

# Don't just adopt cloud computing, adapt to it

How the pandemic accelerated a shift in public sector cloud adoption

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# Introduction



**T**HE PANDEMIC CAUSED many government agencies to dive headfirst into cloud. The flexibility and scalability of cloud allowed governments to meet the urgent challenges of the pandemic, such as massive surges in demand for services or the sudden shift to remote work. As a result, governments at all levels made considerable investments in cloud, but now they face difficult choices about how to maintain, develop, and build upon these new cloud investments.

While many government organizations had adopted cloud in the past, the pandemic shifted priorities for those that were not yet cloud-first in their approach to infrastructure. Suddenly, cloud was not just one of many priorities for an IT organization within a government agency, but was the key capability for both IT and business operations to keeping services running. However, as some of the initial stresses of the pandemic ease, those other competing priorities have not gone away and may soon be clamoring for resources. This leaves government CIOs and technology leaders with difficult questions about what worked

in the pandemic, what to keep, what to make permanent, and what to leave behind.

Our research shows that the pandemic has shifted how government organizations use cloud. Not only have late adopters jumped into cloud, but government organizations of all stripes are increasingly looking to use cloud to improve core mission services. To capitalize on the momentum of the pandemic requires more than just an inventory of technology tools—it often requires changes to the organizational culture, workforce, and a different approach to how agencies use cloud. These changes can improve organizations as they shift from using cloud solely as an infrastructure tool to also taking advantage of the scalability, flexibility, and shareability inherent in cloud to revolutionize how services are delivered to citizens.

While such shifts can be difficult, a few key adjustments can help begin the journey. By adapting the strategy, assessments, governance, and people needed, government organizations can put cloud to work for citizens. And not just for today, but into the future as well.

# The three eras of cloud in government

**B**EFORE EXAMINING WHERE cloud in government is going, it might be useful to take a broader look at the history of cloud in government. Broadly, government agencies' approach to cloud can be bucketed into three eras:

- **The problem-solving era.** This first era was focused on solving the technical and security problems that stood in the way of cloud adoption. The period was characterized by the launch of the policy, technical, and security documents that allowed government organizations to adopt cloud. For example, the White House introduced its Cloud First (now reimagined as Cloud Smart) policy in December 2010. Soon, security and technical standards such as FedRAMP<sup>1</sup> followed. The National Institute of Standards and Technology also released standards and a definition of cloud computing in 2011.<sup>2</sup> Many agencies moved their noncritical applications (such as email services) to cloud to eliminate expensive in-house servers in this era.<sup>3</sup>
- **The competing-priorities era.** Once various technical and security challenges to cloud were addressed, organizations had to wrestle with when they would move to cloud. Cloud migration had to compete with legacy systems and other technology and business priorities for the same limited resources. While many agencies did invest in cloud, those investments were often piecemeal, with mission organizations migrating only a few select services or applications.<sup>4</sup> The result is often a patchwork of cloud utilization without the organizational foundations needed to realize its full benefits.
- **The maximizing-the-mission era.** Once agencies adopt cloud at scale, they enter the third era of cloud in government: trying to determine how best to unlock the mission value of cloud. Cloud technology comes with some inherent capabilities such as flexibility and scalability. However, organizations must determine how to apply those capabilities to their mission to benefit citizens.

# Cloud provided the flexibility demanded by the pandemic

**P**RIOR TO THE pandemic, some early-adopter government organizations implemented cloud at scale and moved to the third era. The steady growth of federal spending on cloud contracts stretching back the better part of a decade is evidence of the progress of these at-scale adopters (figure 1).

However, many were also stuck in the second era, with cloud continually being outcompeted by other priorities, delaying at-scale adoption. The burden of maintaining legacy systems, combined with government's unique challenge of changing priorities which accompany new leaders or administrations, meant that it was easy for significant cloud investments to be outcompeted

for finite budget resources. As the cost of maintaining legacy systems is baked into existing budgets, it is easy for agencies to consistently put off cloud investments year after year, effectively keeping organizations in this second era of perpetually considering cloud.

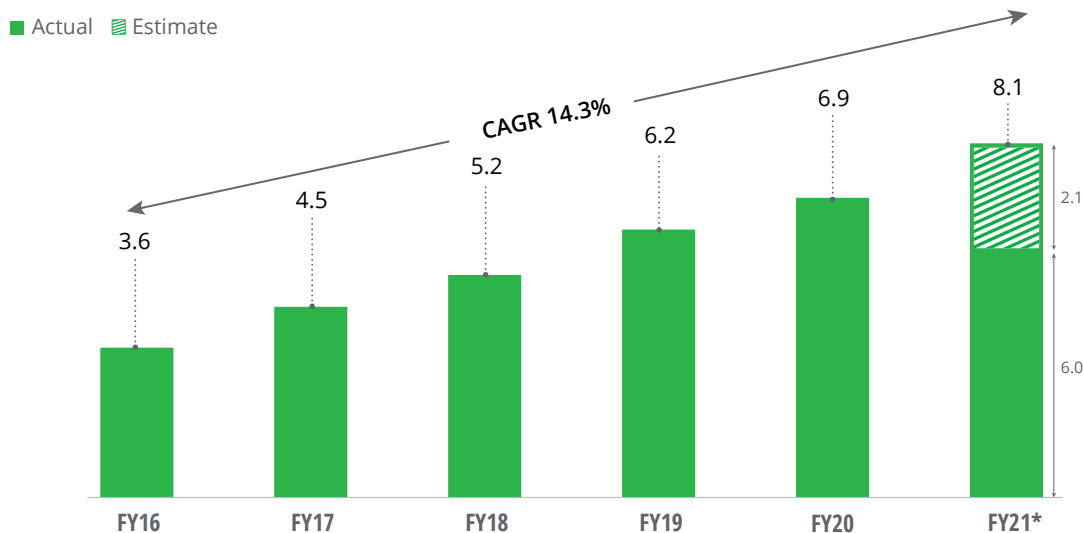
That reality for many government organizations changed during the COVID-19 pandemic. The pandemic broke the cycle of perpetual consideration and pushed many more agencies into the third era.

During the pandemic, the unprecedented strains faced by government organizations seemed tailor-made for the strengths of cloud. Sudden increases in demand for services could be met by the instant

FIGURE 1

## Steady growth of cloud spending shows recognition of the value of cloud

Total federal cloud spending by FY (US\$ billion)



Note: \*Data is available until August 30, 2021; defense and intelligence data is delayed by 3–6 months.

Sources: Bloomberg Government; Deloitte analysis.

scalability of cloud. The virtual nature of cloud services could meet the need to immediately shift to remote work.

The result was that many government organizations turned to cloud to solve many of the new challenges the pandemic introduced to their organization—challenges that often required scalability to address unprecedented demand for existing services, agility to set up entirely new programs, and/or flexibility to support both their customers and their workers remotely. For instance, Rhode Island modernized its unemployment insurance (UI) contact center, using cloud technology to respond to the surge in claims. Within 10 days of migrating to the cloud, the state went from a capacity of 75 concurrent calls to 2,000.<sup>5</sup> Similar stories emerged across the country from New York—which modernized UI and transit systems to cope with fluctuating demand—to California—which used cloud to offer services via “virtual” Department of Motor Vehicle offices.<sup>6</sup>

## The pandemic drove many fence-sitters into cloud

The pandemic upended traditional priorities. Organizations that had been stuck in the perpetual consideration of the second era discovered that cloud was not just yet another potential investment, but the only option for continuing operations or adapting to the new pandemic-specific needs. Many organizations that had been fence-sitters dived into cloud.

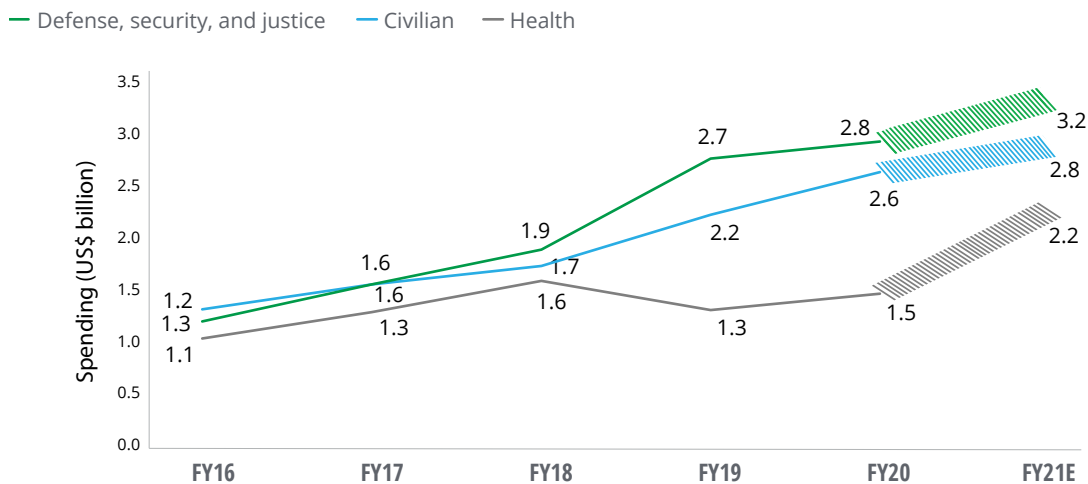
This shift is also reflected in budget data. As these organizations dived into cloud during the pandemic, not only did overall cloud spending increase, but it also converged. Sectors that had lagged, such as health care, caught up with sectors, such as defense, that had set the pace (figure 2).

In terms of the three eras of cloud, prior to the pandemic there was a large mix of government organizations, some in the second era and some in the third. But as the pandemic drove those

FIGURE 2

### The pandemic reduced variability in cloud spending as fence-sitters moved into the cloud

Total federal cloud spending by sector (US\$ billion)



Note: Data is available until August 30, 2021; defense and intelligence data is delayed by 3–6 months; FY21 numbers are shown separately as these are estimated numbers.

Sources: Bloomberg Government; Deloitte analysis.

fence-sitters in the second era more fully into cloud, a greater percentage of government organizations are now in the third cloud era, trying to determine how best to use cloud to accomplish their missions.

## That reality for many government organizations changed during the COVID-19 pandemic.

This trend is not limited to the federal government either, as cloud adoption has also accelerated in many states. Just like federal agencies, state governments before the pandemic were split between those working toward cloud and those that had already adopted at scale. A 2019 NASCIO survey showed that while 51% of IT leaders were working toward a cloud migration strategy, only

34% already had that strategy in place.<sup>7</sup> For state governments, the pandemic also provided the impetus to cloud migration as many legacy systems were not able to manage the massive surges in demand for key services such as unemployment insurance or other human services. For example, our analysis of technology contracts for the state of California shows a marked increase in the latter half of the pandemic (figure 3).

## The challenge of institutionalizing success

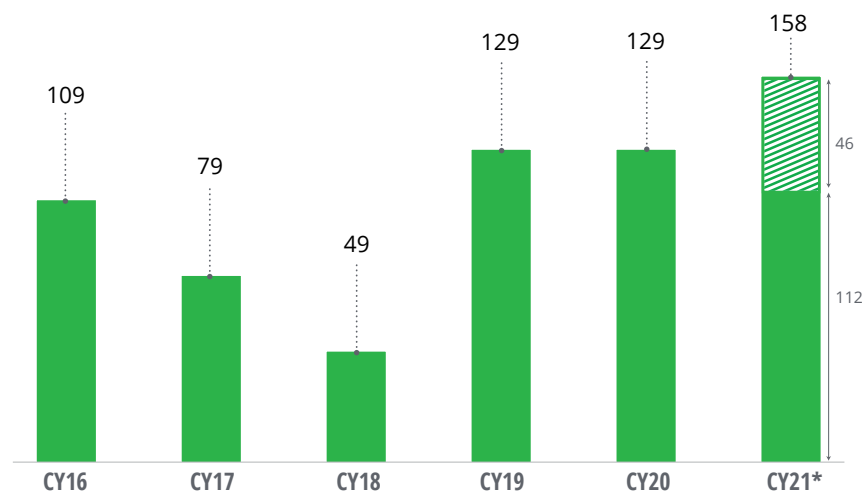
Just because organizations are entering the third era and adopting cloud at scale, it does not mean the journey is over. In fact, leaders now face difficult decisions on how to institutionalize the progress they made on their cloud journey during the initial months of the pandemic.

FIGURE 3

### The pandemic also accelerated cloud adoption in state governments

Number of cloud contracts for the state of California

■ Actual ■ Estimate



Note: \*Data is available until September 30, 2021.

Sources: GovWin IQ; Deloitte analysis.



First is the challenge of budget snapback. The needs of the pandemic may have bumped cloud ahead of most competing priorities, but the other priorities have not gone away (and in fact, the list of priorities may have grown longer due to delays on nonurgent priorities during the pandemic). There will be significant pressure on IT leaders to restore funding to some of those other priorities, potentially taking away resources from cloud efforts.

Making a case for cloud is also complicated because it can be difficult to quantify its benefit for government organizations, which often measure success in terms of nonmonetary mission outcomes. Relying purely on dollar-and-cent arguments can be difficult. When the federal

government began exploring cloud in the first, “problem solving” era, the main goal was cost-saving by closing data centers.<sup>8</sup> While the resulting shift to cloud did save the federal government significant amounts, the savings were less than expected.<sup>9</sup> However, over time, what emerged was a picture in which cloud was bringing additional mission benefits that had not been possible before.

Therefore, one key to institutionalizing the successful shift to cloud is a shift in how government organizations use cloud. More than just rehosting existing services in cloud to save costs, the largest benefits typically come when [applying the unique properties of cloud to the mission](#).<sup>10</sup>

# Shifting how government organizations use cloud

**H**AVING MADE THE decision to move into cloud during the pandemic, government organizations are now faced with the decision of how best to make use of cloud to accomplish their mission. This shift in thinking among government technology leaders is already evident.

In a January 2021 survey, 70% of state and local government executives highlighted that cloud is their preferred environment for hosting citizen and mission data.<sup>11</sup> We can see this shift reflected in what government organizations are spending their money on in the cloud.

## Infrastructure and managed services build flexibility

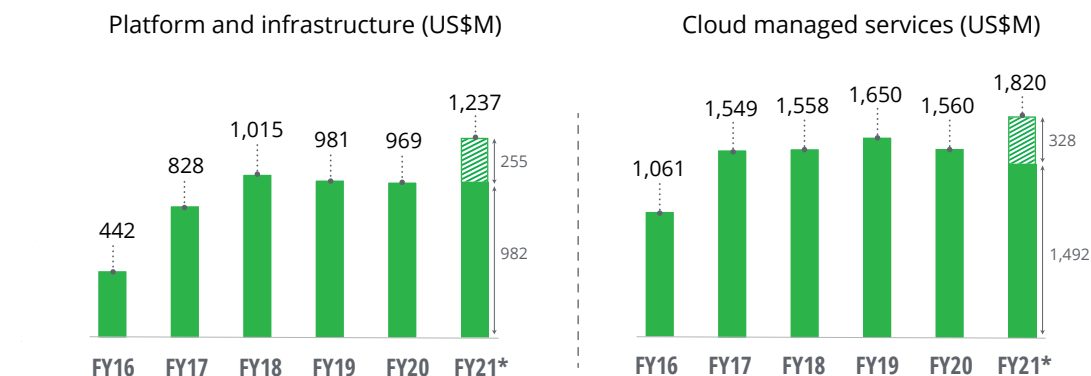
The strain of the pandemic showed not only the dire need for flexibility, but also proved cloud's ability to deliver that flexibility. The result was a significant move—especially among late adopters—to acquire the infrastructure or managed services necessary to improve the flexibility of key government services (figure 4).

State governments appear to be following the same trend. In a NASCIO survey, 60% of state CIOs said they would like to expand the managed services

FIGURE 4

### Cloud managed services is expected to touch US\$1.8 billion in spending

■ Actual ■ Estimate



Note: \*Data is available until August 30, 2021; defense and intelligence data is delayed by 3–6 months.

Sources: Bloomberg Government; Deloitte analysis.

model over the next three years.<sup>12</sup> The Office of Recovery Services (ORS), a Utah Department of Human Services division, migrated its 25-year-old information system for child support from legacy mainframe to a Java-based application hosted on cloud. This allowed the agency to leverage modern, flexible, and scalable technology to automate operations, which could not be done on the mainframe system. The solution's flexibility and scalability had the added advantage of bringing down costs. "We now have a development environment that if we only had it up during the day, Monday through Friday, and spin it down, that decreases the cost significantly. Our operational costs are now 37% of what they were on the mainframe," says Gene Riggs, who led the migration. Since the agency has the right cloud infrastructure, it is looking to modernize further in the near future. "We're putting human-centered development into the application. We're moving it to cloud-native technologies. We're starting to implement and streamline some of the things the business had wanted us to do as a result of moving to the cloud," says Riggs.<sup>13</sup>

## App development and integration of drive cloud into the mission

The ORS's journey from legacy systems to cloud also highlights the second big shift. Once agencies have the right cloud infrastructure, they can use it to develop cloud-native applications (apps) and integrate data silos and apps to enmesh cloud into existing business processes.

Federal cloud spending shows a marked increase in cloud-native application development as government organizations look to create new cloud-based tools for their missions. Use of cloud as an integrator technology has also increased as cloud APIs can integrate datasets, applications, and devices, enabling seamless interaction between different parts of an agency (figure 5).

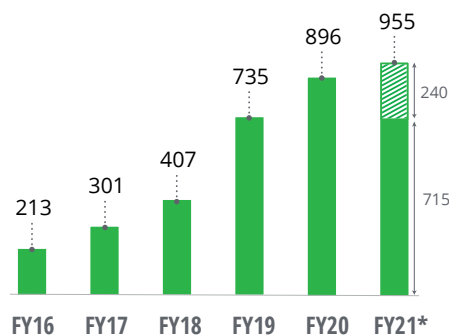
In fact, cloud has been used to create entirely new tools to combat the COVID-19 virus itself. The National Center for Advancing Translational Sciences, part of the National Institutes of Health,

FIGURE 5

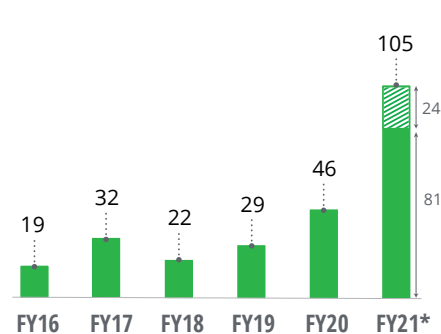
### A shift to a more mission-focused use of cloud is reflected in increases in spending on integration and app development

■ Actual ■ Estimate

Cloud native application development (US\$M)



Integration and APIs (US\$M)



Note: \*Data is available until August 30, 2021; defense and intelligence data is delayed by 3–6 months.

Sources: Bloomberg Government; Deloitte analysis.

funded the development of a cloud-based, data-sharing and analytics platform—the National COVID Cohort Collaborative (N3C)—to study COVID-19 and identify possible treatments. Cloud's flexibility allowed the center to set up a gigantic database with over 10 billion rows within

weeks.<sup>14</sup> Government experts, researchers, and commercial organizations can exchange data, ideas, and observations on the cloud-based platform.<sup>15</sup> It also enables rapid collection and analysis of clinical, diagnostic, and laboratory data from hospital networks across the United States.<sup>16</sup>

# Shifting usage demands different skills

**T**HE PANDEMIC ALSO highlighted another truth of technology modernization: People are the key to success. Even the best technology can be useless without the right people involved. Hence, agencies need to take steps to attract new talent, reskill existing workers, and retain hired talent.

As agencies shift to how cloud is most effectively used, they should also shift the skills and employees they recruit. In many cases, government organizations appear to have already made this

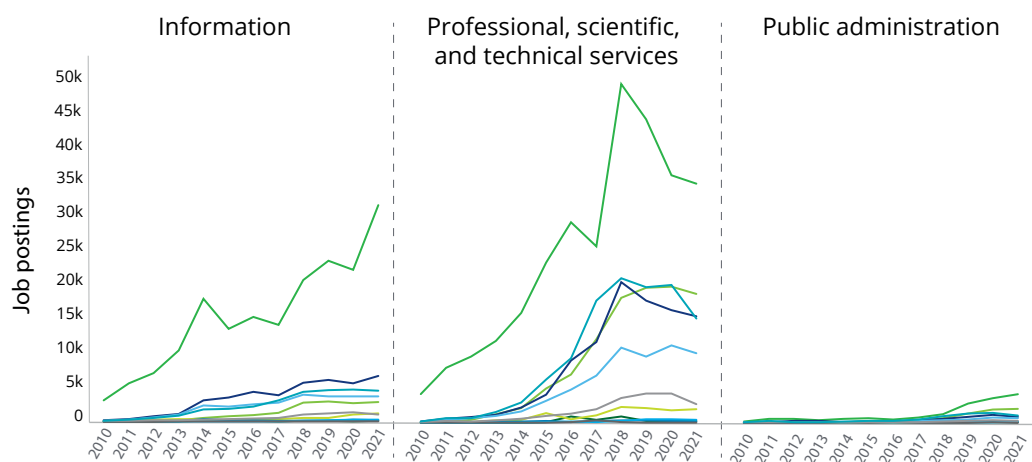
shift, with skills in software-as-a-service and managed-service providers being among the most desired cloud-related skills for public sector workers.<sup>17</sup> The challenge is that similar shifts are taking place in commercial industries such as IT and professional services (figure 6). This means government is competing with the private sector for their cloud talent. Even if government organizations are able to train or attract the talent needed to achieve success in the third era of cloud, they could easily find those workers tempted away by higher salaries or more opportunities in

FIGURE 6

## Government organizations are seeking the right skills for mission-focused cloud, but are also competing with larger industries for the same talent

Cloud skills:

— Amazon Web Services (AWS) — AWS Simple Storage Service (S3) — Backend as a service (BaaS)  
— Infrastructure as a service (IaaS) — Microsoft Azure Cloud Services — Oracle Service Cloud (Rightnow)  
— Platform as a service (PaaS) — Salesforce Service Cloud — ServiceNow — Software as a service (SaaS)  
— Storage as a service



Sources: Burning Glass; Deloitte analysis.

commercial industries. However, the private sector does not necessarily need to be considered a threat. The significant number of skilled cloud professionals in the private sector can also be a large resource that the public sector can tap. By shifting the lens from one of competition to one of ecosystem collaboration, government organizations can draw on a wider array of skills and experiences available in the private sector.

Finally, the focus on building cloud skills should not be limited to technology staff. The biggest challenges to digital transformation are often challenges with budgets, contracts, or other internal business processes.<sup>18</sup> With greater

knowledge about how cloud works, contracting staff can find novel and more cost-effective ways to buy needed resources, while financial management staff may be able to find new sources of funding to pay for cloud services such as software-specific appropriation categories.<sup>19</sup> Both contract and financial management staff can serve as cloud-first champions within an organization, helping prevent unnecessary spending on physical hardware if the cloud could meet a business need faster and cheaper. As a result, building basic cloud fluency among contracting and financial management staff can be a significant accelerator to getting the most out of cloud.



# Adapt the organization, don't just adopt technology

**A**S GOVERNMENT ORGANIZATIONS move into cloud and seek to apply cloud to their core missions, merely bolting the new technology onto existing processes will be of little use. To realize the true transformational benefits of cloud, organizations need to make adjustments to how business is done.<sup>20</sup> Government agencies should not just adopt cloud, but adapt themselves to cloud to get the most out of it.

Maryland's cloud-based human services network is a good example. MD THINK (Maryland's Total Human-services Information Network) is a cloud-based system created to break down data silos between agencies. It aimed to make data discoverable by creating a shared cloud platform with shared data repositories between the Department of Human Services (DHS), the Department of Juvenile Services, and the Department of Health to provide more seamless services for the state's neediest citizens.<sup>21</sup>

The platform reinvented technology in Maryland by moving 40+ applications, development environments, and data to the cloud.<sup>22</sup> The state used agile methodology to develop the new platform and moved applications to cloud in a phased manner by starting with long-term care in 2018. Over the next three years, the state moved applications for child welfare, cash assistance programs, SNAP, and child support.<sup>23</sup> But the

applications were not just lifted and shifted, i.e., physical servers' files were not simply copied to the virtual cloud environment. Instead, the state opted to develop a new core platform in MD THINK and applications were rearchitected, moved to cloud, and deployed in a phased manner.<sup>24</sup> For example, previously, child welfare caseworkers had to login to three different applications to access information about a case, and a simple lift and shift would have just moved the three applications to cloud with caseworkers still needing to access three systems. Hence, the state rebuilt one single integrated application, allowing for an entirely new

way of doing work for caseworkers.<sup>25</sup>

Deployment also considered the human factors in significantly shifting how business was done, using pilots to demonstrate success

and build demand from other agencies. For example, in October 2019, MD THINK's child welfare application was deployed as a pilot in Washington County, followed by Anne Arundel county in January 2020. Before the pilot, caseworkers would go to the field, take painstaking notes, and later come back to office and enter the same data in multiple systems. The pilot provided caseworkers with mobile devices, allowing them to add case information remotely in one system, and thus significantly reduced their paperwork burden. Other counties also jumped on the modernization bandwagon as they watched the caseworkers of these counties working remotely, entering data via

**Government agencies should not just adopt cloud, but adapt themselves to cloud to get the most out of it.**

their phones, and connecting through video conferences—all from the safety of their homes. “It was like a Eureka moment for all the other county directors,” says Subramanian Muniasamy, chief technology officer at Maryland DHS. “They realized MD THINK provided effective, efficient tools for responding to COVID-19, and then they wanted their applications implemented quickly too.”<sup>26</sup>

When government organizations are willing to adapt to new technologies, the benefits can continue to emerge over time as well. Once the initial five-year plan is implemented by 2022, MD THINK plans to onboard systems from agencies like labor, education, and natural resources. “We hope to expand beyond health and human services. That is our goal,” remarks Muniasamy.



# Getting started

**A**DAPTING THE TECHNOLOGY, processes, and structure of any organization can be difficult. So, what can government technology leaders do today to make sure the benefits of cloud that emerged during the pandemic do not evaporate?

- **Follow a road map and use a playbook.**

The first challenge facing CIOs in institutionalizing recent cloud gains is knowing what decisions need to be made. A road map can help chart where the organization is headed and how it wants to get there, as well as document the progress they have already made on that road map. This can help identify goals for how to use cloud to improve the mission, which legacy applications can and should be moved, and where roadblocks may emerge. For example, if an organization wants to move major applications to cloud, does it have the bandwidth available to handle those daily loads? Then, as issues such as those roadblocks emerge, a playbook can enable the organization to think through those issues in a systematic manner, helping to ensure that no major considerations are overlooked.

- **Assess the ecosystem.** Cloud is, by definition, a team sport; so, understanding who is or can be on an organization's team should be a key first step. This not only includes cloud service providers but providers across the tech stack including middleware, databases, hardware, and more. Even other government organizations with similar challenges or capabilities can be important nodes in an organization's ecosystem. Mapping out the ecosystem can not only accelerate a cloud journey by finding the needed resources, but

also helps organizations to do so more securely. Responsibility for different aspects of security can vary widely between different models of cloud offerings such as infrastructure-as-a-service to software-as-a-service. Gaining clarity on who in the ecosystem is responsible for what can help avoid any significant gaps that attackers can exploit.

- **Drive cloud governance into the business.**

If government organizations hope to use cloud to improve the mission, then mission leaders must be involved in decision-making from the start. This means not only including mission leaders in technology decisions from the start, but also making sure that structures like app stores and data-sharing agreements are in place so that one mission unit can benefit from the innovations of another. Finally, it also means using cloud itself to improve governance. Quantifying the overall cost and benefit of technology tools can be difficult, but usage data from cloud itself can often help in difficult budget decisions. Imposing cloud financial operations (FinOps) discipline on an organization can help bring clarity to costs and uncover the difficult-to-quantify mission benefits of cloud.<sup>27</sup> With the cloud success that many agencies saw firsthand during the pandemic, this can prove to be an easy starting ground for getting mission leaders' support for ongoing cloud initiatives.

- **Create pathways for people.** Attracting, training, and retaining the right talent is key to success in cloud. Having opportunities to grow and develop is among the top drivers of employee engagement. Organizations with stronger cultures of learning and development

have 30–50% higher retention rates than their peers.<sup>28</sup> However, these goals can often seem at odds with some personnel systems. Creating career pathways specifically for talent with cloud skills can help ensure that workers have the opportunity to grow and find new challenges without having to leave the organization.

We have entered the third era of cloud for government. This is both an exciting time, but also an uncertain one, as government leaders can

struggle with difficult decisions about where and how to make use of cloud. The good news is that the inherent flexibility and scalability of cloud makes it well-suited to handle many of government's toughest challenges. However, if agencies are to realize the most significant benefits cloud has to offer, they should not just adopt the technology, but also adapt their organizations to match. Doing so can help ensure that the best services reach citizens not just today, but for years to come.

# Appendix: Data sources and methodology

FEDERAL GOVERNMENT SPENDING data used in figures 1, 2, 4, and 5 was sourced from Bloomberg Government. To estimate Federal spending for different cloud use cases in figures 4 and 5, we analyzed the free text description fields describing the nature of each federal contract. Given the disparities in how these fields are populated, the numbers in figures 4 and 5 represent an intentional undercount so that the trends in each use case can be accurately reflected and are not overshadowed by unrelated trends that only happen to share similar keywords. To estimate the spending for the remainder of FY21

and account for a delay in spending data for defense and intelligence, we used an exponential smoothing model that considers trend and seasonal patterns.

The cloud-related skills data used in figure 6 was compiled from an expert-curated list of cloud-related skills using data drawn from Burning Glass and Deloitte's proprietary Human Capital Data Lake. To understand the trend over time, we analyzed the demand for those skills via job posting data from Burning Glass over the last decade.

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