

Software factory playbook

How government agencies and
their partners can modernize
software development for
better public service delivery



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The increasing role of software in delivering public services

Government agencies are modernizing the delivery of public services through software. To that end, many CIOs, CTOs and software engineers are exploring ways to establish software factories that can improve the speed, quality and agility of software development.



23%

Faster time to market

Development teams using Slack deliver 5% more output overall, with 23% faster time to market, 27% less time needed to test and iterate, and faster identification and resolution of engineering-related bugs.*

In this e-book, we'll explore why so many government agencies and their partners rely on Slack as the productivity platform for software factories, and how incorporating DevSecOps tools into a centralized, secure platform can help organizations better deliver on their missions.



* Excerpted from IDC research, sponsored by Slack, [The Business Value of Slack](#), 2017

“Thanks to Slack we can do a better job of all the stuff we care about—keeping people safe and providing people with their full entitlement of rights. We’re able to maintain a more consistent level of quality as well.”

Philippa Manley

Director of Projects and Digital Services, His Majesty’s Passport Office

Even before the Covid-19 pandemic exposed the need to modernize public service delivery for a digital-first experience, government agencies struggled with meeting constituent expectations while tackling evolving cyberthreats.

These issues only grew in scale and complexity. Demand surged as citizens turned to government websites for assistance.

Leaders who embraced new ways of delivering software, leveraging modern tools and development, successfully delivered on their missions:

- [Digital services agency Ad Hoc helped the Department of Veterans Affairs \(VA\)](#) reimagine a website for veterans to get what they need and overhaul its flagship portal, VA.gov.
- [The Metropolitan Transportation Authority \(MTA\)](#), which runs the New York City subway system, digitized and centralized the process for dispatchers to report issues and delays.
- [In the United Kingdom, His Majesty’s Passport Office \(HMPO\)](#) continued processing 6 million applications a year despite moving its 4,000 employees to a fully digital environment.

These examples show that public service is increasingly digital, with software as the primary delivery mechanism.



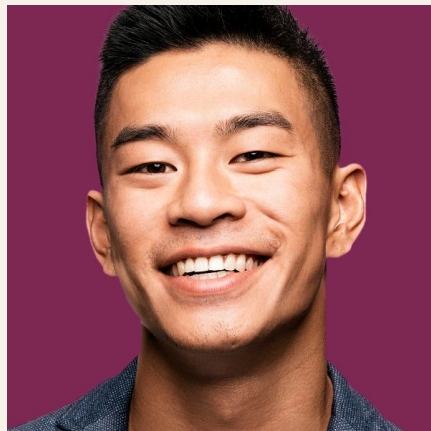
Dedicated government employees, volunteer citizen brigades, non-governmental organizations and contracted partners are showing that:

Software is ~~eating~~ serving the world



Call to service

If we accept that software is central to delivering excellent, equitable and secure public services, then it should be the mission of every government leader to build policies, organizations, culture and technology infrastructure that empower the development of great software.



The role of software factories in digital transformation

Much like a manufacturing factory is more than the assembly line, software factories are the collection of people, processes and technology working together to develop software in a consistent, secure and efficient manner.

“A software factory is a software assembly plant for development and integration that contains multiple pipelines, equipped with a set of tools, process workflows, scripts, and environments, to produce a set of software deployable artifacts with minimal human intervention...”

To realize the full benefit, these capabilities must effectively couple technology (e.g., the tools and platforms) with process change (e.g., security authorization and testing).”

Department of Defense

Software Modernization Strategy



“U.S. national security increasingly relies on software to execute missions, integrate and collaborate with allies, and manage the defense enterprise.

The ability to develop, procure, assure, deploy, and continuously improve software is thus central to national defense.”

Defense Innovation Board

Software Acquisition and Procurement Study

Government agencies, as well as companies within the defense and aerospace industries (a few listed below), have established “software factories” as one method to drive better software development, testing and delivery.



- **Lockheed Martin’s software factory** “delivers cybersecure mission capabilities” enabled by cloud-based apps, automation and DevSecOps.
- **CACI’s Agile Solutions Factory (ASI)** optimizes Agile software development to increase “end-user satisfaction through higher quality and more secure software deployed on shorter release cycles.”
- **Booz Allen Hamilton’s Software Studio** offers software factories as a service to “automate away repeatable tasks, free up time for the critical mission work, and meet the demand for quality solutions at scale.”

Software factories have expanded so much across these sectors because our biggest challenges are increasingly solved with software-based solutions.

* Source: Lockheed Martin, [Lockheed Martin Software Factory](#), 2023.

CACI, [Agile Solution Factory](#), 2023.

Booz Allen, [The Software Studio](#), 2023.

Defense Innovation Board, [Software is Never Done](#), 2019.



Software development teams outside of factories

Civilian agencies, such as the Department of Veterans Affairs and the Department of Homeland Security, have also established software factories to improve their internal IT capabilities and better deliver services.

But software factories are not the only way that government agencies deliver public services digitally. Multidisciplinary teams of UX designers, product managers and engineers at agencies such as the United States Digital Service, Defense Digital Service, and Florida Digital Service help transform how citizens interact with their government through technology.

Other agencies, like NASA, incorporate the principles of DevSecOps and the Digital Services Playbook into their existing IT organizations to enable the rapid and continuous delivery of software capabilities for users.

If you are interested in helping your organization modernize its software development, what follows are a few best practices from these examples that can help get you started.



The Defense Digital Service is a team of technologists working at the request of the Secretary of Defense and helping the DoD leapfrog the current state of technology.

Learn more about how the [Defense Digital Service fortifies government teamwork in Slack.](#)

* Source: Federal News Radio, [Veterans Affairs driving new software capabilities by making DevSecOps part of its culture](#), 2021.
GovCIO, [Coast Guard to Launch Software Factory for Better Cybersecurity](#), 2023



Software factory plays

1. Establish clear goals and objectives

Clearly document the services that your organization will deliver, whether they exist as digital offerings today or not.

Beware of objectives such as “increase innovation” or “promote agility.” While these can certainly result from successful software factories, they should not be goals themselves. The purpose of any software factory is first and foremost to provide users with valuable software.

Objectives should be tied to desired user outcomes. For example, “decrease the amount of time it takes a user to complete an online application by 50%” or “decrease the time spent refueling each aircraft by 20 minutes” are good examples of user-centered goals.

Secondary objectives can be internally focused: “Reduce time to MVP deployment by six months” or “resolve Sev-1 incidents within 24 hours” are examples of goals that software factories may establish to measure their progress in adopting this new way of working.

Documenting key metrics associated with service delivery will also allow you to demonstrate ROI gained from the software factory model. “Increasing software deployments from months to days to minutes” is a good example of a team-centered goal around velocity improvements to meet customer needs.



The Army Software Factory finds mission success with GovSlack

Modernizing the Army meant more than just replacing physical assets like weapons and vehicles. It also meant digital transformation: adopting new technologies to keep the organization agile and effective. Part of that digital effort is being championed by a small but mighty new unit, the Army Software Factory (Army SWF).

Despite having launched just two years ago, the Army SWF has already produced impressive results. In 2021 alone, Army SWF soldiers considered more than 100 Army problems, and are now developing 10 different applications to solve them. These include apps for:

- Mapping the ideal location for storing explosive weapons in supply depots
- Reserving scarce training areas for Army units in Hawaii
- Helping workers more easily find goods and materiel in warehouses
- Streamlining the job-search process for National Guard members



[Learn more about the
Army Software Factory](#)



2. Engage directly with users

“If we have users of our platform offerings who aren’t part of the Software Factory, we can bring them into specific Slack channels where they can make requests. That is really, really beneficial.”

Hannah Hunt

Chief of Product, Army Software Factory



“Understanding what people need” isn’t just nice to have ... it’s central to building great software.

The Army Software Factory achieves this by adding users into Slack channels where they provide direct feedback that drive product changes. The General Service Administration’s (GSA) Technology Transformation Service “has specific channels in Slack that the public can join. These channels end with *-public*.”

Soliciting user feedback is also the only way agencies can design and deliver services consistent with the Executive Order on Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government. The “CX Order,” as it’s colloquially known, charged federal IT leaders with using “technology to modernize government” and to “continually improve their understanding of their customers...”

* Source: Slack, [The Army Software Factory finds mission success with GovSlack](#), 2022.

United States Digital Service, [Digital Services Playbook](#).

General Services Administration, [TTS Handbook: Slack: User Management](#).

The White House, [Executive Order on Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government](#), 2021.



3. Embrace DevSecOps

DevSecOps is a set of practices that combines software development (Dev), security (Sec), and IT operations (Ops) through automation, collaboration, authorization and feedback to enable continuous delivery and running of software.

- It's the model for how engineering and operations teams are already [pushing out secure code on shorter timelines](#).
- It's how leading [tech companies are finding competitive advantages](#).
- And it's [how software factories produce secure software](#) through continuous integration and delivery.

At Slack, DevSecOps means a “service ownership” culture in which teams own the end-to-end customer experience.

Slack views DevSecOps as a way to reduce risk through tools and culture. As systems increase in number and scope, the teams managing them need platforms to reduce complexity. Slack seeks to reduce repetitive manual tasks and the need for operator intervention.

DevSecOps is central to how Slack successfully manages 150 million messages per minute and 180 billion database queries per day with a 99.99% uptime Service Level Agreement (SLA).

“We have what we like to call an ‘end-to-end delivery pipeline’ that starts with source code and goes all the way through to production deployment. And now we have Slack integrated into all the key milestones in that process.”

Thomas Lawless

Senior Software Engineer, IBM



4. Choose the right tools and technologies

ChatOps is a popular way of managing DevSecOps activities like building, validating, deploying and monitoring software from within collaboration platforms. ChatOps brings your tool suite into a single pane of glass, where users can interact with them and each other through natural conversations and commands, creating better alignment and visibility across your organization.

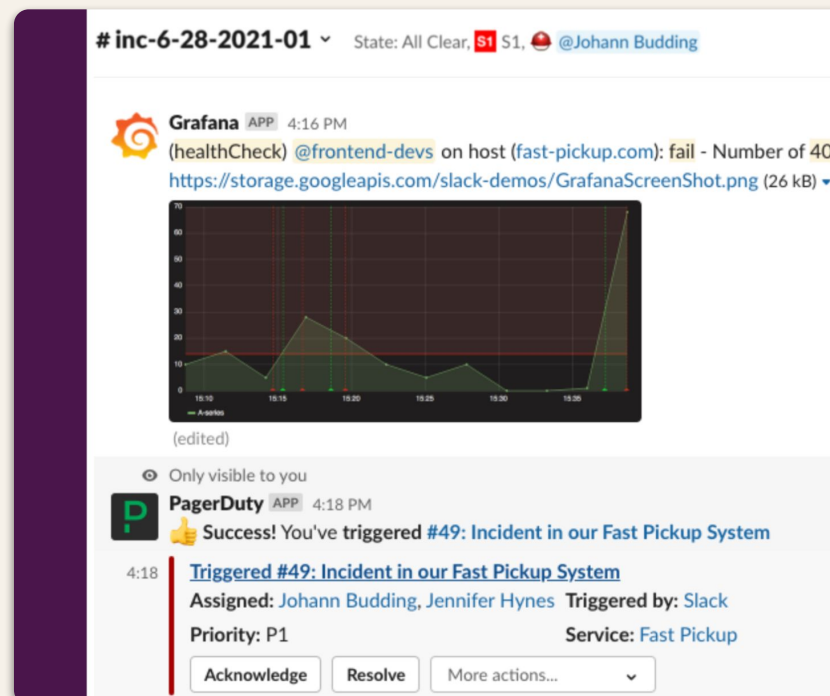
69%

of “elite performing” teams utilize a Slack bot or integration in Slack, according to the 2019 Accelerate State of DevOps Report^{*}

Cloud-based and open-source software development tools are the most commonly used tools by successful software factories as they offer scalability, reliability and savings compared with proprietary software.

In fact, the highest performing DevSecOps teams were 24 times more likely to execute on all five capabilities of cloud computing defined by the National Institute of Standards and Technology (NIST), which include, on-demand self-service, broad network access, resource pooling, rapid elasticity and measured services.

Slack is a cloud-based platform that offers integrations with 2,600+ apps and integrations to bring your tools into one place.



The screenshot shows a Slack channel interface. At the top, the channel name is `#inc-6-28-2021-01` with a dropdown arrow, and the status is "State: All Clear." followed by a red status icon, "S1", and the user "@Johann Budding".

The first message is from the "Grafana" app, timestamped "4:16 PM". It contains a message: "(healthCheck) @frontend-devs on host (fast-pickup.com): fail - Number of 40" followed by a link to a screenshot: <https://storage.googleapis.com/slack-demos/GrafanaScreenShot.png> (26 kB). Below the text is a line graph showing a sharp increase in a metric, with a red vertical line indicating the current point. The word "(edited)" appears below the graph.

The second message is from the "PagerDuty" app, timestamped "4:18 PM". It starts with a thumbs-up icon and says "Success! You've triggered #49: Incident in our Fast Pickup System". Below this, it says "Triggered #49: Incident in our Fast Pickup System". Further down, it lists "Assigned: Johann Budding, Jennifer Hynes" and "Triggered by: Slack". The priority is "P1" and the service is "Fast Pickup". At the bottom, there are three buttons: "Acknowledge", "Resolve", and "More actions..." with a dropdown arrow.



^{*} ^Source: CTO.ai, [What is ChatOps? The 4 Advantages of Automating in Slack](#), 2020.
DevOps Research and Assessment (DORA) and Google Cloud, [The 2019 Accelerate State of DevOps](#), 2019.

Slack offers developers choice

400+

DevOps tool integrations vetted for security and compliance and available in the Slack App Directory

SHIP QUALITY CODE FASTER

Coordinate build pipelines

- Avoid bottlenecks and errors during the build and deploy processes by integrating CI/CD tools into Slack
- **Increase** speed to market

#proj-phenix ⓘ

Jira APP 10:15 AM
@Jennifer created a **Task**

#AZ-7643: User profile language FR resources missing.

Urgency	Status
medium	New

Assignee
N/A

[Update Task](#) [View in Jira](#)

BitBucket APP 3:45 PM
Pull request #147 in Westeros/Web

[web_fix/frontend_repair](#) | (Open)
[web_fix](#) → [master](#)

Description
Fix the memory leak causing crashes on the frontend

Reviewers
✅ @Johann Budding, @Elena Cuevas

Builds
2 of 2 passed ✅

[Merge](#) [Nudge Reviewers](#) [Add Comment](#)

Jenkins APP 9:51 PM
Christopher Rung
Test Project, build #2
Failed

Test Results
Passed: 9, Failed: 1, Skipped: 0

Branch
christopher.rung_JIRA-123

Last Commit
JIRA-123: This is a test commit message

#proj-phenix ⓘ

★ 1 Pinned + Add a bookmark

BitBucket APP 3:45 PM
Pull request #147 in Westeros/Web

[web_fix/frontend_repair](#) | (Open)
[web_fix](#) → [master](#)

Description
Fix the memory leak causing crashes on the frontend

Reviewers
✅ @Johann Budding, @Elena Cuevas

Builds
2 of 2 passed ✅

[Merge](#) [Nudge Reviewers](#) [Add Comment](#)

Release Request WORKFLOW 3:51 PM
@Johann Budding Has submitted a Release Request on 06/30/2023

- Code Repository: [ssh://git@bitbucket.es.adp.com:7999/upenv/configuration-values](#)
- Deployment Instructions: [https://my.company.com/confluence](#)

devbot APP 3:51 PM
@Johann Budding is deploying phoenix
Repo: acme-phoenix
Release Notes: [ACME-6157](#) add new Phoenix functionality (PR #1593)

- ✅ 31. Executing Confirm Choice 1
- ✅ 32. Executing SyncFilesToS3
- ✅ 33. Synching directory /tmp/ACMEDevBot--1f031139-89eb-4dd8-9f21-dd8bae8d88f7-deploy3478279416825419021 to S3 Bucket [static.prod.acmeenterprises.com](#)
- ✅ 34. Executing SetCommitStatus
- ✅ 35. Executing PushReleaseToMaster
- ✅ 36. Pushed release caaf67b0a036f07304d3038f924c12a703c83503 to master

✅ DEPLOYMENT FINISHED ✅
Started At: 2021-6-30 17:51
Finished At: 2021-6-30 17:52

BRING VISIBILITY TO YOUR DEVELOPMENT CHAIN

Orchestrate CI/CD toolchains

- Bring all your DevSecOps tools into a Slack channel to achieve transparent, real time, end-to-end status updates throughout the software development lifecycle.

“Today’s developers fundamentally work more horizontally than vertically, and Slack helps to enable this way of working.”

Martin Wildberger

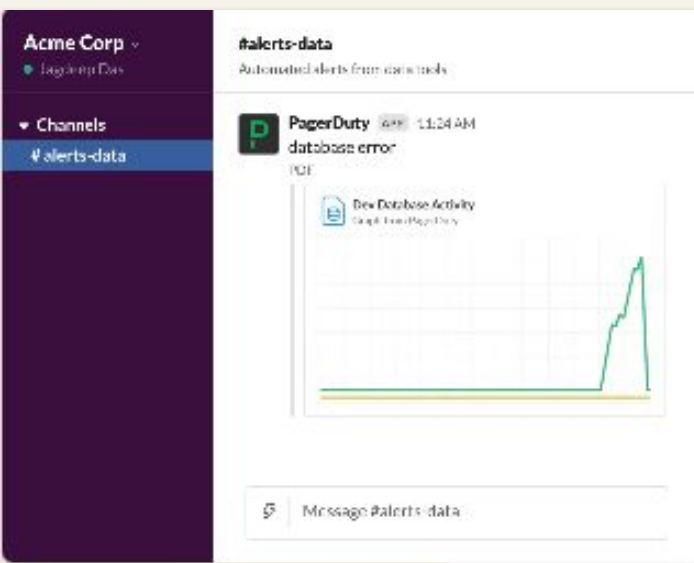
Executive Vice President of Innovation and Technology, RBC

53%

of developers use Slack*

700K+

daily active registered developers^



SOLVE ISSUES FASTER

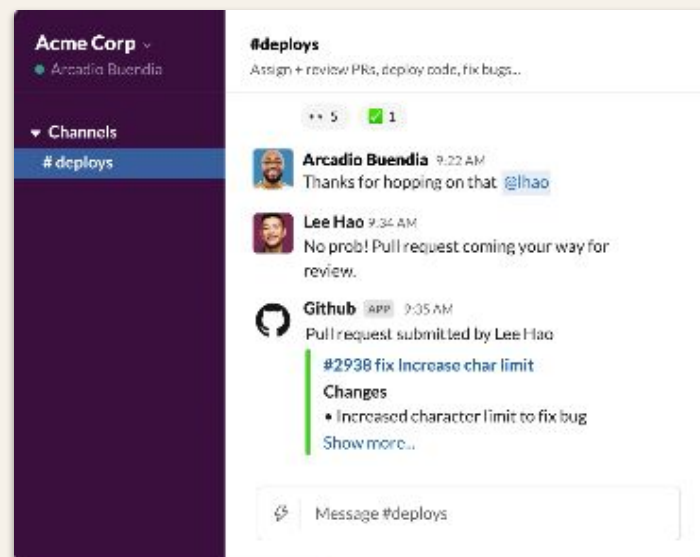
Maximize uptime with a speedy response

- Pipe real-time alerts into channels automatically
- Run parallel investigations to find answers quickly
- Create one source of truth for fast, easy analysis

DEPLOY EFFICIENTLY

Align your team and processes

- Bring documentation into channels for informed decisions pre-code
- Establish a single place for code review and testing
- Integrate tools to boost deployment visibility and automation



Source: Slack, [RBC's tech teams explore new ways of working with Slack](#).

*Source: Stack Overflow, [2020 Developer Survey](#), 2020.

^ Source: Slack, [The value of Slack for software developers](#), 2019.

5. Secure your software supply chain

Software factories can also help organizations meet their security and compliance requirements. The principles of DevSecOps are consistent with some of the most recent guidance for software development including:

- Department of Defense Zero Trust Strategy
- Executive Order on Improving the Nation's Cybersecurity

Zero Trust

Slack is built for Zero Trust—both in how Slack DevSecOps teams develop the platform and how administrators can configure access through enterprise-grade data protection, identity and device management, and information governance.

Additional features such as audit log UI, session-anomaly events, and multi-SAML login, make it easier for software factories to protect themselves from external and internal threats—no extra budget, head count or code required.

To easily detect suspicious behaviors and take immediate action, a new audit log dashboard allows admins to swiftly relieve relevant events in Slack.

Software supply chain

Recent cyberattacks, such as those executed against SolarWinds, demonstrated the “increased need for software supply chain security awareness.”*

Slack offers control and visibility into which tools are used in the software development lifecycle and who is using them. CI/CD pipelines are transparent across teams all within the channel.

Slack admins can approve or restrict integrations at the user or organization level and set up policies for users to request apps.

Security and compliance details allow admins to make informed decisions about the tools used within their software supply chain.



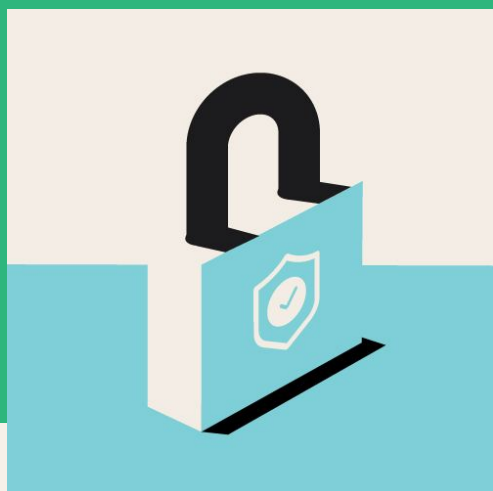
Enterprise-grade security

Slack enables government agencies and system integrators to build software consistent with their security requirements and DevSecOps practices.

Clearly security needs to be in the middle of Dev and Ops. That is why organizations ranging from [Lockheed Martin](#) to [IBM](#) to the [U.S. Army Software Factory](#) use Slack to facilitate their software development work on a secure, compliant and digital platform.

[GovSlack](#) offers additional peace of mind when it comes to securing your software supply chain as it runs in AWS GovCloud data center operated by U.S. personnel and comes with complimentary Slack Enterprise Key Management so that teams can use their own encryption keys for complete visibility and control over the data.

GovSlack is the secure, flexible collaboration version of Slack purpose-built to support the compliance requirements of the U.S. federal government and the organizations that work alongside it. GovSlack runs in an [AWS GovCloud](#) data center and will support key security standards, including FedRAMP High, ITAR, FIPS 140.2, CJIS and DoD IL 4—all without sacrificing the ease of collaboration in Slack.



In response to Log4Shell, the **Cybersecurity and Infrastructure Security Agency (CISA)** “stood up a Slack channel to share intelligence in near-real time, established a platform to serve as the authoritative source on the vulnerability, and took collective action to mitigate the severe risk of this vulnerability to the nation.”*



*Source: Cybersecurity and Infrastructure Security Agency (CISA), [Joint Cyber Defense Collaborative \(JCDC\)](#), 2022.

6. Build a strong, multidisciplinary team

DevSecOps teams composed of engineers, operations staff, security experts, product managers and human-centered designers working collaboratively to deliver end-to-end solutions are more likely to deliver valuable software.

“The biggest predictor of an organization’s application-development security practices was cultural, not technical: high-trust, low-blame cultures focused on performance were 1.6x more likely to have above average adoption of emerging security practices than low-trust, high-blame cultures focused on power or rules.”

2022 Accelerate: State of DevOps Report

The culture within a software factory is as important as the technology or practices—and often is often a reflection of them. When your teams are aligned with your organization’s culture and mission it shows. They’re happier and more engaged with their work, which means better quality and quantity of code from software factories.

One of the most effective ways to boost organization morale and build team culture is by delivering open lines of communication across channels and hierarchies.

Companies that use Slack fully onboard new employees 24% faster, with a 10% increase in employee satisfaction and a 3% reduction in time to hire.*



*Source: IDC Research - Sponsored by Slack, [The Business Value of Slack](#).

**Ready to deliver better
software? Get started.**



The information in this e-book is for informational purposes only