CI/CD With GitHub Actions

Workshop

Muthukumaran Kasiviswanathan

Muthukumaran Kasiviswanathan has 20+ years of industry experience and has specifically been involved in the developer space and DevOps for a decade. He is currently a part of GitHub working on Actions and other code to cloud solutions. Before GitHub he was at Microsoft for 12 years in developer division.

Kanchan Verma

Kanchan is a Senior Software Manager at GitHub. She is working on GitHub Actions and previously worked on building Azure Wiki, Repos, Boards and ChatOps for AzureDevOps at Microsoft. She is passionate about building performant user experiences and believes in 'Together, We Can'.

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Workshop Outcomes

- Understand concepts related to Workflow, Actions and Packages
- Learn how to Automate your CI workflows
- Learn how to Automate your CD workflows deploying to dev-test and production environments
- Lean how to publish to GitHub packages
- Understand concepts related to Action Authoring and Third-party Actions

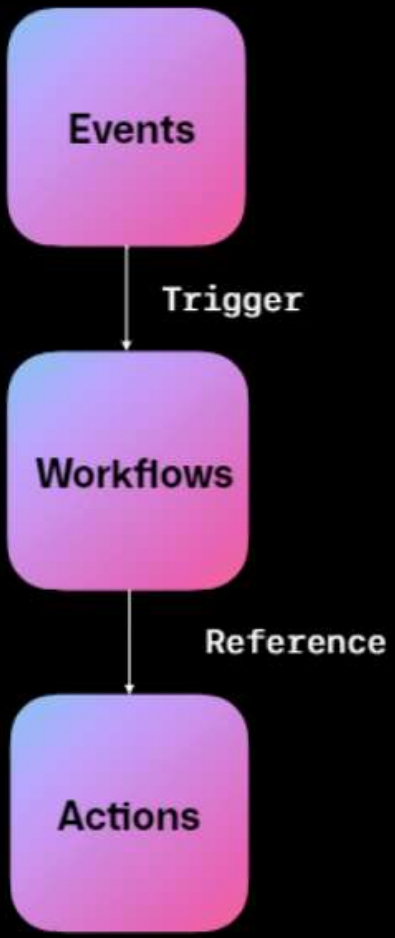
Schedule

- Intro: 5 minutes
- About GitHub Actions and Packages: 5 minutes
- Hands-on workshop setup and goals: 5 minutes
- Exercise 1 - Building CI workflow : 15 minutes
  - Recap of learnings from Exercise 1 : 5 minutes
- Exercise 2 – Building CD workflow : 20 minutes
  - Recap of learnings from Exercise 2 : 5 minutes
- Exercise 3 – Publishing to GitHub packages : 10 minutes
  - Recap of learnings from Exercise 3 : 5 minutes
- About building custom Actions and Marketplace : 5 minutes
- Q & A: 10 minutes

What are GitHub Actions?

GitHub Actions

https://youtu.be/cP0I9w2coGU



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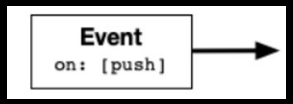
Workflows

- Automated Procedures that is added in your repository
- .yml files
- Located in .github/workflows/ directory.

.github/workflows/learn-github-actions.yml

```yaml
name: learn-github-actions
on: [push]
jobs:
  check-bats-version:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v2
      - uses: actions/setup-node@v1
      - run: npm install -g bats
      - run: bats -v
```

Events

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```

Webhook Events

```yaml
on:
  pull_request:
    types: [assigned, opened, synchronize, reopened]
```

Scheduled Events

```yaml
on:
  schedule:
    # * is a special character in YAML so you have to quote this string
    - cron:  '*/15 * * * *'
```

Manual Events

```yaml
on: workflow_dispatch
```

Jobs

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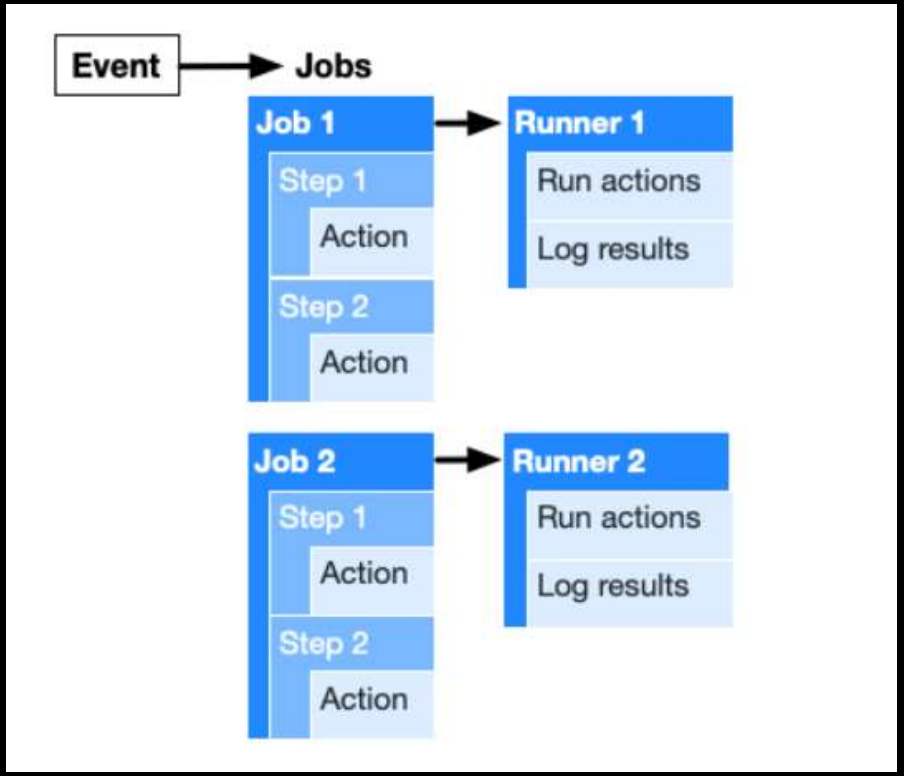

Steps

```yaml
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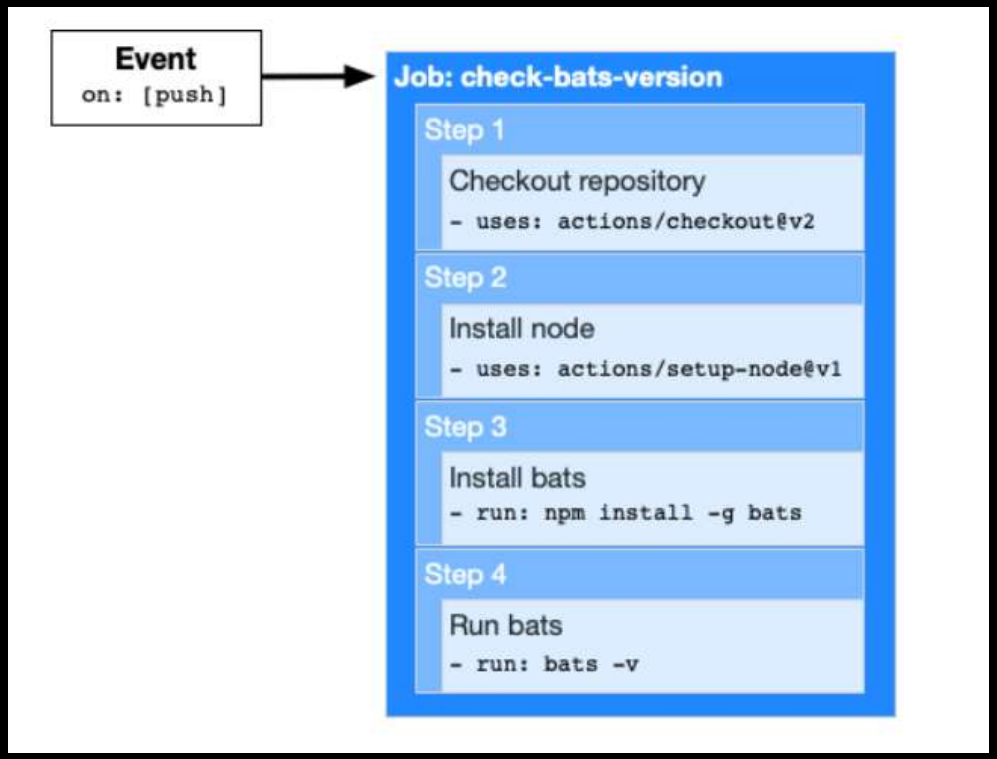

Actions

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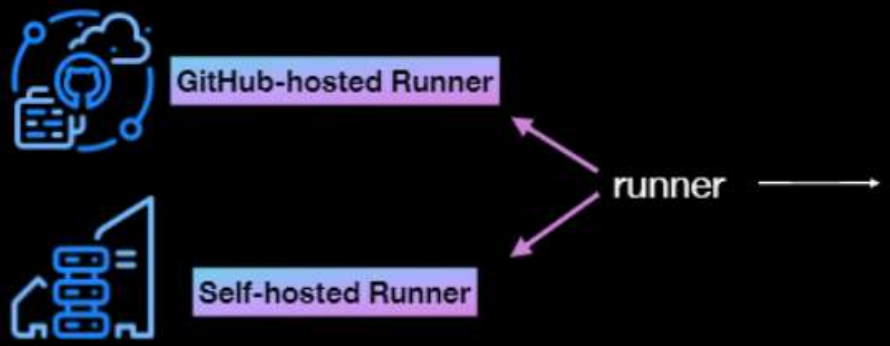
Runners

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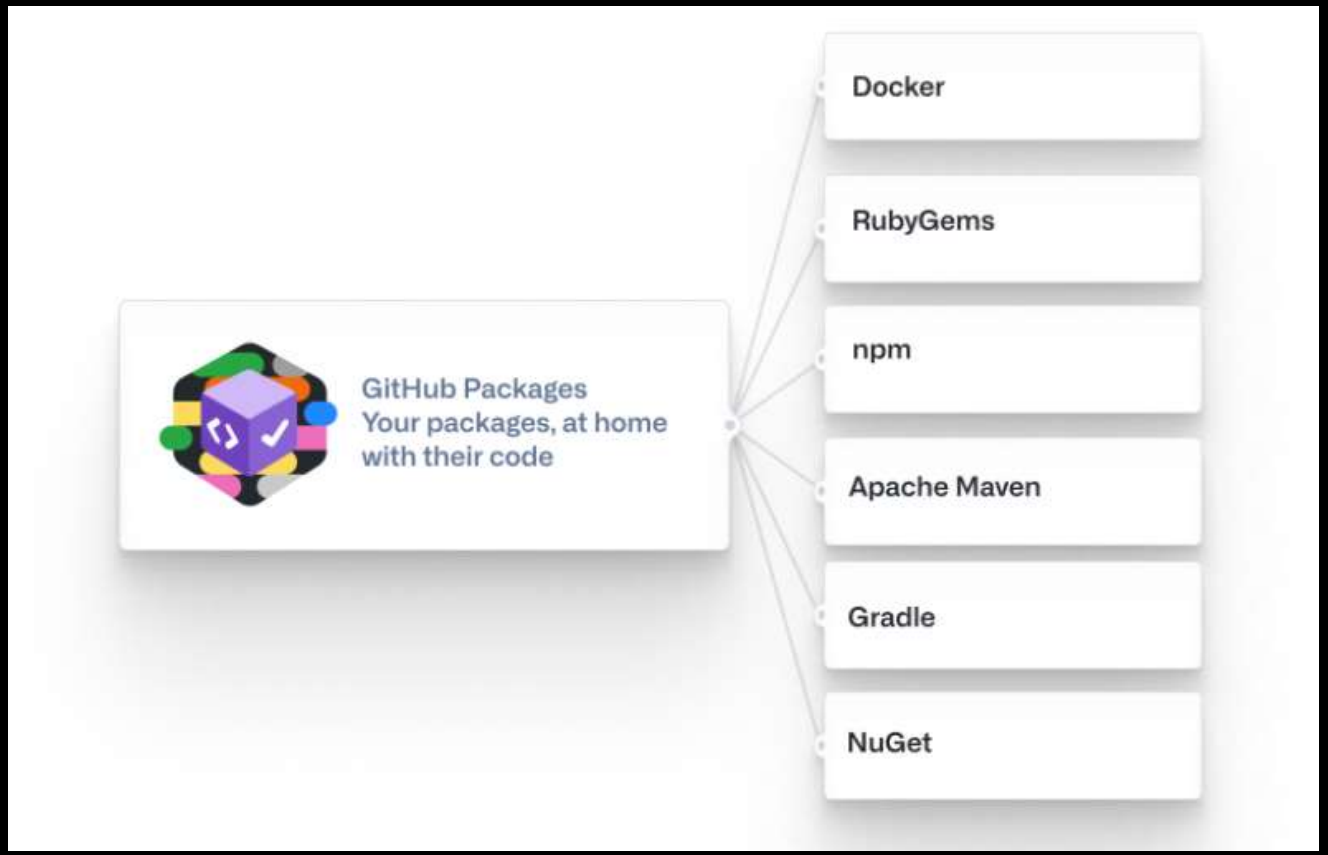
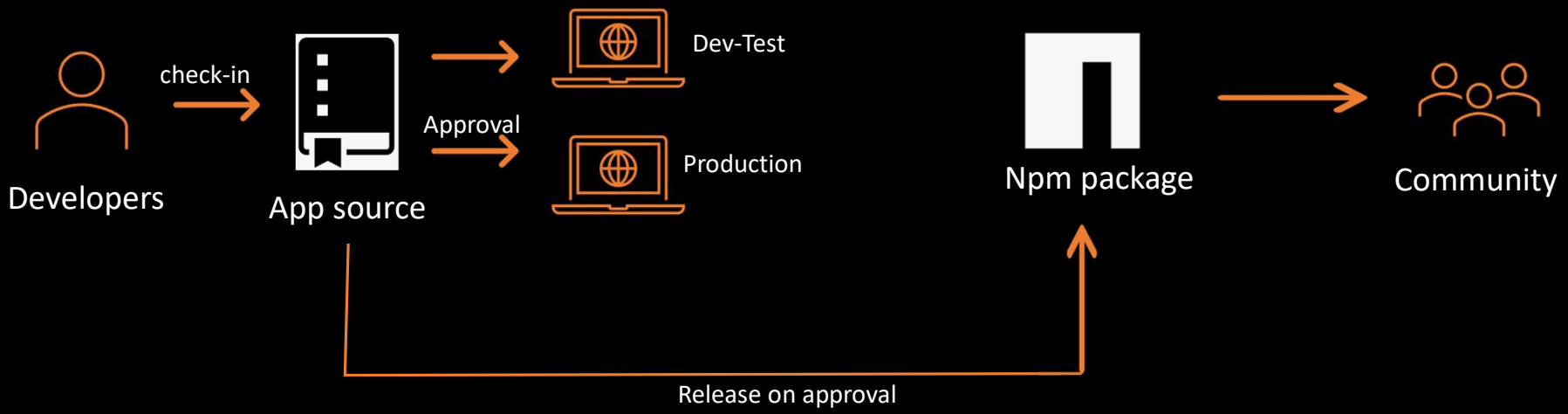
GitHub Packages

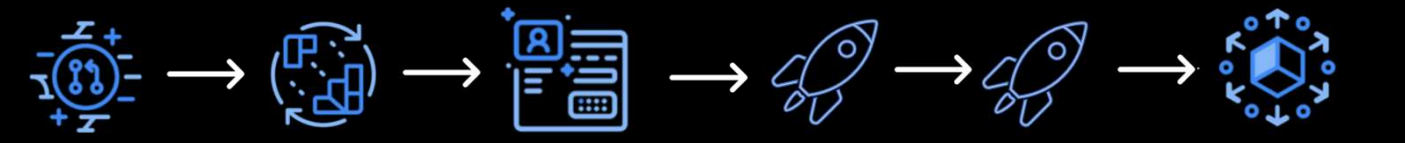


🎉 Hands-on 🎉

Setup - Automate our software workflow



Goal for the hands-on activity



Pull request, push event

CI – Run tests for multiple node versions

User merges PR

Deploy to Dev-test environment

Deploy to production after approval

Publish npm package

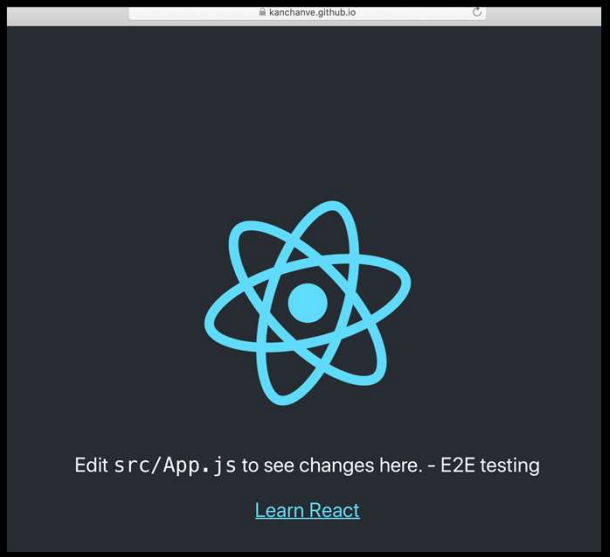
CI
Exercise 1

CD
Exercise 2

Publish package
Exercise 3

App

- For CI -
- A new single page application using a React starter
  - create-a-new-react-app.html
- Ready to use code in src/ and prebuilt package.json
- Contains only a frontend build pipeline
  - 'npm run build'
  - Creates an optimized build of your app in the 'build' folder
  - This build folder can be deployed to a service of your choice



🎉 Hands-on 🎉

Exercise 1 : Automate a CI workflow to build and test your changes as part of PRs and Check-ins.

Exercise 1 - Instructions

- ci-cd-with-actions/workshop_instructions1.md at main · githubsatelliteworkshops/ci-cd-with-actions
- Time alloted – 15 minutes

Recap – Learnings from Exercise 1

1. How to create a new CI workflow?
2. About Workflow templates
3. Action Workflow authoring using GitHub UI
4. Configuring Action triggers and type of triggers
5. About Job strategies
6. Adding status badge for a run

🎉 Hands-on 🎉

Exercise 2 : Build CD with GitHub Actions that deploys to test and production environments

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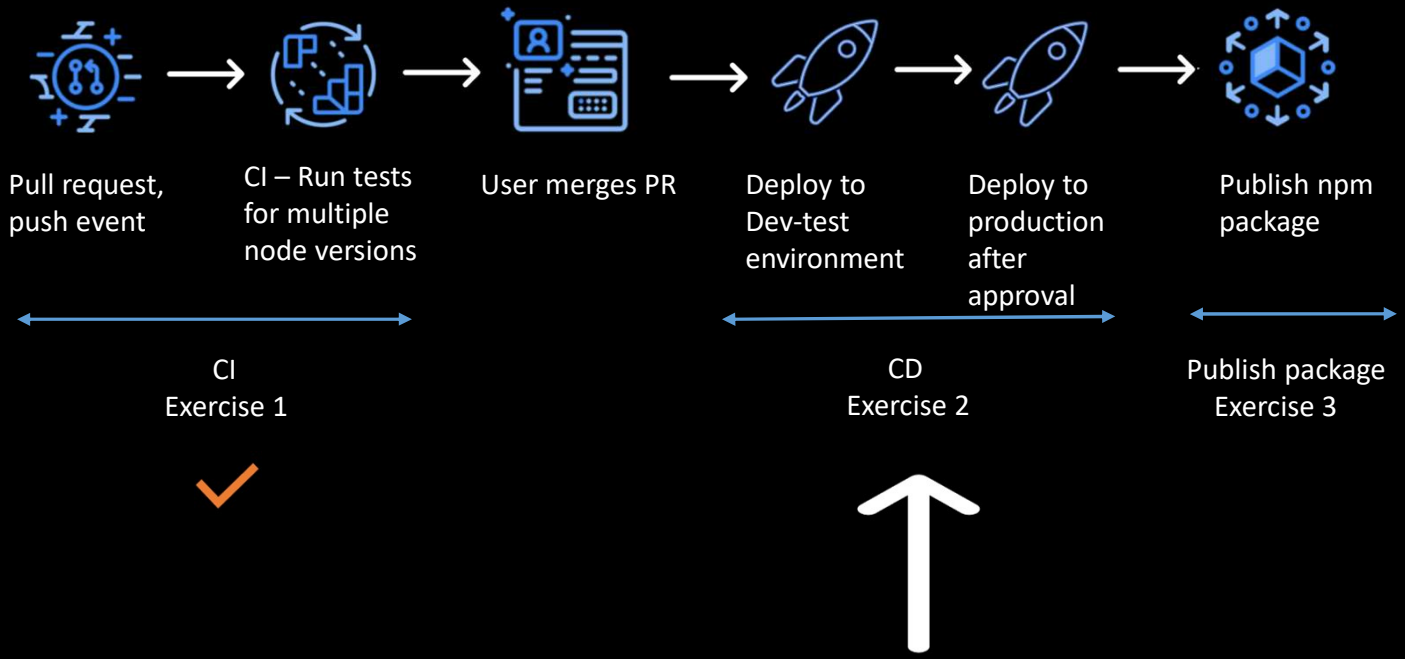
Goal for the hands-on activity



Exercise 2 - Instructions

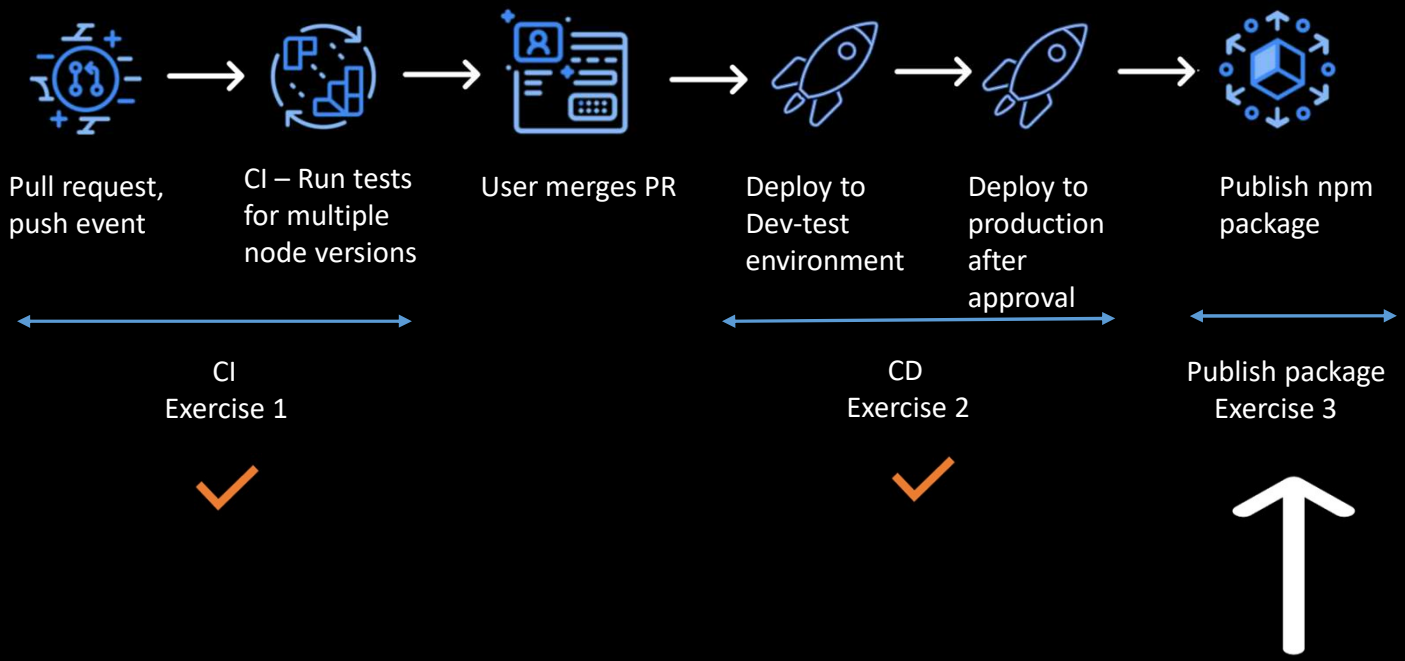
- Exercise 2 setup
  - Continous deployment involves deploying to any hosted or on-premise production computes automatically.
  - We will be using GitHub Pages hosted in two repos to illustrate the CD concepts.
  - One of the repo will host a Dev-Test instance of the app and the other will host the Production instance and will be protected by approvals.
  - These steps and Actions can be replaced with steps and Actions targeting any hosted or on-premise computes.
- ci-cd-with-actions/workshop_instructions2.md at main · githubsatelliteworkshops/ci-cd-with-actions
- Time alloted – 20 minutes

Recap – Learnings from Exercise 2

1. Environments
2. Environment Approvals
3. Secret Variables
4. Using actions built by community from Marketplace
5. Custom Env Variables and their scopes

Exercise 3 : Build a workflow to publish npm package to GitHub Packages

Goal for the hands-on activity



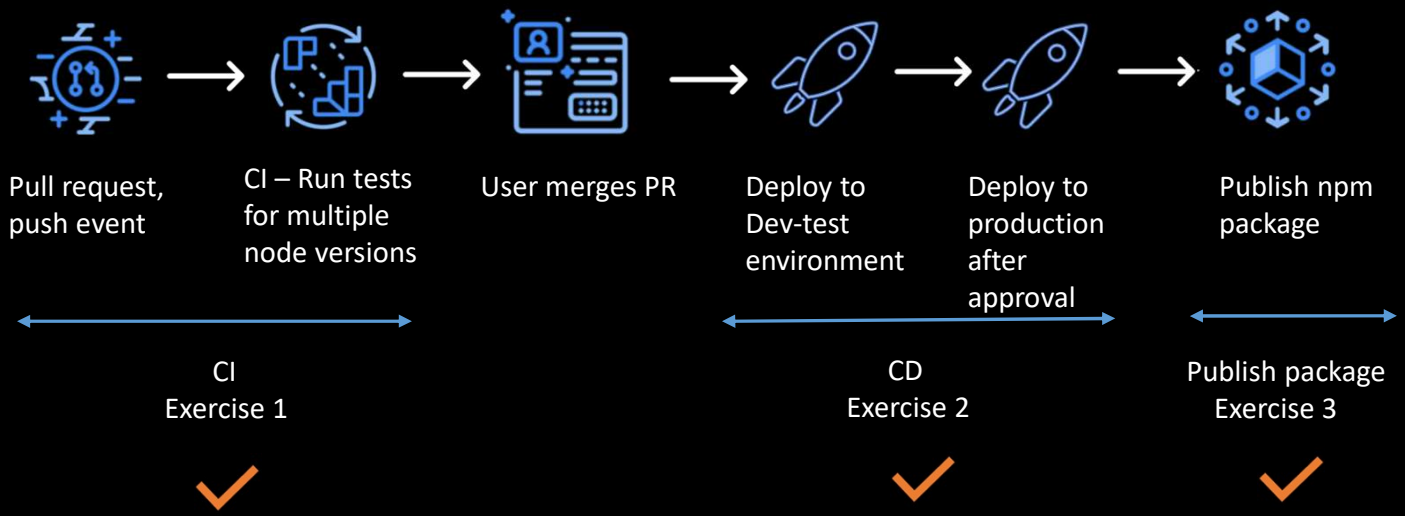
Exercise 3 - Instructions

- ci-cd-with-actions/workshop_instructions3.md at main · githubsatelliteworkshops/ci-cd-with-actions
- Time alloted – 10 minutes

Recap – Learnings from Exercise 3

1. Publish package to GitHub
2. Default env variables
3. Manual triggers (e.g. workflow_dispatch)

Goal for the hands-on activity



Authoring Custom Actions

[Creating actions - GitHub Docs]

action.yml

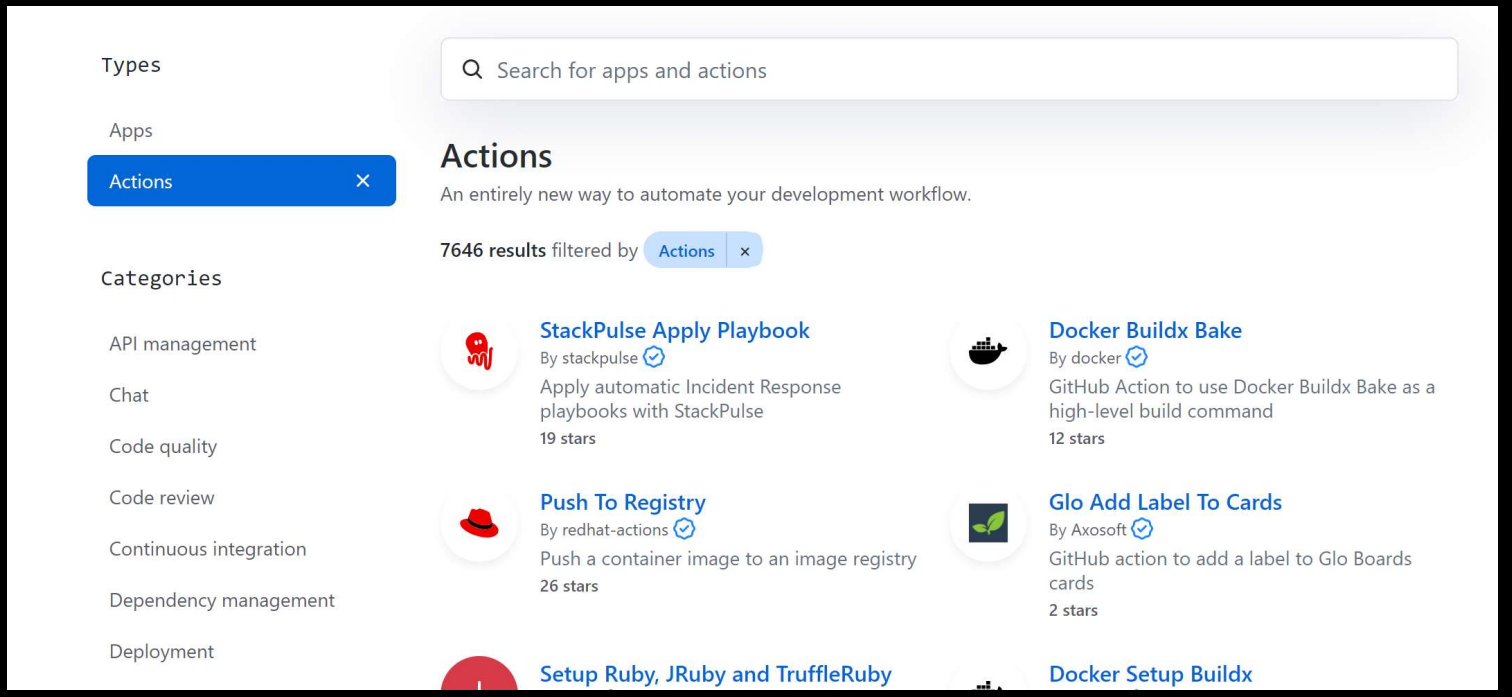
```yaml
name: "Hello Actions"
description: "Greet someone"
author: "octocat@github.com"

inputs:
  MY_NAME:
    description: "Who to greet"
    required: true
    default: "World"

runs:
  using: "docker"
  image: "Dockerfile"

branding:
  icon: "mic"
  color: "purple"
```

Third Party Actions



[GitHub Marketplace · Actions to improve your workflow]

Further Reference

- Documentations
  - GitHub Actions Documentation - GitHub Docs
  - Publishing actions in GitHub Marketplace - GitHub Docs
  - About GitHub Packages - GitHub Docs

- Action Repos
  - Azure/actions: Automate your GitHub workflows using Azure Actions
  - AWS for GitHub Actions
  - google-github-actions
  - hashicorp/terraform-github-actions: Terraform GitHub Actions
  - actions/starter-workflows: Accelerating new GitHub Actions workflows

- RoadMap
  - github/roadmap: GitHub public roadmap

Q & A