

## Task 2 – CI/CD Pipelines Implementation

### Description:

This task focuses on designing and implementing a Continuous Integration and Continuous Deployment (CI/CD) pipeline to automate the build, test, and deployment process of an application. The pipeline ensures faster delivery, reduced manual errors, and consistent deployments across environments. It integrates version control with automated workflows triggered on code changes.

### Overview of the Task:

The CI/CD pipeline was configured to automatically trigger whenever code is pushed to the repository. The pipeline performs code checkout, dependency installation, application build, and basic validation steps. This setup demonstrates how modern DevOps teams ensure code quality and rapid deployment using automation tools.

### Tools & Technologies Used:

- Git & GitHub
- GitHub Actions (CI/CD)
- Docker
- Docker Compose
- Linux shell commands

### Pipeline Workflow:

1. Code push to GitHub repository triggers the pipeline.
2. Workflow checks out the source code.
3. Dependencies are installed automatically.
4. Docker image is built from the Dockerfile.
5. Containers are started using Docker Compose.
6. Basic validation ensures the application runs successfully.

### Commands Used:

```
git add .  
git commit -m "Initial CI/CD pipeline setup"  
git push origin main
```

```
docker build -t app .  
docker compose up --build
```

docker ps

Configuration Files:

- .github/workflows/ci-cd.yml
- Dockerfile
- docker-compose.yml

Sample CI/CD Configuration (GitHub Actions):

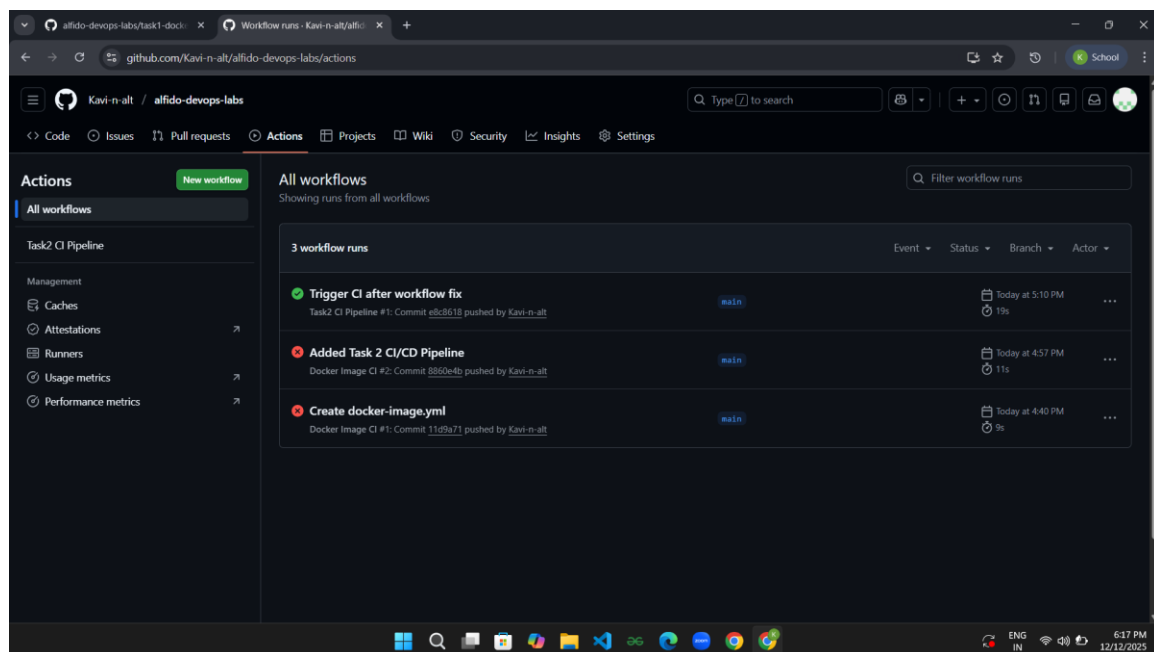
The workflow defines jobs and steps to automate the build and deployment process using YAML configuration. It specifies triggers, runner environment, and execution steps.

Outcome:

The CI/CD pipeline successfully automates application build and deployment on every code update. This task improved understanding of DevOps automation, pipeline configuration, and real-world CI/CD practices.

GitHub Repository:

<https://github.com/Kavi-n-alt/alfido-devops-labs>



COMMIT\_EDITMSG - devops-1

Trigger CI after fixing workflow

alfido-devops-labs/task2-ci-01

Install dependencies in Actions

+

github.com/Kavi-n-alt/alfido-devops-labs/actions/runs/20175210925/job/57921347101

Summary

Jobs

Run details

Usage

Workflow file

build

succeeded 5 minutes ago in 16s

Search logs

Build Docker Image8s

Post Set up Python8s

Post Checkout repository8s

Complete job8s

1 Post job cleanup.

2 /usr/bin/git version

3 git version 2.52.0

4 Temporarily overriding HOME="/home/runner/work/\_temp/562981a8-f11f-4c65-a184-133797d5e7d8" before making global git config changes

5 Adding repository directory to the temporary git global config as a safe directory

6 /usr/bin/git config --global --add safe.directory /home/runner/work/alfido-devops-labs/alfido-devops-labs

7 /usr/bin/git config --local --name-only --get-regexp core.sshCommand

8 /usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'core.sshCommand' && git config --local --unset-all 'core.sshCommand' || :"

9 /usr/bin/git config --local --name-only --get-regexp http.https://\./github.com/.extraheader

10 http.https://github.com/.extraheader

11 /usr/bin/git config --local --unset-all http.https://github.com/.extraheader

12 /usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'http.https://\./github.com/.extraheader' && git config --local --unset-all 'http.https://github.com/.extraheader' || :"

13 /usr/bin/git config --local --name-only --get-regexp 'includeIf.gitter:

14 /usr/bin/git submodule foreach --recursive git config --local --show-origin --name-only --get-regexp remote.origin.url

1 Cleaning up orphan processes

Windows taskbar with icons for Start, Search, File Explorer, Edge, and others.

System tray showing language (ENG IN), network, and time (11:24 PM 12/13/2025).

COMMIT\_EDITMSG - devops-lab

Trigger CI after fixing workflow

alfido-devops-lab/task2-ci-ctf

Install dependencies in Actions

github.com/Kavi-n-alt/alfido-devops-lab/actions/runs/20175210925/job/57921347101

Summary

Jobs

Run details

Usage

Workflow file

build

succeeded 5 minutes ago in 16s

Search logs

Build Docker Image

8s

#5 [internal] load build context

#5 transferring context: 1.18kB done

#5 DONE 0.0s

#6 [1/5] FROM docker.io/library/python:3.10-slim@sha256:8769c310045c67eac267537f40950bc644eeeb9f0e88bec004548a88f1f33d

#6 resolve docker.io/library/python:3.10-slim@sha256:8769c310045c67eac267537f40950bc644eeeb9f0e88bec004548a88f1f33d done

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 00 / 13.82MB 0.1s

#6 sha256:8769c310045c67eac267537f40950bc644eeeb9f0e88bec004548a88f1f33d 10.37kB / 10.37kB done

#6 sha256:d63248f0097e027c53d0c00736707a6f665c88c7f8eeb1da37d63020ba954 1.75kB / 1.75kB done

#6 sha256:53ef2abdf6e974e0d075e5106f2f4dc8cfc5da301d4c6a26509c7bdc38a3e 5.48kB / 5.48kB done

#6 sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5 3.15MB / 29.70MB 0.1s

#6 sha256:9f49c26f8f287696571eb0805e10e91211abb4dd5918c5a2f50d16697191540 00 / 1.29MB 0.1s

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 00 / 13.82MB 0.3s

#6 sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5 16.70MB / 29.70MB 0.3s

#6 sha256:9f49c26f8f287696571eb0805e10e91211abb4dd5918c5a2f50d16697191540 1.29MB / 1.29MB 0.2s done

#6 sha256:7bceabe27c0ff3949f8ad5eb4db394db585a5fbc33e0371b4d621298ef7ccb1 248B / 248B 0.1s done

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 5.24MB / 13.82MB 0.4s

#6 sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5 27.20MB / 29.70MB 0.4s

#6 extracting sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 8.39MB / 13.82MB 0.5s

#6 sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5 29.70MB / 29.70MB 0.4s done

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 12.50MB / 13.82MB 0.6s

#6 sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 13.82MB / 13.82MB 0.6s done

#6 extracting sha256:1733a4cd59540b3470ff7a09063bcdca5b543279dddbda4022d7883fda0221e5 0.5s done

#6 extracting sha256:9f49c26f8f287696571eb0805e10e91211abb4dd5918c5a2f50d16697191540 0.1s

#6 extracting sha256:9f49c26f8f287696571eb0805e10e91211abb4dd5918c5a2f50d16697191540 0.1s done

#6 extracting sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70

#6 extracting sha256:004f0aa18a079de0973edc8a53f2397b4fe498cc595e21fb32ab01c89eb00a70 0.7s done

#6 extracting sha256:7bceabe27c0ff3949f8ad5eb4db394db585a5fbc33e0371b4d621298ef7ccb1

#6 extracting sha256:7bceabe27c0ff3949f8ad5eb4db394db585a5fbc33e0371b4d621298ef7ccb1 done

COMMIT\_EDITMSG - devops-lab

Trigger CI after fixing workflow

alfido-devops-lab/task2-ci-ctf

Install dependencies in Actions

github.com/Kavi-n-alt/alfido-devops-lab/actions/runs/20175210925/job/57921347101

Summary

Jobs

Run details

Usage

Workflow file

build

succeeded 4 minutes ago in 16s

Search logs

Install dependencies

4s

16 Downloading click-8.3.1-py3-none-any.whl.metadata (2.6 kB)

17 Collecting itsdangerous==2.2.0 (from flask->r requirements.txt (line 1))

18 Downloading itsdangerous-2.2.0-py3-none-any.whl.metadata (1.9 kB)

19 Collecting Jinja2==3.1.2 (from flask->r requirements.txt (line 1))

20 Downloading Jinja2-3.1.6-py3-none-any.whl.metadata (2.9 kB)

21 Collecting MarkupSafe==2.1.1 (from flask->r requirements.txt (line 1))

22 Downloading MarkupSafe-3.0.3-cp310-cp310-manylinux2014\_x86\_64.manylinux2\_17\_x86\_64.manylinux2\_28\_x86\_64.whl.metadata (2.7 kB)

23 Collecting werkzeug==3.1.0 (from flask->r requirements.txt (line 1))

24 Downloading werkzeug-3.1.4-py3-none-any.whl.metadata (4.0 kB)

25 Downloading flask-3.1.2-py3-none-any.whl (103 kB)

26 Downloading blinker-1.9.0-py3-none-any.whl (8.5 kB)

27 Downloading click-8.3.1-py3-none-any.whl (108 kB)

28 Downloading itsdangerous-2.2.0-py3-none-any.whl (16 kB)

29 Downloading Jinja2-3.1.6-py3-none-any.whl (134 kB)

30 Downloading MarkupSafe-3.0.3-cp310-cp310-manylinux2014\_x86\_64.manylinux2\_17\_x86\_64.manylinux2\_28\_x86\_64.whl (20 kB)

31 Downloading werkzeug-3.1.4-py3-none-any.whl (224 kB)

32 Installing collected packages: MarkupSafe, Itsdangerous, click, blinker, werkzeug, Jinja2, flask

33

34 Successfully installed blinker-1.9.0 click-8.3.1 flask-3.1.2 Itsdangerous-2.2.0 Jinja2-3.1.6 MarkupSafe-3.0.3 werkzeug-3.1.4

Syntax Check

8s

1 Run python -m py\_compile app.py

2 python -m py\_compile app.py

3 shell: /usr/bin/bash -e (0)

4 env:

5 pythonLocation: /opt/hostedtoolcache/Python/3.10.19/x64

6 PKG\_CONFIG\_PATH: /opt/hostedtoolcache/Python/3.10.19/x64/lib/pkgconfig

7 Python\_ROOT\_DIR: /opt/hostedtoolcache/Python/3.10.19/x64

8 Python2\_ROOT\_DIR: /opt/hostedtoolcache/Python/3.10.19/x64

github.com/Kavi-n-alt/alfido-devops-labs/actions/runs/20175210925/job/57921347101

Summary

Jobs

build

Run details

Usage

Workflow file

build  
succeeded 4 minutes ago in 16s

Search logs

Checkout repository

```
627091864aa80a53ec5bfb684cd602ae3a6c234b:refs/remotes/origin/main
54 From https://github.com/Kavi-n-alt/alfido-devops-labs
55 * [new ref] 627091864aa80a53ec5bfb684cd602ae3a6c234b -> origin/main
56 ▼Determining the checkout info
57 /usr/bin/git sparse-checkout disable
58 /usr/bin/git config --local --unset-all extensions.worktreeConfig
59 ▶Checking out the ref
60 /usr/bin/git log -1 --format=%H
61 627091864aa80a53ec5bfb684cd602ae3a6c234b
```

Set up Python

```
1 Run actions/setup-python@v4
2 with:
3   python-version: 3.10
4   check-latest: false
5   token: ***
6   update-environment: true
7   allow-prereleases: false
8 ▼Installed versions
9 Successfully set up CPython (3.10.19)
```

Install dependencies

```
1 Run pip install -r requirements.txt
11 Collecting flask (from -r requirements.txt (line 1))
12 Downloading flask-3.1.2-py3-none-any.whl.metadata (3.2 kB)
13 Collecting blinker-1.9.0 (from flask->-r requirements.txt (line 1))
14 Downloading blinker-1.9.0-py3-none-any.whl.metadata (1.6 kB)
15 Collecting click-8.1.3 (from flask->-r requirements.txt (line 1))
```

github.com/Kavi-n-alt/alfido-devops-labs/actions/runs/20175210925/job/57921347101

Summary

Jobs

build

Run details

Usage

Workflow file

build  
succeeded 4 minutes ago in 16s

Search logs

Checkout repository

```
27 hint: Using 'master' as the name for the initial branch. This default branch name
28 hint: will change to 'main' in Git 3.0. To configure the initial branch name
29 hint: to use in all of your new repositories, which will suppress this warning,
30 hint: call:
31 hint:
32 hint:     git config --global init.defaultBranch <name>
33 hint:
34 hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
35 hint: 'development'. The just-created branch can be renamed via this command:
36 hint:
37 hint:     git branch -m <name>
38 hint:
39 hint: Disable this message with "git config set advice.defaultBranchName false"
40 Initialized empty Git repository in /home/runner/work/alfido-devops-labs/alfido-devops-labs/.git/
41 /usr/bin/git remote add origin https://github.com/Kavi-n-alt/alfido-devops-labs
42 ▼Disabling automatic garbage collection
43 /usr/bin/git config --local gc.auto 0
44 ▼Setting up auth
45 /usr/bin/git config --local --name-only --get-regexp core.sshCommand
46 /usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'core.sshCommand' && git config --local --unset-all
47 'core.sshCommand' || :"
48 /usr/bin/git config --local --name-only --get-regexp http.https://github.com/\,extrahader
49 /usr/bin/git submodule foreach --recursive sh -c "git config --local --name-only --get-regexp 'http.https://github.com/\,extrahader' && git config --
50 -local --unset-all 'http.https://github.com/\,extrahader' || :"
51 /usr/bin/git config --local --name-only --get-regexp 'includeIf.gittir:
52 /usr/bin/git submodule foreach --recursive git config --local --show-origin --name-only --get-regexp remote.origin.url
53 /usr/bin/git config --local http.https://github.com/\,extrahader:AUTHORIZATION:basic ***
54 ▼Fetching the repository
55 /usr/bin/git -c protocol.version=2 fetch --no-tags --prune --no-recurse-submodules --depth=1 origin
56 627091864aa80a53ec5bfb684cd602ae3a6c234b:refs/remotes/origin/main
```

COMMIT\_EDITMSG - devops-l... Trigger CI after fixing workflow alfido-devops-labs/task2-ci-cl... Install dependencies in Actions

github.com/Kavi-n-alt/alfido-devops-labs/actions/runs/20175210925/job/57921347101

Summary

Jobs

- build

Run details

- Usage
- Workflow file

build

succeeded 4 minutes ago in 16s

Search logs

Set up job

Complete job name: build

Checkout repository

```
1 Run actions/checkout@v4
2 with:
3   repository: Kavi-n-alt/alfido-devops-labs
4   token: ***
5   ssh-strict: true
6   ssh-user: git
7   persist-credentials: true
8   clean: true
9   sparse-checkout-cone-mode: true
10  fetch-depth: 1
11  fetch-tags: false
12  show-progress: true
13  if: false
14  submodules: false
15  set-safe-directory: true
16  syncing-repository: Kavi-n-alt/alfido-devops-labs
17  Getting git version info
18  Working directory is '/home/runner/work/alfido-devops-labs/alfido-devops-labs'
19  /usr/bin/git version
20  git version 2.52.0
21  Temporarily overriding HOME='/home/runner/work/_temp/7bd36915-1144-4773-9804-852cd2a56487' before making global git config changes
22  Adding repository directory to the temporary git global config as a safe directory
23  /usr/bin/git config --global --add safe.directory /home/runner/work/alfido-devops-labs/alfido-devops-labs
24  Deleting the contents of '/home/runner/work/alfido-devops-labs/alfido-devops-labs'
25  Initializing the repository
26  /usr/bin/git init /home/runner/work/alfido-devops-labs/alfido-devops-labs
```

COMMIT\_EDITMSG - devops-l... Trigger CI after fixing workflow alfido-devops-labs/task2-ci-cl... Install dependencies in Actions

github.com/Kavi-n-alt/alfido-devops-labs/actions/runs/20175210925/job/57921347101

Trigger CI after fixing workflow #5

Re-run all jobs

Summary

Jobs

- build

Run details

- Usage
- Workflow file

build

succeeded 4 minutes ago in 16s

Search logs

Set up job

```
1 Current runner version: "2.329.0"
2 Runner Image Provisioner
3 Hosted Compute Agent
4 Version: 20251208.455
5 Commit: 6c18caca910b1904f60de21ad720bd317c474e3
6 Build Date: 2025-12-02T15:56:59Z
7 Worker ID: [c1b5fe3]-2852-4fcb-bbda-7830fb1a07a1
8 Operating System
9 Ubuntu
10 24.04.3
11 LTS
12 Runner Image
13 Image: ubuntu-24.04
14 Version: 20251208.163.1
15 Included Software: https://github.com/actions/runner-images/blob/ubuntu24/20251208.163/images/ubuntu/Ubuntu2404-Readme.md
16 Image Release: https://github.com/actions/runner-images/releases/tag/ubuntu24/20251208.163
17 GITHUB_TOKEN Permissions
18 Contents: read
19 Metadata: read
20 Packages: read
21 Secret source: Actions
22 Prepare workflow directory
23 Prepare all required actions
24 Getting action download info
25 Download action repository 'actions/checkout@v4' (SHA:34e11487608b11c390a5c381ad16ebd13914f8d5)
26 Download action repository 'actions/setup-python@v4' (SHA:7f44c3e22c37d6ff65e88745f38bd1157c663f7c)
```

alido-devops-labs/task1-dock: X Trigger CI after workflow fix: K: X +

github.com/Kavi-n-alt/alido-devops-labs/actions/runs/20165627184/job/57888199200

Kavi-n-alt / alido-devops-labs

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Task2 CI Pipeline

Trigger CI after workflow fix #1

Summary

Jobs

build

Run details

Usage

Workflow file

build

succeeded 1 hour ago in 15s

Search logs

- Set up job 8s
- Checkout repository 1s
- Set up Python 8s
- Install dependencies 2s
- Syntax Check 8s
- Build Docker Image 8s
- Post Set up Python 8s
- Post Checkout repository 8s
- Complete job 8s

alido-devops-labs/task1-dock: X Trigger CI after workflow fix: K: X +

github.com/Kavi-n-alt/alido-devops-labs/actions/runs/20165627184/workflow

Summary

Jobs

build

Run details

Usage

Workflow file

Workflow file for this run

github/workflows/task2-ci.yml at e8c8618

```
1 name: Task2 CI Pipeline
2
3 on:
4   push:
5     paths:
6       - "task2-ci-cd/**"
7
8 jobs:
9   build:
10    runs-on: ubuntu-latest
11
12    steps:
13      - name: Checkout repository
14        uses: actions/checkout@v4
15
16      - name: Set up Python
17        uses: actions/setup-python@v4
18        with:
19          python-version: "3.10"
20
21      - name: Install dependencies
22        working-directory: task2-ci-cd/app
23        run: pip install -r requirements.txt
24
25      - name: Syntax Check
26        working-directory: task2-ci-cd/app
27        run: python -m py_compile app.py
28
29      - name: Build Docker Image
30        working-directory: task2-ci-cd/app
31        run: docker build -t task2-image .
```

COMMIT\_EDITMSG - devops-i- x Trigger CI after fixing workflow x alido-devops-lab/task2-ci-cd x Install dependencies in Actions x +

github.com/Kavi-n-alt/alido-devops-lab/actions/runs/20175210925/job/57921347101

Summary

Jobs

- build

Run details

Usage

Workflow file

build  
succeeded 5 minutes ago in 16s

Syntax Check 8s

```
9 Python3_ROOT_DIR: /opt/hostedtoolcache/Python/3.10.19/x64
10 LD_LIBRARY_PATH: /opt/hostedtoolcache/Python/3.10.19/x64/lib
```

Build Docker Image 8s

```
1 Run docker build -t task2-image .
2 docker build -t task2-image .
3 shell: /usr/bin/bash -e {0}
4 env:
5   pythonlocation: /opt/hostedtoolcache/Python/3.10.19/x64
6   PKG_CONFIG_PATH: /opt/hostedtoolcache/Python/3.10.19/x64/lib/pkgconfig
7   Python_ROOT_DIR: /opt/hostedtoolcache/Python/3.10.19/x64
8   Python2_ROOT_DIR: /opt/hostedtoolcache/Python/3.10.19/x64
9   Python3_ROOT_DIR: /opt/hostedtoolcache/Python/3.10.19/x64
10  LD_LIBRARY_PATH: /opt/hostedtoolcache/Python/3.10.19/x64/lib
11 #0 building with "default" instance using docker driver
12
13 #1 [internal] load build definition from Dockerfile
14 #1 transferring dockerfile: 201B done
15 #1 DONE 0.0s
16
17 #2 [auth] library/python:pull token for registry-1.docker.io
18 #2 DONE 0.0s
19
20 #3 [internal] load metadata for docker.io/library/python:3.10-slim
21 #3 DONE 0.5s
22
23 #4 [internal] load .dockerignore
24 #4 transferring context: 2B done
25 #4 DONE 0.0s
```

11:23 PM  
12/12/2025