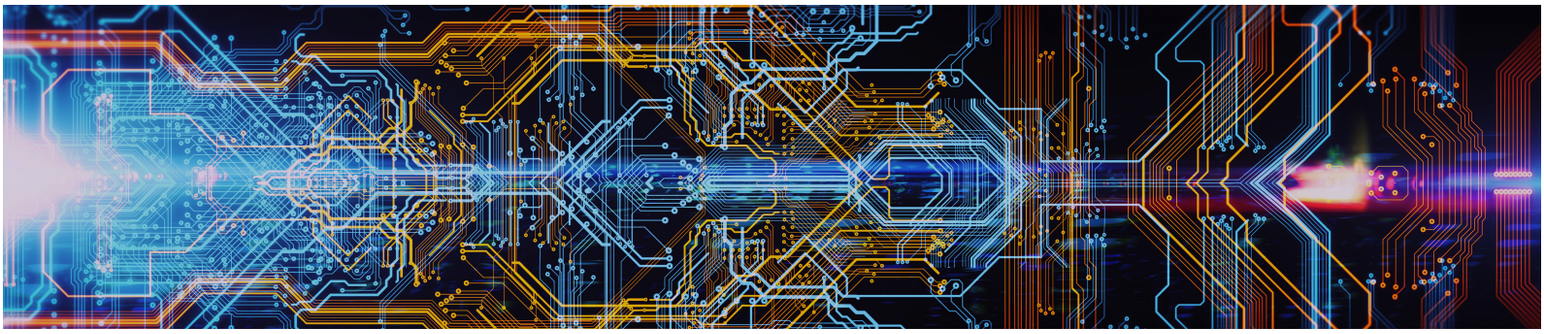

# Meet the Next Generation of DevOps Practice: Intelligent Software Delivery

Some federal agencies still struggle with iterative software delivery that can power digitization, however, intelligent software delivery can help with that struggle and speed the journey to digital services.

Agencies have been behind the curve in adopting new technologies and at becoming efficient at DevOps and DevSecOps practices and toolchains. Some are holding onto outdated toolchains—much of DevOps inherently consists of some legacy technology—and that can make it more difficult for agencies to turn out innovative citizen-services, or internal applications in a timely manner.

The intelligence agencies have been further along than most in the government at adopting DevOps, because many of their technical people come out of institutions such as Los Alamos National Laboratory and Oak Ridge National Laboratory as well as Silicon Valley companies, said Billy Miller, federal sales engineer at Harness.

"They're already on the cutting edge of what is going on" with the latest development tools and techniques," Miller said.

Other agencies haven't become as proficient in creating simple and secure way for engineering and DevOps teams to release applications into production, according to some experts.

"They are trying to figure out a way to get there but I think they're still falling short," said Paul Almeida, vice president of federal sales at Harness, which provides a platform for intelligent software delivery. The company's platform uses machine learning (ML) technology to detect the quality of deployments and automatically roll back failed ones, saving time and reducing the need for custom scripting and manual oversight.

Many federal agencies DevOps efforts, according to Almeida, try to combine the concepts of continuous integration (CI) and continuous delivery (CD) and treat them as a single tool, rather than taking each to a higher level of performance.

## New Vision

To improve software delivery processes, federal agencies need to embrace a new vision for software delivery using the latest technological capabilities.

A platform, such as the one offered by Harness, enables self-service deployments. Engineers can also leverage what the company calls Smart Automation to build pipelines in minutes. The platform applies AI and ML to an organization's existing monitoring and log data to verify the success of deployments.

Among the key considerations with software delivery are compliance and governance, so a platform should build enterprise-grade security into an organization's pipelines, ensuring compliance and governance through all stages of development.

Important security features include single sign-on (SSO) and role-based access control that enables managers to govern teams across the organization; follow audit trails with a catalog of all events; use native secrets management; and secure integration with other platforms.

AI and ML can also be applied to CI. For example, testing is the most time-consuming component of CI pipelines, and AI/ML can decide which tests to run and in which order. Harness calls this "test intelligence," and said it can lead to 50% reduction in overall CI pipeline execution times with no reduction in quality.

The Harness platform uses containers to standardize and drop pre-configured steps into an organization's pipeline. Each pipeline step is executed inside an isolated container, and every build runs in the container so there's no concern about conflicting builds on shared servers across teams.

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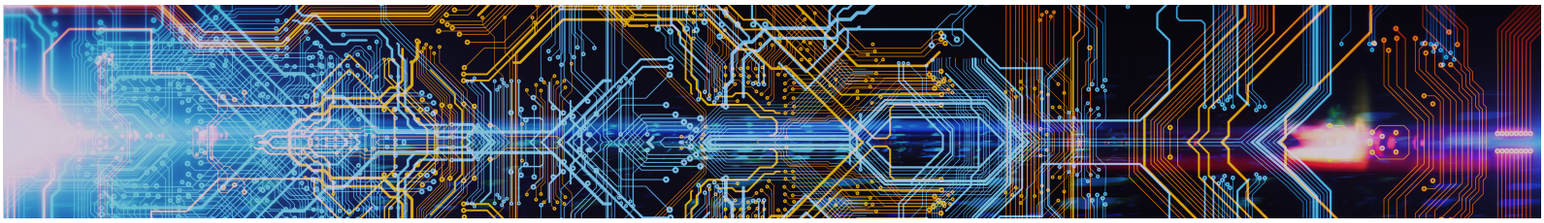

Harness Feature Flag tool allows developer teams to quickly release new features with minimal risk, test with a specified subset of users, or roll out to all customers. The government can utilize this tool for continuous Authority to Operate (ATO) on anything from changing warfighter features to updates in civilian public facing websites.

Harness Feature Flag tool is designed into our platform and can be added into developer workflows or used separately as an individual module in a customer's existing CI/CD solution.

The company also offers a Cloud Cost Management (CCM) tool that integrates with the CI/CD platform and uses intelligence and automation to reduce cloud costs. It provides granular visibility into cloud resource inventory, including compute, storage, network, and database.

Gaining control over cloud costs is especially important with the move toward hybrid and multi-cloud environments at so many government organizations.

## Benefits to Government

There are plenty of CI/CD tools in the market—Jenkins, CircleCI, Bamboo, GitLab, to name a few. Not a lot of companies have invested heavily in creating innovative features, however. That has created a big gap in the market, and this has contributed to the struggles many federal agencies are experiencing.

Taking a new approach to DevOps and software delivery can result in a number of benefits for government agencies. Here are some of the most significant:

- Achieve digital modernization through an end-to-end CI/CD platform that leverages AI and ML to enhance processes.
- Create and deliver critical applications and services to users quickly and with the ability to scale.
- Use AI/ML in existing application monitoring tools to mitigate performance anomalies.
- Apply governance via enterprise-grade security into pipelines with role-based access controls and audit trails.
- Deploy cloud and DevOps technology stack that works for on and off premises implementation.
- Standardize agency software delivery processes with modern application deployment methods.

With capabilities such as test intelligence, government agencies can more efficiently write code and deploy it, resulting in both cost reductions and potential revenue gains. "You're able to recapture wasted costs," Miller said.

Many agencies have "technical debt," technology costs that might otherwise have been better spent on solutions that were perhaps a little more expensive but a lot more efficient than alternatives, he said. They can work toward eliminating some of this technical debt by deploying more efficient software testing methods.

Another key aspect of the new DevOps, made possible by AI, are the smart rollbacks that can save agencies a lot of time. When the platform senses a decline in performance or quality, it can roll an application back to the previous working version within in seconds.

For example, Jenkins, an open source server-based system that helps automate the parts of software development related to building, testing, and deploying and facilitating CI and CD, is an aging technology. The latest products leverage automation to deliver self-service CI and CD that can greatly enhance the process of bringing software to production.

Automation has to be built into the platform from the beginning to be effective, however. Some products on the market use limited automation capability that "still requires a DevOps engineer to spend countless hours writing playbooks to pull all of these things together," Miller said. If automation is native to the platform, "you don't have to think about it anymore; it just becomes part of what you're doing in the pipeline creation process," he said.

Agencies should look for specific features and functionality in these products. For example, a CD platform should deliver self-service CD that is deployable on-demand via the cloud without scripts, plugins, version dependencies, or downtime.

Some newer tools leverage artificial intelligence (AI) and machine learning (ML) to auto-detect performance and quality regression for canary phases, and if necessary, automatically roll back to the last working version within seconds.

A key benefit of the CCM offering for government include better management of cloud costs, by automatically shutting down idle virtual machines and containers, and dynamically running them on spot instances with no interruptions.

CCM also provides deep Kubernetes cost visibility and root cost analysis for agencies, and recommends ways they can optimize idle or unallocated cloud spending.

As government continues to move toward more digital services, agencies will rely more than ever on DevOps and CI/CD to deliver software to production in efficient and secure ways. They will need to do this while also keeping cloud costs under control.

While agencies have been using DevOps for years, now is the time to bring it to a higher level, to enter the age of intelligent software deliver.