ITJ BOOTCAMP

DevOps Bootcamp

HELLO!

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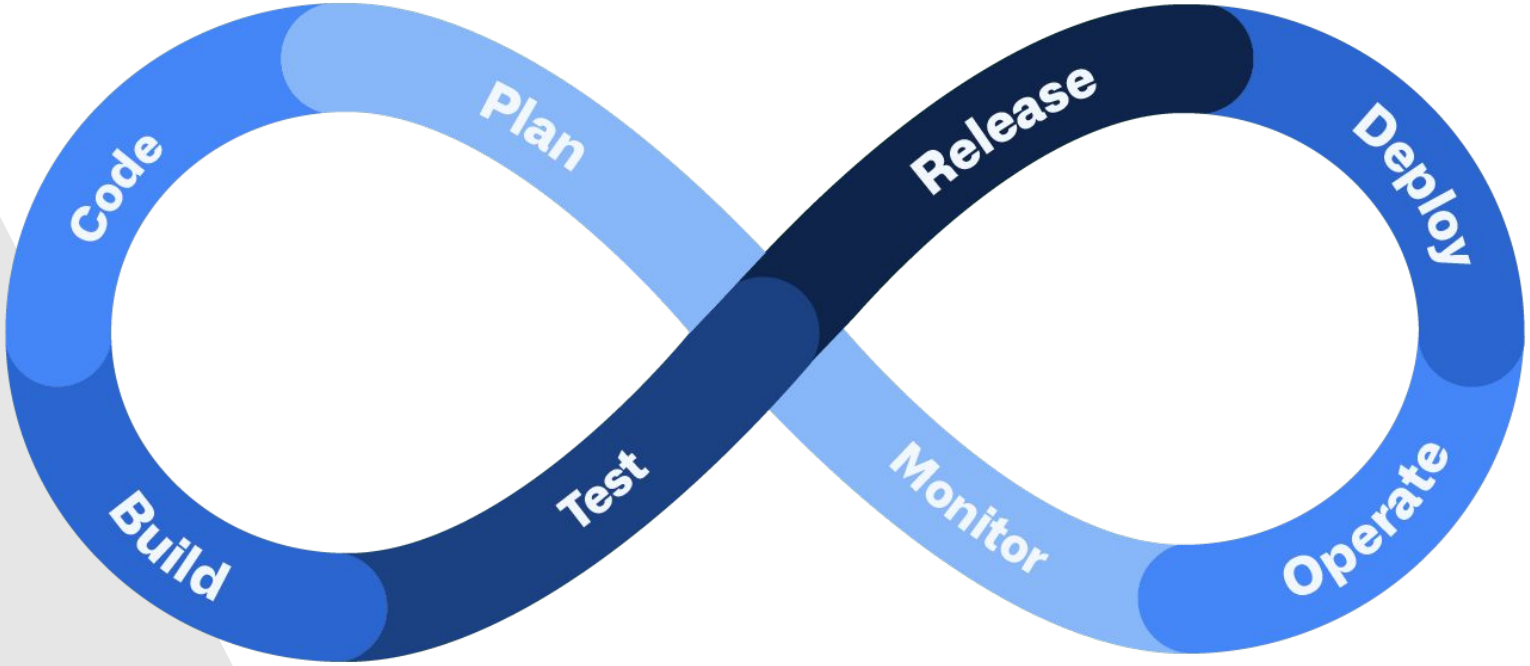
1. Pipelines- GitHub Actions

Let's start 😀

DevOps Pipelines

A DevOps pipeline is a set of tools and automated processes utilized by the software engineering team to compile, build, and deploy code.



Components of Pipelines

- Continuous integration and continuous delivery (CI/CD)
- Continuous Testing (CT)
- Continuous Deployment
- Continuous Monitoring
- Continuous Operations

CI Tools

CircleCI

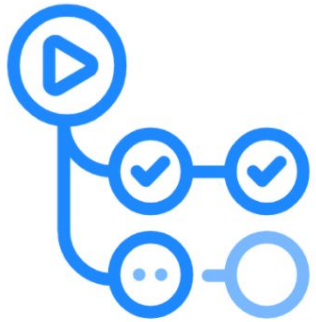
Jenkins

Azure Pipelines

Github Actions

GitHub Actions

GitHub Actions



GitHub Actions

GitHub Actions is a continuous integration and continuous delivery (CI/CD) platform that allows you to automate your build, test, and deployment pipeline.

GitHub Actions requirements

- Github Account
- Github Repo
- Create and manage a repo branch
- Commit code changes
- Work with PR’s

YAML files

Is a human-readable data-serialization language. It is commonly used for configuration files and in applications where data is being stored or transmitted.

- Not a markup language
- Extensions .yml or .yaml

Scripting

- Shell scripting

- Scripting in higher-level language (Python, Ruby)

Workflows

- Define the event that triggers actions
- Define which actions to run
- Repos can contain multiple workflows

Workflows

My First Workflow YAML

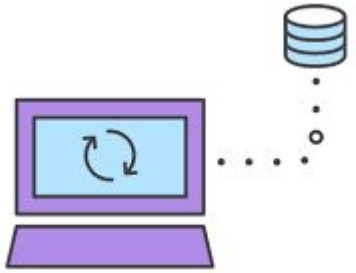
```yaml
# This is a basic workflow to help you get started with Actions

name: CI

# Controls when the workflow will run
on:
  # Triggers the workflow on push or pull request events but only for the main branch
  push:
    branches: [ main ]
  pull_request:
    branches: [ main ]

  # Allows you to run this workflow manually from the Actions tab
  workflow_dispatch:
```

My First Workflow YAML

```yaml
# A workflow run is made up of one or more jobs that can run sequentially or in parallel
jobs:
  # This workflow contains a single job called "build"
  build:
    # The type of runner that the job will run on
    runs-on: ubuntu-latest

    # Steps represent a sequence of tasks that will be executed as part of the job
    steps:
      # Checks-out your repository under $GITHUB_WORKSPACE, so your job can access it
      - uses: actions/checkout@v2

      # Runs a single command using the runners shell
      - name: Run a one-line script
        run: echo Hello, world!

      # Runs a set of commands using the runners shell
      - name: Run a multi-line script
        run: |
          echo Add other actions to build,
          echo test, and deploy your project.
```

On Events

- Repository events:
  - Push
  - Pull Request
  - Schedule
  - etc



List of events: https://docs.github.com/en/actions/learn-github-actions/events-that-trigger-workflows

Jobs

- Workflows must have at least 1 job
- Each job must have a unique ID
- Job id must start with a letter or underscore
- Jobs run in parallel by default

GHA available environments

Environment	YAML Label	Included Software	Latest Release & Rollout Progress
Ubuntu 20.04	`ubuntu-latest` or `ubuntu-20.04`	ubuntu-20.04	ubuntu20 20220111.1 (99.99%)
Ubuntu 18.04	`ubuntu-18.04`	ubuntu-18.04	ubuntu18 20220111.1 (100.00%)
macOS 11	`macos-11`	macOS-11	macos-11 20220110.2 (100.00%)
macOS 10.15	`macos-latest` or `macos-10.15`	macOS-10.15	macos-10.15 20220110.2 (100.00%)
Windows Server 2022	`windows-2022`	windows-2022	windows-2022 20220110.1 (2.11%)
Windows Server 2019	`windows-latest` or `windows-2019`	windows-2019	windows-2019 20220110.1 (99.93%)
Windows Server 2016	`windows-2016`	windows-2016	windows-2016 20220110.1 (100.00%)

Actions

Action Location	Syntax
Public repository	`uses: {owner}/{repo}@{ref}` `uses: octocat/super-cool-action@v1`
The same repository as the workflow	`uses: ./path/to/the/action` `uses: ./.github/actions/my-local-action`
A Docker image registry	`uses: docker://{image}:{tag}` `uses: docker://hello-world:latest`

GHA Marketplace

GitHub Marketplace connects you to developers who want to extend and improve their GitHub workflows.

You can list free and paid tools for developers to use in GitHub Marketplace.

Link: https://github.com/marketplace?type=

Adding a command

- run: execute commands in OS shell
- Bash: Default shell for Ubuntu, macOS
- PowerShell: Default shell for Windows

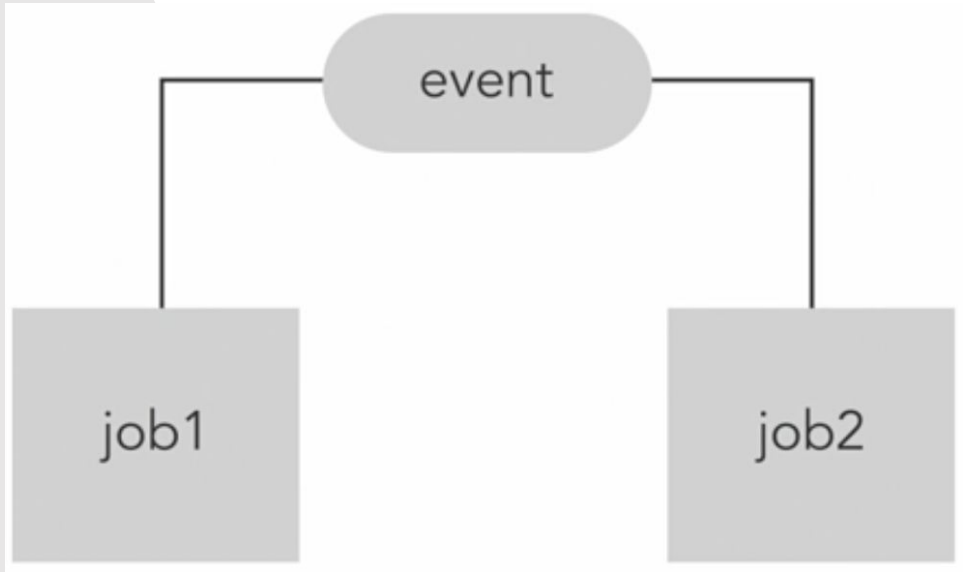
Adding a command

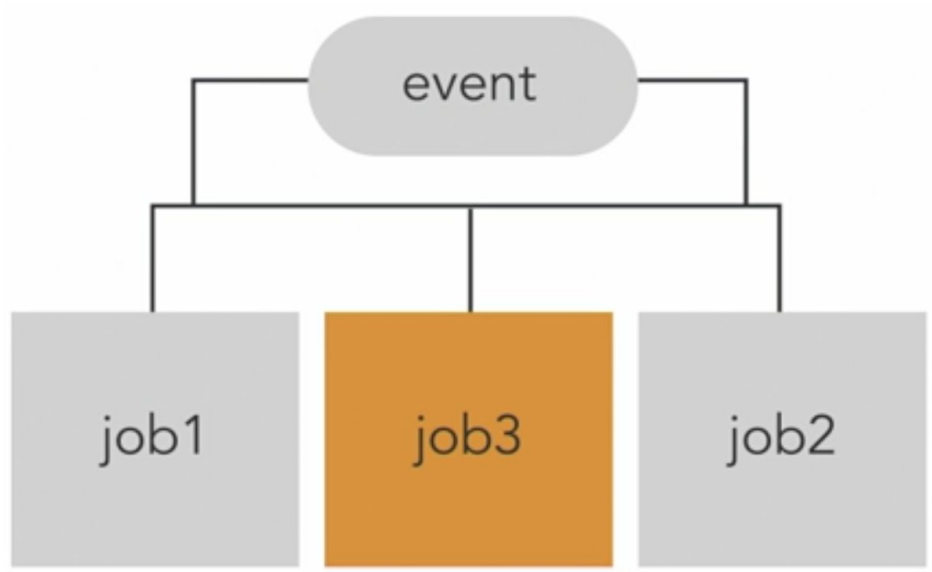
Run	Syntax
Single-line command	`run: {command} {parameters} {arguments}` `run: mv ./output ./archive`

Multiline command	`run: |`
	`  Command 1`
	`  Command 2`
	
	`run: |`
	`  g++ -c -Wall -g Main.cpp`
	`  g++ -g -o Main.exe Main.o`

Adding dependencies

Needs: Identifies one or more jobs that must complete successfully before a job will run





Workflow and Actions limitations

- Workflow concurrency is limited to 20
- Job concurrency is limited based on your plan

GitHub Plan	Concurrent Jobs per Repository
Free	20
Pro	40
Team	60
Enterprise	180

- Jobs are limited to 6 hour of runtime
- Actions can’t trigger other workflows (can cause infinite loops)

Secrets

- Stored as encrypted env variables
- Can’t be viewed or edited
- Workflows can have up to 100 secrets
- Use the secrets workflow context

  ${{ secrets.SECRET_NAME }}

Useful resources for learn GHA

GitHub actions free course:
https://lab.github.com/githubtraining/github-actions:-hello-world

GitHub actions documentation:

https://docs.github.com/en/actions

Github actions LinkedIn Learning course:
https://www.linkedin.com/learning/?u=2066508#:~:text=Learning%20GitHub%20Actions

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THANKS!

Any questions?

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