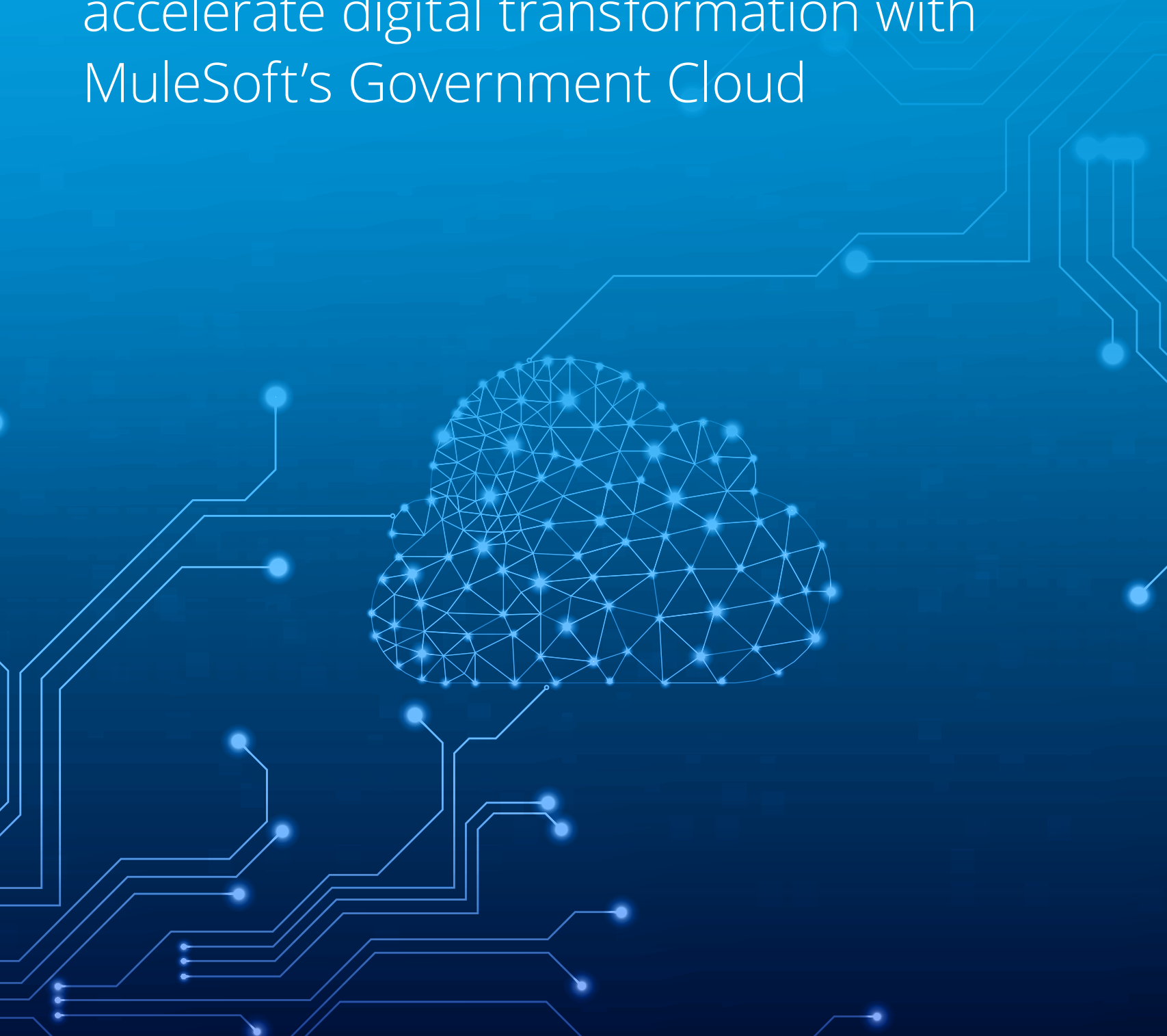




WHITEPAPER

# Cloud-based integration for FedRAMP compliance

How government agencies can  
accelerate digital transformation with  
MuleSoft's Government Cloud



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# Executive summary

Growing citizen expectations, executive mandates, and aging infrastructure are putting increasing pressure on government IT teams to find ways to reduce costs while simultaneously delivering technological advancements faster for their respective agencies.

While a number of government agencies have begun to leverage cloud-based technologies to help meet digital transformation goals, the underlying integration technologies connecting these applications are still based on-premises. This approach requires government IT teams to spend a great deal of time, energy, and resources provisioning and maintaining infrastructure to ensure that their middleware doesn't become a performance bottleneck for their applications.

Cloud-based integration solutions, also known as iPaaS (integration platform-as-a-service), are growing in popularity across the private sector to accelerate digital transformation goals and ultimately replace on-premises integration and the aging, costly infrastructure needed to support it. More than 1,100 private sector companies already use MuleSoft's iPaaS version of Anypoint Platform for designing, developing, and managing APIs and integrations. However, government options for iPaaS have been limited to date due to FedRAMP (Federal Risk and Authorization Management Program) compliance standards required for usage in the federal government. Likewise at state and local levels, FedRAMP Authorization provides a level of vetting and trust needed for cloud-based integration of their sensitive data.

MuleSoft has been working to address this problem by launching our Government Cloud, the first FedRAMP-compliant environment in a single runtime engine designed for government agencies to develop, deploy, manage, and monitor integrations and APIs in the cloud. With MuleSoft's Government

Cloud, government IT teams can leverage the same core Anypoint Platform benefits in the cloud to accelerate their project delivery speed up to 3x faster via reusable APIs. Anypoint Platform allows all government integration assets to be managed and monitored from a single, secure, cloud-based management console, simplifying operations and increasing IT agility.

Leveraging integration as-a-service via MuleSoft's Government Cloud environment also frees up government IT teams to focus on designing, deploying, and managing integrations while only paying for the integration infrastructure and computing capacity needed. This approach reduces agency dependency on outdated on-premises integration, saves considerable time and costs associated with on-premises infrastructure, all while adhering to executive mandates for cloud-based migration.

This whitepaper provides an overview of the trends driving digital transformation within government, some of the challenges with managing legacy, on-premises integrations, and the benefits of leveraging cloud-based integration through MuleSoft's Government Cloud. Subsequent sections of this paper will provide an introduction to the security and privacy features inherent to a FedRAMP-authorized Government Cloud deployment of Anypoint Platform that government agencies can use to build and secure the connections between their applications and customer data. The security and privacy features that help achieve compliance with the FedRAMP moderate baseline controls are referenced throughout this document.

# State of government cloud migration

Cloud-related IT spending represents one of the biggest areas of investment for government IT departments. Federal agencies spent more than \$6.5 billion on cloud-related projects in fiscal year 2018, a 32% increase year-over-year and the eighth straight year with an increase in spending<sup>1</sup>. Likewise, state agencies continue to make cloud investment a top priority, and more than 86,000 local agencies in the U.S. spend more than 20% of their annual IT budget on cloud services<sup>2</sup>.

## Speed

Agencies at all levels of government have been pursuing Cloud First strategies for a number of reasons, but the speed and efficiency of project delivery via cloud-based infrastructure and applications is one of the most often cited. Private sector companies have long leveraged cloud-based services for this very reason. According to a recent study conducted by the market research company Vanson Bourne, companies that adopted cloud services cited a 20% improvement in time to market and an 18% average increase in process efficiency<sup>3</sup>.

## Cost savings

While speed is paramount, the cost savings from adopting cloud-based infrastructure and applications do not trail far behind. According to McKinsey, moving to the cloud can reduce IT overhead costs by 30-40%<sup>4</sup>, which, considering the budget

1 <https://fedtechmagazine.com/article/2018/10/federal-cloud-spending-soars-2018>.

2 <https://governmentciomedia.com/state-and-local-agencies-privately-become-cloud-providers>.

3 <https://www.skyhighnetworks.com/cloud-security-blog/11-advantages-of-cloud-computing-and-how-your-business-can-benefit-from-them/>.

4 <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/cloud-adoption-to-accelerate-it-modernization>.

size of government agencies, can easily reach tens of millions of dollars in projected savings. One of the agency trailblazers of cloud adoption, the General Services Administration (GSA), was able to close all 120 of their data centers and save the agency a projected \$26 million in on-premises infrastructure costs<sup>5</sup>.

## Security

Perceptions are also changing around the security of cloud-based services. With cybersecurity incidents involving aging, on-premises government systems growing by 1,120% since 2006<sup>6</sup>, what was once thought of as a major roadblock for government adoption now drives greater pressures to update or migrate off of decades old, on-premises systems.

5 <https://federalnewsnetwork.com/federal-executive-forum/2019/03/it-modernization-in-government-2019-progress-best-practices/>.

6 <https://deloitte.wsj.com/cio/2018/10/02/accelerating-it-modernization-in-government/>



# Challenges persist in wide-scale adoption

Agencies have been trying to adopt cloud-based services for more than a decade. From President Obama to President Trump, Cloud First to Cloud Smart, IT departments have tried a number of initiatives to reduce data centers and accelerate digital transformation via cloud-based infrastructure and applications. Yet overall, these initiatives have created a lot of urgency with lukewarm results to date.

## Overall, on-premises IT infrastructure spending is not slowing down

A good starting point for examining government cloud progress is taking a look at where government IT spends the majority of its budget. In 2018, the U.S. federal government spent an estimated \$74 billion of its allocated \$95 billion IT budget on the operations and maintenance of existing on-premises infrastructure<sup>7</sup>. While that is a large amount of money to spend on maintenance and support, given the eight straight years of Cloud First initiatives, the expectation would be that on-premises spending would at least be decreasing. However, that is not the case. Per the most recent OMB Report on IT Modernization, U.S. federal government IT spending on legacy, on-premises infrastructure as a percentage of total IT spending actually rose over the past three fiscal years from 68% to 70.3%<sup>8</sup>.

So given that government agencies are spending more on cloud services than ever before, why are government agencies also continuing to invest so much of their budget on maintaining on-premises infrastructure?

7 <https://deloitte.wsj.com/cio/2018/10/02/accelerating-it-modernization-in-government/>

8 [https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/budget/fy2018/ap\\_16\\_it.pdf](https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/budget/fy2018/ap_16_it.pdf)

## Cloud initiatives (to date) have been slow and cumbersome

Government cloud initiatives are not overnight endeavors. Moving on-premises applications and supporting infrastructure to the cloud can take a number of years to complete<sup>9</sup>.

Take the Data Center Optimization Initiative (DCOI) for example. In 2014, the DCOI tried accelerating cloud adoption by requiring agencies to establish plans to close between 20% to 60% of their data centers by 2018. But an overall lack of clarity in how each agency was expected to meet their goals led to less than ideal results. Per a recently-released OMB report, only two of the 24 agencies participating had established plans to meet their respective targets, with 20 agencies admitting they would not be able to meet the OMBs targets for 2018<sup>10</sup>.

9 <https://fedtechmagazine.com/article/2018/11/data-migration-process-how-agencies-can-successfully-move-data-modern-systems-perfcon>

10 <https://www.gao.gov/products/GAO-19-241>



# Legacy, on-premises integration and underlying infrastructure gets in the way

What many government IT departments have found is that on-premises integration has emerged as a major stumbling block in moving to the cloud. As agency IT teams undergo massive cloud migration projects or look to add new cloud-based technologies to improve citizen engagement, these projects are added to the hundreds of other managed integrations on-premises. To support all of these needs, IT teams then have to spend an increasing amount of their limited budget and working hours provisioning and maintaining their on-premises middleware infrastructure to avoid performance bottlenecks.

The challenges with on-premises integration for cloud-based initiatives extend far past just cost and labor. The performance issues and core computing power associated with designing an integration on-premises, connecting it with cloud-based services that harness their own infrastructure and associated costs, followed by the time, energy, and hours of custom coding needed to manage that connection — alongside thousands of other integrations of on-premises and cloud-based services — minimizes the benefits of moving to cloud-based services in the first place.

Having integrations run on-premises also requires a dependency to the underlying on-premises infrastructure needed to support it. As agencies begin to migrate more and more applications to the cloud, keeping on-premises infrastructure up and running to continue managing the integrations on-premises will become more and more of a burden.

It's also important to consider the skill set of the next generation of IT professionals. As older members of the

federal IT workforce begin to retire, the institutional technical knowledge in maintaining decades-old, on-premises IT infrastructure and integrations is retiring with them. In late September 2018, the U.S. Government Accountability Office released an update on the state of federal IT procurement, noting, “the increasing complexity of acquisitions in areas like IT has caused a skills gap in the acquisition workforce across numerous agencies.”<sup>11</sup>

Hiring a younger workforce familiar with cloud-based infrastructure and services — just to have them spend considerable time and energy learning how to operate and maintain decades-old, on-premises infrastructure, integrations, and processes — is just another bottleneck for digital transformation.

So while cloud migration does require considerable time and resources, it’s nothing compared to what it takes to keep the status quo running on-premises. Spending more resources on managing the maintenance and ongoing support of older, on-premises infrastructure (and the underlying integration needs) leads to less capacity for adopting new cloud applications, thus making it harder for agencies to complete their cloud initiatives.

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If government agencies are pursuing Cloud First strategies to accelerate innovation and save costs, why keep the underlying integrations on-premises?

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11 <https://www.federaltimes.com/acquisition/2018/09/17/3-big-problems-continue-to-dog-federal-procurement/>.

# Time for a new approach: integration Platform as a Service (iPaaS)

To address these challenges, integration Platform as a Service (iPaaS) has emerged as a cloud-based integration solution for connecting cloud applications to both applications deployed on-premises as well as other applications deployed in the cloud, and requires no on-premises hardware or software.

Similar to other as-a-service offerings, iPaaS vendors handle all of the infrastructure and associated maintenance overhead (upgrades, resource management, etc.) to run the platform and the full suite of integration-associated tasks. No separate on-premises servers or VMs are needed, and all patching and upgrading work is handled by the vendor, freeing up agency IT team workload. This approach unlocks the scalability expected when choosing to migrate to cloud-based applications and infrastructure in the first place.

By applying this standardized approach to connecting end systems together, IT teams gain visibility into the entire network of connected services from one central location. They have the ability to monitor all integrations running in the cloud and to take corrective action where necessary on a simple-to-use user interface. This centralized visibility allows for rapid identification of issues and quicker response times while also making it easier to identify and adopt best practices across the enterprise.

Almost every, if not all, services provided in an iPaaS solution are hosted in the cloud. For these reasons, iPaaS is the ideal solution when adopting a cloud-first strategy.

# Enabling iPaaS in government with our Government Cloud deployment environment

[MuleSoft's Anypoint Platform](#) has long been the leading choice of more than 1,100 enterprise-grade companies looking to design, deploy, and manage APIs and integrations from a single, cloud-based integration platform. Our API-led approach has helped IT teams achieve the speed and agility necessary to drive digital transformation within their companies while leveraging the infrastructure and pay-as-you-go benefits of cloud-based services.

However, due to the FedRAMP requirements for cloud vendors, government options for iPaaS to date have been limited.

MuleSoft has been working to address this problem by creating a FedRAMP-authorized deployment environment for Anypoint Platform, called **Government Cloud**, that meets the security and compliance standards set through FedRAMP. It is intended specifically for use by U.S. federal, state, and local government customers, U.S. government contractors, and Federally Funded Research and Development Centers (FFRDCs).

MuleSoft's Government Cloud enables the public sector to leverage the industry-leading Anypoint Platform from a FedRAMP Authorized environment for cloud-based integration.



Learn more about the benefits of Anypoint Platform by visiting the [MuleSoft website](#).

# FedRAMP requirements met for MuleSoft's Government Cloud

MuleSoft's Government Cloud has received a FedRAMP Authorization at the moderate impact level as of August 2019.

To obtain a FedRAMP Authorization, MuleSoft conducted security assessment and authorization activities in accordance with FedRAMP guidance, NIST 800-37. The security assessment was conducted by a third-party assessment organization (3PAO) in accordance with NIST 800-53A and FedRAMP requirements. The security assessment testing determined the adequacy of the security controls used to protect the confidentiality, integrity, and availability of MuleSoft's Government Cloud and the data it stores, transmits, and processes.

MuleSoft's Government Cloud environment is configured within Amazon Web Services (AWS) GovCloud. AWS GovCloud is a FedRAMP High Authorized, ITAR-compliant environment with provisional DoD IL2, IL4, and IL5 authorization. MuleSoft has hardened its configuration within AWS GovCloud to comply with FedRAMP-specific requirements to ensure that the confidentiality, integrity, and availability of government data is properly protected.



## Security is at the heart of MuleSoft's Government Cloud

Security is at the heart of MuleSoft, and the protection of government data is paramount. MuleSoft's approach to cloud security is two-pronged:

- We do not inspect, permanently store, or otherwise interact directly with sensitive government data.
- We provide a highly secure environment in which government entities can perform sensitive data manipulations.

MuleSoft's dedicated security team follow industry best practices, run internal security audits, and maintain policies that span operations, data security, passwords and credentials, facilities and network security, and secure connectivity. MuleSoft ensures compliance with our security policies through regular audits. To this end, government agencies will always maintain control over their data, configuration, and workers.

## Additional safeguards included in MuleSoft's Government Cloud

In addition to meeting FedRAMP compliance requirements at the moderate impact level, Anypoint Platform, deployed within MuleSoft's Government Cloud, is designed to adhere to the following security protocols:

- Federal Information Processing Standards (FIPS 140-2) compliant hardware and software encryption.
- Significant enhancements in logical security based on FedRAMP and NIST 800-53 requirements.
- Extending TLS 1.2 encryption end-to-end. Not only externally, but internally, we have an encrypted path where "man in the middle" attacks are blocked.
- Hardening of our instances to CIS benchmarks.



# Anypoint Platform within MuleSoft's Government Cloud: accelerating digital transformation

Anypoint Platform deployed within MuleSoft's Government Cloud environment carries a number of unique, differentiated integration benefits for government agencies to consider when pursuing a Cloud First strategy.

## Accelerated speed of IT project delivery

Anypoint Platform is uniquely designed to empower IT teams with an accelerated speed of project delivery.

Legacy, on-premises integration solutions require IT teams to first deploy servers, set up their integration bus, along with a number of other time consuming activities, just to implement the infrastructure necessary to support their integrations. With Anypoint Platform, IT teams can get started quickly to deploy sophisticated cross-cloud integration applications within seconds, create new APIs on top of existing data sources, integrate on-premises applications with cloud services, and much more. Once an application is deployed, IT teams can quickly access and manage it alongside all other integrations by logging into Anypoint Platform and going to the Runtime Manager.

Many customers have found that MuleSoft's technology and approach to connectivity have allowed their IT teams to deliver projects 3x faster on average.

## Improved efficiency at lower costs

Implementing a cloud-first strategy from the ground up is inefficient. Anypoint Platform allows IT integration teams to focus on designing, deploying, and managing integrations in

the cloud. MuleSoft handles all infrastructure needs, allowing agencies to only pay for what they use, saving considerable costs and IT resources spent maintaining legacy on-premises integration systems.

In addition to managing the infrastructure needed for integration, MuleSoft also provides monitoring and security capabilities from our single, cloud-based console. No other product on the market is designed to offer all of these features under one platform.

Consider also the changing generational workforce. Rather than having a new employee spend time learning and managing both cloud applications and legacy on-premises integrations, new IT employees will ramp faster because our platform components were designed to work together as a single, unified platform. Many legacy vendors require purchasing multiple products to match the functionality that Anypoint Platform provides.

As a single product, IT teams don't have to manage different products and thus gain a cohesive experience thanks to synergies impossible for different products to replicate. The costs associated with training IT teams on multiple products and the software and patching updates typically needed from agency IT teams are all avoided with Anypoint Platform.

## **Reliable scalability for managing government integration needs**

The amount of data involved in most cloud-based government IT migration and integration projects is massive. With executive mandates adding increasing pressure on agencies to quickly start projects that can take years to finish, IT teams need an integration solution they can rely on — one that can be trusted to manage enterprise-grade workloads over long periods of time.

Anypoint Platform is designed to be highly available and scalable through redundancy, intelligent healing, and zero downtime updates.

All of the Anypoint Platform services within MuleSoft's Government Cloud environment, from load balancing to the API layer, have at least one built-in layer of redundancy and are available in two AWS FedRAMP-certified data centers at all times. This redundancy ensures that even if there is a data center outage, the platform remains available.

Anypoint Platform also monitors the worker clouds for any type of problems and provides a self-healing mechanism to recover from problems. If the underlying hardware suffers a failure, Anypoint Platform migrates impacted applications to a new worker automatically. In the case of an application crash — whether due to a problem with custom code or a bug in the underlying stack — Anypoint Platform recognizes the crash and can restart the worker automatically.

Anypoint Platform supports zero-downtime application updates so end users of an agency's HTTPS APIs experience no disruption of service. While an application update is deploying, Anypoint Platform keeps the previous version of it running. The agency's systems points to the previous version of their application until the newly uploaded version is fully started. This allows the IT team to keep servicing requests from their previous application while the new version of their application is starting.

MuleSoft's cloud-based infrastructure was built to scale enterprise grade workloads. Agencies can add multiple workers to their application to make it horizontally scale, adding additional reliability. Regardless of the size of the project, Anypoint Platform was built to handle government agency needs.

# Conclusion

Cloud Smart initiatives, continued expansion of FedRAMP-approved cloud-based infrastructure and applications, and higher citizen expectations are fueling an accelerated growth of government agencies embracing cloud initiatives. But the challenges of employing outdated integration approaches with legacy, on-premises infrastructure adds significant cost, time, and energy roadblocks. With Anypoint Platform, deployed in MuleSoft's Government Cloud, government agencies can leverage the same benefits of cloud-based services to better build, deploy, and manage their integrations, allowing for accelerated project delivery, new levels of scalability, and operational efficiency, all from a single FedRAMP-authorized, platform.

# About MuleSoft

## MuleSoft, a Salesforce company

MuleSoft's mission is to help organizations change and innovate faster by making it easy to connect the world's applications, [data](#), and [devices](#). With its API-led approach to connectivity, MuleSoft's market-leading Anypoint Platform™ empowers over 1,600 organizations in approximately 60 countries to build application networks. By unlocking data across the enterprise with application networks, organizations can easily deliver new revenue channels, increase operational efficiency, and create differentiated customer experiences.

For more information, visit [mulesoft.com](https://mulesoft.com)

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