

CITIES IN THE CLOUD

What City Leaders Need to Know
About Cloud Computing

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Introduction

THE WORLD IS becoming increasingly virtual. Cities, towns and villages are working hard to keep current with the latest hardware and software to provide the best services to their communities. The COVID-19 pandemic expedited this call to action for cities to take advantage of trends in government innovation and expand their digital services. Digital services not only became a “nice to have” for residents looking to get information or complete a transaction without going into City Hall, but also became a public health imperative to stop the spread of COVID-19 and enable city staff to work remotely. Some cities were well on their way to providing virtual services and benefitting from cloud computing prior to the pandemic. Many cities took the opportunity of pandemic-driven disruption to transition, or continue their transition, from on-premise to cloud-based solutions in order to be more responsive during a period of unique challenge. Other cities were unsure about how to get started in the cloud, even if they recognized the need.

Because technology is constantly evolving and there will always be challenges to navigate, city leaders need to stay informed about the benefits of modern solutions and approaches. This brief provides city leaders the information they need to know about cloud computing to better understand what decision makes the most sense for their organization. It defines cloud computing, explores why now may be the right time to invest in cloud computing and profiles cities that are successfully navigating this decision point between on-premise and cloud solutions.



Cloud computing is the hardware and software that delivers a service over internet.”

What is cloud computing?

CLOUD COMPUTING IS a relatively new concept, coined in 1996 by Compaq Computer technologists who were envisioning the future of the internet.¹ Most simply, cloud computing is the use of computing resources (hardware and software) that deliver a service over a network, typically the internet. Historically, cities relied on on-premise technology solutions to power operations. In this approach, an organization keeps its computing resources, managing them in-house or contracting with a third party for help. Now, with new cloud-enabled technologies that offer many benefits, cities have options and can decide what makes the most sense for their organization today as well as in the future.

The National Institute of Standards and Technology (NIST) defines cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.²

Cloud computing is a foundational change in how information technology resources are “invented, developed, deployed, scaled, updated, maintained and paid for.”³ Because computers are getting increasingly powerful, cloud computing enables users to use their computers to “rent” access to applications (or computer programs), to software development and deployment environments, and to computing infrastructure assets (e.g., networks, servers, etc.) instead of making upfront, long-term investments in this software and hardware.⁴ For city governments, cloud computing could mean a move away from large capital expenditures for IT infrastructure and maintenance.

End users of cloud-enabled technology solutions may not even realize they are using the cloud. This is likely the case for most city personnel. When employees log onto a website to access their email or calendar while working remotely, they are using a cloud-enabled solution. Developing and launching a new website with up-to-date COVID-19 response information can be a cloud-based solution. When residents pay a bill online, instead of in-person at city hall, they are likely using a cloud-enabled solution.

Breaking down the cloud

The cloud is not just one thing. Different cities use the cloud in different ways to achieve their operation and service goals. There are four different types of deployment models (ways for the cloud to be technically provided) and three types of service models (ways for the cloud to be used).

Deployment models

Let's define the four cloud deployment models, or ways for the cloud to be technically provided:⁵



Public cloud

Cloud (e.g., servers, storage, etc.) resources are owned and operated by a third-party cloud provider and delivered over the internet. These resources are shared with multiple organizations.



Private cloud

Cloud computing resources are used by only one organization but can be located on-site or hosted by a third-party cloud provider.



Hybrid cloud

This is a combination of two or more separate cloud environments (e.g., on-premises infrastructure – or a private cloud – with a public cloud) that are unique entities but are connected to enable data and application sharing.



Community cloud

Cloud computing resources are available for exclusive use by a specified community of users who have the same goals and requirements. The community cloud can be owned, managed and operated by one or more of the members of the community, a third-party provider, or some combination of them. It may exist on- or off-premise. This model is less frequently used, especially in the local government context.

Service models

Let's define the three service models, or ways for the cloud to be used:⁶



Infrastructure as a service

Infrastructure as a service (IaaS) is when foundational elements of information technology infrastructure (e.g., servers, virtual machines, storage, networks, operating systems) are hosted in the cloud, instead of on-premise, and managed by a cloud provider.

With IaaS, users can do a variety of things in the cloud from running a website or storing data, to managing identities and permissions and continuously monitoring performance and security standards. For example, a city information technology staff member could requisition additional server space to support the deployment of a building management control system that monitors energy use in city buildings.



Platform as a service

Platform as a service (PaaS) is an on-demand environment for developing, testing, delivering and managing software applications without managing the underlying infrastructure. PaaS provides the full scope of both software and infrastructure in one platform.

With PaaS, users can develop custom applications to meet specific needs, which may not be readily available or offered at an acceptable price point. For example, a city may want to share performance data with decision makers and the public at city council meetings. With PaaS, an information technology staff member with the right skills could quickly spin up an application using the PaaS infrastructure that takes data from a variety of systems and visualizes it in a way that the city council prefers.



Software as a service

Software as a service (SaaS) is the delivery of software applications over the internet, on demand and typically on a subscription basis.

With SaaS, users can do things like access their emails, calendars and documents, or perform myriad business operations. For example, city staff members could log into a desktop application or a website on their internet browser to review and approve building permit applications or determine eligibility for business license requests.



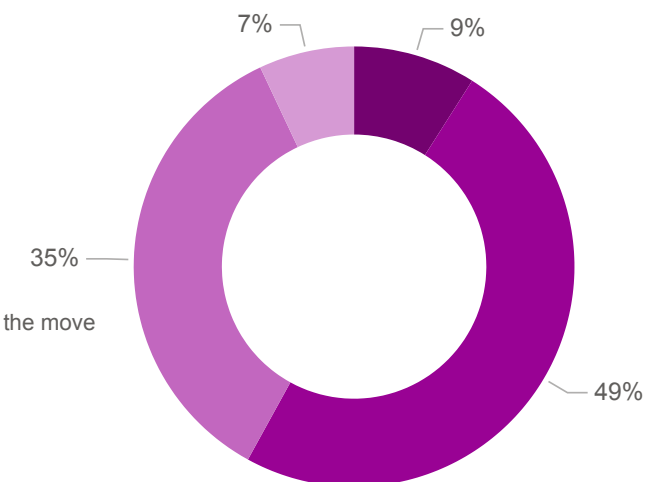
How are cities using the cloud?

IN RECENT YEARS, the cloud has become an increasingly popular choice for local governments looking to modernize their computing resources and improve operations. A 2020 survey with responses from 300 state and local government information technology decision makers found that 9 percent of states, counties and cities are using all cloud-based systems and solutions while 93 percent had at least some systems in the cloud.⁷

To what extent has your organization adopted the cloud?⁸

Question

- All systems and solutions are in the cloud
- Most systems and solutions are in the cloud
- Some systems and solutions are in the cloud, but not all
- No systems or solutions are in the cloud yet, but considering the move
- Would not consider adopting cloud services



For more information on the advantages and challenges of the three cloud computing services, consider CompTIA's blogs on the topics.

What is IaaS?

www.comptia.org/content/articles/what-is-iaas

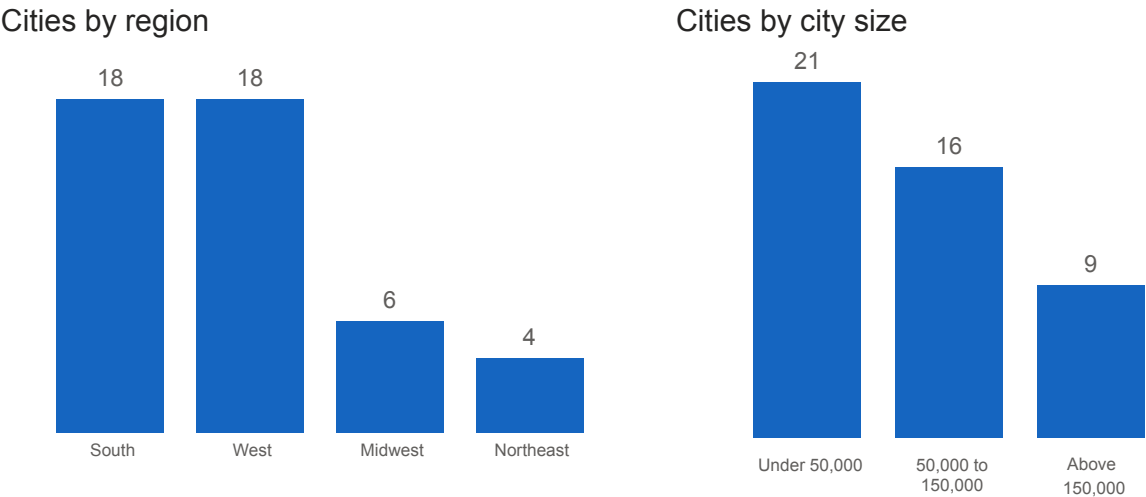
What is PaaS?

www.comptia.org/content/articles/what-is-paas

What is SaaS?

www.comptia.org/content/articles/what-is-saas

Cities in the cloud survey respondents



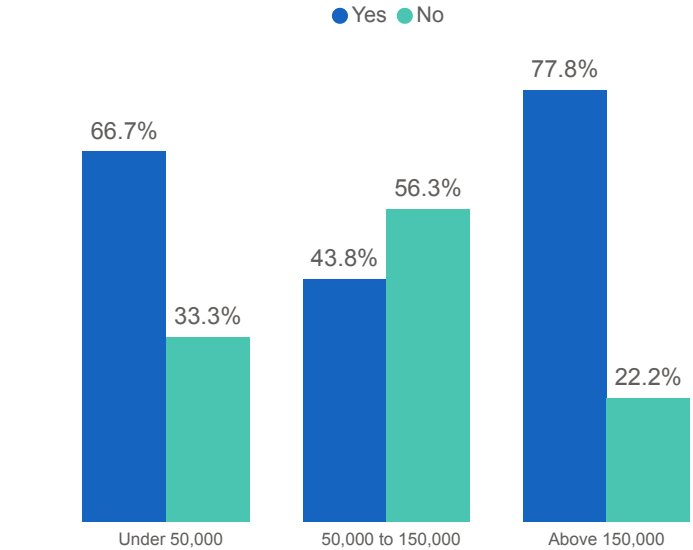
As part of CompTIA's 2021 National Survey of Local Government Cybersecurity and Cloud Initiatives, NLC surveyed city leaders to get additional insight into how cities are approaching cloud computing. Forty-six information technology professionals in cities across the U.S. responded with details on their approach to cloud computing and their perception of its opportunities and obstacles.

This research shows that cities are embracing and using cloud-enabled solutions. More than 60 percent of respondents stated that their cities are using cloud-based solutions. Thirty-nine percent are even planning to implement additional cloud-based solutions in the next 12 months. Cities of all sizes are increasing their investments in the cloud. Two-thirds of cities with populations of less than 50,000 residents are planning additional cloud investments. This reflects a larger shift in the information technology industry to cloud solutions. The capabilities and functionality of cloud-based solutions are agile and continually expanding, making them more attractive options for cities looking to better meet current and future challenges.

Is your organization using cloud computing?

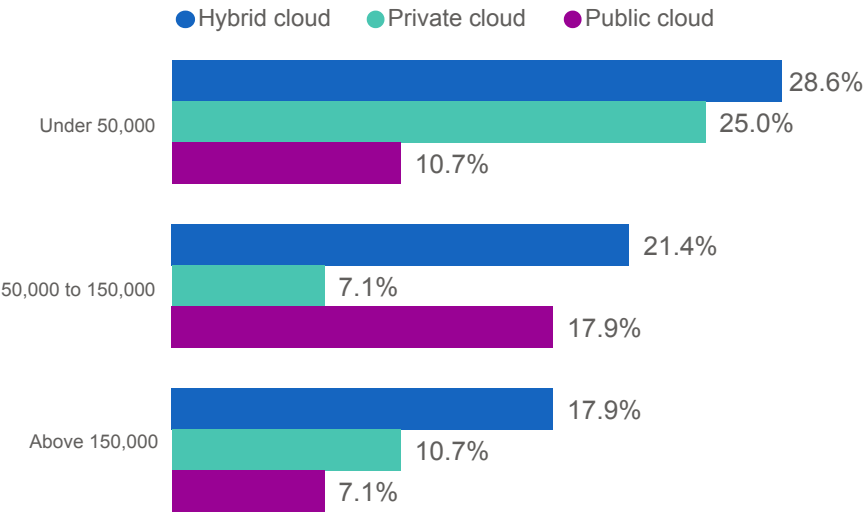


Are you planning for a cloud computing implementation in the next 12 months?



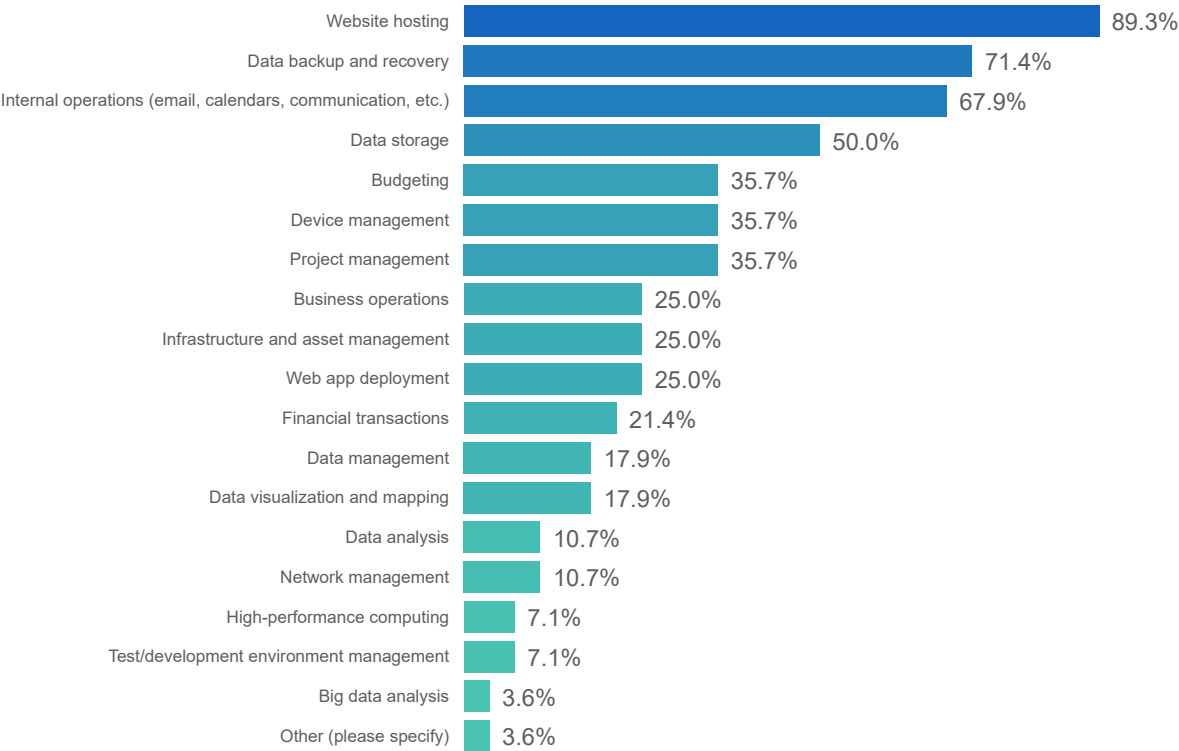
Although cloud use is increasing in local government, the ways in which cities are using the cloud vary. Two-thirds of cities are using a hybrid cloud model, a combination of two or more separate cloud environments that are unique entities but are connected to enable data and application sharing or a mix of on-premise and hosted cloud environments. This prioritization of the hybrid cloud and shift away from private cloud solutions where only one organization is using the infrastructure reflects a greater comfort with cloud solutions overall. City leaders' trust in the cloud and its security is growing so cities are increasingly open to benefiting from cost savings associated with multiple organizations using the same physical cloud infrastructure.

What type of cloud deployment is your organization using?



Cities are most frequently investing in infrastructure as a service and software as a service cloud solutions. A majority of cities are using these solutions for a few key operations: website hosting, data backup and recovery, and internal operations like email, calendars and communication. Very few have tapped into the full potential of cloud computing for more efficient operations and enhanced public engagement, among other benefits. Although many solutions are technically feasible in on-premise environments, they could be easier to adopt in the cloud, in addition to providing improved remote access and better data security. Solution providers are focusing their efforts on making sure the cloud solutions are scalable, agile and will meet current as well as future needs. Moving to the cloud is not just about choosing new technology, it is about choosing a long-term vision for smarter operations and better service. As cloud solutions continue to grow, city leaders will no doubt expand the ways in which their organizations use the cloud.

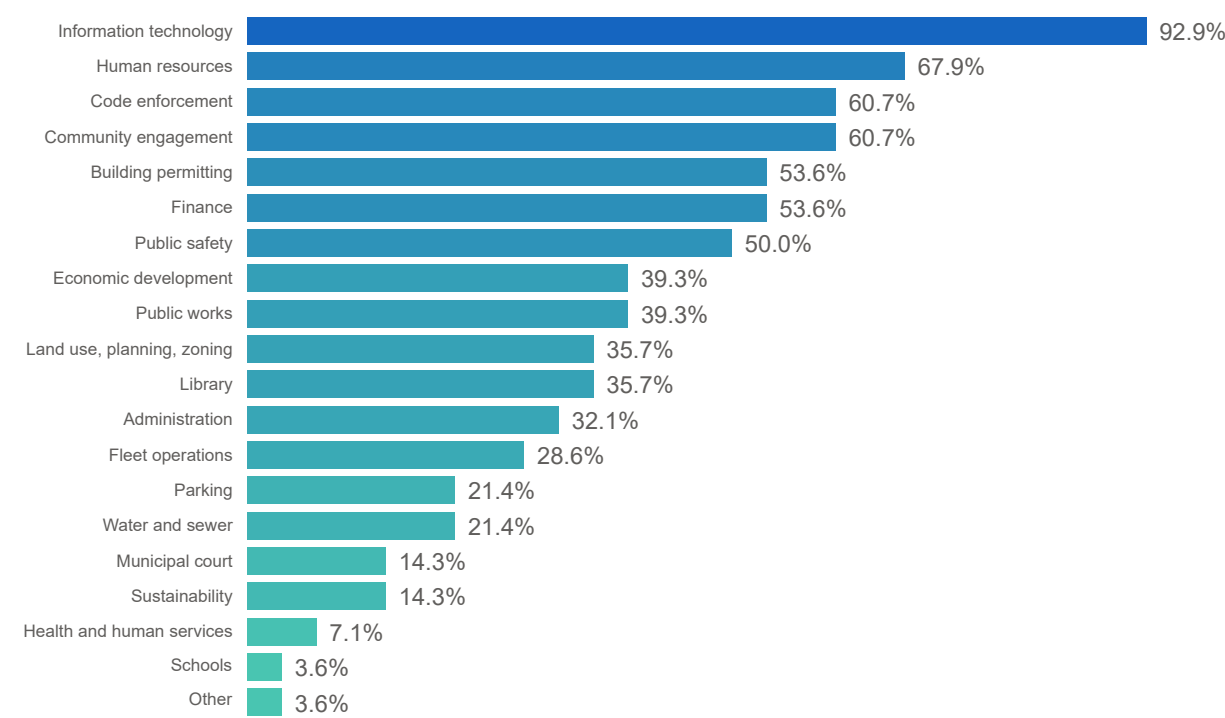
In what ways has your organization invested in the cloud?



Today, cloud-enabled solutions are primarily used in a few key areas in cities: information technology, human resources, code enforcement, community engagement, building permitting and finance. Cities with populations of more than 150,000 residents are more likely to use the cloud for information technology and community engagement (both 78 percent). Cities of 50,000 to 150,000 use the cloud for information technology, human resources and finance (all 38 percent). Cities with fewer than 50,000 residents use the cloud for information technology (62 percent).

The focus on cloud solutions for community engagement, in particular, will continue to grow. Cities are steadily investing in open data portals and performance management platforms, which are mainly cloud-based, to promote transparency and accountability with the public. Cities have been quick to adopt these community engagement solutions. In 2010, Chicago, IL, launched what is believed to be the first city open data portal in the U.S.⁹ A 2019 survey found that 266 U.S. cities provide data publicly.¹⁰ During the COVID-19 pandemic, city leaders used these community engagement tools to communicate with residents and demonstrate their response. Community engagement tools have come to be the norm in government service provision and are likely the next area for widespread adoption in cities.

What areas of your organization are using cloud computing?



Deciding to invest in the cloud

There is no one-size-fits-all solution or right way to invest in the cloud. Cities decide to invest in cloud computing for a variety of reasons. Depending on the needs of the organization, an opportunity that cloud computing can bring to one city could be an obstacle for another. CompTIA's 2021 National Survey of Local Government Cybersecurity and Cloud Initiatives asked local leaders why they are not using or considering cloud computing.¹¹ Responses came down to two main reasons:



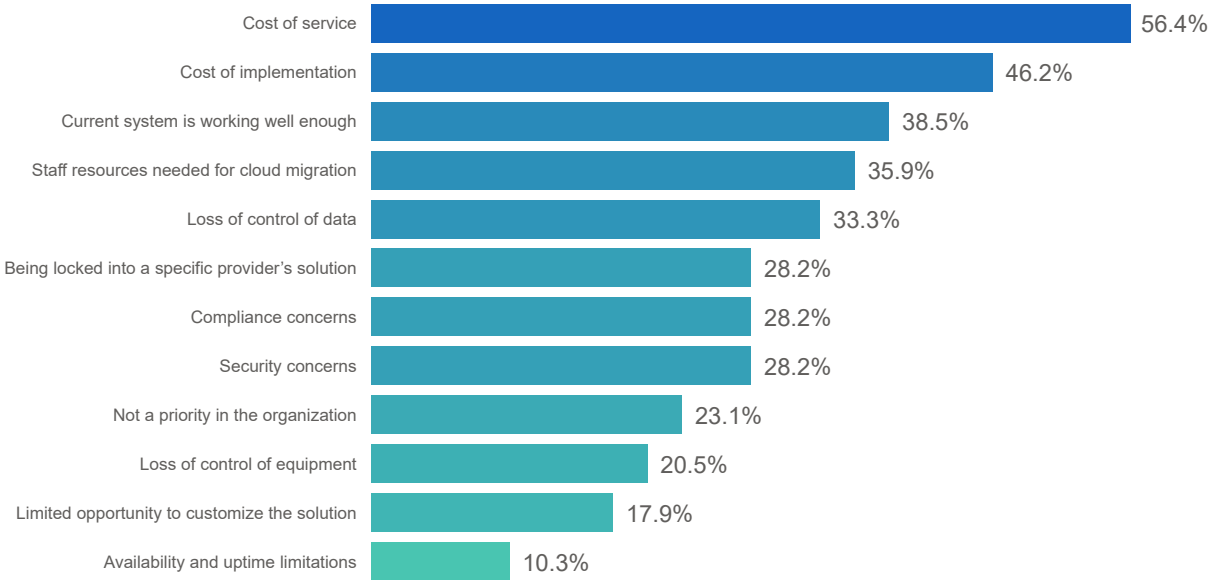
Cost



Cybersecurity

This section will explore these reasons and how they can either be opportunities or obstacles depending on a city's needs.

Why is your city not using, or considering, cloud computing?





Cost

Depending on current systems and processes and the type of investments an organization is looking to make, cloud computing solutions can either bring cost savings or end up being more costly than current on-premise solutions. Here are the common cost responses city leaders give when explaining their reasons for investing in the cloud or not.

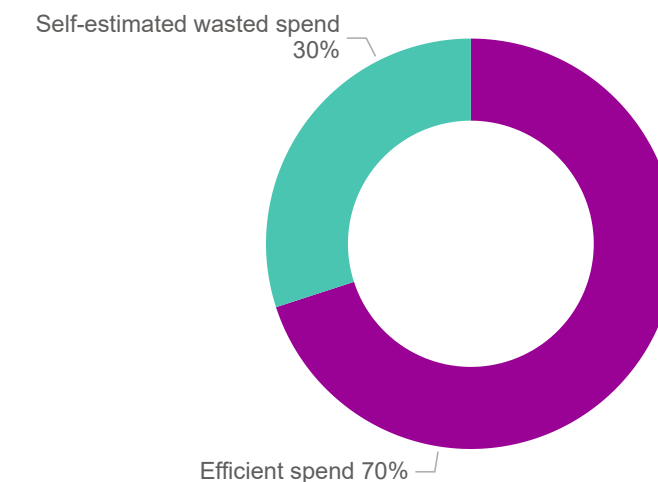
Cost savings

- ◆ **Lower IT operational costs:** Because data and processing happen in the cloud, costs associated with the delivery of information technology services can be lower. Sometimes costs are removed altogether (e.g., renting of physical space, installation of on-premise equipment), while other costs are significantly lessened (e.g., equipment, software licensing fees). Third-party cloud providers frequently provide technical support, so these costs are included in service agreements instead of additional expenses.
- ◆ **Lower IT maintenance costs:** For cloud solutions, the third-party provider handles replacing outdated equipment and installing updates and patches. This means information technology professionals are able to focus on other organizational priorities instead of maintaining or upgrading current systems.
- ◆ **More predictable overall costs:** Most cloud solutions are purchased as subscriptions or pay-as-you-go. This enables cities to predict their monthly expenditures and gives them the ability to reduce services if demand lowers or if they only require certain capabilities.

Increased costs

- ◆ **Higher staff training costs:** Because cloud-based solutions are newer and sometimes require a learning curve for different information technology skills, implementing these solutions can lead to higher staff training costs. Although these are generally one-time expenses for professional development, it is important to keep them in mind when planning for cloud transitions.
- ◆ **Costs of migration:** Migrating computer resources to the cloud can be labor intensive. Increased staff capacity (e.g., hiring of temporary contractors for implementation or project management, overtime for current staff, etc.) is generally needed for cloud migrations.
- ◆ **Potential for overspend:** Although cities are able to control the amount of resources they are using for cloud-based solutions, most cloud users do not adjust their subscriptions frequently enough to see these benefits. A 2021 state of the cloud report found that 24 percent of survey respondents were spending more than originally budgeted for cloud solutions while 30 percent stated that their organizations are spending funds on cloud capabilities that are unused or underused.¹²

How effective is your organizational spending on cloud resources?





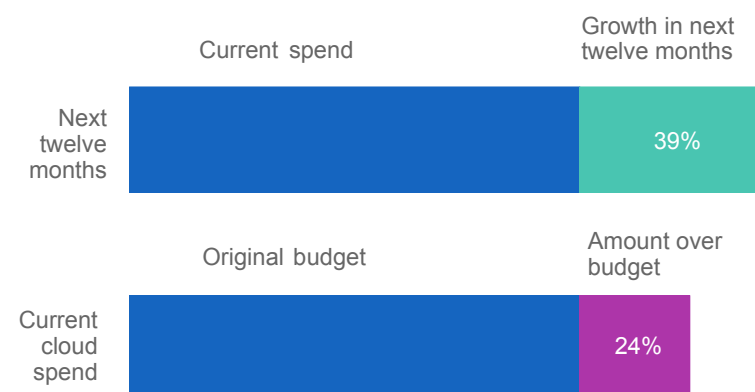
Cybersecurity

Depending on the needs of an organization, the type of data it generates and its core operations, cybersecurity, actual and perceived, can be a reason that cities use cloud-based solutions or would prefer to keep their systems on-premise. Here are the common cybersecurity responses city leaders give when explaining their reasons for investing in the cloud or not.

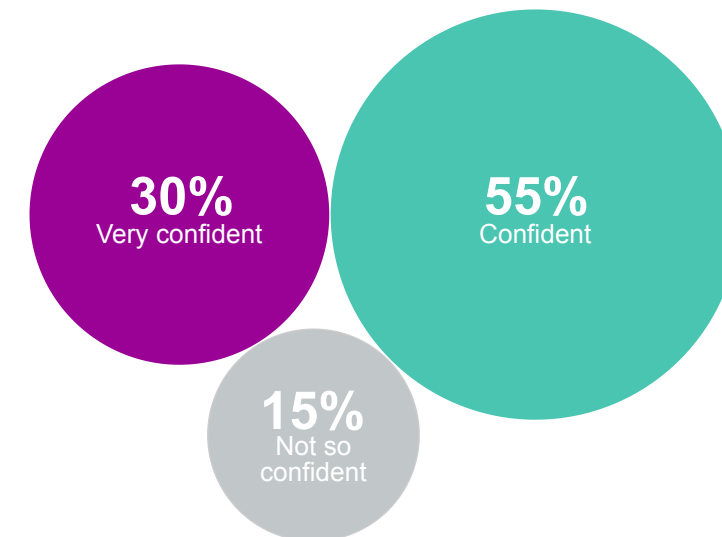
Security assurances

- ◆ **Disaster recovery and backup:** Cloud providers run large data centers around the world with the ability to shift usage between centers when demand surges or disaster hits (e.g., power outages, extreme weather). The cloud keeps computing resources backed up externally so no matter what is going on at city hall, a jurisdiction's information is safe. Because of these resources, cloud providers can be better positioned to respond to and recover information.
- ◆ **Cybersecurity safeguards:** Cloud providers invest heavily in security technology and expertise; much more so than many cities are able to on their own. This attention and proficiency mean that cloud computing has the potential to minimize the cybersecurity burden on cities. Depending on the type of service purchased and the specific contract, customers can arrange for the provider to cover technical elements cybersecurity protections are beyond their technological or staff capacity. A survey of city information technology leaders found that 85 percent were confident in the security of their cloud services.

Organizational spend on public cloud



For the cloud services you use, how confident are you about their security?



Security concerns

- ◆ **Loss of control of equipment and data:** Sensitive or private data is frequently shared with local governments. Data protection is of primary importance when it comes to cities' use of the cloud. Unless contracts with cloud providers give cities explicit access to their data, city leaders may have concerns moving forward with these solutions. Some organizations prefer to keep systems and data on-premise because they feel this gives them more control of their equipment and data.
- ◆ **Compliance concerns:** Although cloud providers are responsible for protecting the infrastructure that runs the cloud solutions, cities are always responsible for compliance with any regulations. Cloud adoption can amplify compliance challenges. Some cloud applications lack controls that meet the stringent requirements of government. Others require new skills or processes to confirm that cloud solutions are meeting compliance standards. At the same time, many cloud solution providers are increasing compliance and regulation standards to keep pace with regulatory needs.



Focusing on public accountability in Dumfries, VA

THE TOWN OF Dumfries, VA, knows how to seize an opportunity. For several years, town leaders sought to enhance transparency and find new ways to engage with residents. The COVID-19 pandemic made it even more important to leaders to increase the town's online presence and decrease the stress of residents by providing more insight and access to digital services. Dumfries was able to leverage funds from the Coronavirus Aid, Relief and Economic Security (CARES) Act to invest in cloud computing, launching an open data portal and digital performance management platform in May 2021.¹³

According to Town Manager Keith Rogers, Jr., the open data portal is delivering on its promise of strengthening accountability and improving government operations. The online portal not only surfaces data on operations and performance, but it also translates those datapoints into visualizations for the community.¹⁴ Town leaders are looking to this cloud computing solution to provide opportunities for more community engagement. Dumfries is interested in soliciting community feedback on the data and visualizations it is currently sharing to determine what other datasets residents and businesses would like to have.

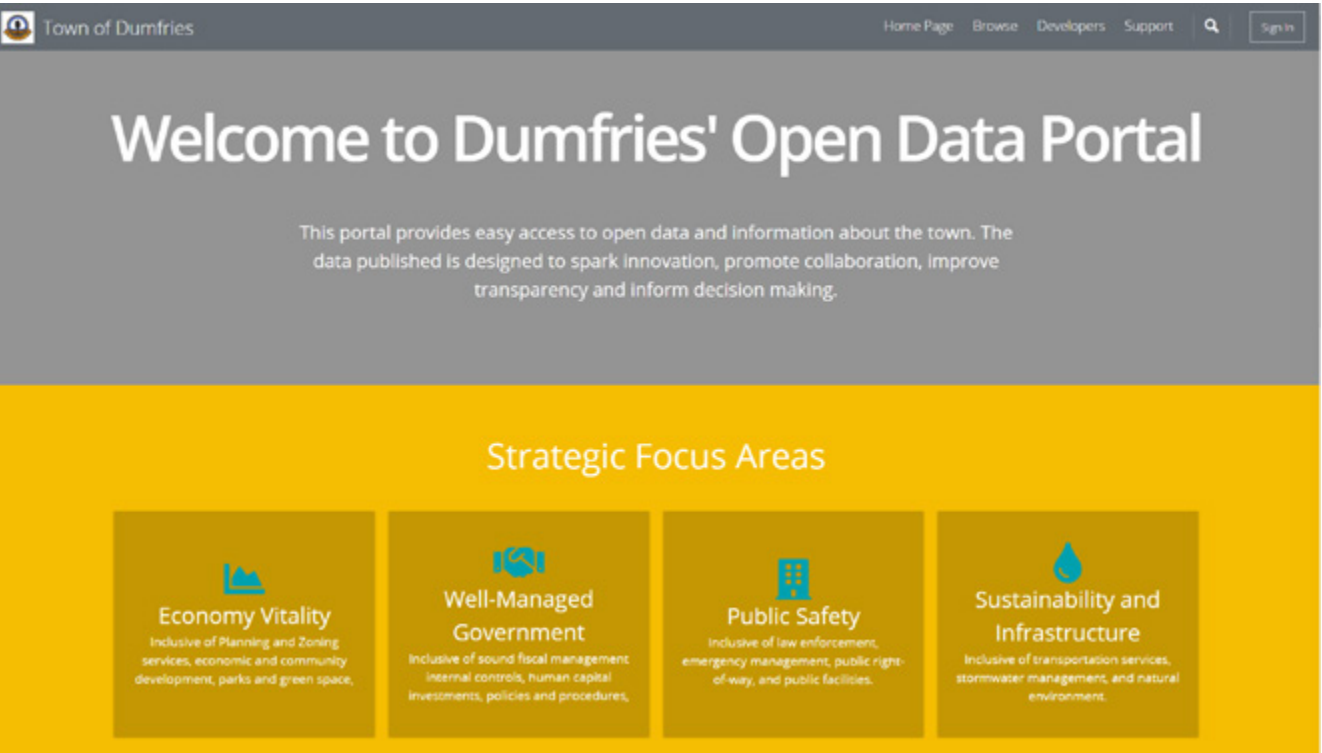
The launch of this tool would not have been possible without the town manager's previous experience transitioning to a cloud computing solution and the willingness of town staff to put in the needed time during implementation. It is noteworthy that this implementation was successfully completed while staff also managed the hectic day-to-day COVID-19 pandemic response. Dumfries' management analyst took the lead in building relationships with the technology provider, collecting the data from departments and troubleshooting challenges.

The more time Dumfries invested in getting good data into the portal on the front end, the more time savings they realized on the back end. When town leaders go to speak with the community or present to town council, they can more easily access the information they need through the open data

portal. Instead of relying on anecdotes to make decisions, town leaders are now utilizing current, accurate data to track performance and inform policy. Residents have been particularly interested in public safety. Now, when the police chief attends neighborhood meetings, he can quickly pull together up-to-date data on calls for service that are specific to that area of the town and dispel any misperceptions around safety with actual numbers.

The biggest challenge has been migrating data from the town's disparate systems into the cloud solution. Because different departments utilize different software systems, dedicated time and effort is required from key staff members to get the necessary information into the open data platform. Dumfries staff understand the importance of this work and how it supports wider city goals. Although updating the portal with new information is still a manual process, Dumfries is working on getting the systems in place to automate this work.

As a town with a population of approximately 6,000 residents with 30 full-time staff members, Dumfries shows that local governments of all sizes can reap the benefits of cloud computing solutions. When organizational goals are aligned with technology procurements, these tools can become an immediate asset for the entire community.





Working smarter in Jersey Village, TX

THE CITY OF Jersey Village, TX, is well on its way to embracing the cloud. The city is taking a measured approach in its transition to and adoption of cloud computing solutions. City leaders see cloud computing as the best way to ensure the IT department can spend less time on maintenance and more time supporting other departments and improving government operations and customer experience.

Jersey Village spent the last several years transitioning current solutions to the cloud. The city manager championed this move when, in 2017, he and the IT department began considering the advantages it could bring to the city. Most recently, those advantages have come in the form of productivity tools for communications, calendaring, and document collaboration and sharing. The COVID-19 pandemic expedited the transition to these technology tools as many city staff members began working remotely and needed access to their data and software to continue serving the community. The tools also facilitated their ability to communicate with each other and the public through video conferencing.

Because Jersey Village is a smaller municipal government, it does not have a large data center. Before investing in cloud computing solutions, the IT department was managing fewer than 20 servers and did not have significant storage requirements. These factors made it easier for the city to gradually transition parts of its operations to the cloud in a staged approach. Jersey Village waited to begin the phased in approach of moving to the cloud until the costs began to decrease and the city could build these expenses into the budgeting process. Now, cloud computing solutions are prioritized in new IT purchases.

This move to the cloud was not an immediate cost savings for the city. However, it did bring other benefits that made it a worthwhile investment. Having the city's data available on-demand and accessible to staff paired with the ease with which IT can upgrade the infrastructure as needed improved insight and efficiency, benefits that made the cloud the right choice for Jersey Village. Cloud solutions also addressed many of the network speed and bandwidth issues the city was experiencing when many staff members were using virtual private networks (VPNs) to access on-premise data and software.

Even though the initial transition to the cloud can be time intensive, the IT department remains eager to help other departments with this work. The IT staff members find that cloud-enabled solutions provide a much better user experience with more functionality than the legacy on-premise solutions they were using. City staff and community members are empowered by new self-service options and features that add convenience and save time. IT leaders are also assisting several departments, including Parks and Recreation, Human Resources and Public Works, in moving their systems from on-premise to the cloud in the near term.

The city's only regret is not starting the transition to the cloud earlier. This work takes time to not only physically complete, but it also takes time to get city staff buy-in. Because the COVID-19 pandemic expedited the city's implementation of cloud-based solutions, IT and other frontline staff members did not have the level of training they may have otherwise preferred. Even so, leaders and staff of Jersey Village are glad the city made the investment in cloud computing when it did, and stakeholders continue to explore new service areas and programs that will also benefit from these solutions.

“

The cloud ends up giving us the value we're looking for especially on the customer-facing side. It allows us to work smarter.”

Bob Blevins, IT Director





Choosing cloud solutions carefully in Portland, ME

THE CITY OF Portland, ME, found a balance between cloud-based applications and on-premise technology solutions. The city adopted cloud-based productivity tools five years ago, but also maintains core systems on-premise to support many lines of business including finance, human resources, permitting and inspections, and public safety. Like many other cities, Portland's technology upgrades began with a push from the executive department. The city manager and finance director believed in the increased efficiency and functionality of tools in the cloud. They wanted to bring the city up to speed with the latest innovative technology even if it took time to realize cost savings.

The city uses cloud-based applications for its productivity and collaboration tools, for example, email, calendaring, document creation and editing, and more. Portland had a goal to be premise agnostic for computer endpoints by 2022, meaning that city staff can log into a secure workplace environment and work from a web browser on any computer from any location. The COVID-19 pandemic accelerated this work. Today, many city staff are able to work remotely because of these cloud-enabled solutions. To encourage department heads to continue to embrace the cloud-based technology tools and realize their benefits, the IT department passes on individual licensing costs for on-premise solutions to each department.

For Portland, achieving a balance between operating and capital expenditures was a driving force behind the decision to use both cloud-based and on-premise solutions. Servers and switches have a finite, expected life cycle. The IT department prefers the predictability of the costs of these on-premise solutions in the near term while planning for longer-term investments in hardware and software.

It is important to Portland that IT staff have the ability to support both cloud and on-premise solutions. The cloud-based solutions do not eliminate the need for all physical IT infrastructure. The IT department still must invest in firewalls, switches and wireless networks. Additionally, system administration of the cloud



requires a different skillset than for on-premise support. The city has taken a measured approach to professional development in this area so that staff are able to build new skills and ensure security practices across all types of solutions.

Currently, the city is most comfortable managing a majority of its operational data in on-premise solutions. There is a high desire for full visibility and control over its own data and processes. The IT department believes that because the city operates its own servers, it can more easily evaluate and verify security measures without going through a third party. The city is open to considering how cloud computing could support its cybersecurity goals in the future.

Thus far, the city has been pleased with its hybrid experience. During the initial rollout, the city staff felt well prepared and supported by their cloud provider with training materials, hands-on training sessions and overall thoughtful project management of the implementation. The training and support continue today as the IT department helps staff members familiarize themselves with other features of the productivity tools that will make their work easier. As far as Portland's advice for others, the information technology department emphasizes careful planning for on-premise and cloud-based solutions to ensure the organization is getting what it needs from its investments and making the most cost-effective choice. In particular, Portland recommends taking a careful look at all costs associated with purchases, needed staff training to support this new way of working and strong contract language to ensure that a city always has direct access to its systems and data.





Saving valuable staff time in Buffalo, NY

FOR THE CITY of Buffalo, NY, executive buy-in was key to moving forward quickly and capitalizing on the benefits of cloud-enabled solutions. The city first embraced cloud computing in 2017 with the rollout of a new website, and today runs ten cloud-based applications. The city's Executive Office prioritized the transition to the cloud as part of its open data program, initially started in 2016 with Bloomberg's What Works Cities Initiative. As part of that initiative, the city committed to drafting an open data policy and procuring software for an open data portal.¹⁵ City leaders were pleased with the functionality of this cloud-based solution and its ability to provide the public with millions of rows of data to download, visualize, filter and utilize in other formats or applications. They also appreciated the low level of maintenance it required, a quality that provided savings for one of the most precious city resources: staff time.

Buffalo's Use of SaaS in the Cloud



Open Data



Workplace Productivity



Information Technology Service Management



Wi-Fi-Routing and Security



City Website



Fleet Tracking



Emergency Notification Service



Traffic Violation



Online Payment Portal

The positive results of the open data portal confirmed what city officials suspected: shifting to the cloud would help the city provide better, faster and more secure information to residents and city staff alike. IT leaders continued to focus on cloud-based solutions that required less maintenance and had staff buy-in to ensure future support of these tools across the organization. Because the city's IT office could rely on the solution provider to run automated software updates and patches, the IT department had fewer worries about maintaining these systems themselves. An added plus was the lack of down-time for system maintenance. Initially the thought of losing direct control over their applications sparked some concern among the city's software developers. This was assuaged by the knowledge that cloud providers take comprehensive cybersecurity measures, rendering the city's data much more secure.

To promote seamless transitions when the city moves a department's operations to a cloud-based application, the IT department found that getting training to City Hall early on in the process helped staff feel comfortable with the new technology and highlighted its benefits for them. Most cloud technologies are intuitive and familiar. They are similar to applications that people use in their personal lives for communicating, gathering information and shopping. This meant that Buffalo's IT office did not have to work too hard to help its colleagues get the hang of using these new software solutions and did not need to invest in any additional technical training for IT staff. The city intentionally selected solutions that were especially user-friendly and found themselves pleasantly surprised by how easily the transitions went.

The IT office also focuses on cloud computing solutions that meet the requirements of the departments that will be using them and are flexible, low-code tools that enable departments to do some of their own application building and customization. By keeping these priorities at the forefront of selecting cloud-enabled solutions, the city can further alleviate the support burden placed on its IT staff.

Fortunately for Buffalo's staff and residents, City Hall was already well underway with its implementation of and transition to cloud-based applications and productivity tools when the COVID-19 pandemic hit. City staff found they were able to swiftly support the entire staff transitioning to remote work overnight, allowing for a near seamless continuation of city processes during an otherwise chaotic time.

With a largely successful transition to the cloud the City of Buffalo only has a few words of advice for other cities looking to adopt cloud-based technology. Specifically, a city must have explicit access to its own data in any contracts with service providers. This access should be direct to the raw data and through an API; not hidden behind a reporting system. Having access to the primary data ensures a city can provide information to its residents and reap the benefits of cloud computing solutions.

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Whether it's open data or moving to other cloud-based technologies, my advice would be to determine the goals of your administration and then determine what cloud-based technology can support those goals moving forward.”

Kirk McLean, Director of Open Data and Chief of Staff to the CIO



Conclusion

IT IS CLEAR that cloud-enabled solutions are here to stay in local government. A survey of city information technology professionals showed that more than 60 percent are using the cloud, while almost 40 percent are making additional investments in cloud solutions in the next year. As cities, towns and villages look to benefit from advances in technology, many are considering cloud computing. The cloud has many important benefits: It enables remote work for city employees, provides residents the opportunity to interact better with their local government, connects departments to promote collaboration and ensures that information technology goals are reached. The cloud can also save money over time, provide enhanced data security and provide agile solutions so that governments can easily weather whatever challenges arise next. However, there are also key cost and cybersecurity considerations cities must navigate with each decision to transition to the cloud.

With the foundational knowledge about cloud computing found in this report, city leaders can become more involved in conversations about the critical intersection between technology investments and strategic operational and service goals. Cities have choices when it comes to their technical solutions, and communities will be best served by leaders who are knowledgeable and proactive in this area.



Endnotes

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