

# **CI/CD with GitHub Actions**

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# Chris Ayers

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A large, semi-transparent GitHub logo watermark is positioned on the left side of the slide, consisting of a white octocat icon inside a light gray circle.

# Agenda

- YAML
- CI / CD
- Actions Overview
- Demos

# YAML

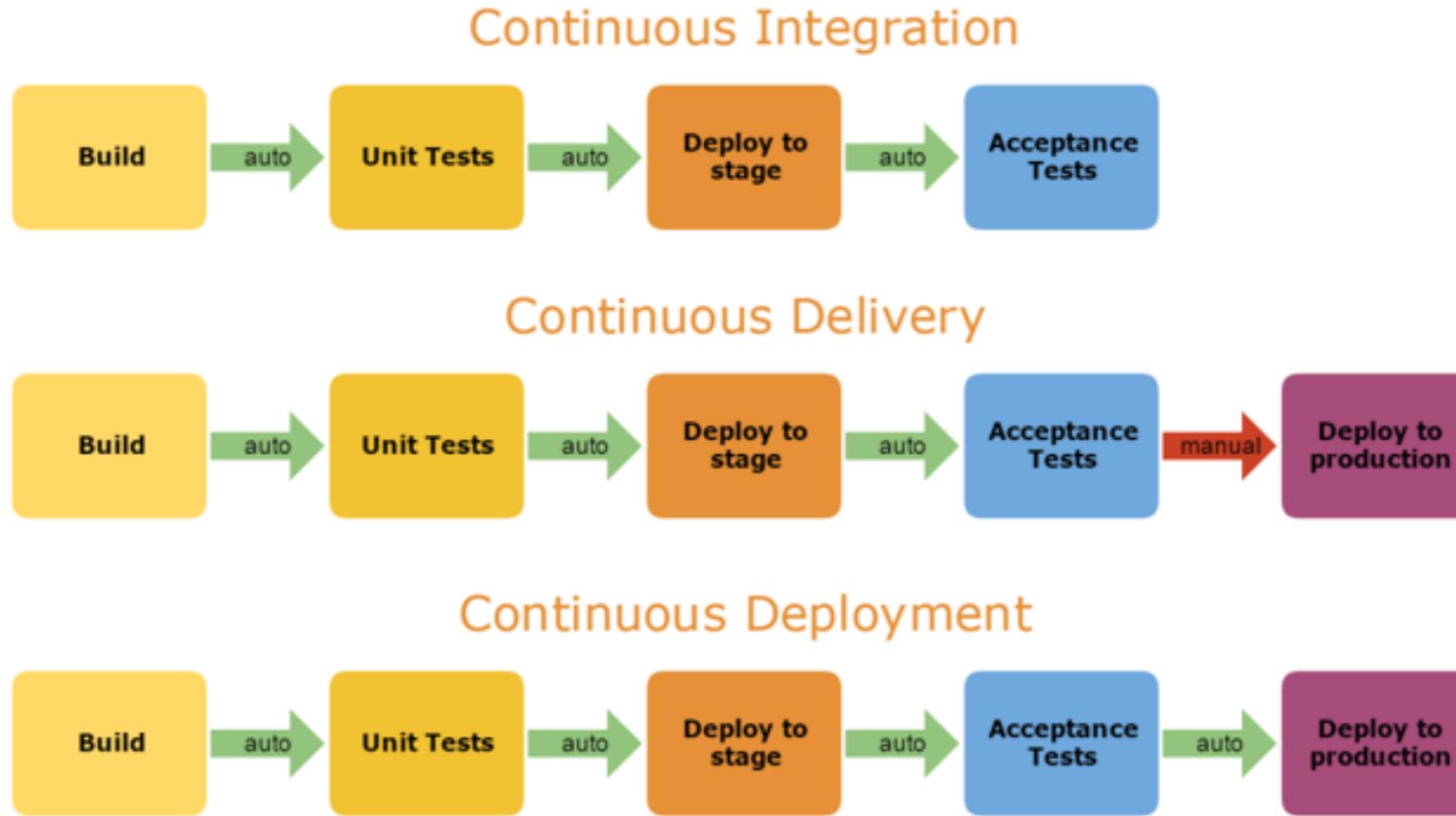
## Yet Another Markup Language

GitHub uses YAML for workflows

Demo: [Online Parser](#)

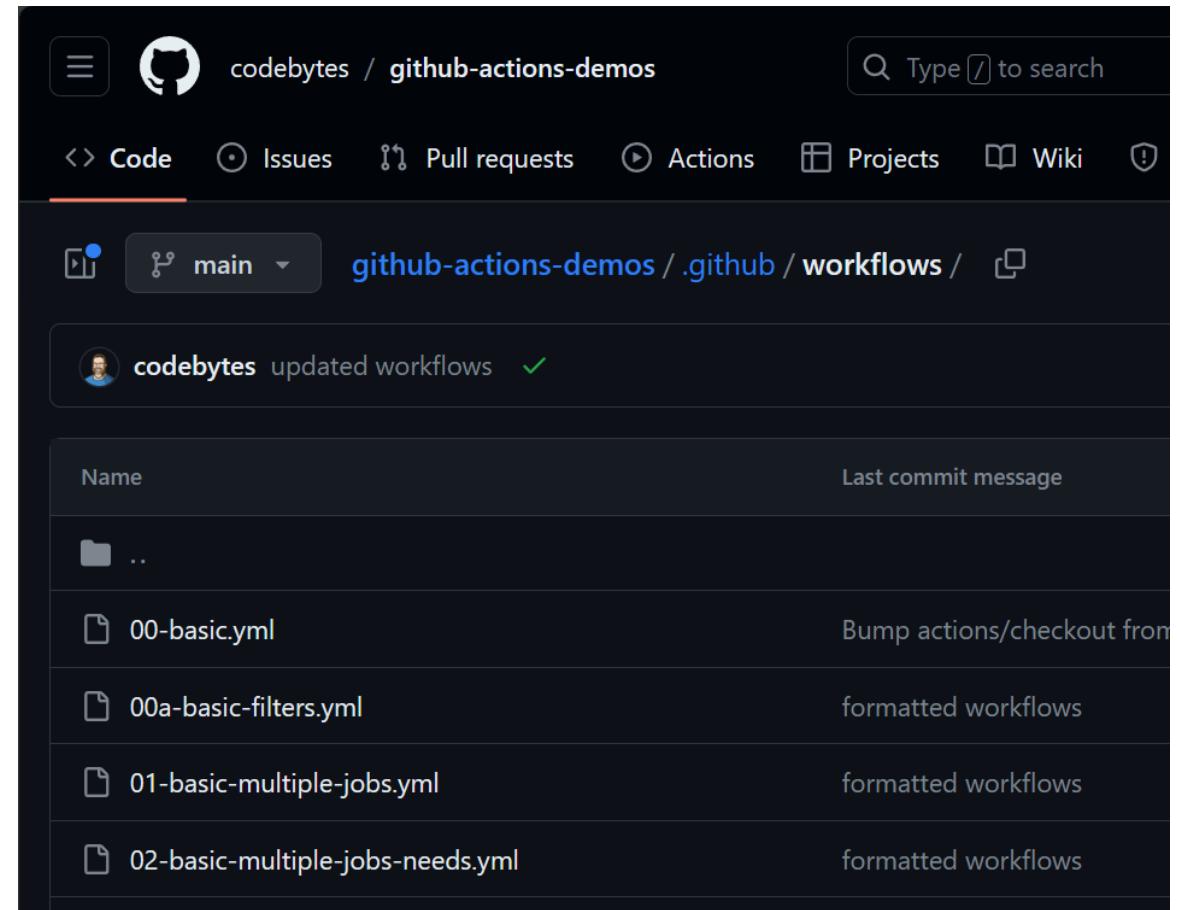
Feature	Description
Lists	Start with a –
Key-Value	Key: value
Objects	Objects: Properties of objects

# What is CI/CD?



# Actions Overview

- Live in the `.github/workflows` folder
- Workflows are defined in YAML
- Workflows are Event Driven



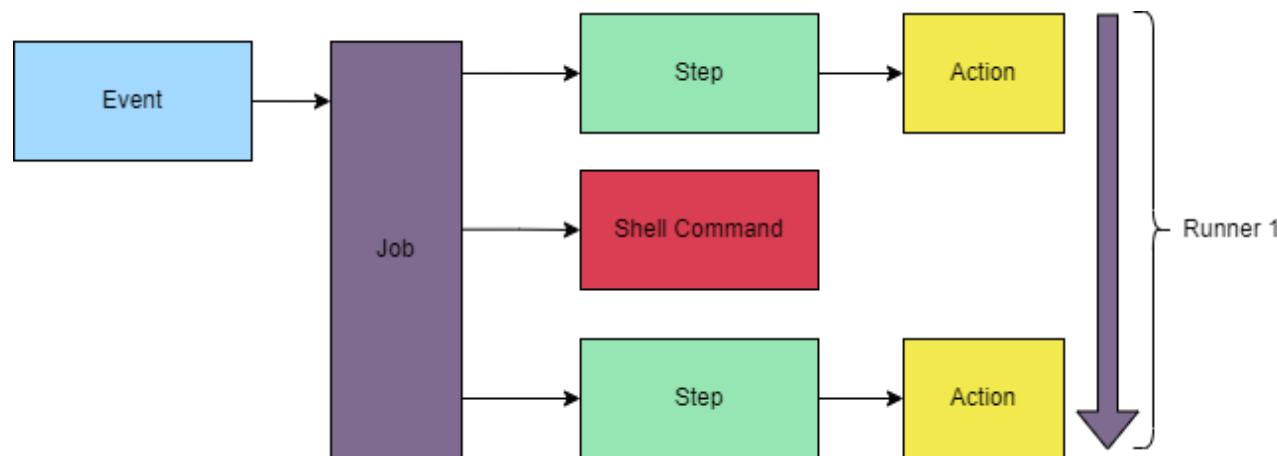
# Events that trigger workflows

<https://docs.github.com/actions/using-workflows/events-that-trigger-workflows>

- branch\_protection\_rule
- checks
- create
- delete
- deployment
- discussion
- fork
- issue\_comment
- issues
- label
- page\_build
- pull\_request
- pull\_request\_review
- pull\_request\_review\_comment
- push
- release
- schedule
- status
- workflow\_call
- workflow\_dispatch

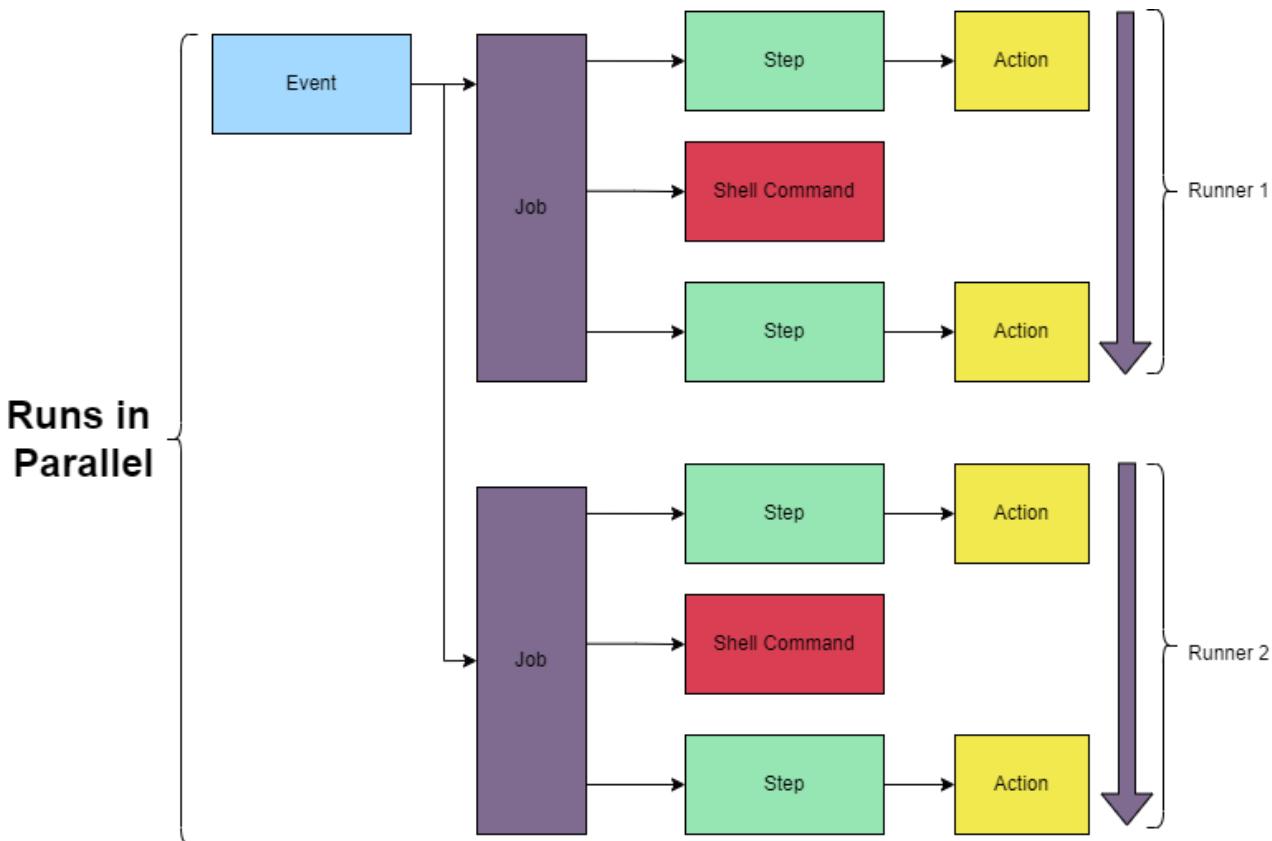
# Workflows

- Events trigger workflows
- Workflows contain jobs
- Jobs contain steps
- Steps are commands or actions



# Jobs

- Workflows can contain multiple jobs
- Jobs run in parallel by default
- Each job runs on a **Runner**
- Steps and Shell Commands run in sequence



# Runners

- Specify the type of runner with `runs-on` (e.g., `ubuntu-latest` ).
- GitHub provisions a new VM for each job.
- Steps in a job share information using the runner's filesystem.
- VM is decommissioned after job completion.

# Supported runners and hardware

- GitHub-hosted runner application is open source.
- OS: Windows, Linux, and macOS
  - Runners include preinstalled software, updated weekly.
  - There are also Large Hosted Runners
- Self-Hosted Runners
- You can install additional software on runners.

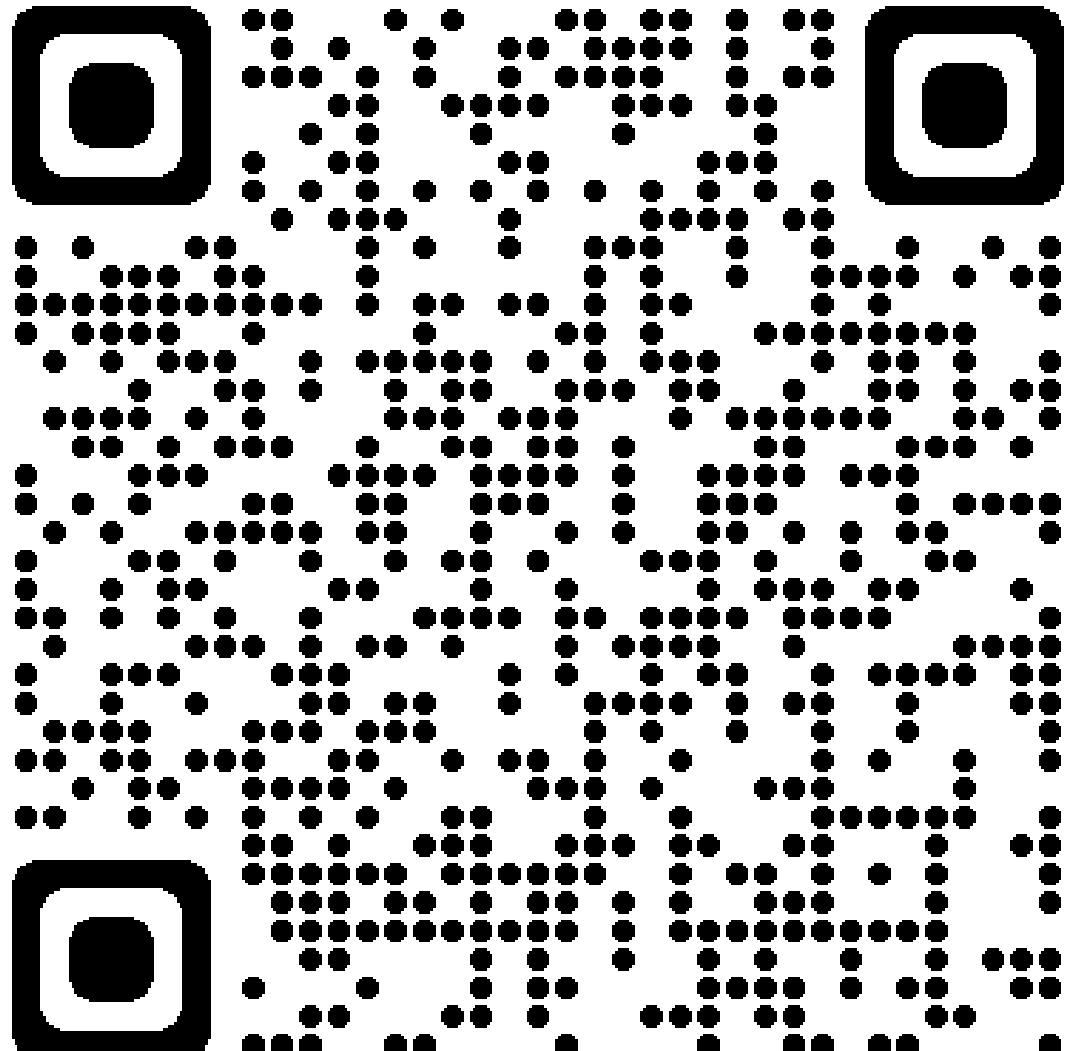
# DEMOS



# Workshop

<https://github.com/actions-workshop/actions-workshop>

<https://tinyurl.com/ghactions>



# ACT

## Run Actions Locally

A screenshot of a terminal window titled "zsh". The command "git clone https://github.com/cplee/github-actions-demo" is being run. The output shows the progress of the clone, with the last line indicating success: "ls/default ✘ 10215 14:06:21". The background of the terminal is black, and the text is white.

# Security

- Never use structured data as a secret
- Register all secrets used within workflows
- Audit how secrets are handled
- Use credentials that are minimally scoped
- Audit and rotate registered secrets
- Consider requiring review for access to secrets
- Use an action instead of an inline script (recommended)
- Use an intermediate environment variable
- Use OpenID Connect to access cloud resources
- Pin third-party actions to a full length commit SHA

# Actions Updates - Dependabot

- Actions are regularly updated for enhanced automation.
- Dependabot keeps GitHub Actions references in workflow.yml up-to-date.
- If newer action versions exist, Dependabot sends an update pull request.
- Dependabot also updates git references for reusable workflows.

```
.github/dependabot.yml
```

```
version: 2
updates:
  # See documentation for possible values
  - package-ecosystem: "github-actions"
    # Location of package manifests
    directory: "/"
    schedule:
      interval: "weekly"
```

# DEMOS



# Questions



# Resources

## Links

- <https://docs.github.com>
- <https://skills.github.com>
- [codebytes/github-actions-demos](https://codebytes.github-actions-demos)
- <https://learn.microsoft.com/en-us/training/paths/automate-workflow-github-actions/>

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