

Mid-Project: 3 Tier Application App DevOps Pipeline

A comprehensive project to build and deploy a microservices application using a complete DevOps pipeline, incorporating modern development practices, containerization, and automated deployment.

Project Overview

This project focuses on building and deploying a microservices application with separate backend and frontend components through a complete DevOps pipeline. The implementation will demonstrate modern software development practices with automated testing, deployment, and infrastructure management.

Application Components

The project consists of multiple integrated components working together to create a complete microservices application with a robust DevOps pipeline for continuous integration and deployment.

Technologies & Tools

Infrastructure & Automation

- Linux Ubuntu 24.04 LTS
- Git & GitLab
- Ansible 2.15
- Docker 24.0 & Docker Compose

Development

- Python 3.10 with Flask
- React 18
- PostgreSQL 15
- Swagger

Testing & Quality

- Jest and React Testing Library
- Pytest
- SonarQube

3 Tier Application



Backend

Flask REST API with
Python 3.10



Frontend

React 18 application
application



Database

PostgreSQL 15 for
persistence



Documentation on

Swagger API docs
docs with
comprehensive
testing

Infrastructure Setup

Server Environment

The infrastructure consists of two Ubuntu VMs:

- Development/Staging server
- Production server

Ansible Automation

Ansible playbooks will handle:

- Base server configuration
- Docker installation
- PostgreSQL setup
- Application deployment

Docker Configuration



Multi-stage Dockerfile

Optimized build process with separate stages



Container Separation

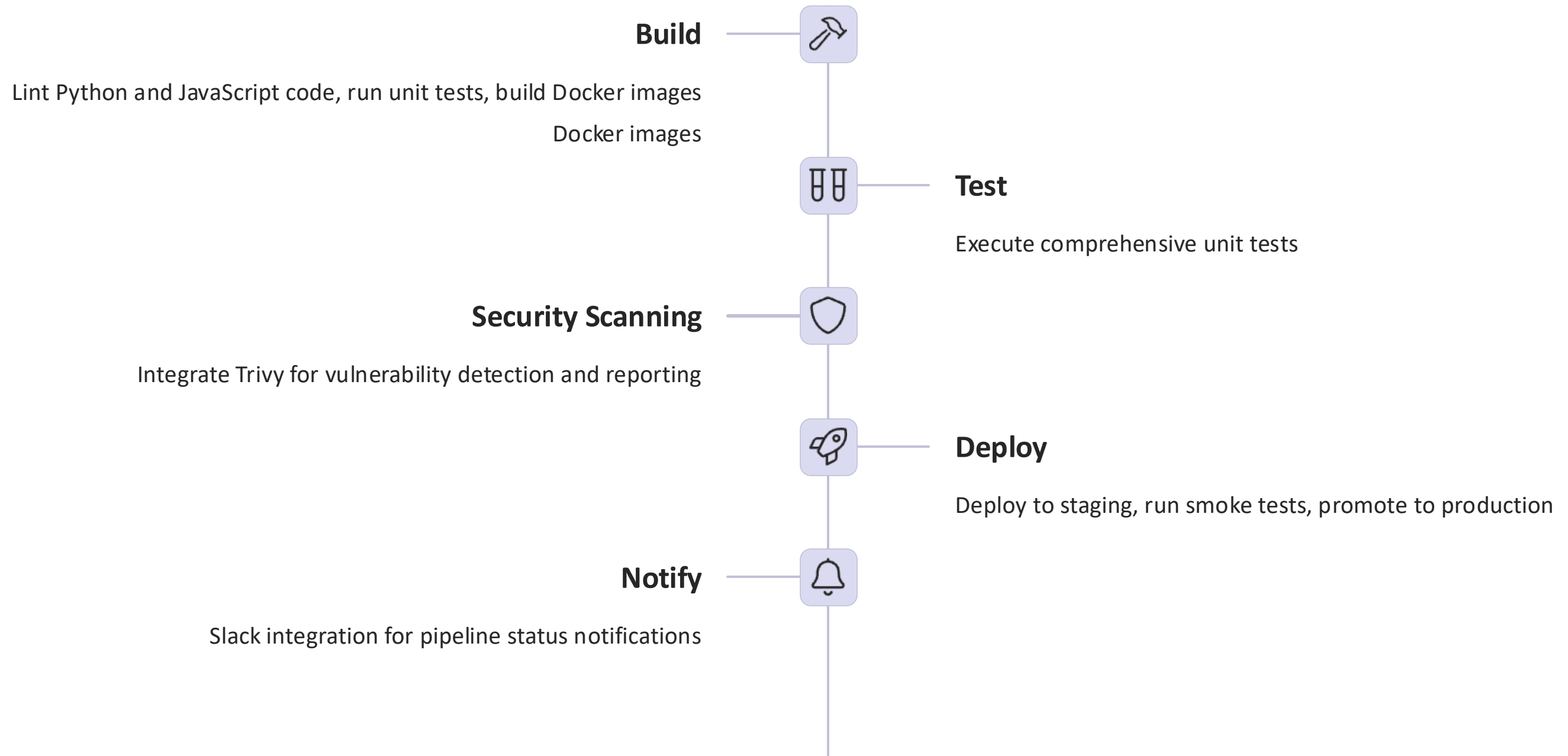
Dedicated containers for Flask, React, and PostgreSQL



Docker Compose

Orchestration for local development environment

CI/CD Pipeline Stages



Deliverables

1 Documentation

Comprehensive Git repository with detailed documentation

3 Pipeline Configuration

GitLab CI/CD pipeline with Slack integration

2 Infrastructure Code

Ansible playbooks, Dockerfiles, and Docker Compose Compose configurations

4 Architecture

Detailed architecture diagrams and documentation documentation