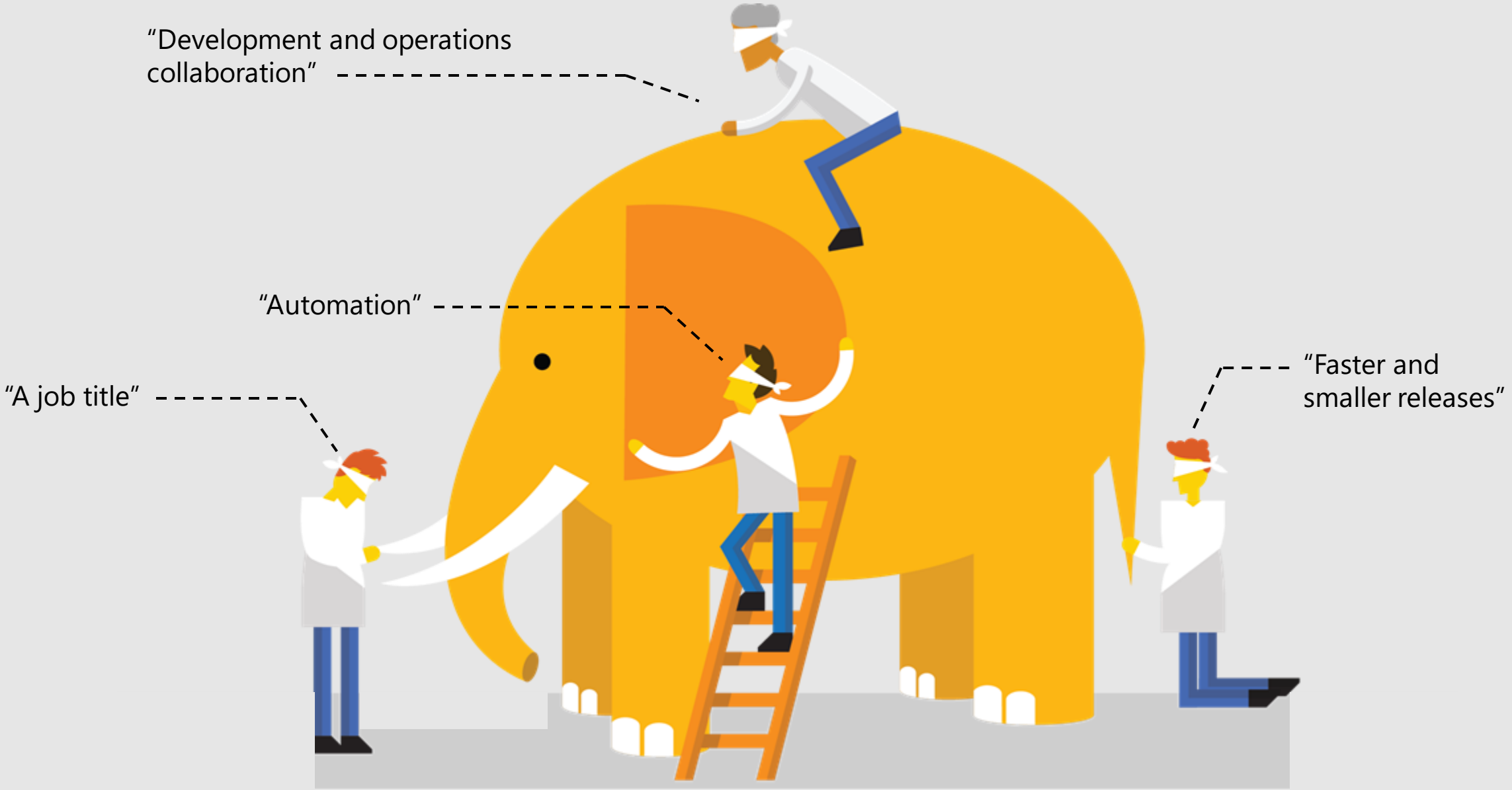
Microsoft

DevOps with GitHub

Simona Toader | Cloud Solution Architect

What is DevOps?



The Plan: Flawless Execution

http://devopsreactions.tumblr.com

The Reality: Environments differ

http://devopsreactions.tumblr.com

A Partial Solution: The Right Tools

http://devopsreactions.tumblr.com

A Partial Solution: Team

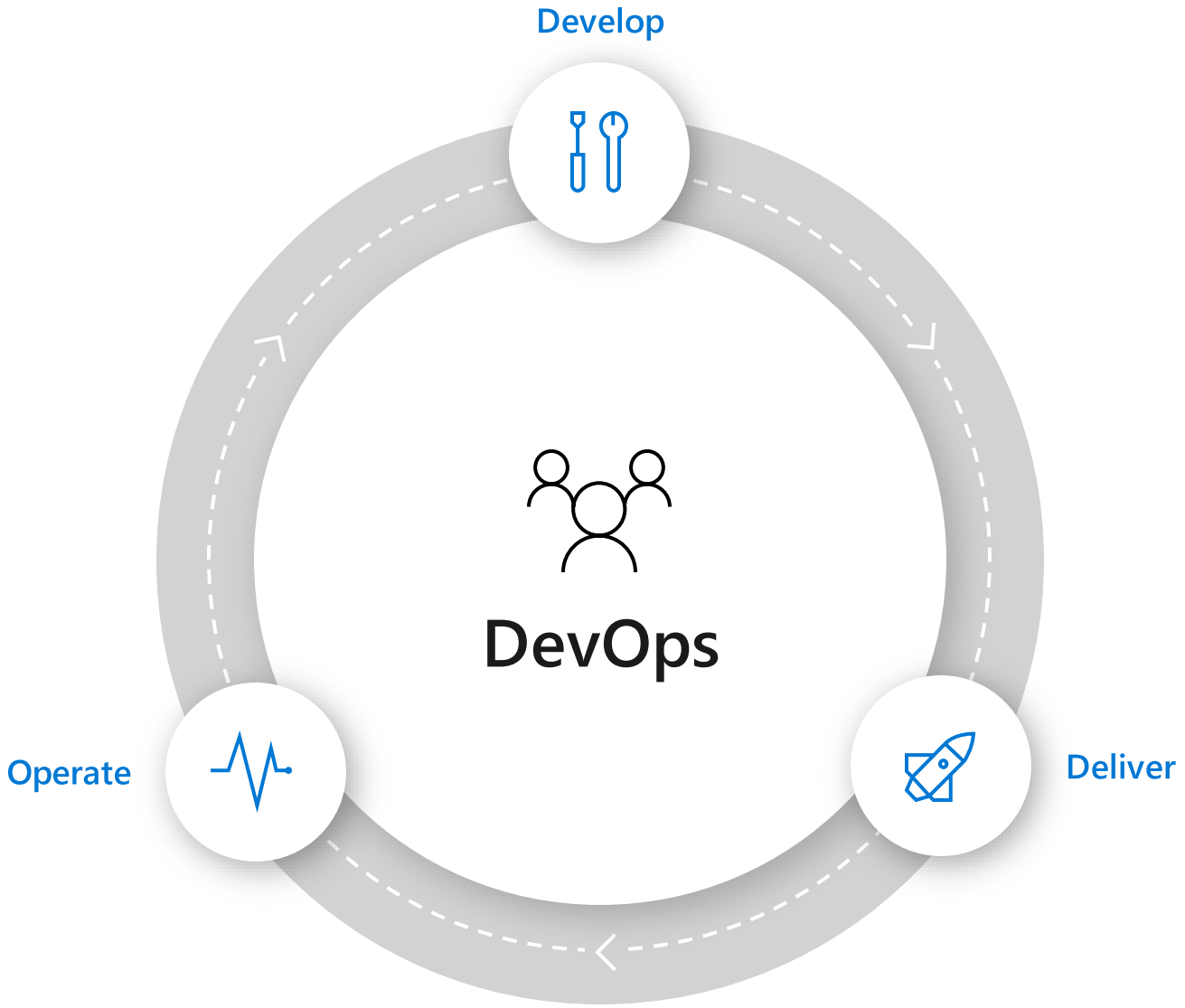
http://devopsreactions.tumblr.com

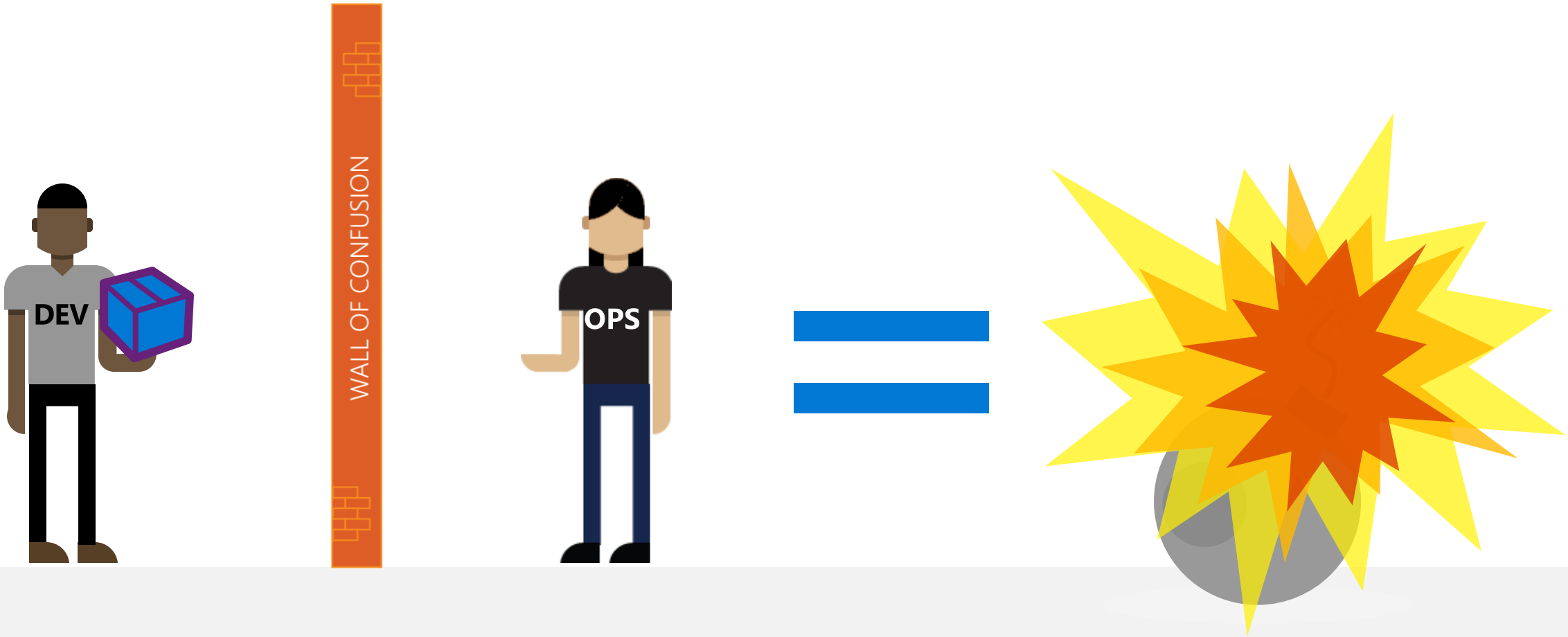
Full Solution: Tools, Team and Process

http://devopsreactions.tumblr.com

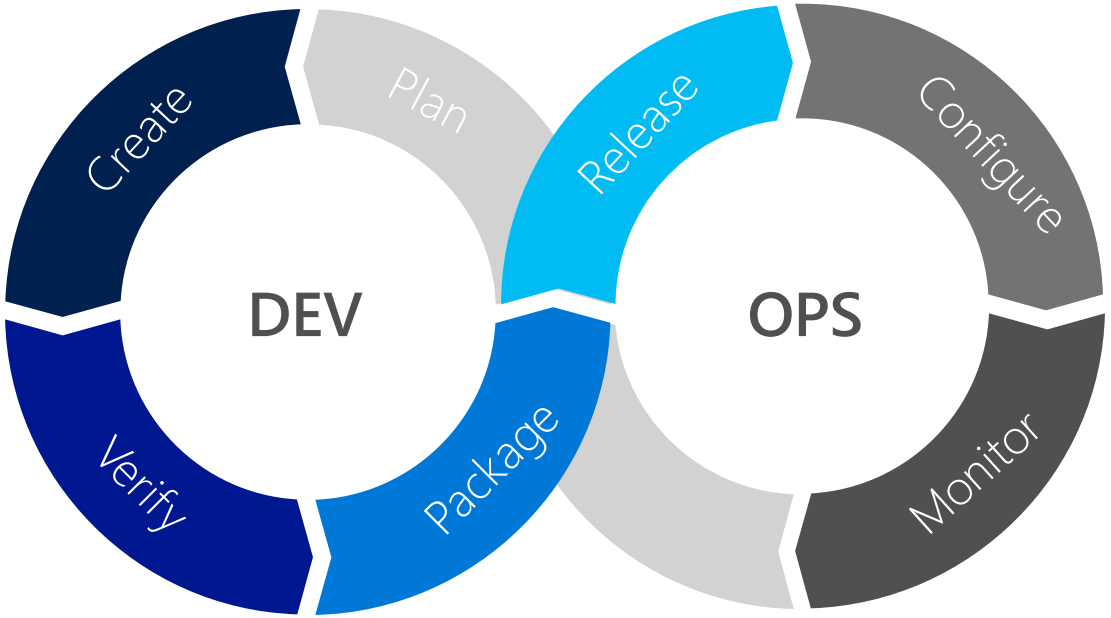
What is DevOps

> DevOps is the union of **people**, **process**, and **products** to enable continuous delivery of value to your end users.




DEV
WALL OF CONFUSION
OPS

DevOps is here… and driving business value

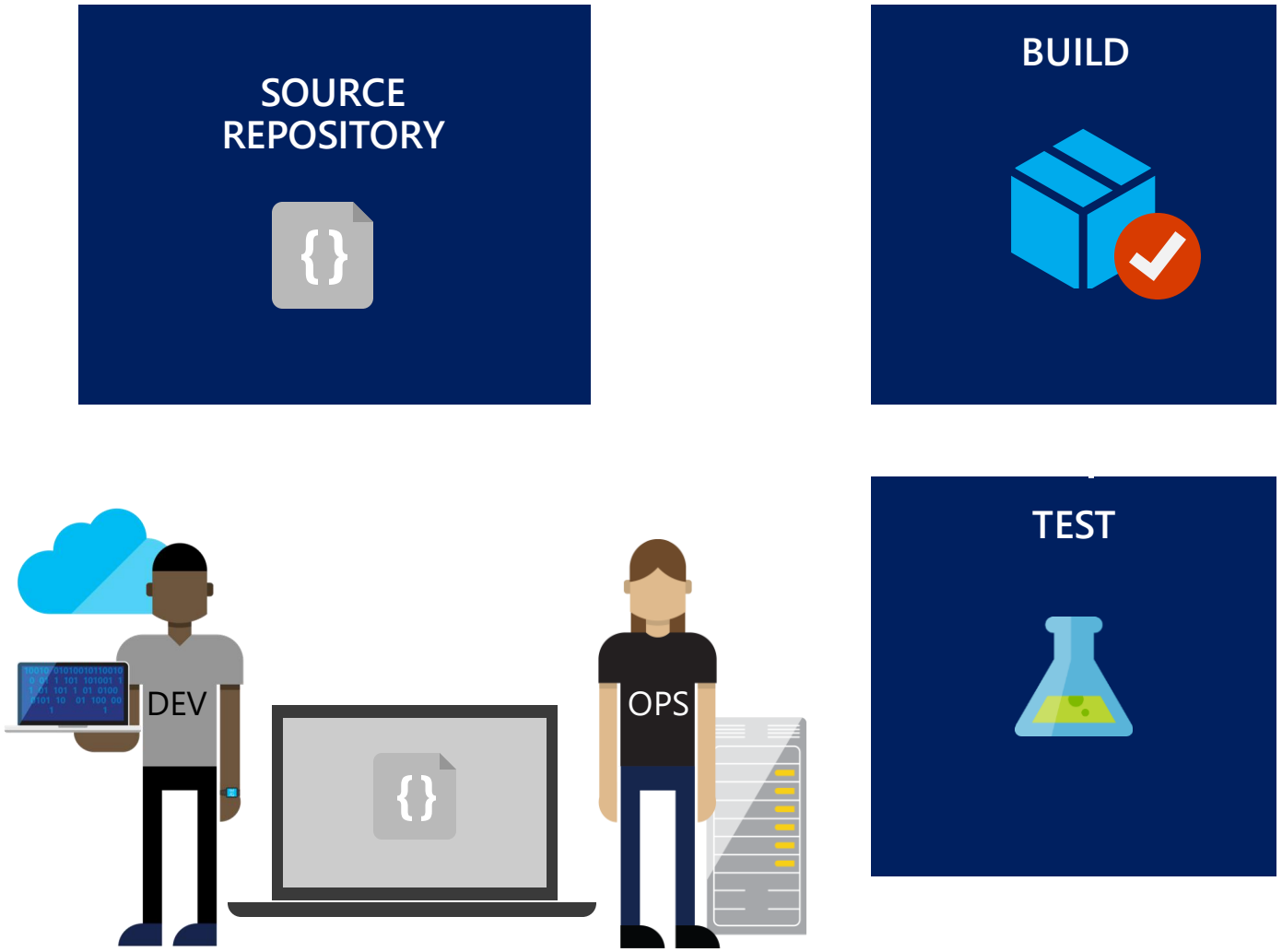


Organizations realizing up to 20% improvements in..

- Time-to-market
- Software quality
- Frequency of deployment
- Increased revenue
- Customer reach and retention

Source: Global Study by CA Technologies

Continuous Integration (CI)



Issues

Delivery delays

Non-working/low-quality code

Incomplete solutions

Rework

Value

Frequent integration

Higher quality

Repeatability

Continuous Integration

Version Control System

Branching Strategy

Automated Build

CI Goals:

#1: Harness collaboration

#2: Enable parallel development

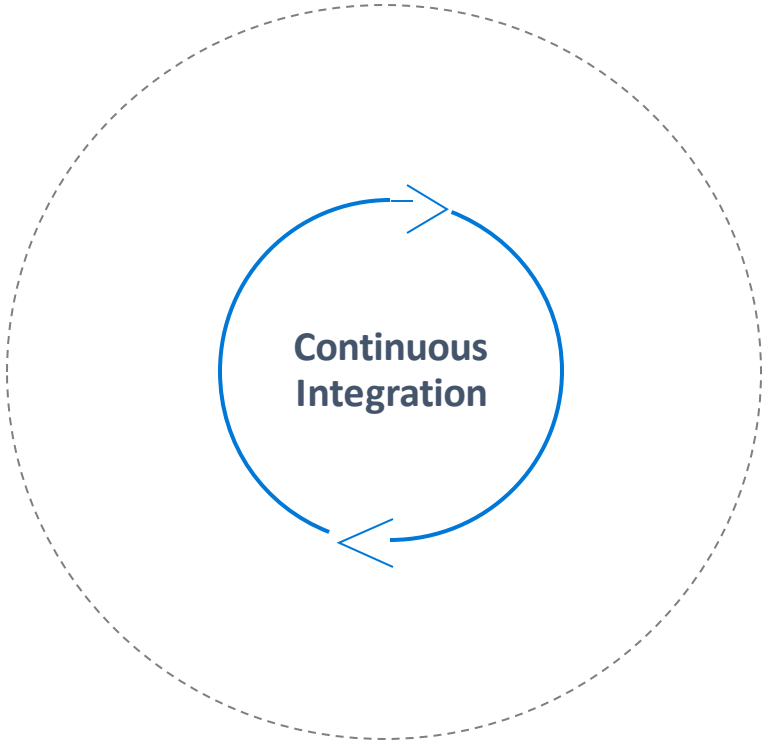
#3: Minimize integration debt

#4: Act as a quality gate

#5: Automate Everything!

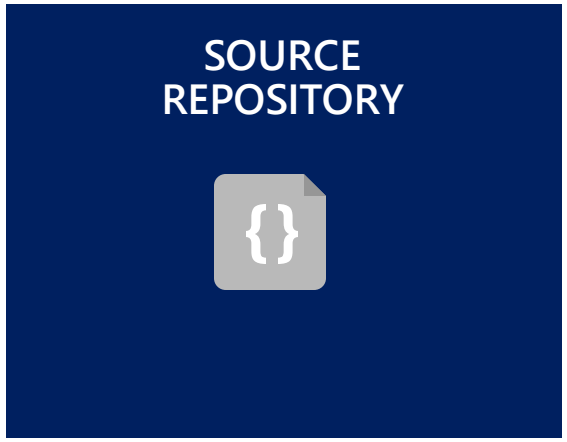
Continuous Integration Practices

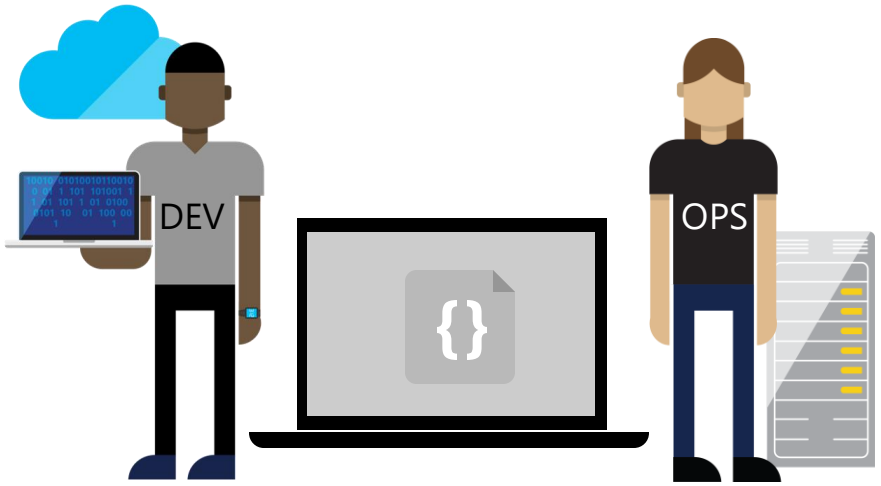
- Multi-Repo
- Trunk Based Branching
- Branch Policies
- Parallel Builds

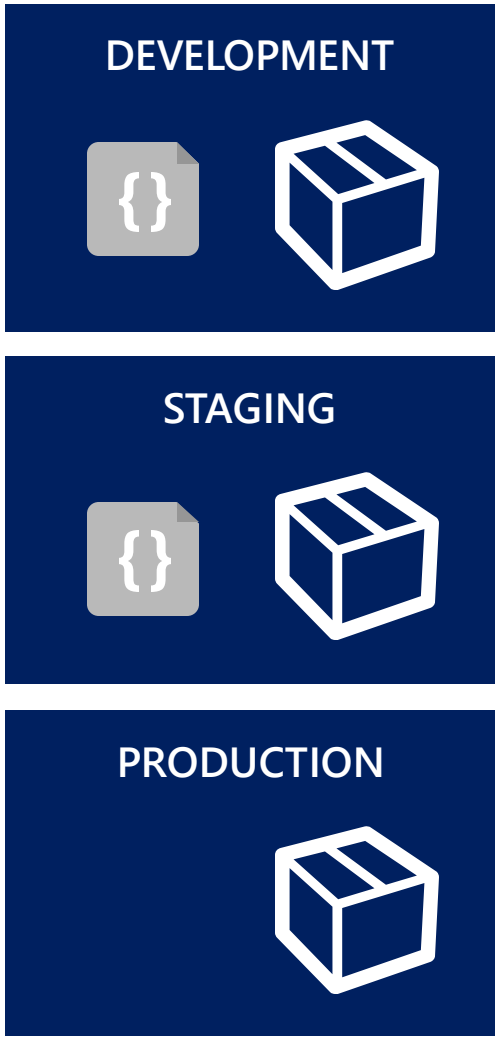


- Culture & Collaboration
- Unit Testing
- Pull Requests
- Security Scanning

Continuous Delivery (CD)







Issues

Slow delivery cadence

Limited predictability when deploying

Complexity when deploying

Value

Consistency

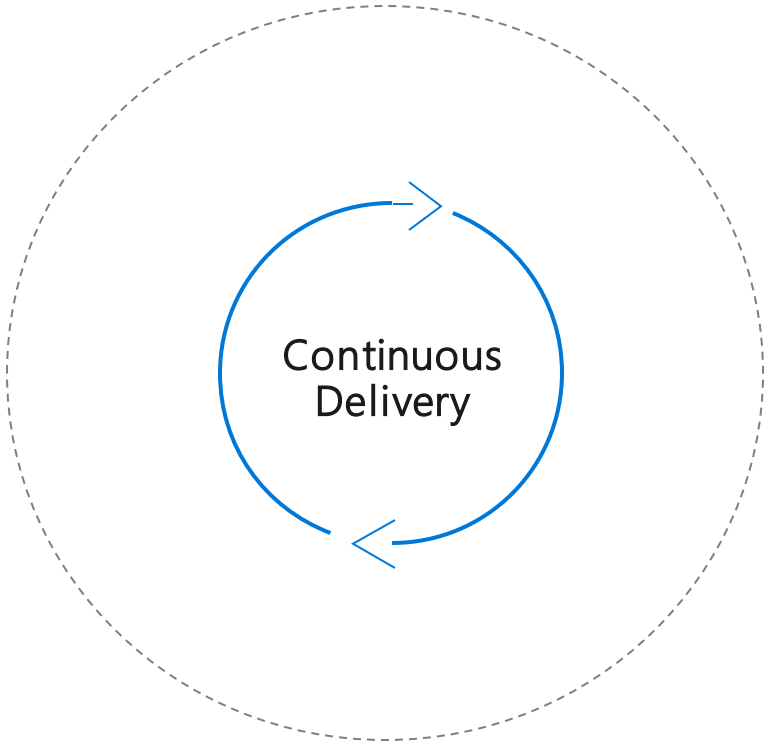
Accelerated deployment

Repeatability

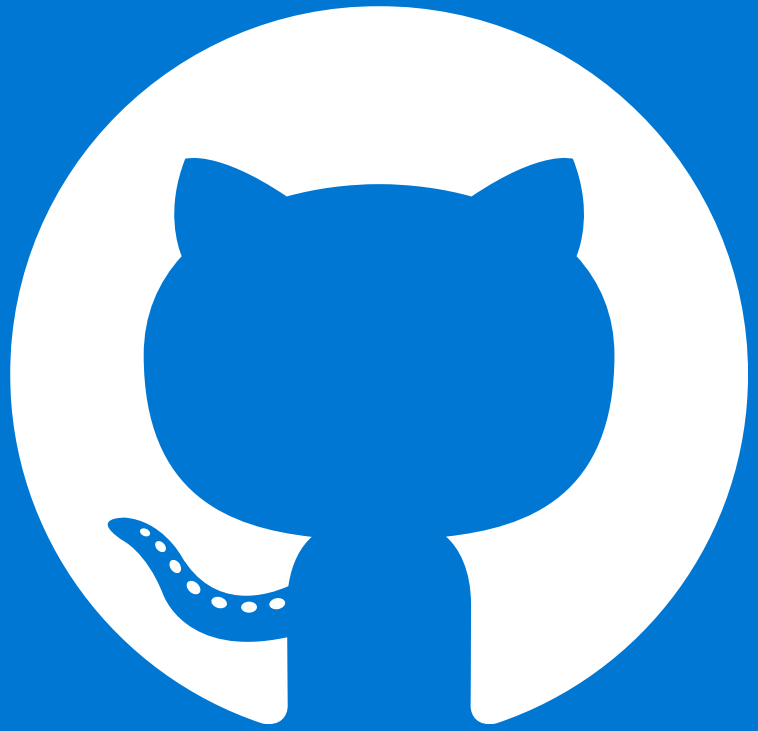
Human error reduction

Continuous Delivery Practices

- Automated Builds
- Build Once
- Trunk Always Prod Ready
- Fix Immediately



- Everything in Source Control
- Feature Flags
- Blue/Green Deploy
- Canary Deployment



GitHub is a critical partner for your Digital Transformation

Team Collaboration

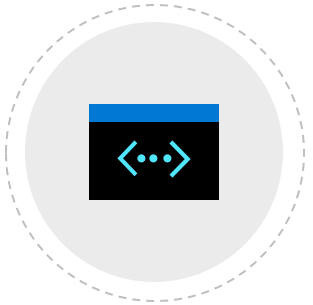
Bring open source code, culture, and best practices into your org

Security & Compliance

Securely integrate open source code in your software

Developer Talent

Attract and retain the best talent with tools developers know and love



Code-to-Cloud DevOps

Automate workflows from code to any cloud

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Team Collaboration

Bring open source culture and best practices into your organization

Increased collaboration

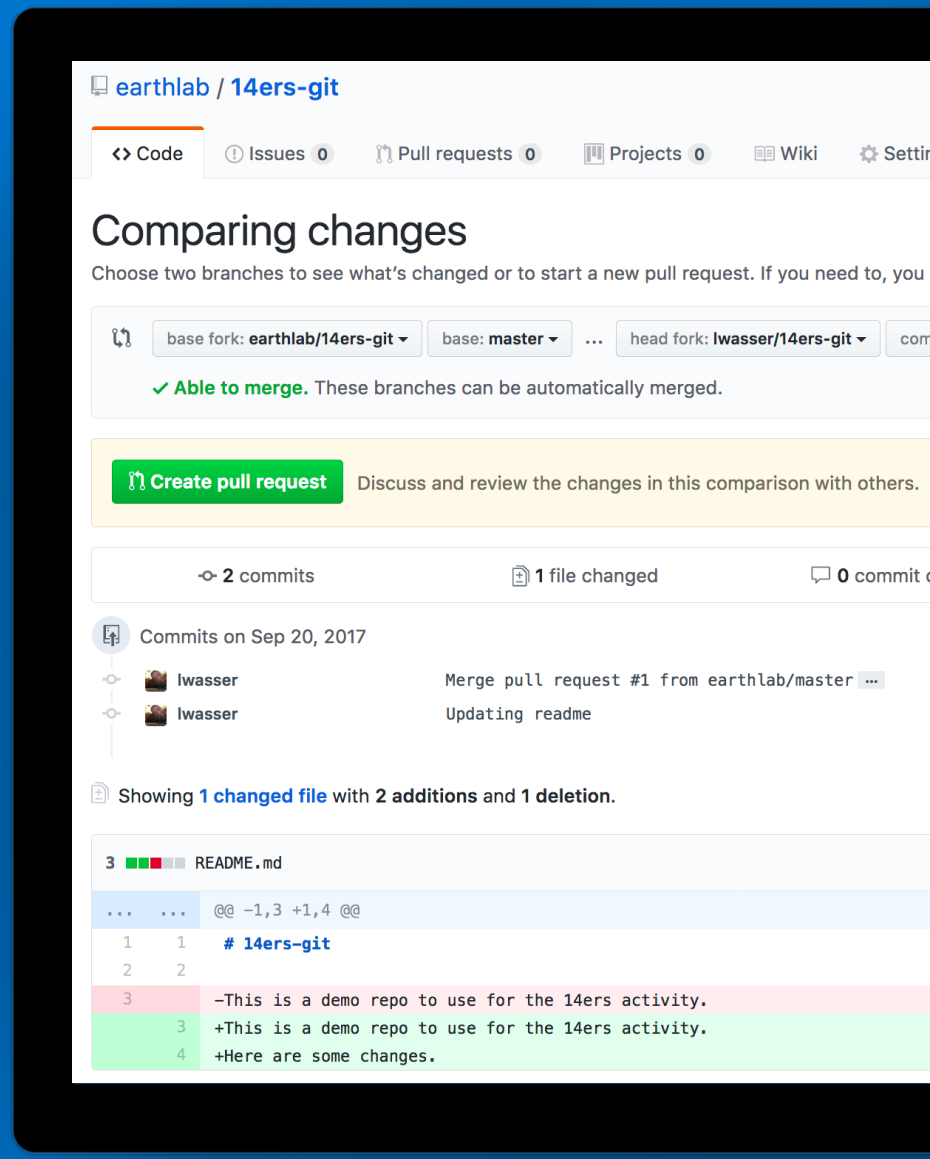
Empower teams to collaborate within your organization

Breaking silos

Simplified collaboration across teams, sharing of knowledge, improved code reuse, and secured workflows

Team Insights

Visibility into team metrics and actionable recommendations to improve team effectiveness and collaboration



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Security & Compliance

Identify early, resolve rapidly

Secure use of Open Source

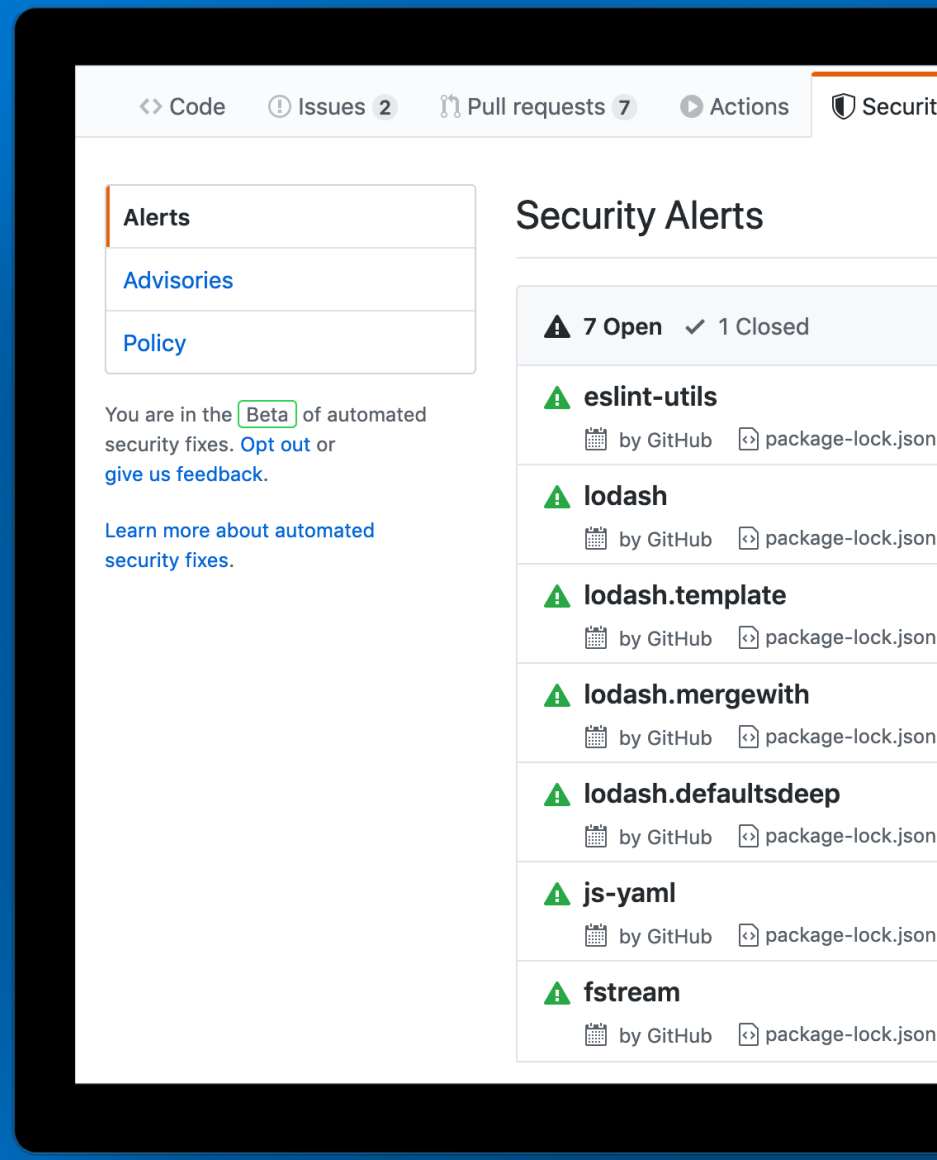
Dependency Insights and automated security fixes help keep your dependencies secure and up-to-date

Pattern based security analysis

Always-on security analysis with GitHub Advanced Security scanning both open source repositories and enterprise code

Global community for security

Integrated into the National Vulnerability Database, MITRE, and WhiteSource for up-to-date security information



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Developer Talent

Attract and Grow Your Teams

Get connected

Recruit top developers to your team and make them feel at home with the platform and processes they already know and love.

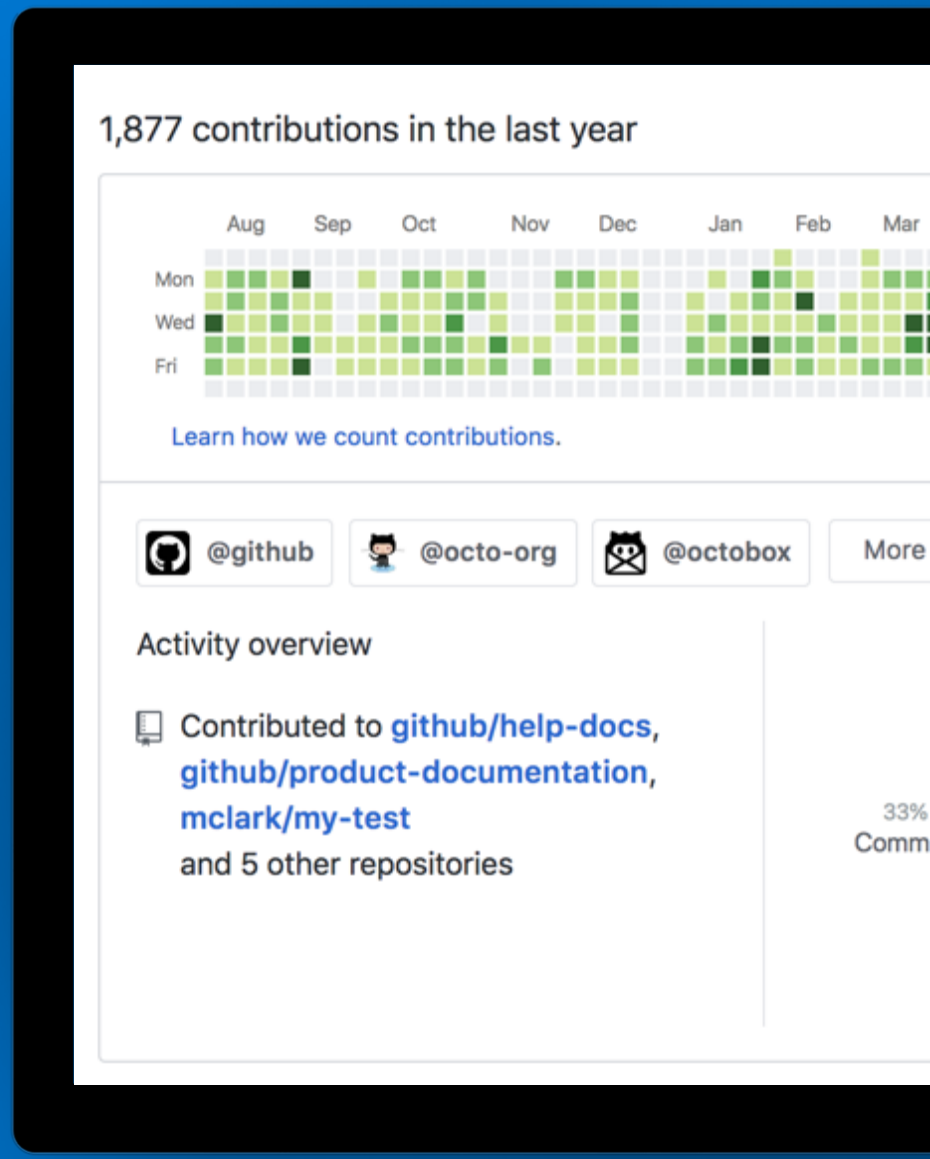
Stay connected

Make it easy for your team to work on the projects they care about—whether open source or internal code

Get started, faster

Provide developers with the platform they prefer and are familiar with can reduce on-boarding time by 40%

Total Economic Impact of GitHub, Forrester Consulting 2020



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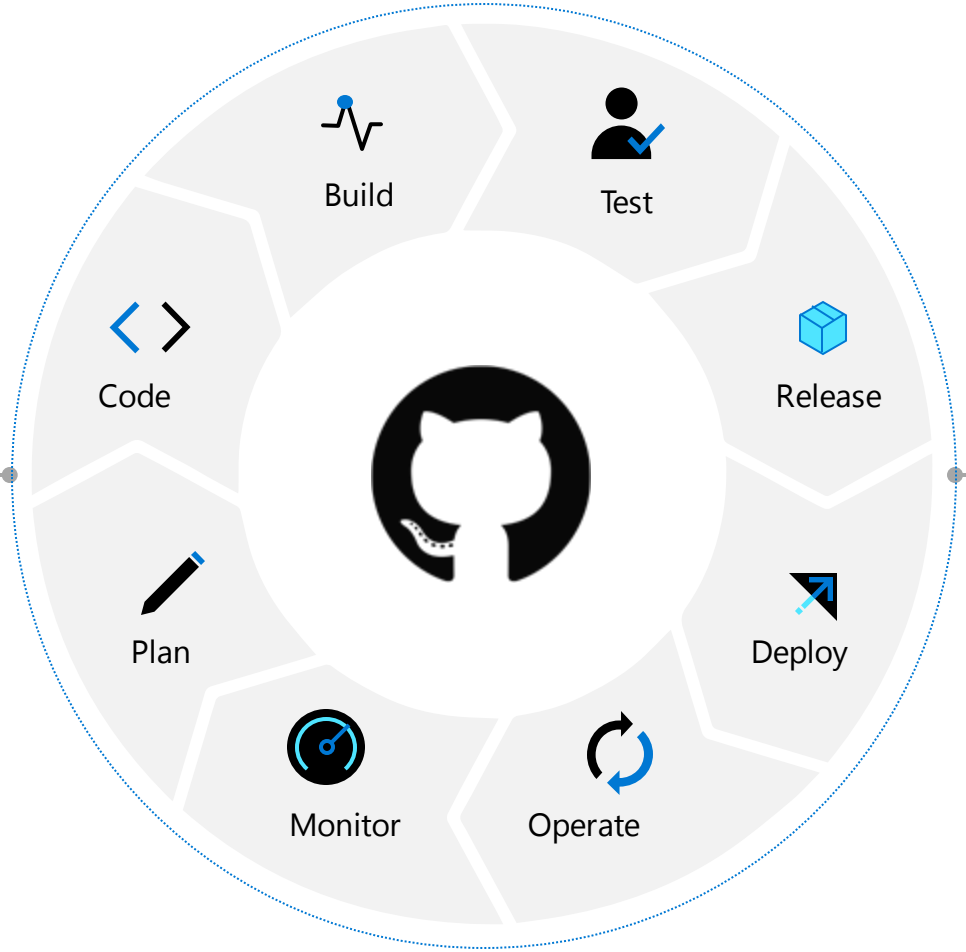
Code-to-Cloud DevOps

Automating workflows from code to any cloud

Home for all developers
Home for the world's code

- Elastic, to any scale
- Fully managed
- Always the latest packages
- Supports all OS for CI/CD
- Largest DevOps ecosystem
- Community-led automation



Deploy anywhere, including your own data centers

- On-prem
- Azure
- AWS
- Google Cloud Platform

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Automated Delivery

Automating workflows from code to cloud

Accelerate delivery through automation

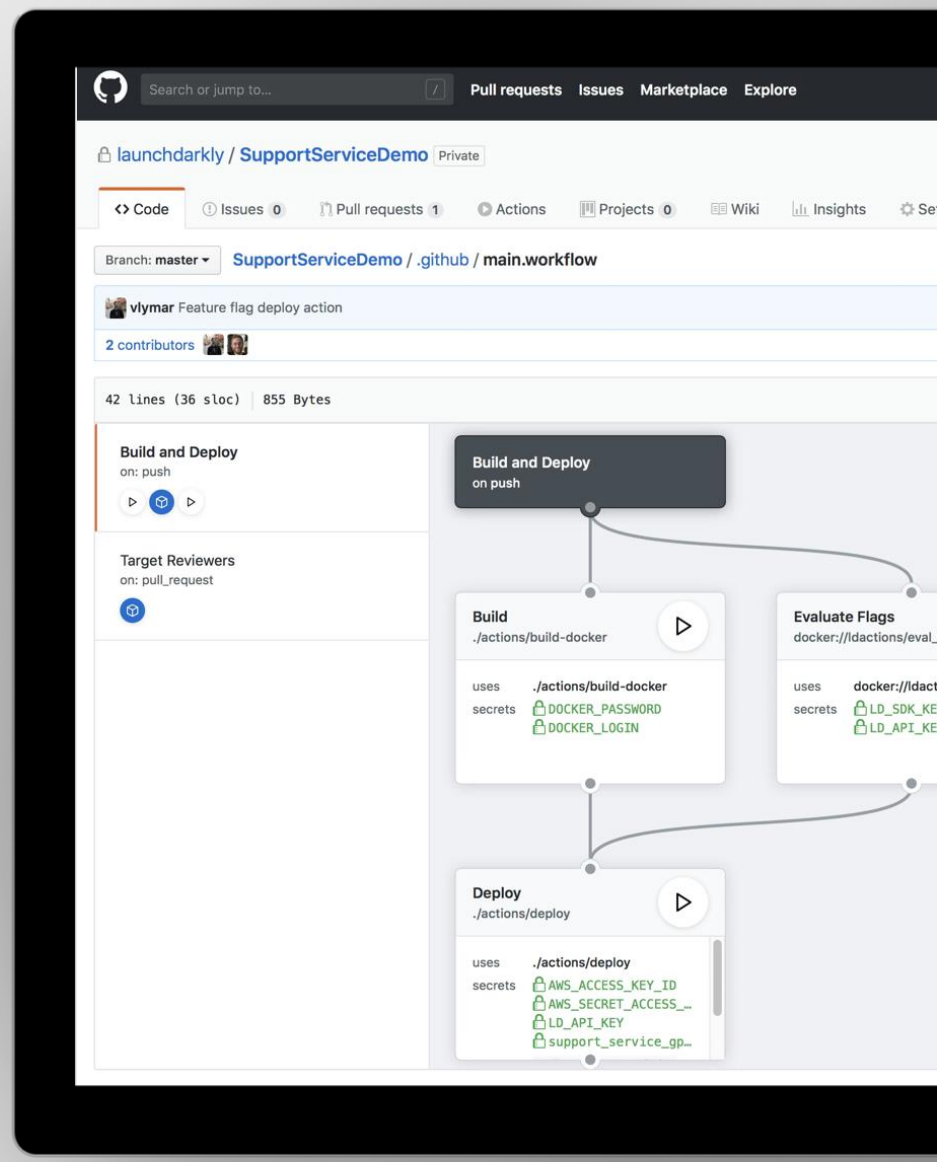
Automation triggers for 20+ project events allows for automation beyond just CI/CD to any available API

Simple and easy to use

Configuration based on YAML with a host of sample workflows to learn from and get started

Global community for actions

Thousands of open source Actions, maintained by the community and by companies offering integrations, including Microsoft Azure



Github Actions

Automate your workflow from idea to production

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Getting started with GitHub Actions

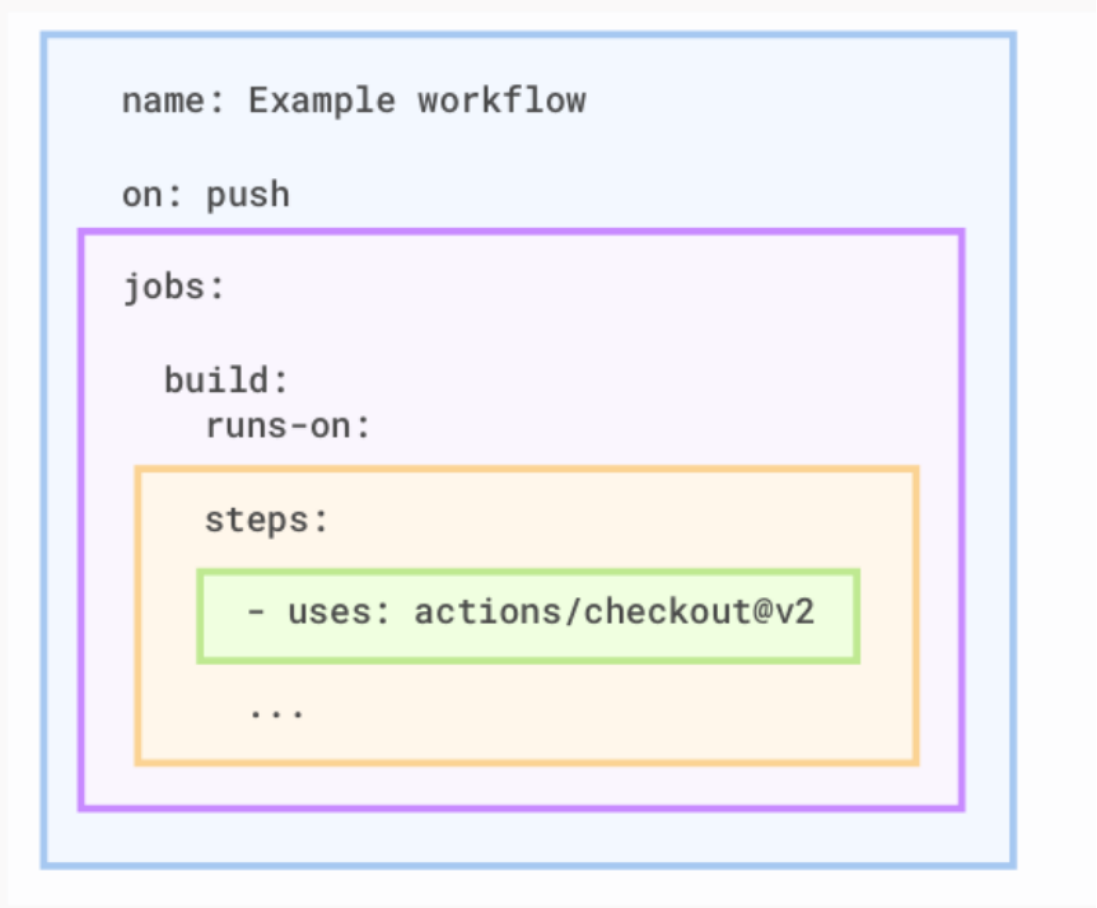
Workflow

-> YAML file stored in the .github/workflows

Action

-> Marketplace or write your own

Getting started with GitHub Actions



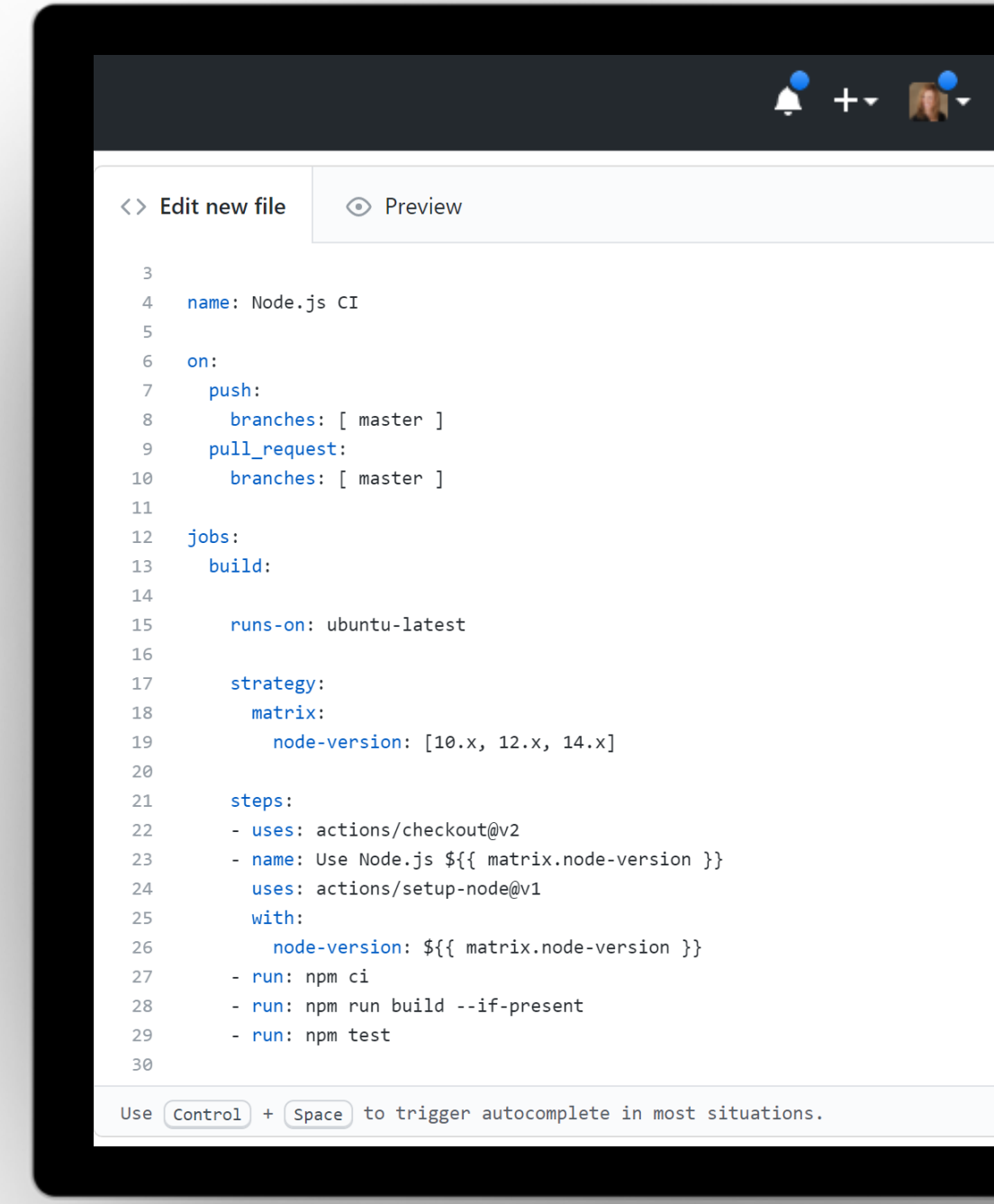
- **Workflow**: unit of automation from start to finish, including triggers, environment or aspects to be considered during the automation
- **Job**: a section of the workflow and is made up of one or more steps.
- **Step**: A step represents one effect of the automation, could be a GitHub Action, or another unit, like printing something to the console.
- **Action**: a piece of automation written in a way that is compatible with workflows.

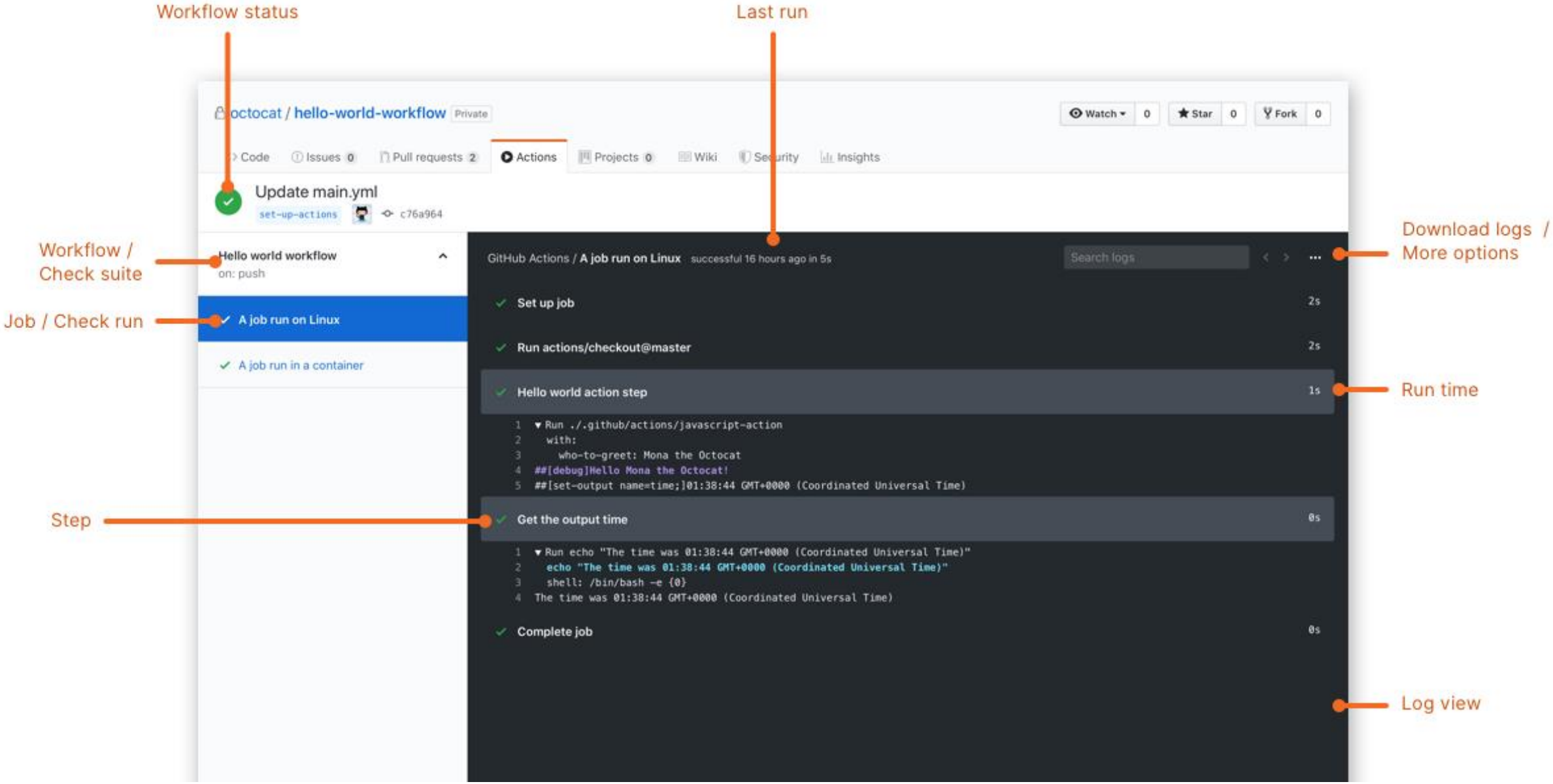
GitHub Standard Actions

The power of GitHub Actions lies in the community. Here are two Actions officially written and supported by GitHub:

- **actions/checkout@v2** ensures the runner has a copy of the codebase.
- **actions/setup-node@v1** is used to set up proper versions of Node.js
- **actions/upload-artifacts:** uploads artifacts from your workflow allowing you to share data between jobs and store data once a workflow is complete.

In addition to running pre-built actions, the workflow can also execute commands, just as you would if you had direct access to the runner.





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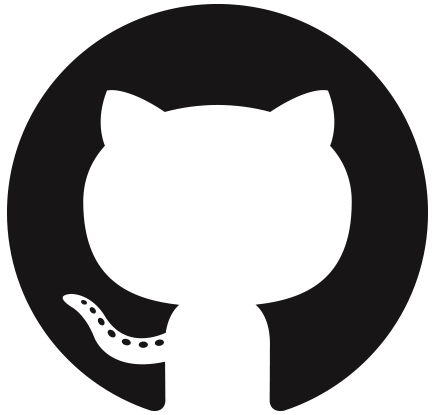

Run a workflow on any GitHub event

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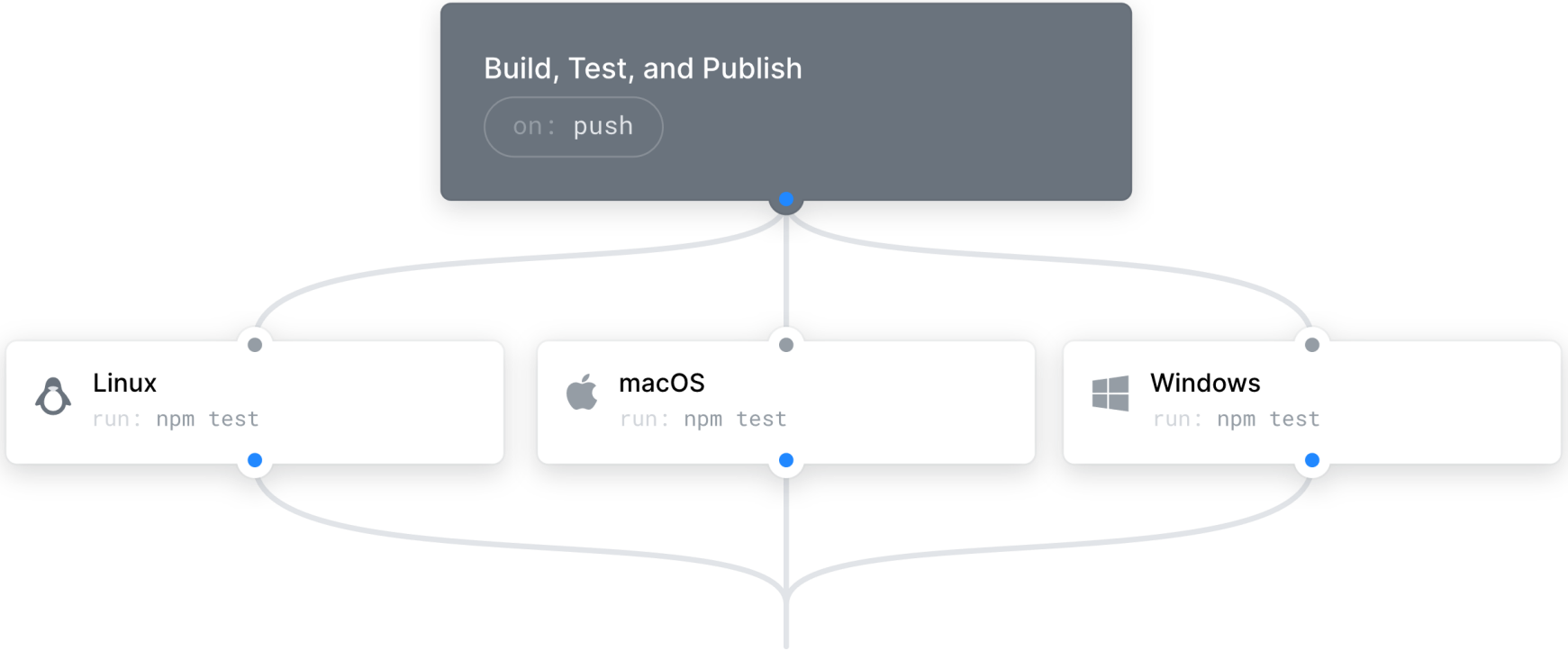

Linux, macOS, Windows, containers

Matrix Builds

Any Language

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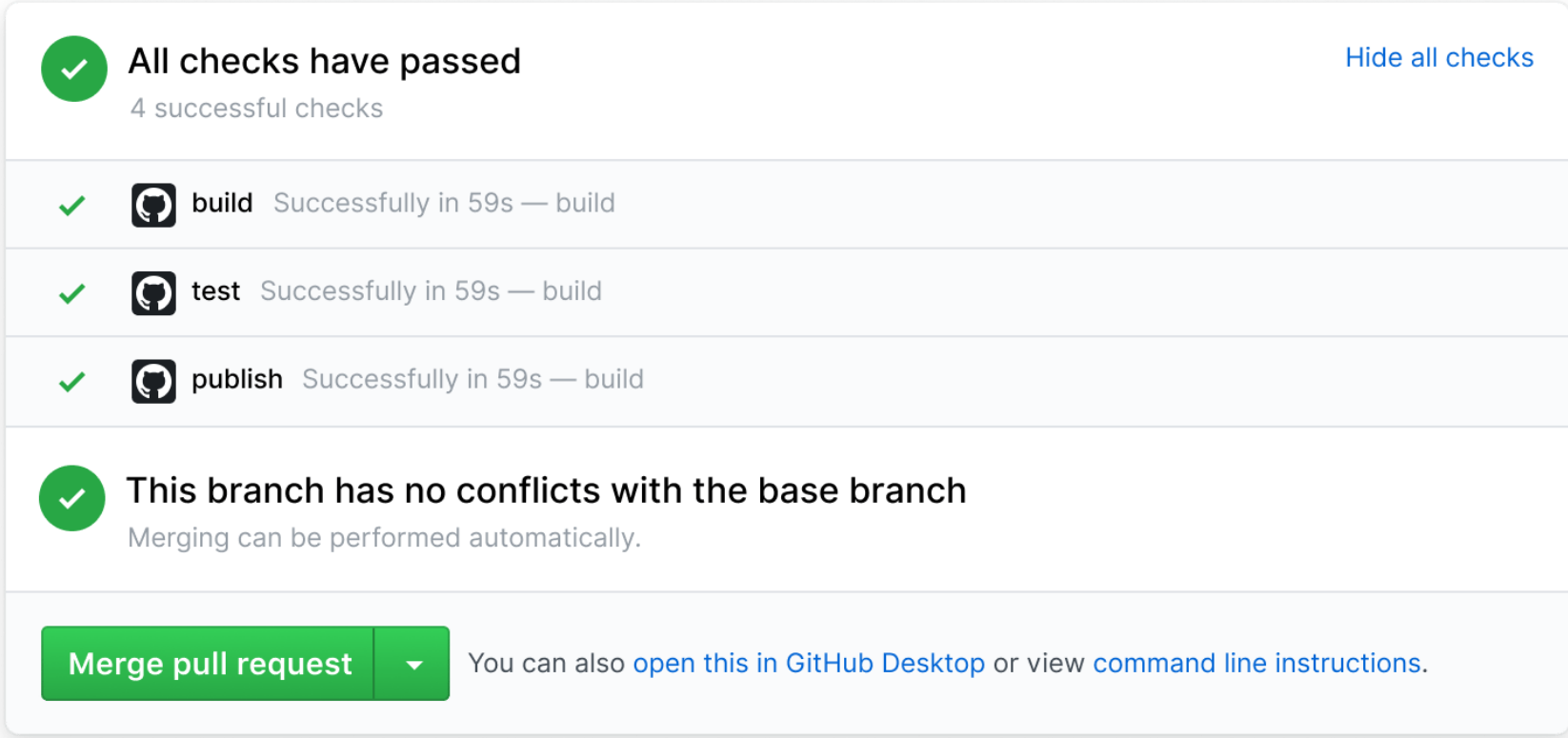
Live logs

Built in secret store

Multi-container testing



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Secure, scalable enterprise workflow automation

End-to-end traceability + governance

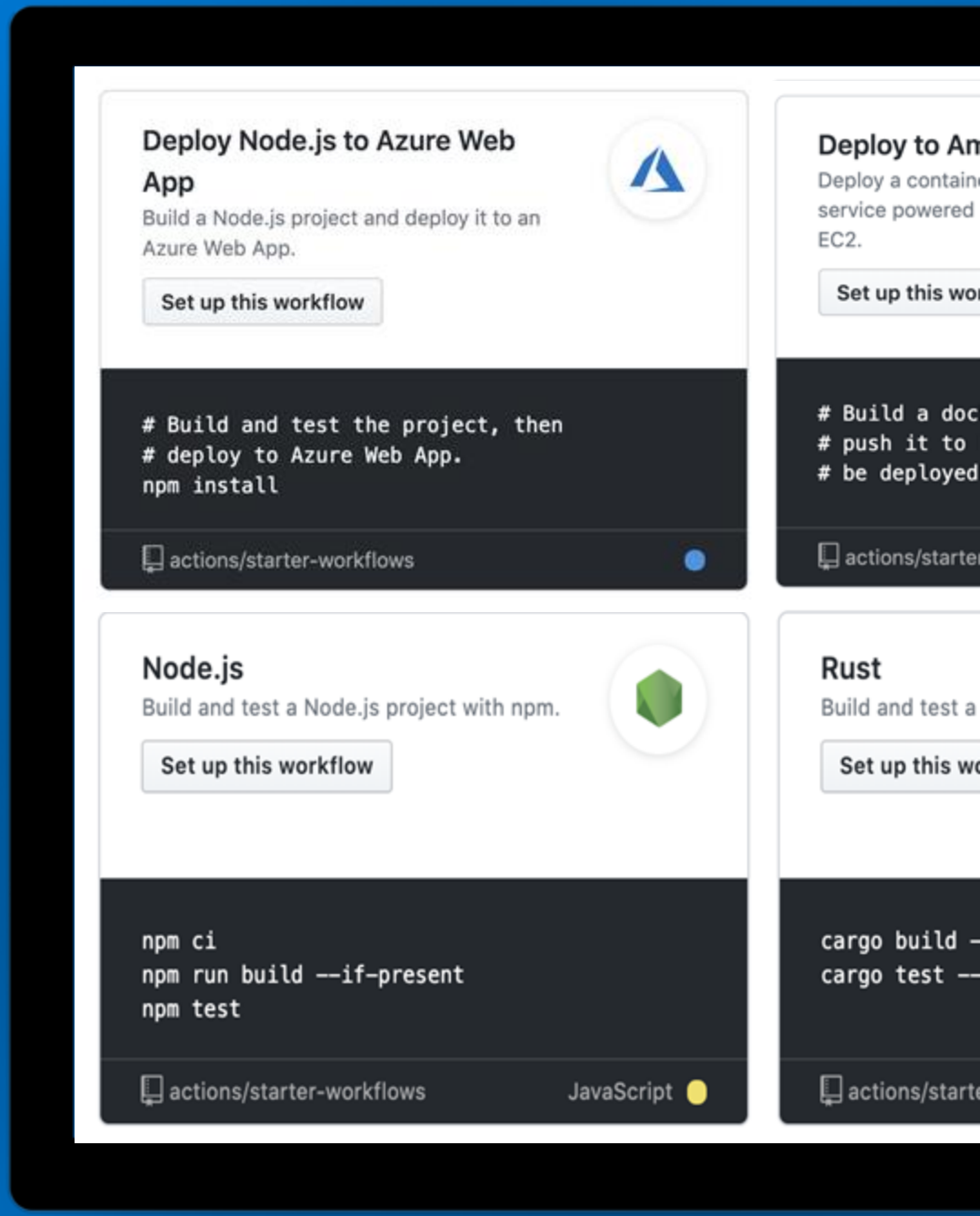
Plan and track work in Azure Boards linked to GitHub, and monitor your code deployed to Azure from GitHub Actions

Scale best practices with code

Define and scale processes, security, and compliance policies for your organization, across teams, repos, and throughout the software lifecycle

Unified authentication

Sign into Azure with your GitHub credentials and authenticate to GitHub Enterprise with Azure AD



Community standard for code-to-cloud

The largest DevOps ecosystem on earth

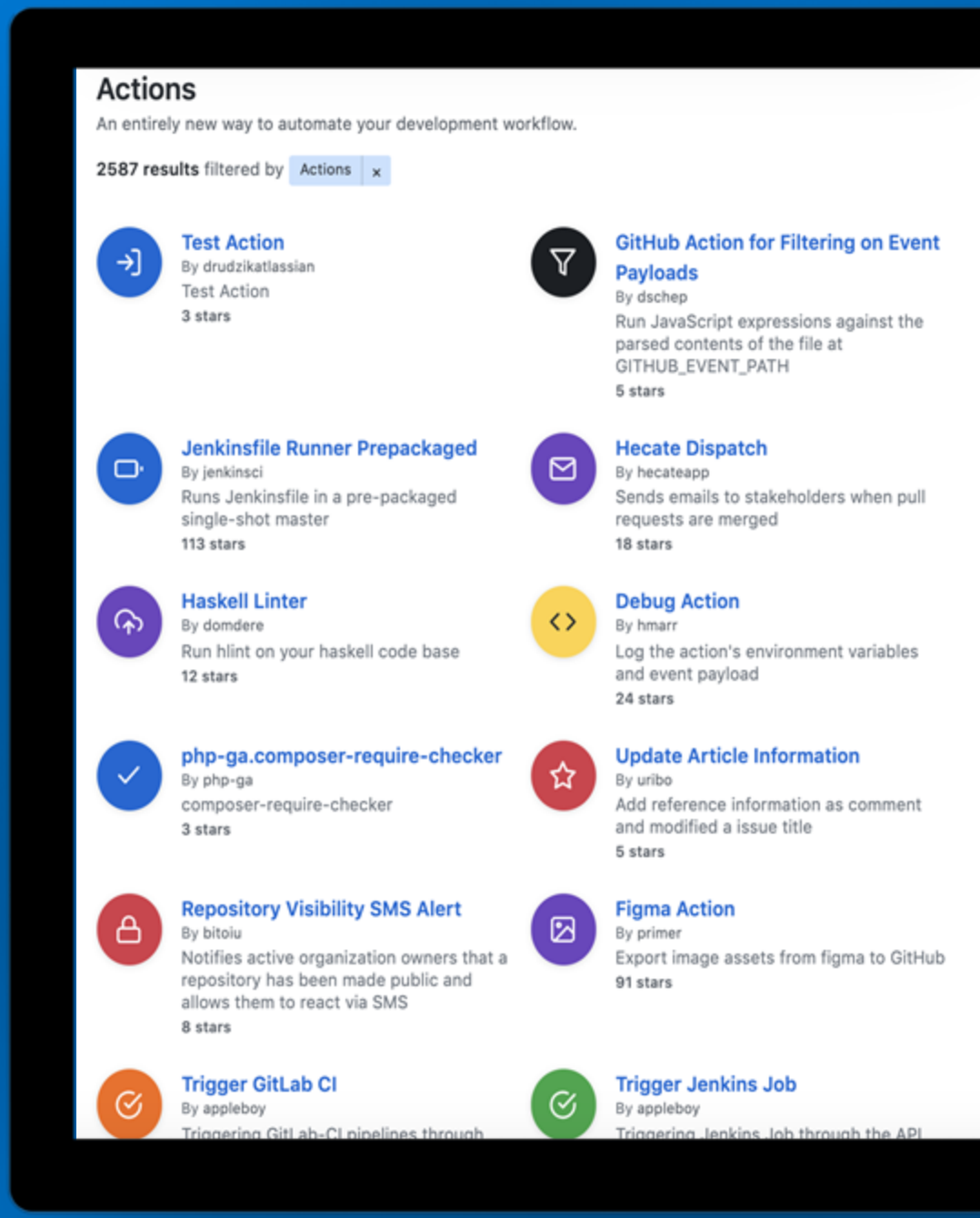
2,500+ Actions available in GitHub Marketplace, a 5x increase since August 2019 and growing every day

Leading cloud partners for automation

Container, Kubernetes, and serverless deployments for Microsoft Azure and other clouds. Automate infrastructure as code with HashiCorp.

Seamlessly bring community standards into your development

Industry standard package formats for .NET, JavaScript, Ruby, Java, and Docker containers



GitHub loves Azure

Provide a seamless cloud experience for GitHub

Automated workflows with Azure

GitHub Actions for Azure has native support for deployments to Azure Kubernetes Service, Azure Web Apps, Azure Container Registry, and more planned

End-to-end traceability and governance

Plan and track work in Azure Boards linked to GitHub, and monitor your code deployed to Azure from GitHub Actions

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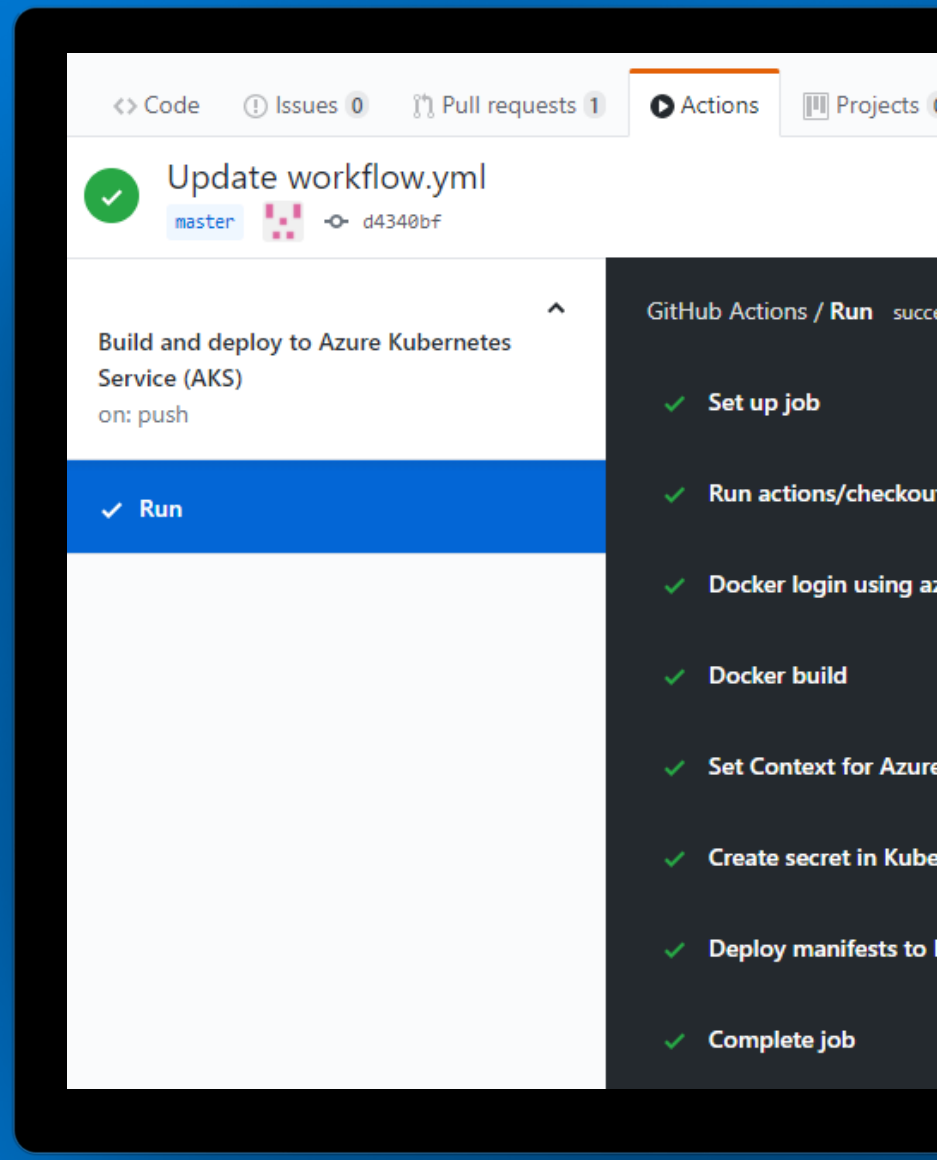

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Codespaces

Your instant dev environment

Code without compromise

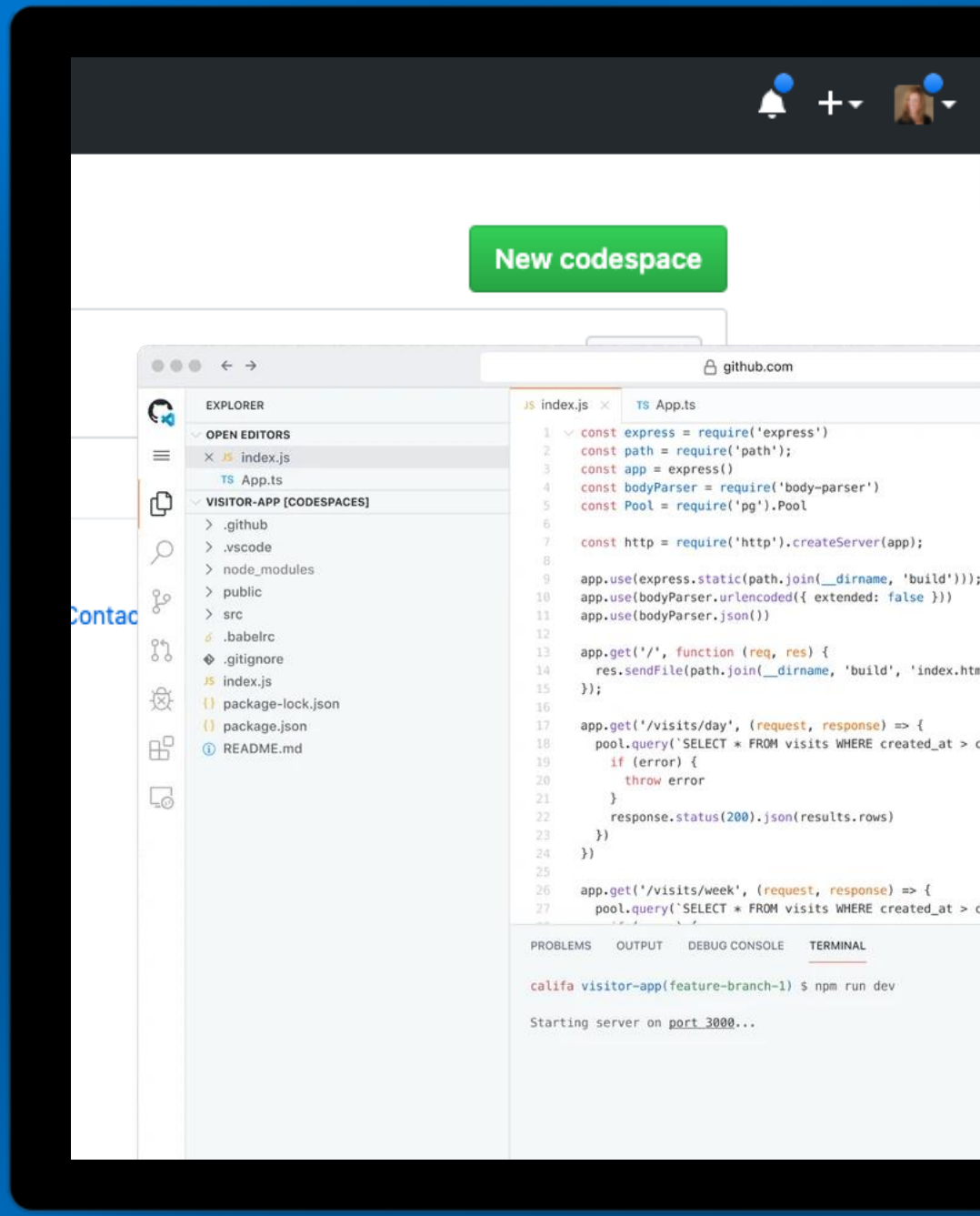
Code, build, test, debug, and deploy with a complete development environment in your browser.

Simplify your workflow

Automatically set up dependencies and SSH keys. Go from code to commit faster on any project.

Extend and customize

Configure your editor with dotfiles and VS Code extensions to create a consistent environment in every codespace.



Insights

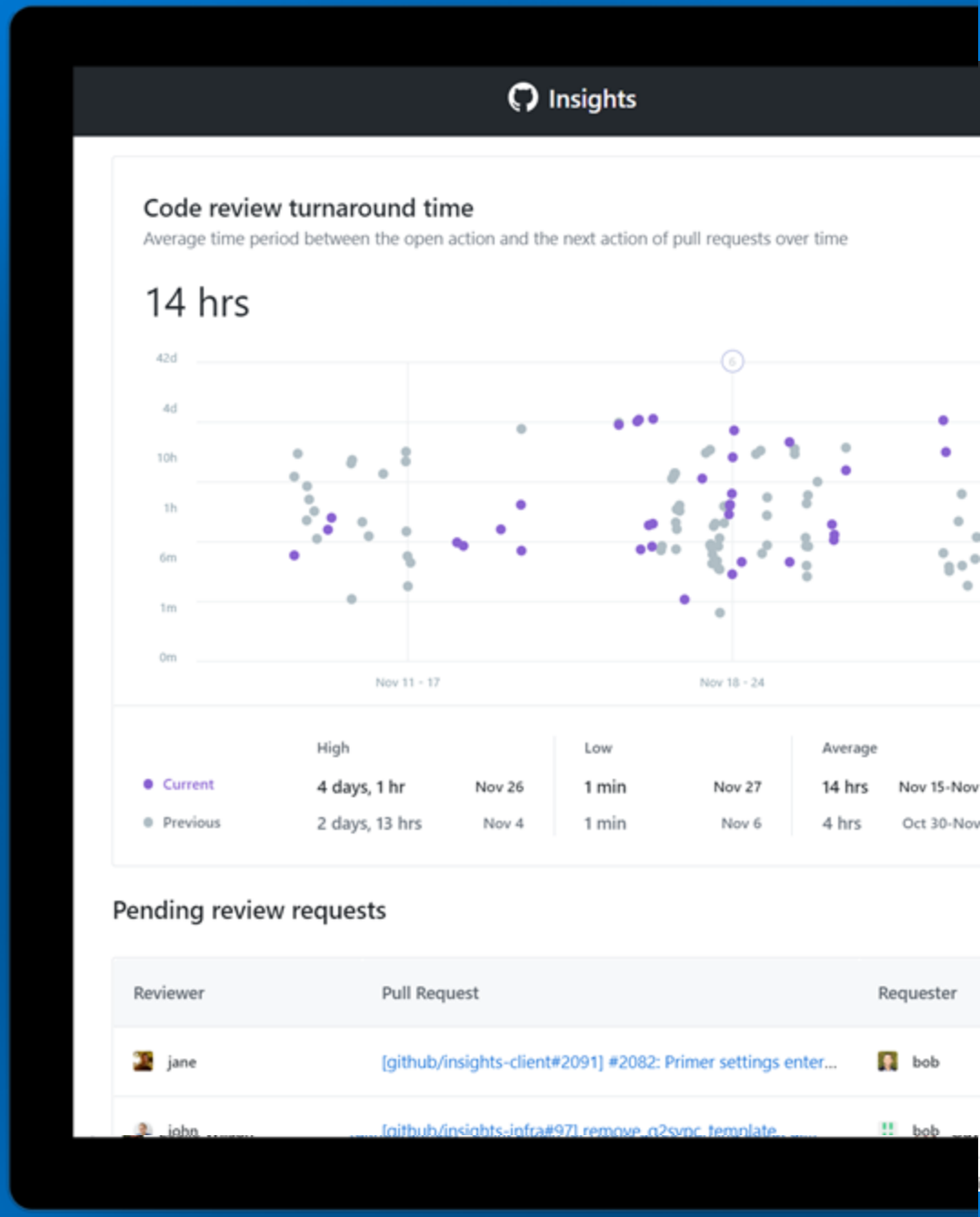
Development metrics that matter

Get research-backed guidance

Make sure what you're measuring is making a difference with actionable, helpful, and impactful KPIs validated by the GitHub community

See progress in real-time

Visualize current activity, get up-to-date snapshots, and understand how your team collaborates as quickly as the work happens.

Ship faster through better process

Measure every step of your development process so teams can make decisions that shorten cycles and speed time to market.