?
5. How can the cloud foster greater collaboration and cooperation on different data sets?
6. How can the cloud scale for larger amounts of data as new information emerges?
7. What emerging technologies can the cloud also support for improving data access?

What other technologies can cloud enable for better data access?

1. Automation: The ability for machines to perform a manual process or procedure with minimal human involvement
2. Machine learning: The predictive and statistical data that machines use to perform specific tasks without explicit instructions from people.
3. AI: The ability for machines to mimic cognitive abilities such as learning and problem-solving performed by humans.
4. Geographic information systems (GIS): Technology that captures, stores, analyzes and displays geographic and spatial data.
5. Robotic process automation (RPA): The process of automating a set of manual human procedures for a machine to perform a desired outcome.

RESOURCES

This video discusses why the cloud was better-suited for hosting DC Health Link than the legacy technologies that previously housed the program.

This footage recounts the origins of OpenGrid and how the cloud made the program what it is today for Chicago residents.

This segment reveals how Johns Creek, Georgia used cloud to give improved data access to people and the devices they use.

THANKS TO AWS FOR THEIR SUPPORT IN PRODUCING THIS PUBLIC-SECTOR RESOURCE.

About Amazon Web Services

With over 2,000 government agencies using AWS, we understand the requirements US government agencies have to balance economy and agility with security, compliance and reliability. In every instance, we have been among the first to solve government compliance challenges facing cloud computing and have consistently helped our customers navigate procurement and policy issues related to adoption of cloud computing. Cloud computing offers a pay-as-you-go model, delivering access to up-to-date technology resources that are managed by experts. Simply access AWS services over the internet, with no upfront costs (no capital investment), and pay only for the computing resources that you use, as your needs scale.

To learn more about AWS, please visit **https://aws.amazon.com**

About GovLoop

GovLoop's mission is to inspire public sector professionals by serving as the knowledge network for government. GovLoop connects more than 300,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to the public sector.

For more information about this report, please reach out to **info@govloop.com**

Data is only valuable if you can reach it: Cloud can help you and your co-workers access your agency's data more easily and deliver higher-quality services to your constituents.

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