

Jenkins CI/CD Pipeline for Flask Application

1. Project Overview

This project demonstrates the implementation of a Jenkins CI/CD pipeline for a Python Flask web application. The objective was to automate the process of building, testing, and deploying the application using Jenkins, GitHub, and Python tools.

2. Tools and Technologies Used

- Jenkins (CI/CD Automation)
- Git & GitHub (Source Code Management)
- Python 3 & Flask (Application)
- Pytest (Testing Framework)
- Linux (Ubuntu)

3. Project Structure

The repository is structured as follows:

```
jenkins_CI_CD_pipeline_for_flask_application/  
├── Jenkinsfile  
├── app.py  
├── requirements.txt  
├── test_app.py  
├── README.md  
└── documentation/  
    ├── Jenkins_CICD_Overview.md  
    ├── Pipeline_Stages.md  
    ├── Setup_Prerequisites.md  
    └── Screenshots.md
```

4. Jenkins Pipeline Explanation

The Jenkins pipeline is defined using a Jenkinsfile and consists of the following stages:

Checkout:

Jenkins pulls the latest source code from the GitHub repository.

Build:

A Python virtual environment is created and application dependencies are installed using pip.

Test:

Unit tests are executed using pytest. The pipeline proceeds only if tests pass successfully.

Deploy:

The Flask application is deployed to a staging environment after successful build and testing.

5. GitHub Webhook and Automation

A GitHub webhook is configured to automatically trigger the Jenkins pipeline whenever changes are pushed to the main branch. This ensures continuous integration without manual intervention.

6. Screenshots

The screenshot shows a GitHub repository page for 'jenkins_CI_CD_pipeline_for_flask_application'. The repository is public and was forked from 'surendergupta/jenkins_CI_CD_pipeline_for_flask_application'. The main branch has recent pushes 23 minutes ago. The repository is 5 commits ahead of the upstream master branch. The commit history shows a series of updates to the CI/CD pipeline and documentation.

Commit	Message	Time
8104a0b	Added CI/CD documentation folder	23 minutes ago
	Added CI/CD documentation folder	23 minutes ago
	Update files	2 years ago
	Added Jenkins CI/CD pipeline	1 hour ago
	Updated README with CI/CD documentation	34 minutes ago
	update	2 years ago
	Update requirements.txt	2 years ago
	update	2 years ago
	Added basic pytest test	45 minutes ago

Jenkins

flask-ci-cd

Status

Changes

Build Now

Configure

Delete Pipeline

Full Stage View

Stages

Rename

Pipeline Syntax

GitHub Hook Log

flask-ci-cd

Add description

Stage View

	Declarative: Checkout SCM	Build	Test	Deploy	Declarative: Post Actions
Average stage times: (full run time: ~9s)	674ms	5s	650ms	269ms	110ms
#4 Jan 06 01:39	643ms	3s	596ms	162ms	
#3 Jan 06 01:35	630ms	5s	599ms	346ms	95ms
#2 Jan 06 01:29	616ms	3s	611ms	378ms	109ms
#1					

Builds

Filter

Today

✓

#4

01:39

✓

#3

01:35

✓

#2

01:29

✓

#1

Jenkins

flask-ci-cd

#5

Console Output

Status

Changes

Console Output

Edit Build Information

Delete build '#5'

Polling Log

Timings

Git Build Data

Pipeline Overview

Restart from Stage

Replay

Pipeline Steps

Workspaces

Previous Build

Console Output

Download

Copy

View as plain text

```

Started by GitHub push by Rushiargade
Obtained Jenkinsfile from git https://github.com/Rushiargade/jenkins_CI_CD_pipeline_for_flask_application.git
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/flask-ci-cd
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
No credentials specified
> git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/flask-ci-cd/.git # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/Rushiargade/jenkins_CI_CD_pipeline_for_flask_application.git #
timeout=10
Fetching upstream changes from https://github.com/Rushiargade/jenkins_CI_CD_pipeline_for_flask_application.git
> git --version # timeout=10
> git --version # 'git version 2.43.0'
> git fetch --tags --force --progress -- https://github.com/Rushiargade/
jenkins_CI_CD_pipeline_for_flask_application.git --force --progress -- https://github.com/Rushiargade/

```

Webhooks

Add webhook

Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our [Webhooks Guide](#).

✓ <http://18.144.12.145:8080/github-w...> (push)

EditDelete

Last delivery was successful.

Jenkins / flask-ci-cd

Q

⚙️

👤

⚙️ Configure

🗑️ Delete Pipeline

🔍 Full Stage View

📁 Stages

✎ Rename

❓ Pipeline Syntax

📄 GitHub Hook Log

Buils

Filter

Today

🟢 #5 8:20 PM

Average stage times:
(full run time: ~7s)

	Declarative: Checkout SCM	Build	Test	Deploy	Declarative: Post Actions
45 Jan 06 01:50 1 commit	599ms	4s	848ms	347ms	93ms
44 Jan 06 01:39 1 commit	643ms	3s	596ms	339ms	101ms
43 Jan 06 01:35 1 commit	630ms	5s	599ms	346ms	95ms
42 Jan 06 01:29 1 commit	616ms	3s	611ms	378ms	109ms

7. Conclusion

This project successfully demonstrates a complete CI/CD workflow using Jenkins for a Flask application. Automation of build, test, and deployment improves reliability, reduces manual effort, and ensures faster delivery of applications following DevOps best practices.