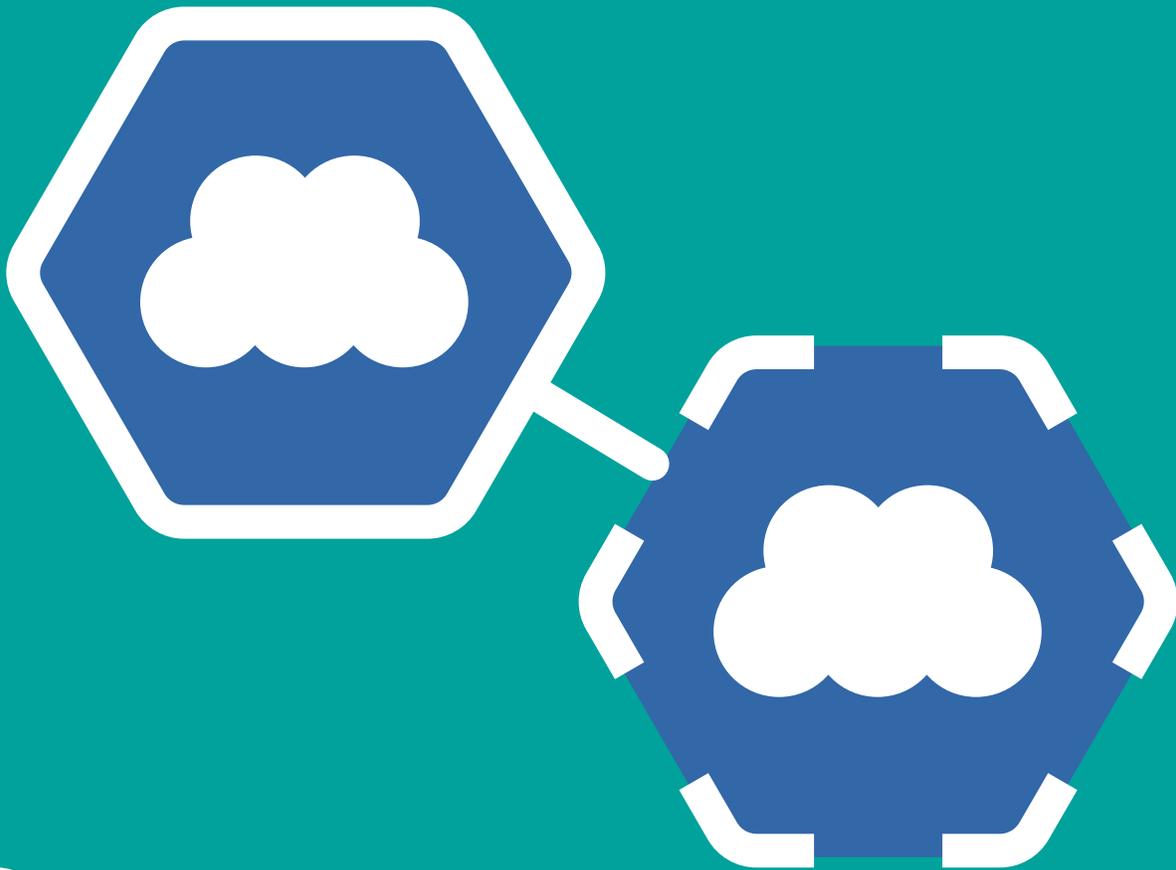


# Modernizing Applications to Improve Government Services

Industry Perspective



# Introduction

Expectations for government agencies are rising at a rapid and sometimes overwhelming pace. New laws, mandates and policies combined with rising citizen demands for usability and technology driven services put pressure on the public sector to deliver with current or even shrinking resources.

To provide modern services, government agencies need to become adept at building and delivering new capabilities with speed and in ways that increase efficiency and save money. This includes modernizing mission critical legacy applications.

One way to overcome these challenges is through application modernization, the process of updating legacy applications with modern IT practices to deliver on current business and mission needs.

Successful application modernization efforts deliver a foundation for continuous on-going application transformation and avoids stumbling from old legacy to new legacy. The following three capabilities enable that success:

- 1. A flexible and scalable platform that can respond to changing demands.**
- 2. An open architecture that enables access to emerging technologies and prevents lock-in to proprietary services and software.**
- 3. A platform that can extend and support the transformation of existing applications while also serving as a platform for future innovation.**

To leverage existing applications, securely manage sensitive data and access innovative technologies, agencies are increasingly using hybrid cloud approaches for application modernization. A [recent Gartner survey](#) found 75 percent of federal IT managers plan to implement a hybrid cloud solution, and adoption of hybrid cloud has increased by 13 percent year to year.

To help agencies successfully modernize their applications with hybrid cloud approaches, GovLoop partnered with IBM for this report. In it, we explore the challenges and benefits agencies face as they modernize their applications. We also hear insights from IBM leaders, including Periasamy Girirajan, Executive IT Architect, Cloud Solutions; Elliott Aten, Director, State and Local Government; and Vikram Gulati, Product Manager, Application Modernization.

# The Challenge

## *The Difficulty of Application Modernization in a Legacy IT World*

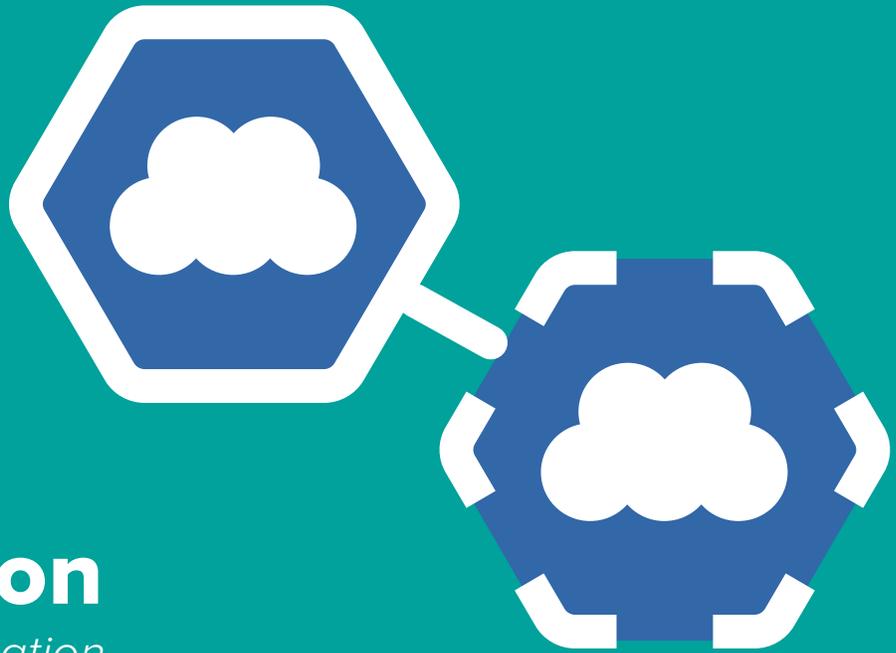
As agencies face tightening budgets, rapidly increasing amounts of data to manage and analyze, and growing demands for digital services, they're thinking differently about how their IT infrastructure can respond to improve service delivery to employees and citizens.

“Historically speaking, many applications in government were built using a monolithic architecture that now have difficulty adapting,” said Elliott Aten, Director, State and Local Government, IBM. “That’s why modernizing is critical now for agencies. It allows them to incorporate new functionality, be more agile, more scalable, all of which improves their ability to deliver services to citizens.”

Over the last decade, government agencies of all sizes have begun adopting cloud technologies. Email, productivity tools and public facing websites have been the initial cloud-based applications used by agencies. But modernizing legacy, mission-critical applications is challenging. Updating a mission-critical application with ever present data privacy needs and security requirements has complex dependencies which must be well understood.

“The timeline to deliver even a small change in a legacy application can be significant because the ripple effect is very, very high in a monolith architecture,” said Periasamy Girirajan, Executive IT Architect, Cloud Solutions, IBM. “Add in concerns about the sensitivity of data that government collects, and it can be not only difficult but unwise to modernize applications too quickly and without a clear strategy.”

Additionally, many agencies’ IT systems were built using older technologies and proprietary platforms. Agencies need to think of application modernization as part of their cloud journey. Like any journey, one begins knowing the destination and problem being solved, whether that’s an IT problem or new functionality for users.



# The Solution

## *Application Modernization with Hybrid Cloud*

Succeeding in this new world of government IT requires agencies to embark on a journey to unlock innovation. One benefit of hybrid cloud platforms is how they enable agencies to integrate existing on-premise investments with cloud services, such as analytics and artificial intelligence. The result: innovation that provides the agility, time to value and efficiency necessary for government today.

But government won't get the complete benefits of hybrid cloud technology until they address legacy, monolithic applications that have been designed or configured to run on a specific system. To break down monolithic apps and prepare them for cloud deployment, agency development teams can turn to containers and microservices.

Microservices and containers are a fast-emerging industry standard that give agencies flexibility and portability to move data and workloads in and out of different clouds, to deploy more quickly, and to consistently manage applications and data across environments, including on-premises and private and public cloud technologies.

“What hybrid cloud really enables you to do is deploy an application's component parts to the ideal environments. This could mean leaving some components on-prem and moving others to private and/or public clouds. These component pieces run inside containers on a hybrid platform. This allows you to make iterative changes to different parts of the application without worrying that the

whole thing will come down,” explained Vikram Gulati, Product Manager, Application Modernization, IBM.

As agencies look to modernize by moving applications to the cloud, they may determine that the right path is to incrementally unbundle monolithic applications into their logical components, turning them into microservices, and managing them all through a container platform, like Kubernetes.

By separating out the different tasks an application provides into microservices, agencies decrease risk by being able to upgrade and fix applications one logical piece at a time. They can also gain efficiencies by deploying services that can then be shared by many applications, rather than needing to develop duplicate services for each application.

A hybrid cloud approach enables agencies to continue generating value from existing investments by delivering cloud capabilities on premise, sharing common services across applications and securely integrating with other environments. As agencies take these steps, they build up skills and processes that enable the agency to perform effectively with cloud native tools and processes.

# Best Practices for Application Modernization via the Hybrid Cloud

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## 1. Inventory the applications you have

Modernizing your applications starts with identifying and classifying what you have — which apps should stay on prem? Which should be upgraded or moved to the cloud? Should any be sunset? Engage with stakeholders to help prioritize what to do first and document the mission impact and ROI.



## 2. Prioritize applications

Make sure to order applications for modernization in terms of importance to the mission, ease of moving to the hybrid cloud, and cost. Using a ranking system, you can then determine which applications should take priority over others and even determine which applications should not be moved or replaced.



## 3. Analyze applications with an understanding of the workloads involved

With this information, you'll be ready to make an informed decision on what changes each application requires and what approach will work best when rehosting on a hybrid cloud.



## 4. Take culture into account

Modernizing applications to a hybrid cloud environment can change the relationship between development and operations teams. With so many moving parts, integration is critical. Work to foster a culture of autonomous, cross-functional teams with approaches such as the agile methodology, which supports shared responsibility, shared decision-making, trust and collaboration.



## 5. Work with a trusted vendor to help you make the journey

Having the right partner to help you craft a hybrid cloud architecture that can easily adapt to the changing needs of your agency is essential. Your vendor must have a platform built on open standards that can accelerate deployment while minimizing disruption and enable openness while ensuring the highest security.



Emergency management officials in most states would welcome the opportunity to modernize the way they manage emergency vehicles. Particularly important is being able to predict where hundreds if not thousands of pieces of equipment (boats, trucks, plows, etc.) will be needed most.

These assets are typically stored, managed and tracked by multiple agencies. When one part of the state is preparing for a natural disaster, or something occurs with less notice, like fires or flash floods, officials need to know what assets are available, where the assets are and if they're ready. Most current systems used by states provide a dashboard view of where assets are. But this often requires manual updating and does not provide a real time view. For example, if a piece of equipment is in maintenance and the information has not yet been submitted to the central system, it would appear to officials in other agencies as available. Valuable time would be wasted searching for it.

Dashboard systems are also not designed to incorporate external information like weather and social media to create predictive models. These models can provide advance recommendations of actions to get assets where

they needed to be. State and local governments need to eliminate data silos that prevent better communication between agencies and answer the question: do I have enough certified, ready for use equipment available and if not, where is the closest location to get that equipment?

This challenge can be addressed by modernizing asset management applications with a hybrid cloud platform approach. Since some data may need to remain behind an agency's firewall, analytics services accessed through a private cloud enables each agency to maintain their existing asset management system while virtually, and automatically, using each agency's data to create a real-time virtual data lake.

Meta data can be added and end to end analytics to enable discovery of patterns and anomalies. Importantly, through application modernization secure access is provided through APIs to external sources, like weather and social media. By combining these external data sources, analytic models can run on the data lake, bringing actionable insight to forecast the best place for emergency equipment to be at any given time.

## How IBM Helps

IBM offers several tools and strategies that can help public sector organizations modernize applications using proven methods tailored to their unique needs.

The [IBM Cloud](#) is a FedRAMP-certified full-stack cloud platform spanning public, private and hybrid environments. IBM Cloud is built on open standards and enables agencies to serve citizens with a robust suite of advanced data and AI tools.

[IBM Cloud Private](#) is a reliable and scalable cloud platform built on open-source frameworks and runs on your infrastructure. With IBM Cloud Private, development and administrative teams share a flexible cloud environment behind their firewalls to create

new container and microservices-based applications, modernize existing apps using cloud-enabled middleware and securely integrate between the two.

[IBM Transformation Advisor](#) helps identify workloads ready to move to the cloud and offers suggestions on how to get there. It offers insight into how you can accelerate migration of existing applications to the cloud and guides a transformation which can realize that much-sought-after optimization, agility and flexibility.

[IBM Cloud Innovation Advisory](#) offers strategic guidance to successfully accelerate agency objectives through IT Innovation, with a focus on technology, modernization, rationalization, agility and migration to the cloud.

# Conclusion

Government agencies at all levels know they must modernize legacy systems and invest in solutions that enable them to better serve the public and carry out their missions.

There is no one size fits all approach to application modernization. Depending on your agency's needs and constraints, the right decision may be to modernize applications by exploiting legacy applications and connecting them via APIs to cloud services.

But to get the true benefit of cloud, the right decision may be to lift and shift applications to a flexible and open cloud platform to deliver a consistent development and management experience across a hybrid environment – on premise, private and public clouds.

Hybrid cloud provides agencies with access to emerging technology and faster time to value by using cloud native technologies such as containers and microservices. A hybrid approach also enables agencies to securely connect cloud services to sensitive data that for regulatory, security or other reasons, need to remain behind the firewall. Hybrid cloud enables lower total costs, security, innovation and speed to value that is increasingly expected of government.

## About GovLoop

GovLoop's mission is to "connect government to improve government." We aim 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 connect and improve government.

For more information about this report, please reach out to [info@govloop.com](mailto:info@govloop.com).



## About IBM

IBM Cloud gives government agencies the freedom to innovate with new technologies and modernize traditional applications without lock-in and significant rework. Built on open standards, the FedRAMP-certified IBM Cloud platform optimizes for security, performance and flexibility by matching workloads to the deployment model best suited for your government's unique requirements.

For more information about how IBM Cloud for Government can help, visit [www.ibm.com/cloud/government](http://www.ibm.com/cloud/government).





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