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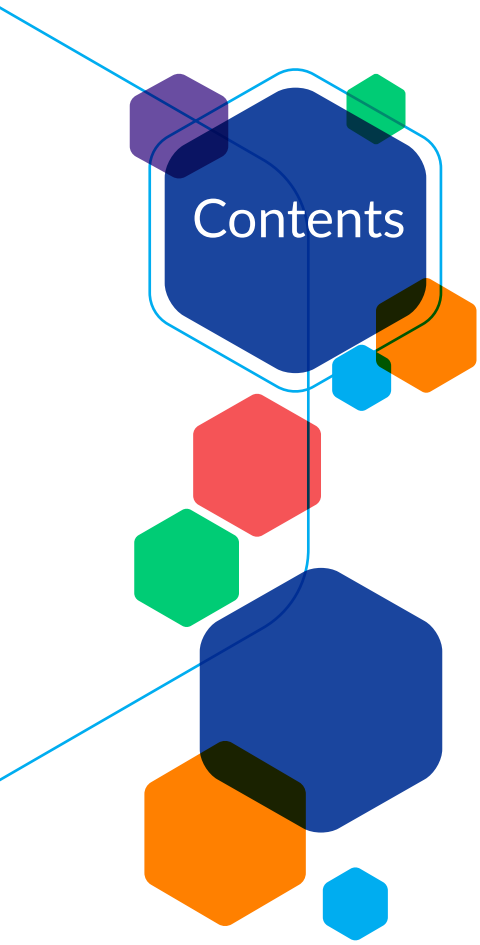
The Federal Government: Speeding Service Delivery with DevOps



Introduction: Federal Government IT Leaders – Big Expectations, Big Hurdles

In the private sector, CIOs are responsible for delivering applications that provide direct, positive impact on customers. The same is true for CIOs in the federal sector, but with an important distinction. Instead of customers, government organizations have constituents. This isn't just a case of semantics. Customers typically have several options from which to choose a product or service in a free market; if they aren't satisfied with their choice, they can go elsewhere. Constituents, however, have no other choice but to depend solely on federal agencies for all sorts of services, from healthcare to veterans' services to small business services.

Federal IT leaders have a difficult challenge when trying to develop or enhance applications – constituents have extremely high expectations: They want to consume digital services in the same way they are delivered from companies in the private sector. Constituents don't adjust their expectations just because they are interacting with a governmental organization. Therefore, there is a mandate for a new, dynamic approach to applications development.

Whether fair or unfair, constituents expect governmental agencies to provide multi-channel interactions. Private businesses are increasingly using multi-channel, digital initiatives to improve customer engagement. The private sector has set the standard with the innovative technologies that allow them to interact in innovative ways with their customers. Private business has transformed commerce around the globe, with technology. Therefore, it is not surprising that constituents demand similar digital capabilities from government.

The mission for the government digital experience is to streamline and improve constituent interactions and to efficiently deliver services and information. Digital transformation and enhancing the user experience is a difficult challenge for both the private and public sector. Additionally, a major challenge for technology advances within governmental organizations is getting buy-in from stakeholders in a highly bureaucratic organization.

With the signing of the Federal Information Technology Acquisition Reform Act (FITARA) in December of 2014, federal CIOs gained a seat at the table. FITARA mandates that to better serve their agency's mission, federal departments must improve how they integrate innovation, technology, services and people. At the same time, these technological and process improvements must be accomplished under tight budgets, increased oversight and enhanced concern over cybersecurity. Further supporting these initiatives, the Obama White House, in partnership with the Office of Management and Budget, outlined the government's Digital Government Strategy.

Federal Agency IT Challenges

Besides needing to deliver better digital services, government IT organizations face many of the same technology and business trends that their colleagues in the private sector face. However, government IT organizations have additional challenges in areas such as oversight, culture, regulations and security that are unique to them. These challenges include changing mandates when new administrations take office, shrinking budgets and ever-shifting budget priorities.

Though the challenges are many, the top technical and business challenges that federal IT leaders face today include:

Increasing Use of Cloud Services

Many federal agencies have been mandated to evaluate the use of cloud services. The cloud can help agencies reduce costs while also increasing flexibility. Leveraging the full capability of cloud-based development platforms allows agencies to develop services in a more agile manner. In addition, cloud vendors have been increasingly offering government-compliant cloud offerings that meet government risk and management requirements.

Application Modernization

New DevOps software delivery practices, enabled by continuous integration (CI) and continuous delivery (CD), are providing IT organizations with the ability to quickly develop, improve and deploy applications. At the same time, many agencies have legacy applications that are poorly documented and decades old. As IT organizations move some legacy applications to the cloud, they do not simply want to shift them to a new platform. The shift to the cloud also means improving legacy applications in terms of business process, underlying architecture, user interface and efficiency.

Advances in Cybersecurity

The need to be hypervigilant with cybersecurity is a chief mandate for federal IT leaders. Federal agencies face a myriad of security challenges. These security challenges range from employees making innocent mistakes to criminal organizations trying to steal constituents' personal information and state-sponsored attacks from other nations. Security must be integrated from the onset when federal IT organizations offer new digital services and modernize legacy applications.

Digital Government

Delivering digital services has definitely become a priority for federal agencies. Agencies are building their own digital services groups to identify better, more efficient ways to serve their constituents through the use of technology. While these digital services can sometimes be expensive to implement, they can drastically reduce the frequency with which constituents must reach out to a governmental agency for access to services, and/or eliminate frustration and time involved to simply get an answer to a question. Digital government can also help agencies educate constituents on the services they provide, with 24x7 availability. The White House has charged government agencies with harnessing the power of technology to help create a 21st century digital government – one that is efficient, effective and focused on improving the delivery of services to the American people.

Accelerated Application Delivery, with Less Cost and Risk

Software application delivery is where federal IT leaders can make a significant difference in leveraging resources and meeting the mission of their agency. They are responsible for delivering applications that provide direct, positive impact on constituents. Despite the hurdles facing government organizations, federal IT leaders can deliver constituent services by adopting innovative strategies for software delivery. In addition, these leaders have the backing of Congress through FITARA to deliver world-class digital services. This mandate in FITARA is extraordinarily significant. Because it recognizes and prioritizes constituent services, it empowers federal IT leaders to enhance service with digital solutions.

In order to meet the needs of the agency and its constituents, applications must be built, tested and deployed in real time. There are two critical components in this ongoing effort:

- **DevOps** and
- **Continuous delivery** (which includes continuous integration)

DevOps is an organizational set of practices that accelerate application delivery while ensuring more reliable releases. DevOps is achieved through a culture of collaboration and teamwork. DevOps essentially brings together development and IT operations teams to manage the entire application lifecycle. Adopting a DevOps strategy means that an organization no longer tosses code over the proverbial wall that has always separated development and operations. This team approach immediately removes a large amount of internal bureaucracy and friction. Most federal IT leaders have begun evaluating DevOps, but as with other governmental and large enterprise changes, the challenge they face in adoption is cultural, not technical.

What is Continuous Delivery?

Continuous delivery is a process that enables development teams to continuously have secure and tested code in a production-ready state at all times. To achieve continuous delivery, application development teams replace manual processes with automation, thus delivering updates more rapidly and with fewer errors. Once a new feature or update is complete, the code can be immediately made available for deployment to a staging environment or even directly to production. When a continuous delivery process is adopted, software is continuously tested for production readiness, with feedback provided immediately whenever a change is made.

The first step to implementing a continuous delivery process is continuous integration. Continuous integration is the process of automatically integrating code into a shared repository. After a developer checks in code, it is then verified by an automated build and test process. If all is well, the new piece of code will continue through the next steps as defined in the organization's software delivery pipeline process. Unlike continuous integration, which deals solely with automation of the development environment, continuous delivery extends this automation across the complete application delivery lifecycle. Continuous delivery is the end-to-end process enabled by DevOps organizational practices.

Delivering World Class Digital Services – the Role of DevOps and Continuous Delivery

A DevOps culture emphasizes methods for more effective communication and collaboration between development, testing, quality assurance and IT operations. Integrating DevOps into an IT organization requires an organizational culture shift, in addition to changes in process and technology. DevOps teams are increasingly using continuous delivery practices as a way to transform to a DevOps culture.

DevOps centers on the collaborative culture required for rapid and frequent application development, testing and delivery, therefore there is no such thing as a "DevOps tool." There are, however, a variety of tools used to enable continuous delivery, thus supporting the overall transformation to a DevOps culture. Each tool has a role in the software delivery process and available tools include both proprietary and open source products. As pressure to deliver new and improved applications increases, government agencies must think about new ways to manage software delivery using automation driven by modern tools. The top three challenges that are forcing IT leaders to rethink the way their organization manages IT tools are:

- **High costs** of support and training inherent when many tools are used across an organization
- **Risks** related to the overwhelming task of managing updates and patches for various tools
- **Collaboration barriers** resulting from different team members and groups using disparate tools

Hurwitz & Associates completed a CloudBees-sponsored study of 150 IT decision makers about how they handle the challenges of software development and deployment. The respondents were from a wide range of industries, including governmental agencies. An overwhelming majority - 86% of the respondents – indicated that they are standardizing tools across their development organizations to meet the above challenges.

Continuous delivery is an end-to-end process. There are many tools required and utilized as the code progresses from one process to the next. As in a symphony orchestra, a master conductor is needed to coordinate all of these tools, promote the code from stage-to-stage, handle exceptions and manage the compute resources required by the tools. Too often, this orchestration is handled by manual processes that are slow and cumbersome.

Jenkins – The Open Source, Reliable Tool for Continuous Delivery

Jenkins is an open source automation server. Jenkins enables software delivery teams to continuously deliver secure and tested code, that is in a production-ready state at all times. To accomplish continuous delivery, application delivery teams incorporate automation to push updates more rapidly and with fewer errors. Jenkins does not dictate the process followed or the tools used. IT organizations define what is right for their agency or project and Jenkins makes sure it all happens.

Jenkins is already the de facto continuous delivery tool of choice. According to the Hurwitz & Associates study, nearly half of respondents across both public and private sectors use Jenkins.

Why do so many organizations use Jenkins? Because its automation capabilities allow development organizations to:

- Increase the pace of software delivery by automating tasks, enabling processes to occur more quickly,
- Improve code quality by detecting errors much earlier in the software delivery process,
- Enable developers to focus on more strategic work by automating routine or manual tasks.

In addition, the flexibility and extensibility Jenkins offers gives users the ability to work with a wide array of tools and technologies. Therefore, Jenkins is able to integrate with existing tools already used throughout each stage of the application lifecycle. An important point is this: Jenkins does not dictate process or tools, thus does not mandate a complete tooling overhaul. You define the tools that are right for your organization or project.

Open Source and Government Agencies

The need to create a more agile application delivery process has led DevOps teams to adopt open source software tools. Many of these open source tools have extensive and collaborative communities populated by highly skilled and creative developers. This constant stream of innovation has led to adoption of open source tools in huge numbers. In addition to Jenkins, other important open source tools used by DevOps teams include Chef, Docker, GitHub and Puppet.

While open source software projects may have frequent updates and active communities, they often require users to go it alone. For example, if there is a security update, a developer needs to make sure the software is properly patched and tested. Along with the commercial sector, government is in an era of hypervigilance around data and application security and reliability. A breakdown in a constituent-facing application can lead to disaster, including the possibility of widespread fraud and audit. If there is a critical error, it is difficult for IT leaders to explain to executives why a core tool used in the DevOps process is open source.

Open source tools when used in government, require more security, functionality, predictability and support than

can be achieved through an open source community. To fulfill these needs, CloudBees provides CloudBees CI - an enterprise version of Jenkins. CloudBees CI delivers Jenkins with advanced enterprise features, guaranteed levels of availability, professional support and verified and tested updates.

CD and Government – Success at the Agency Level

The stakes for agency managers are high, meaning that the stakes for federal IT leaders are just as high, if not higher. Success in leveraging the benefits of continuous delivery requires the following best practices:

- **Ensure a strong, ongoing commitment to a DevOps culture.** As agency IT organizations move more resources to modernization and automation, development and operations teams need to ensure a culture of collaboration, teamwork and shared goals throughout the software delivery process.
- **Extend meaningful collaboration to include non-IT agency stakeholders.** Federal CIOs should look to the software industry as a model. The mission-critical nature of new applications, along with ongoing enhancements, require software delivery teams to understand the agency mission and business – and to quickly deliver software that supports that mission.
- **Use tools that are designed for the enterprise** – and automate as much of the software delivery process as possible. This means development and deployment tools need to have the scalability, predictability, manageability, high availability and support that software delivery teams require.

The Way Forward

These are challenging times for government IT leaders, yet these challenges represent significant opportunities. There are fundamental changes occuring in technology and how we use it to access products and services. Federal IT leaders cannot avoid these technological changes – they are the new normal. Industry trends are changing the way IT organizations deliver services and such trends include:

- Shifting new and legacy applications to the cloud
- Increasing user expectations for modern, multi-channel interactions
- Hypervigilance with cyber security
- The increased pressure to deliver services with digital resources

The threats and opportunities are real and immediate. Modernizing legacy applications, developing new applications and continually improving existing applications are clearly agency priorities; at the same time, new practices, methodologies and tools are available to help agencies meet the challenge.

Development organizations across industries want to create and update software at the speed of ideas to meet constituent and partner expectations. To quickly develop new applications, organizations are adopting a DevOps cultural and organizational shift that promotes collaboration between development and operations teams. Continuous delivery is a process that enables organizations to automate code integration, continually test code and have it in a production-ready state at all times. IT organizations that have begun to adopt a DevOps culture and continuous delivery processes have found that they are able to meet customer/constituent expectations with incremental application improvements while producing high-quality and secure code.

CloudBees Drives Enterprise DevOps and Continuous Delivery

CloudBees is the hub of DevOps, providing companies of all sizes with smarter automation solutions and actionable insights for accelerating software delivery. Our continuous delivery solutions offer DevOps teams the industry's broadest suite of DevOps products, from on-premise to cloud native, from selfmanaged to self-service, from guided best practices to flexible choice. By making the software delivery process more productive, manageable and hassle-free, CloudBees puts companies on the fastest path to transforming great ideas into great software and returning value to the business more quickly.

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