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Final Presentation

GROUP 39

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Project Overview

Our project was to set up a complete CI/CD pipeline and develop a simple application to demonstrate the use of this pipeline. We used GitHub as our Version Control, and we'll use GitHub Actions as the Continuous Integration server. Instead of a database, we used an external API to retrieve our data.

Functional requirements

➔ The pipeline should take code submitted by developers on GitHub, build it, then perform static analysis such as unit testing.
➔ The DevOps pipeline must package the application using podman or buildah, and then deploy the containers onto a Red Hat OpenShift Container Platform (OCP).
➔ The containers should then run individually on Linux systems using “podman”.
Why?

Why spend time and resource to develop a CI/CD pipeline?
Short answer: Laziness.
Long answer: It streamlines development and enables development on a larger scale.

What does it do?

- Automated testing/linting.
- Automated code packaging.
- Automated code deployment.
- And many more depending on the configuration.

I am a lazy developer
I trust my fellow developers to make proper tests before making a pull request. This means I don’t have to checkout their branch, build and run tests. I could have watched anime with that free time!

Too much pull requests
I am a small time developer, but my project exploded and there are too many pull requests coming in!
Think about this.

- Time saved.
- Errors avoided.
- Volume increased.
- Development velocity.
- Heart attacks avoided.
Get started with GitHub Actions

Build, test, and deploy your code. Make code reviews, branch management, and issue triaging work the way you want. Select a workflow template to get started.

Skip this and set up a workflow yourself →

Workflows made for your JavaScript repository

- **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
  ```

- **Node.js**
  By GitHub Actions
  Build and test a Node.js project with npm.
  - Set up this workflow
  ```
  npm ci
  npm run build --if-present
  npm test
  ```
The best part?

- It’s cheap (to make and maintain).
- It’s basically English (very descriptive).
- It’s already there for free! (premade)
Containerisation

Why?
People use and develop products for different environments. (Windows/MacOS/Linux).

Q: How do we ensure the same behaviour on every environment?

A: We just replicate one environment and put it everywhere else.

What is it?
“A container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another.” - Docker

TL;DR: We stuff the bare minimum and ship it.
As long as it supports Docker...
Podman vs Docker

The greatest difference between Docker and Podman is their architecture. Docker runs on a client-server architecture, while Podman runs on a daemonless architecture.

- **Daemonless.**
  - One can only view their own containers.
  - Rootless to start up.
- **Can be run as root or non-root.**
  - Rootless.
  - If one escapes container, they’re still user!
- **Podman is a more secure Docker.**
OpenShift

What is it?

OpenShift offers a platform for building and scaling containerized applications.

How does it work?

OpenShift creates nodes from a cloud provider, physical systems, or virtual systems. Kubernetes interacts with node objects that are a representation of those nodes. The master uses the information from node objects to validate nodes with health checks.
Our Application

The Application

- Our application is made with **Vue.js** and **Node.js**.
- It is a **COVID-19 Tracker** which shows information about COVID-19 for each country.
- It gets its information from an API with an API key.
- Shows this information both through **text**, and with **graphs** such as the **bar chart** and **pie chart** shown on the left.

The purpose of it?

- We can then use this application to **test our CI/CD pipeline**.
- It will be deployed on to **OpenShift**.
Our Demo

https://www.youtube.com/watch?v=mD3vXeTYzVg&ab_channel=CormacMadden