



Hybrid Cloud: A Path to IT Modernization

MARKET TRENDS REPORT



INTRODUCTION

Increasing budget pressures and rising costs to operate and maintain government systems have forced agencies to take a hard look at their IT operations. Under the current administration, agencies are required to identify specific high-risk legacy IT systems and set a budget for system modernization.

From a technology standpoint, two key drivers powering IT modernization have been open source software and cloud computing. Government IT professionals are finding that commercially supported open source solutions can help deliver new services quickly and cost-effectively, while also providing a strategic path for transitioning workloads to an on-premise or external cloud. Additionally, a 2016 federal mandate requires agencies to use open source code in at least 20 percent of their development efforts for three years, which further underscores the importance and influence of open source.

Open source is about more than just code; it's about the foundations of meritocracy, transparency, participation, communication and collaboration of upstream developers and supporting teams that enable open source vendors to be innovative in their approach and solutions.

Another aspect of enabling IT modernization is the adoption of cloud computing, specifically the hybrid cloud. Agencies need the ability to quickly provision their cloud services and manage those services with transparency and ease across multiple clouds. They must also ensure applications are portable and designed to break down cultural barriers among development, operations and security teams — often referred to as DevSecOps.

Among the top challenges agencies face are the delays and cultural friction that come with provisioning server resources internally. The process can take months or years for agencies working out of their own data center. There's also the challenge of managing manual processes that are not scalable. Determining the best way to modernize applications and manage the cultural hurdles around development, operations and security can be daunting.

To help agencies navigate their path to IT modernization with hybrid cloud, GovLoop partnered with Red Hat for this report. In it, we explore common challenges to IT modernization, open source and hybrid cloud solutions, and best practices for taking advantage of these solutions to solve government's pressing modernization needs.

BY THE NUMBERS

In June 2018 the Technology Modernization Board announced the following awards under the Technology Modernization Fund:

- **\$15 Million** for enterprise cloud email migration acceleration at the Energy Department
 - **\$20 Million** for mainframe application migration acceleration at the Housing and Urban Development Department
 - **\$10 Million** for farmers.gov customer experience portal at the Agriculture Department
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**\$500,000
to \$10 million**

per year is the range of cost savings agencies have seen since moving to cloud-based collaboration tools.

“The Technology Modernization Fund is an innovative funding model that allows agencies to accelerate key IT modernization projects in support of the President’s Management Agenda.”

Margaret Weichart, Deputy Director of Management at the Office of Management and Budget

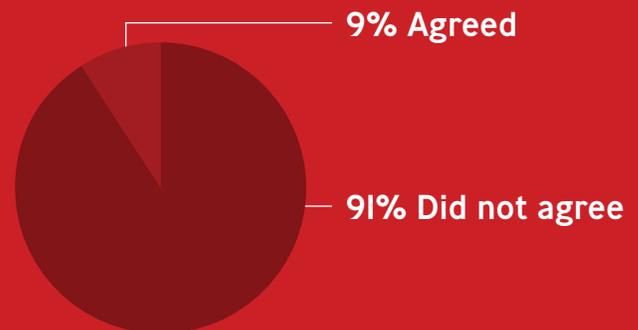
6 is the average number of clouds government cloud adopters are using.

“This report envisions a modern Federal IT architecture where agencies are able to maximize secure use of cloud computing, modernize Government-hosted applications, and securely maintain legacy systems.”

Report to the President on Federal IT Modernization

Red Hat’s 2017 open source culture survey polled more than **150 IT decision makers** from more than **30 countries**.

Technological developments are changing the way organizations in my industry must operate in order to succeed.



THE CHALLENGE

Managing the cultural and technological aspects of IT modernization

Government organizations face several challenges when implementing the kind of IT modernization that will improve service delivery to citizens. They've been stymied by several factors, including resource prioritization, the ability to procure services quickly, as well as technical issues, according to a [2017 report to the president on IT modernization](#).

"In order to enhance the speed of service delivery, cut costs, maximize security and productivity, and provide stability, agencies are looking for ways to become more agile with their resources, and find tools that will support dynamic workloads," said Zohaib Khan, Application Modernization Practice Lead for Red Hat North America Public Sector.

Agencies need the ability to provision cloud services quickly and manage those services with transparency and ease across multiple clouds. At the same time, agencies must still manage manual processes that are not scalable.

Plus, determining the best way to modernize applications often raises cultural hurdles around development, operations and security. A top challenge agencies face is delays and cultural friction that come with provisioning server resources internally. "The process can take months or years for agencies working out of their own data center," said Rob Patrick, a Cloud Specialist with Red Hat Public Sector.

Wherever possible, agencies want to scale out applications, accommodate dynamic workloads, provision and install applications automatically and have tools that enable management and visibility of multiple cloud services across the agency. They must also account for virtualized infrastructure and physical servers, including legacy applications that cannot be moved to a public cloud.

Many agencies are mixing the security, accessibility and privacy that cloud can offer by turning to hybrid cloud. But while hybrid cloud offers a path toward IT modernization, it isn't always easy to adopt and manage. "Despite understanding the potential benefits that a hybrid cloud provides, it's challenging to implement systemic change," Patrick said.

THE SOLUTION

Adopting a single platform for hybrid cloud management

"Many IT leaders view hybrid as a safer alternative to moving everything to the cloud at once," according to GSA's 2017 [Hybrid Cloud Almanac](#). "Hybrid allows lessons learned to be discovered that are agency-specific, and factors in that not all systems are suited for the cloud."

To create a frictionless experience for managing public and private clouds, agencies need a hybrid cloud management platform that enables them to view and manage multiple clouds as a single entity. This type of management includes provisioning, patching, securing and updating IT resources in the cloud.

Using this hybrid platform, agencies can also take advantage of more self-service and automated options, which enhance productivity and lower production costs. IT departments can spend less time and resources managing the complexities of multi-cloud integration and orchestration and focus instead on modernizing workloads and applications.

Additionally, IT staff can easily transfer applications and tools to the cloud environment, due to the portability provided by containerization. In other words, agencies can move workloads to where they make sense, without having to worry about re-tooling applications for integration or risking security.

Altogether, a hybrid cloud management platform enables agencies to easily control what is happening, where it's happening and how it's happening in their cloud environment. In the next section, we detail best practices for embracing hybrid cloud to drive IT modernization.

BEST PRACTICES

Embracing hybrid cloud to drive IT modernization



I. Develop a well-defined methodology for analyzing legacy workloads

For many agencies, a key challenge to IT modernization is understanding which workloads and applications should be migrated or transformed, and how to do so. Red Hat has developed a well-defined methodology and tools to analyze existing legacy workloads, rank them by level of complexity and then transform them into modern software and hardware architectures. Agencies can use these tools to prioritize and strategically transform their workloads for modernization.

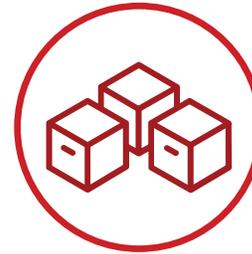
“This scalable delivery model brings teams of subject-matter experts, delivery consultants and stakeholders together with an agile delivery approach to transform legacy systems consistently,” Khan said.



2. Embrace a “culture of automation”

Hybrid cloud environments can quickly grow in complexity, as multiple public clouds or another vendor’s cloud are introduced into the ecosystem. Automation maximizes the benefits of multi-cloud — without overwhelming the operations staff — by eliminating the need for manual workflow processing. When agencies embrace a culture of automation, they embrace the best practice of implementing automation throughout the organization — from developers to networking to storage and beyond — to include third-party hardware and software vendors.

“Here, the automation itself becomes the common language that unifies the organization,” Patrick said. For automation to become this pervasive, it must be simple and powerful.



3. Use containerization to drive data portability across multiple clouds

Once applications are identified for use in a hybrid cloud environment, containerization is an important technology that enables agencies to move their applications and data freely across multiple cloud environments. The container agencies use must be fully integrated and supported by the chosen Linux vendor, and it must be 100 percent open source and supported by the emerging industry standards for things such as orchestration.

“As important as the decision to containerize, so is the choice of container runtime platforms,” Khan said.

A container runtime is a lower-level component typically used in a container engine, or a piece of software that accepts user requests. The container runtime plays a key role in setting up policies and rules, and communicating when to start the containerized process. Collaborating with agencies, Red Hat provides a common platform for true multi-cloud deployment of containerized applications, enabling networking and data storage to move from one cloud to another, without causing major disruptions.



CASE STUDY

One particular civilian agency was in dire need of modernizing both mainframe and aging and obsolete IT infrastructure.

Its challenges included escalating costs related to maintaining aging infrastructure, difficulty hiring personnel who were able and willing to maintain applications written in obsolete languages and an inability to respond to citizens in a timely manner. In addition, the agency recognized the need to move from a failing waterfall development process to a modern, agile software development, or DevOps approach.

“Linux containers were an important component to this agency’s modernization vision because it provided solutions to several challenges,” Khan said. The reason? Containerization is a key technology for agile DevOps. It enables developers to produce more frequent releases, while simultaneously enabling operations to safely put the releases into production.

Containers are portable between cloud infrastructures because the container packages the application and all of its dependencies in one unit. This portability factor also helped ensure the agency would not be tied to any specific vendor in the future. These features made Red Hat OpenShift Container Platform the ideal solution for the agency.

At the same time, the agency also realized that to efficiently run containerized applications, its infrastructure needed to be more agile. Early experiences with public cloud providers exposed the ease with which new infrastructure could be quickly created. But due to the nature of the agency’s legacy applications, it was also necessary to provide this same level of agility in an on-premise data center.

The agency selected Red Hat Cloud Infrastructure to construct a private cloud, in addition to their public cloud. Red Hat Cloud Infrastructure provides the Red Hat OpenStack Platform, for creation of a true private cloud, and also provides Red Hat CloudForms for multi-cloud management and self-service. The Red Hat Cloud Infrastructure solution also includes Red Hat Satellite, which is an infrastructure management product, specifically designed to keep Red Hat Enterprise Linux environments

and other Red Hat infrastructure running efficiently, properly secured and compliant with various standards.

The self-service aspect enables users to request resources in the agency’s private cloud, with the same level of ease that they request them in a provider’s public cloud. This specific agency is managing its public and private clouds in one dashboard, as a unified multi-cloud environment. The agency is also able to place its legacy and new applications in the most optimal place for execution.

HOW RED HAT HELPS

Red Hat enables agencies to have transparency around their cloud workloads, regardless of where those workloads are physically located, in one dashboard. Red Hat’s secure solution can run in private data centers or in any public cloud provider’s facility.

“Our open source software development model uses the collective input, resources and knowledge of a global community of contributors who collaborate to develop, maintain and enhance software,” Patrick said.

As a starting point of its government partnerships, Red Hat also provides access to its Open Innovation Labs, where operations, development and security professionals can experience and glean best practices for creating a modern software development process. Red Hat then integrates, hardens, tests and further develops this community software.

“As a result of this model, we are able to offer our software more quickly and often at a better quality than typical proprietary vendors” Khan said.

Learn more here: redhat.com/government

CONCLUSION

Federal agencies are in the process of modernizing legacy systems and investing in solutions that enable them to better serve the public and carry out their missions. To support collaborative and successful implementation of modern capabilities, agencies are investing in open source and cloud-based technologies.

An open source culture enables government employees to share their ideas, quickly adapt to changing needs and build on the work of others. Coupled with open source are the benefits of hybrid cloud, which enables agencies to accommodate and manage multiple cloud infrastructures.

To fully embrace open source and cloud solutions, agencies must first develop a well-defined methodology for analyzing legacy workloads and embrace a culture of automation.

As agencies mature in their use of cloud and open source, they will reap the benefits of transparency and ease needed to drive mission objectives.



ABOUT RED HAT

Red Hat® is the world's leading provider of open source solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux® and middleware technologies. Today, Red Hat is at the forefront of open source software development for enterprise IT, with a broad portfolio of products and services for commercial markets. That vision for developing better software is a reality, as CIOs and IT departments around the world rely on Red Hat to deliver solutions that meet their business needs. Solutions that provide technology leadership, performance, security, and unmatched value to more than 90 percent of Fortune 500 companies.

Learn more: www.redhat.com/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 270,000 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.

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