



GitHub Talk

Containerized deployments for enterprises with GitHub Actions and Packages



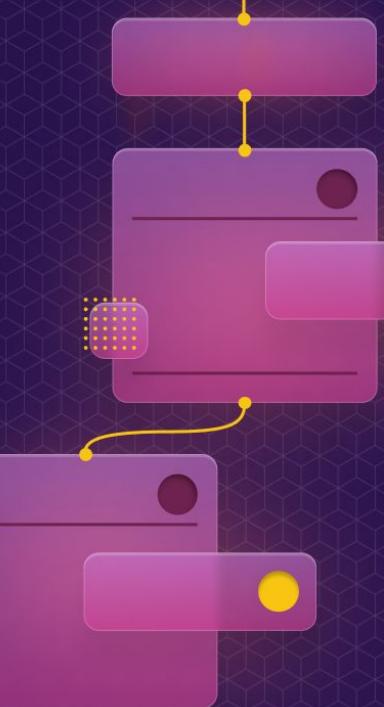
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Solutions Engineer



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Solutions Engineer



Kayla Ngan
Sr. Product Manager



Speakers



Sarah Khalife
Solutions Engineer



Pavan Ravipati
Principal Solutions Engineer



Kayla Ngan
Senior Product Manager

Motivation

We want to deploy a containerized application to the cloud.

What are the challenges?

- Containerizing and maintaining an application, especially legacy applications
- Managing user permissions and configuration without leveraging additional tools
- Standardizing across a set of best practices for continuous integration and delivery across an organization

Today

Code to cloud with GitHub

A quick introduction to Actions and Packages

Demo

- Containerize an existing application
- Best practices for enterprise deployments
- Automate deployment to the cloud

Q+A



The largest developer platform on Earth

100M+

Private and public repositories

1,000s

Open source communities

50M+

Developers

1B+

Contributions per year

3M+

Organizations

GitHub is your platform for rapid innovation



Security &
Compliance



Code-to-cloud
DevOps



Team
Collaboration



Developer
Talent



Community-powered Developer Platform





Actions



Packages

Automate everything

Powerful, flexible automation for any workflow, directly from GitHub

Standardize and scale best practices

Consistently apply security, compliance, and best practices across teams

Community-powered innovation

Collaborate with your organization, industry leaders, and the open source community



Actions

- Linux, Mac, Windows and containers
- Matrix builds
- Live, searchable, linkable logs
- Built-in secret store
- Easy to find, write, and share actions
- Artifact and dependency caching
- Self-hosted runners including ARM, X86

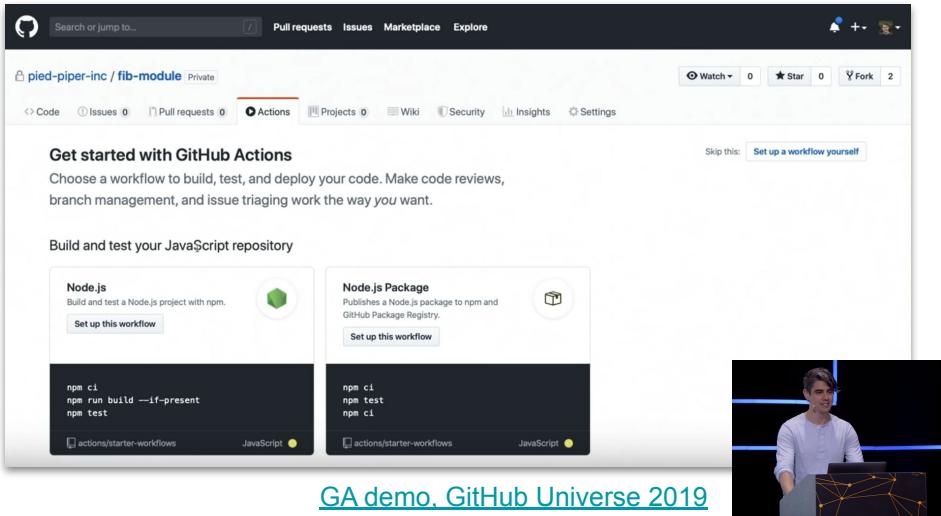


Packages

- Public and private registries
- One login for code & packages
- npm, Docker, Maven, Gradle, Ruby, NuGet
- Integrated with GitHub Actions
- Packages analytics
- npm proxy



Recent announcements



[GA demo, GitHub Universe 2019](#)

November 2019

GitHub Actions GA

- CI / CD and workflow automation
- Artifact and dependency caching
- 1000s of community Actions
- GitHub- and self-hosted runners

GitHub Packages GA

Unified credentials for code and packages

February 2020

Actions API GA

April 2020

npm joins GitHub

May 2020

- Org-level runners, labels, secrets, and workflow templates

Aug, Sep 2020

- Enterprise-level runners and labels
- Composite run steps
- Improved reporting and notifications
- Improved Docker container support

Containers

Improving how we support containers
within GitHub Packages

More cloud native standards

- Open Container Initiative (OCI) image spec
- Helm Chart support
- Generic artifact storage

Fine-grained, enterprise permissions

- Share container content across repos
- Enable anonymous access
- Enforce security for the enterprise,
organizations, teams, and users

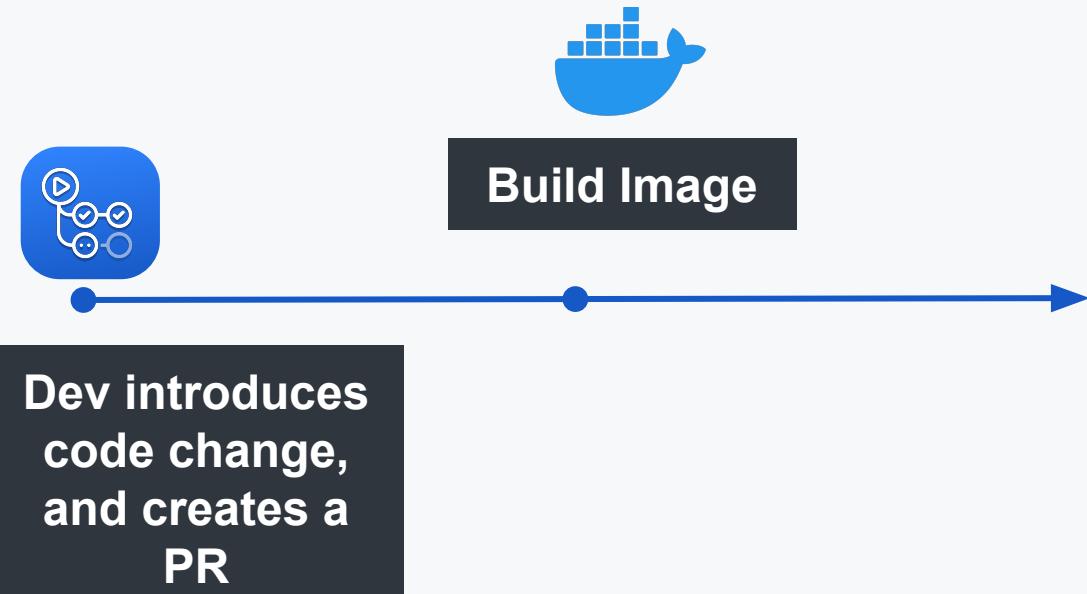
The screenshot shows the GitHub Packages page for the repository "super-linter". At the top, there's a navigation bar with links for Repositories, Packages (which is highlighted), People, Teams, Projects, Discussions, Insights, and Policies. Below the header, the repository name "super-linter" is displayed with its icon, followed by the tagline "Lint your code base with GitHub Actions". A summary card provides quick stats: Last published 3 hours ago, 0 discussions, 39 issues, and Total Downloads 10.8K. A chart shows the download volume over time. A section for "Install from the command line" includes a copyable command: \$ docker pull ghcr.io/github/super-linter:v3. Another section lists "Recent image versions" with entries for v3 (published about 3 hours ago, digest ..., 160 downvotes), v3.11.0 (published about 3 hours ago, digest ..., 0 downvotes), and latest (published about 3 hours ago, digest ..., 3 downvotes). A "View all 9 versions" link is also present. At the bottom, there's a "README.md" section titled "Super-Linter" with the text: "This repository is for the GitHub Action to run a Super-Linter. It is a simple". On the right side, there are sections for "Details" (github, MIT License, Readme), "Contributors" (admiralAwkba, zkoppert, GaboFDC, nemchik Eric), and a link to "Open an issue".

Automated Workflow

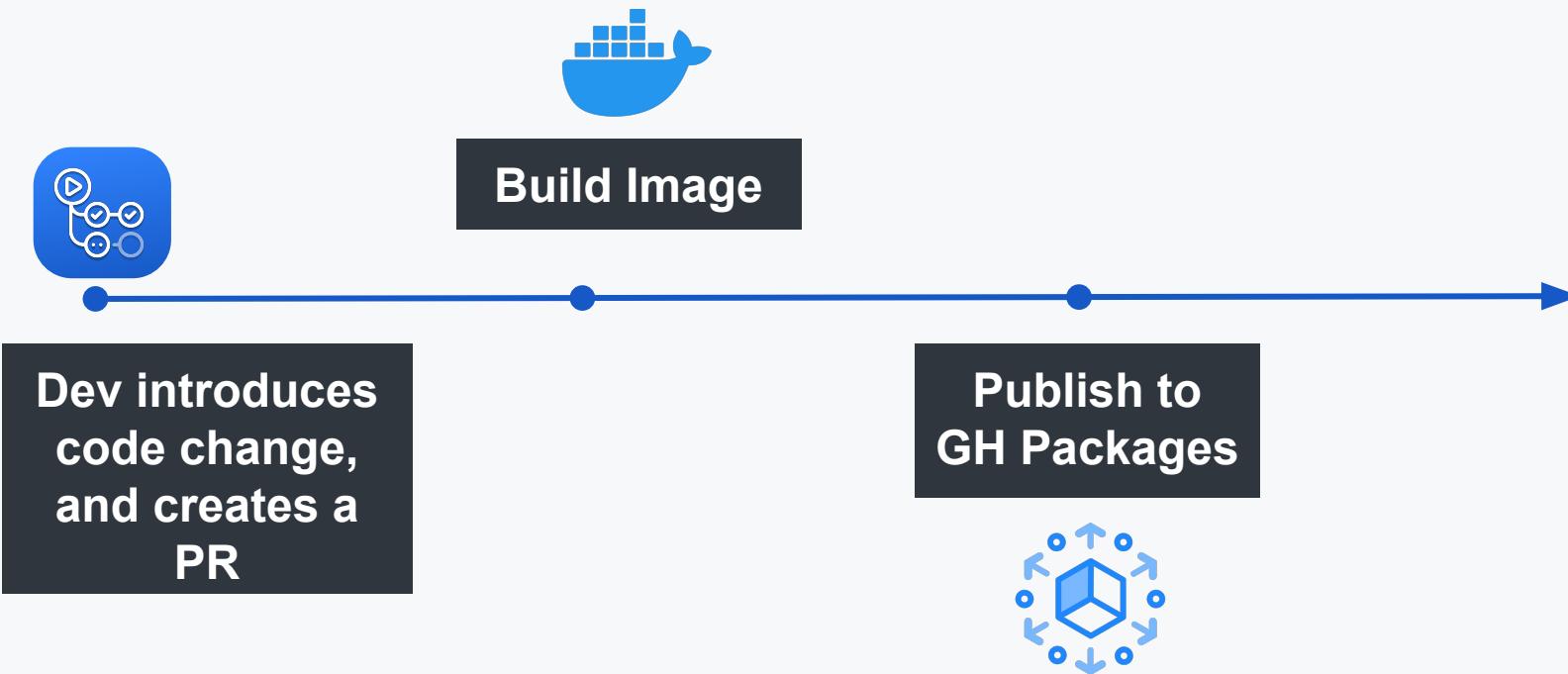


Dev introduces
code change,
and creates a
PR

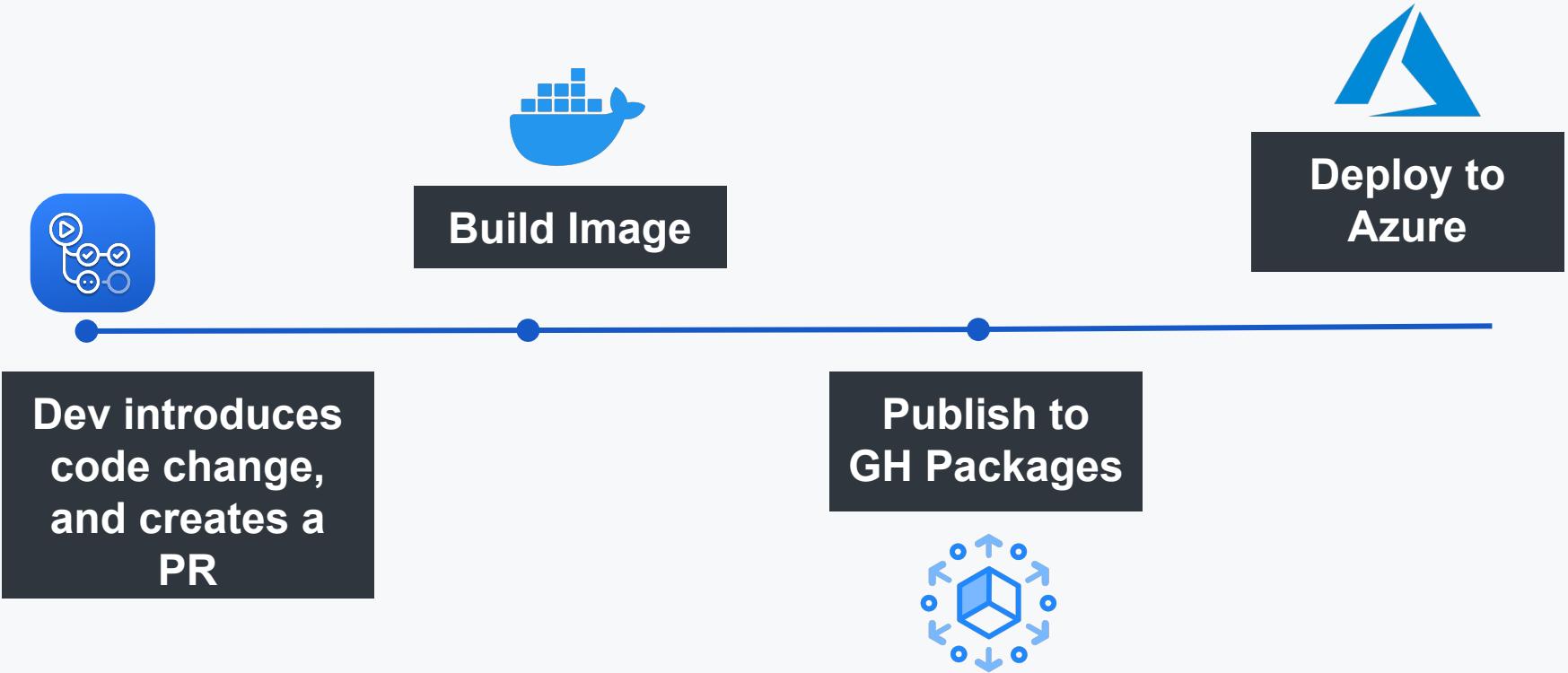
Automated Workflow



Automated Workflow



Automated Workflow





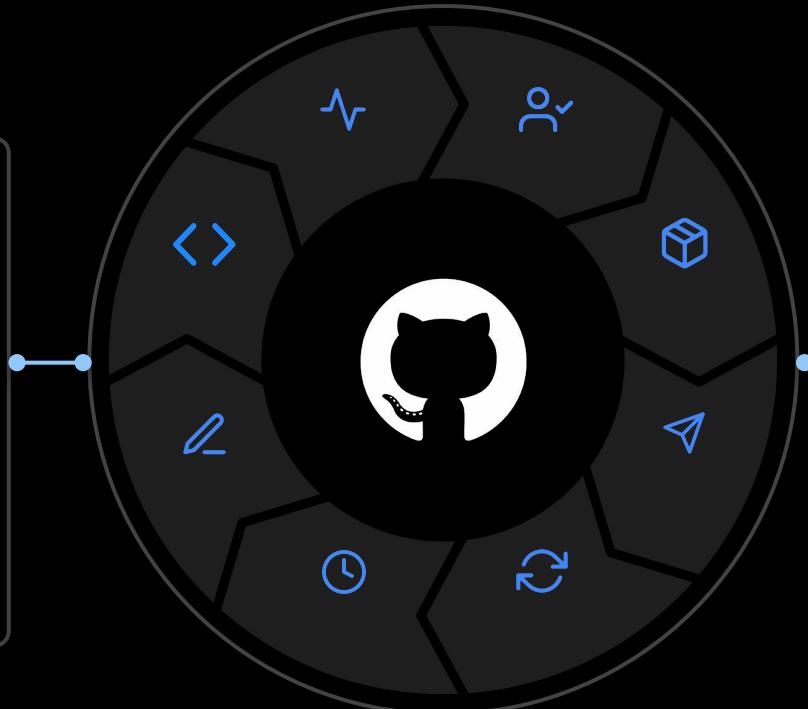
Demo

Code-to-Cloud DevOps



**Home for all developers
and the world's code**

- Collaborate with anyone
- Powerful, flexible automation
- Community-powered innovation



**Deploy anywhere, including
your own data centers**





Benefits of Containers

- Lightweight, booting up faster and using a minimal memory
- Packaged, modular, providing easy isolation from other apps
- Deployable anywhere; spin up locally, in a datacenter, or any cloud.



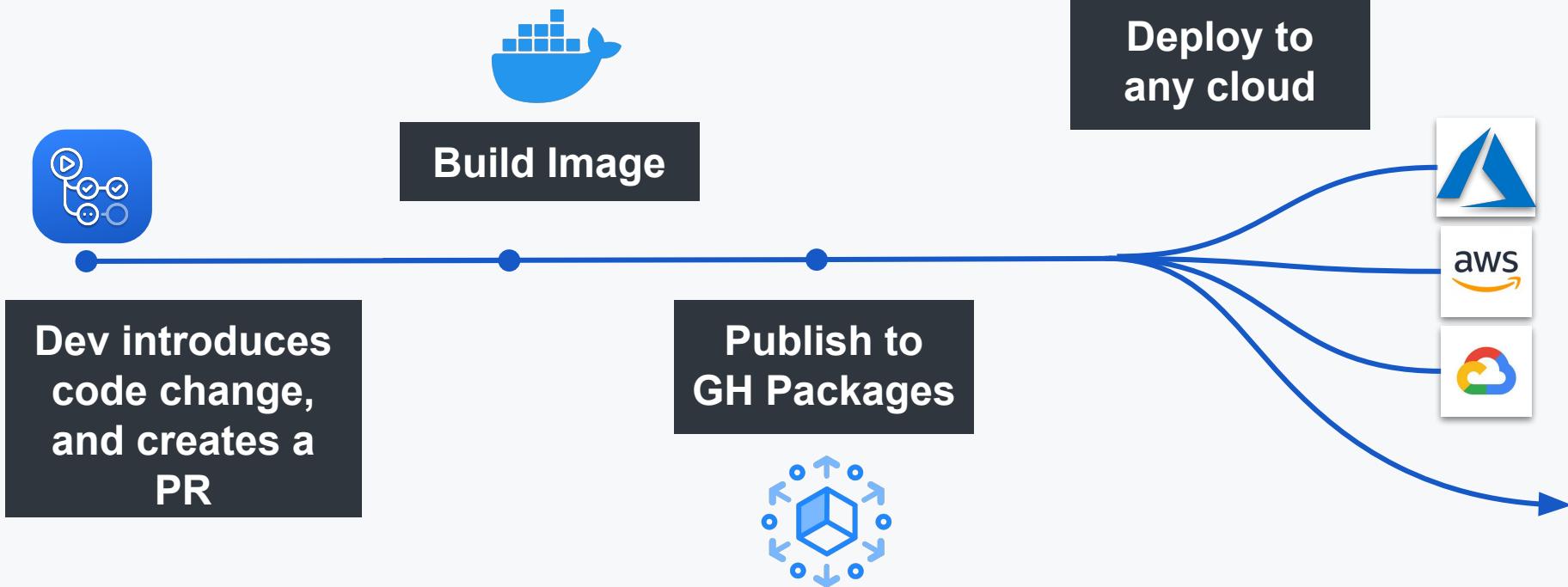
Azure App Service

- Container is hosted for you
- Managed network configuration
- Auto-scaling & HA
- No need for app configuration and infrastructure management

Azure K8s Service

- Complete K8s environment
- Fine-grained configuration, storage, and network controls
- No need for operations and infrastructure management

Automated Workflow



Cloud native deployments

Deploy to AWS, GCP, and Azure

Verified actions and workflows for serverless, container, and Kubernetes services from our cloud partners

Manage infrastructure as code

Cloud-agnostic management with verified actions for HashiCorp Terraform and Vault, or with services from our cloud partners

AWS for GitHub Actions

Repositories 11 Packages People 2 Projects

Find a repository... Type: All ▾ Language: All ▾

aws-cloudformation-github-deploy
Deploys AWS CloudFormation Stacks
nodejs aws cloudformation
TypeScript MIT 14 stars 60 issues 1 pull requests Updated 6 days ago

amazon-ecs-deploy-task-definition
Registers an Amazon ECS task definition and deploys it to an ECS service.
JavaScript MIT 32 stars 144 issues 1 pull requests Updated 7 days ago





Why GitHub Actions?

5,700+

Actions in GitHub Marketplace

65m+

jobs per month

#1

Overall CI on GitHub

GitHub Packages

Single, secure login for code and packages

Public and private registries, with support for multiple formats and ecosystems.

Chain of custody

Find packages on GitHub, understand details and dependencies.

Innersource and collaboration

Centralized, searchable source for approved and secure packages within your organization.



Maven™



Gradle

 **autoscaler**

 `github/ci-autoscaler`

1.0.3
-o 5h734cr

2 ↓ 35



 **primer/css**

 `primer/css`

13.4.0
-o a47ea42

0 ↓ 6.3k



 **rubygems/project**

 `rubygems/project-repo`

6.0.3
-o jj32r67

4 ↓ 52



No more manual work

Share workflows across your organization:

- Identify and templatize automation jobs
- Make workflows configurable
- Standardize on best practices

Publish Node.js Package
By GitHub Actions
Publishes a Node.js package to npm and GitHub Packages.

[Set up this workflow](#)

```
npm ci  
npm test  
npm ci
```

actions/starter-workflows

JavaScript

Workflows created by octodemo

Octodemo Organization Workflow
By octodemo
Octodemo Organization CI workflow template.

[Set up this workflow](#)

octodemo/.github

Java

Octodemo SonarCloud Scan
By octodemo
Octodemo Organization SonarCloud Scan

[Set up this workflow](#)

octodemo/.github

Code Quality

Deploy your code with these popular services

Deploy Node.js to Azure Web App
By Microsoft Azure
Build a Node.js project and deploy it to an Azure Web App.

Microsoft Azure

Deploy to Amazon ECS
By Amazon Web Services
Deploy a container to an Amazon ECS cluster using the AWS Fargate or Container instance launch type.

Amazon Web Services

No more manual work

Set up your workflow -
decide what jobs you need to
run:

- *I need to build my docker image & push it to GH Packages*
- *I need to run an app App Services*
- *I need a deploy job to spin up my app on k8s*

```
jobs:  
  build:  
    runs-on: ubuntu-latest  
  
    steps:  
      - uses: actions/checkout@v2  
      - name: Build the Docker image  
        run: make docker-build-osd
```

```
jobs:  
  deploy:  
    needs: build  
    runs-on: ubuntu-latest  
    strategy:  
      matrix:  
        k8s-version: ['v1.16', 'v1.17', 'v1.18']
```

No more manual work

Automate based on event triggers - decide what type of events best suit the job you want to run:

- *Should I run this test on every push to main?*
- *When should I deploy my app to Azure?*

```
name: Docker Image CI
```

```
on:
```

```
  push:
```

```
    branches: [ main ]
```

```
  pull_request:
```

```
    branches: [ main ]
```

```
name: Build and Deploy to Azure
```

```
on:
```

```
  release:
```

```
    types: [created]
```

No more manual work

Setup Protected branches -
choose the rules that should apply:

- Require code reviews
- Have status checks based on workflows
- Disable force push

Branch protection rule

Branch name pattern

prod*

Protect matching branches

Require pull request reviews before merging

When enabled, all commits must be made to a non-protected branch and submitted approving reviews and no changes requested before it can be merged into a branch.

Require status checks to pass before merging

Choose which [status checks](#) must pass before branches can be merged into a branch. First be pushed to another branch, then merged or pushed directly to a branch that

Require signed commits

Commits pushed to matching branches must have verified signatures.

Require linear history

Prevent merge commits from being pushed to matching branches.

Include administrators

Enforce all configured restrictions above for administrators.

Availability for GitHub Enterprise



GitHub
Enterprise
Cloud

GA

Actions

GA

Packages*



GitHub
Enterprise Server

BETA

Actions and Packages
with GHES 2.22

*organization-level containers with fine-grained permissions are in beta



Upcoming features

GitHub Actions

- Manual approvals
- Workflow visualization
- Centrally-managed workflows

GitHub Packages

- Helm charts
- Universal / generic storage

See what's coming with the
[GitHub public roadmap](#)



Q&A



Learn more

github.com/learn/devops