GROUP 4

DevOps - SW C6 & C7 2024 Presentation

The Team

Muzakkir

Azni Syahirah

Amirah Aifa

Nor Aqilahani

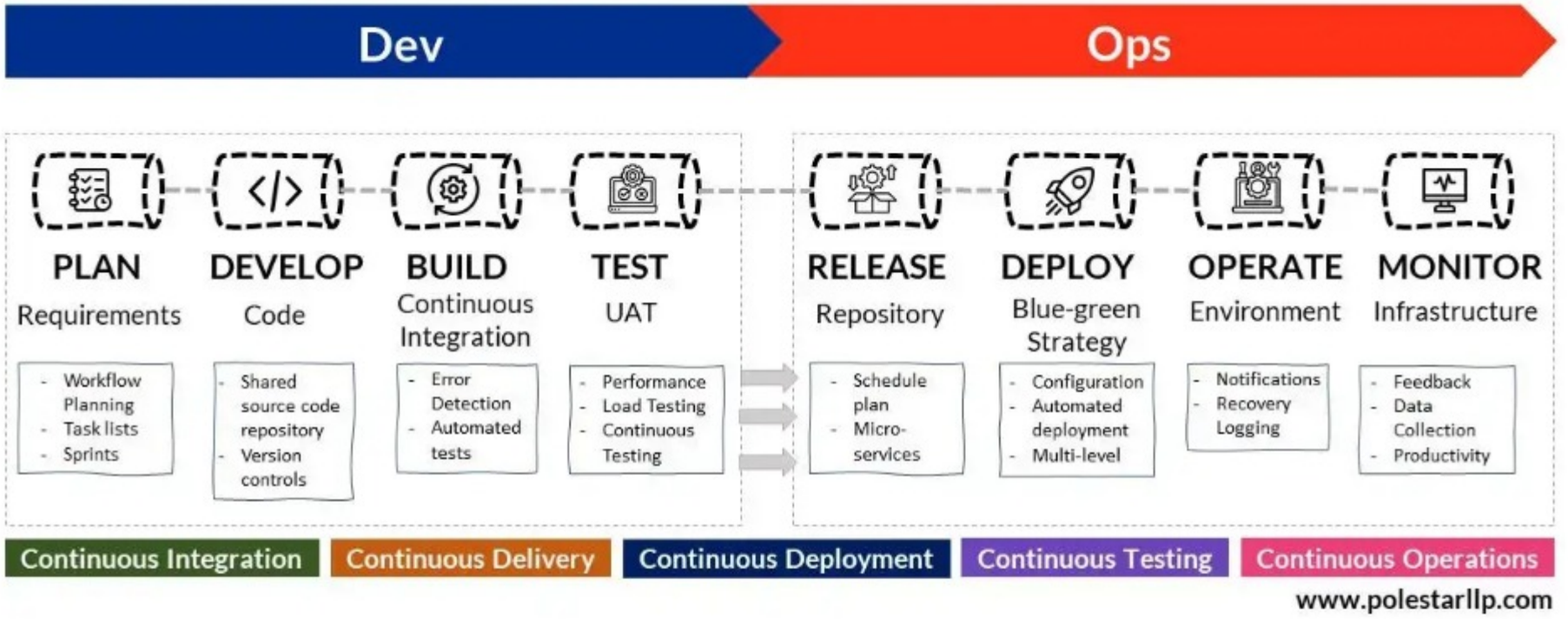
Farzana Jeffri

Introduction

Learning Objective:

- To acquire foundational knowledge and practical exposure to DevOps, including core principles, essential concepts, and tools, with the ability to implement DevOps practices
- To learn how automation, testing, and monitoring can reduce the time to market for new features while minimizing bugs and ensuring higher performance

DevOps in a nutshell



- tools, practices and philosophies
- to build and deploy software more quickly and reliably
- agile methods and continuous delivery via automation
- improving collaboration between development and operations teams

Project Task and Timeline

Notion

Group 4 / Projects & Tasks

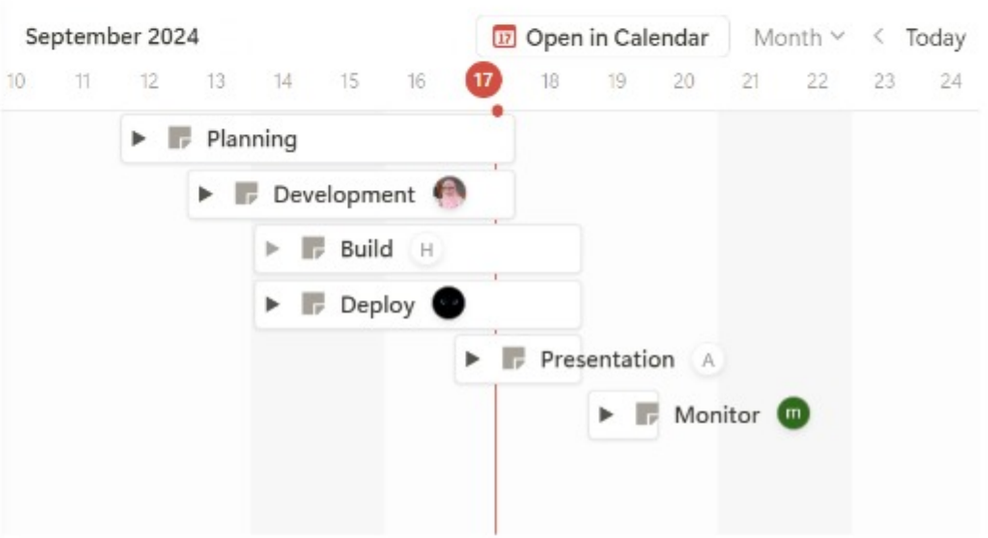
Tasks

Job Portal Website 6

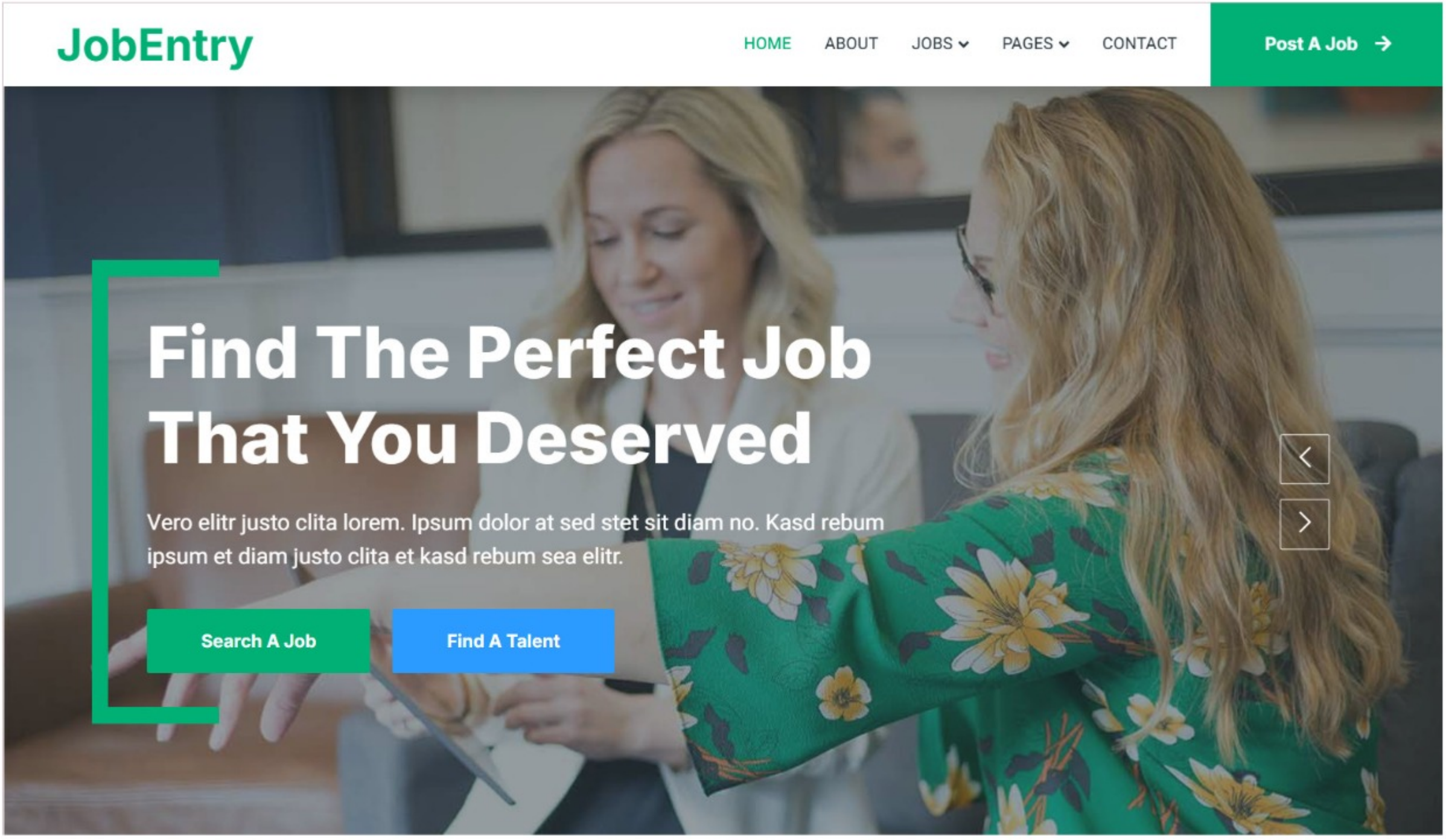
Task name	Status	Assignee	Due
Planning	Done		September 12, 2024 –
Development	Done	Farzana Jeffri	September 13, 2024 –
Deploy	Done	Azni	September 14, 2024 –
Build	Done	Hani S	September 14, 2024 –
Presentation	In Progress	Amirah Aifa	September 17, 2024 –
Monitor	In Progress	muzakkir github	September 19, 2024

+ New

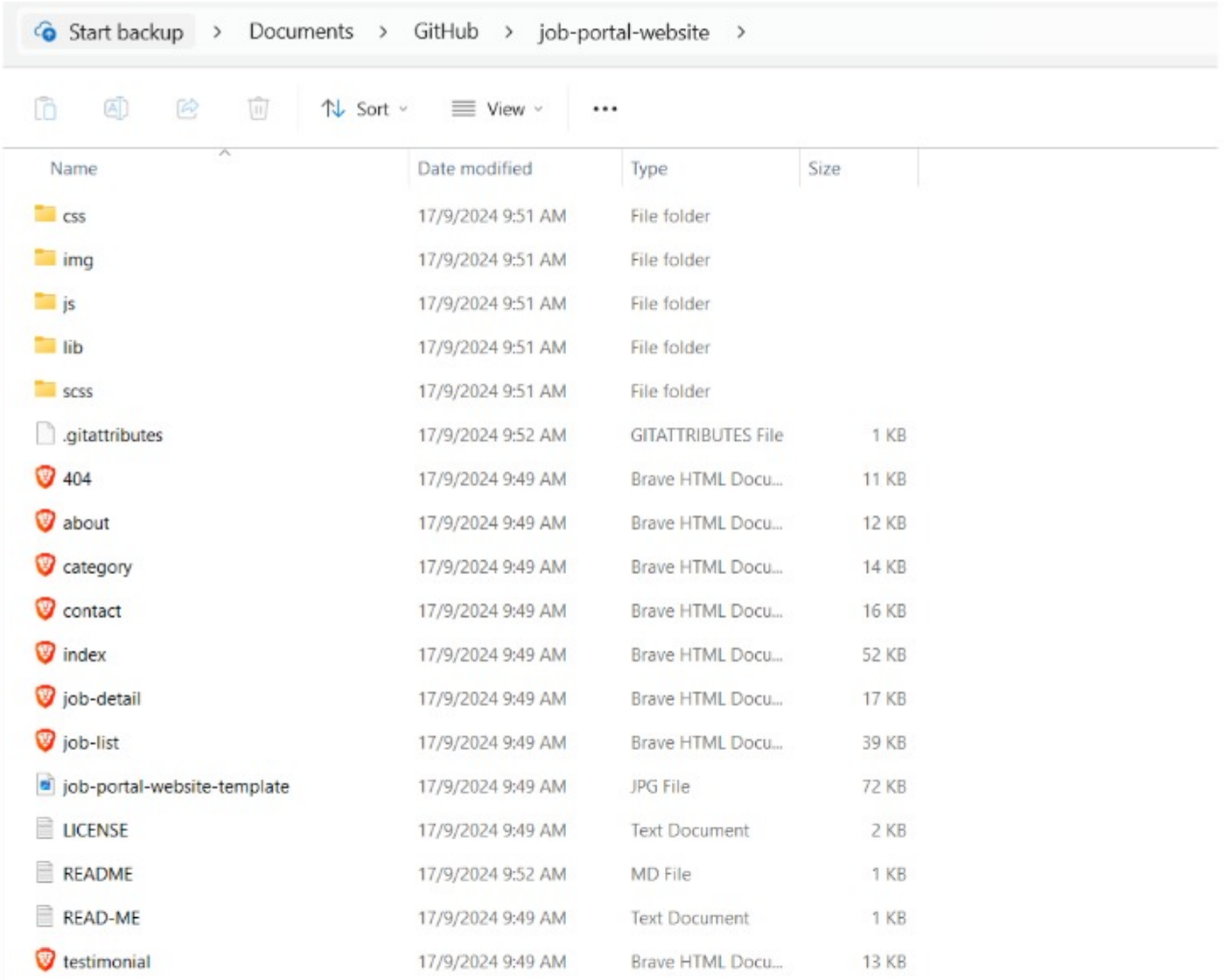
COMPLETE 4/6

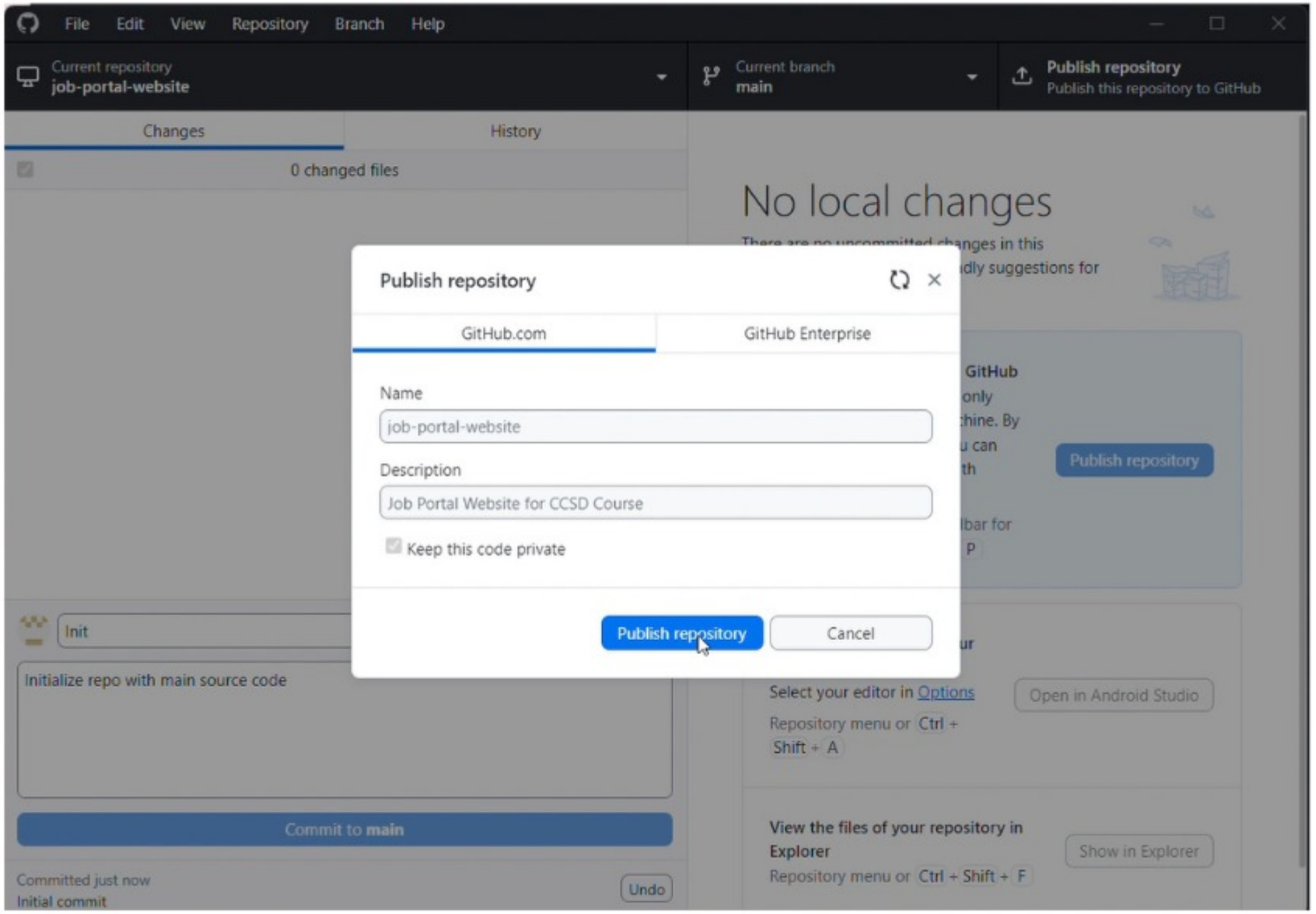


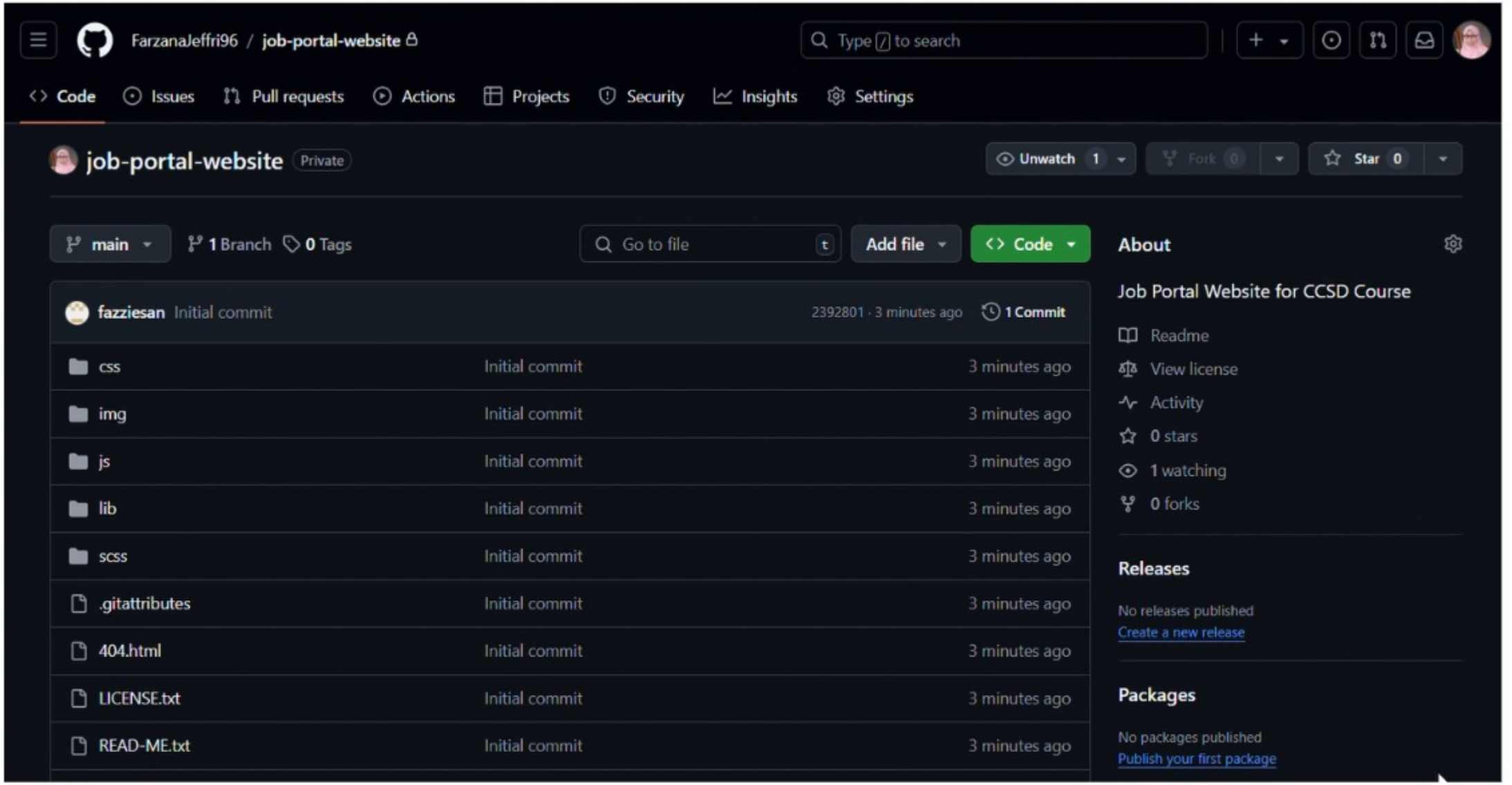
https://yummy-pepper-2ad.notion.site/Projects-Tasks-


JobEntry
HOME
ABOUT
JOBS
PAGES
CONTACT
Post A Job
Find The Perfect Job That You Deserved
Vero elitr justo clita lorem. Ipsum dolor at sed stet sit diam no. Kasd rebum ipsum et diam justo clita et kasd rebum sea elitr.
Search A Job
Find A Talent

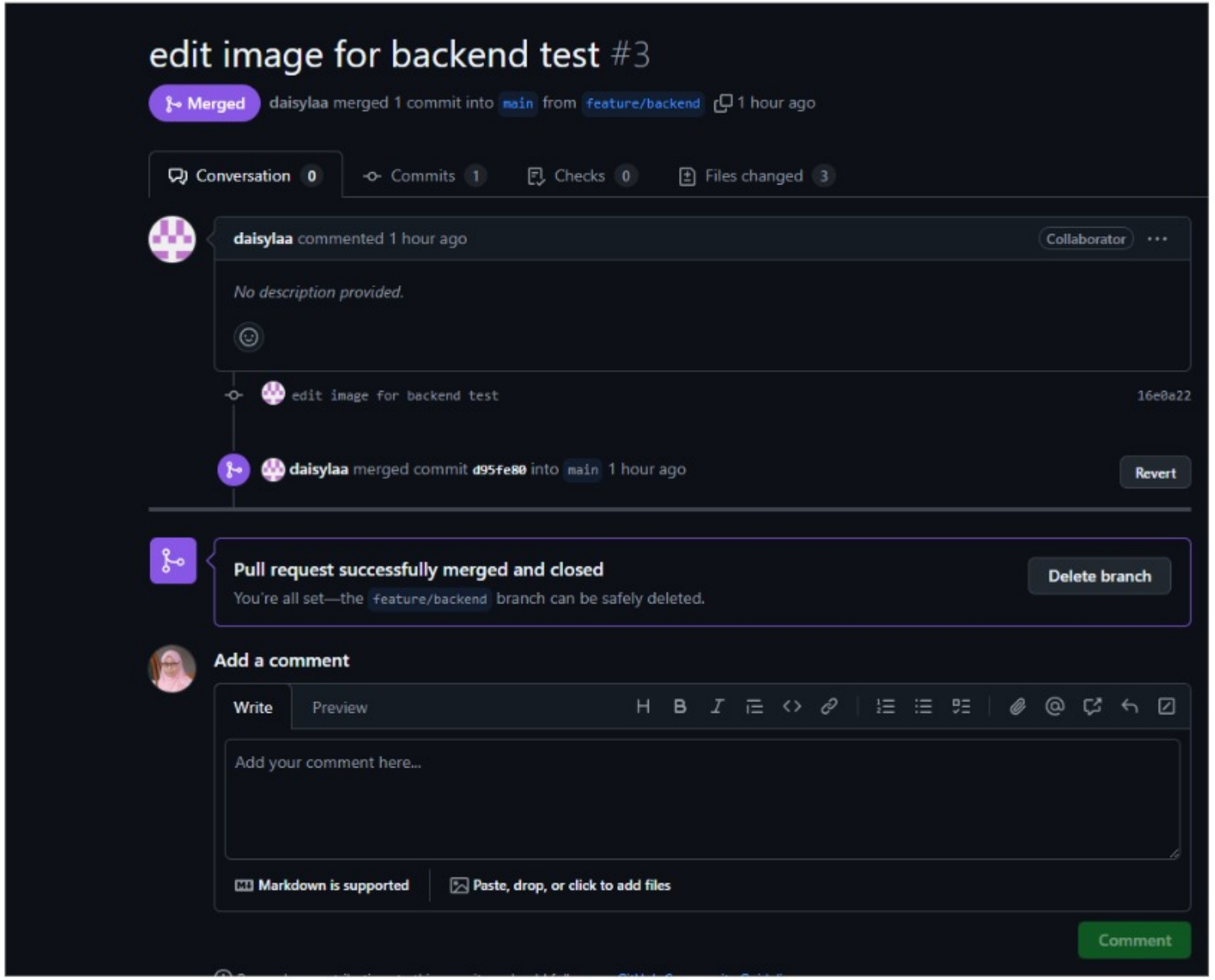
Project Architecture

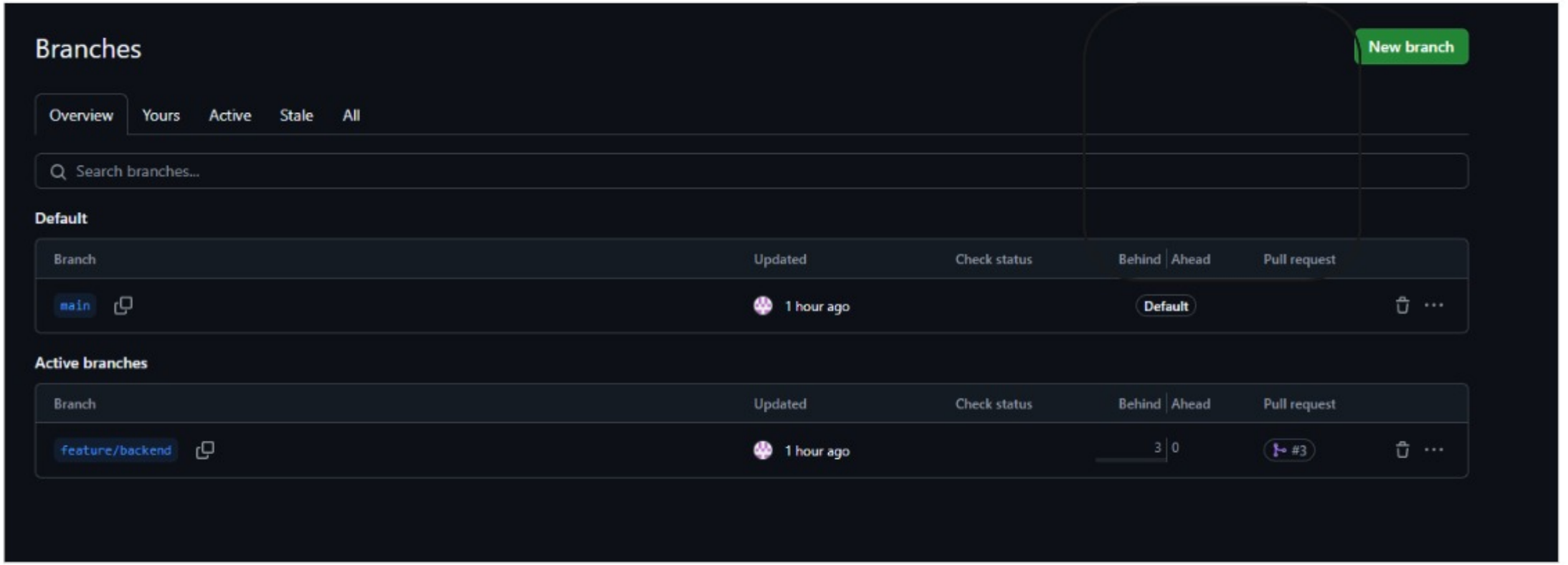

Start backup
Documents
GitHub
job-portal-website
Sort
View
Name
Date modified
Type
Size
css 17/9/2024 9:51 AM File folder
img 17/9/2024 9:51 AM File folder
js 17/9/2024 9:51 AM File folder
lib 17/9/2024 9:51 AM File folder
scss 17/9/2024 9:51 AM File folder
.gitattributes 17/9/2024 9:52 AM GITATTRIBUTES File 1 KB
404 17/9/2024 9:49 AM Brave HTML Docu... 11 KB
about 17/9/2024 9:49 AM Brave HTML Docu... 12 KB
category 17/9/2024 9:49 AM Brave HTML Docu... 14 KB
contact 17/9/2024 9:49 AM Brave HTML Docu... 16 KB
index 17/9/2024 9:49 AM Brave HTML Docu... 52 KB
job-detail 17/9/2024 9:49 AM Brave HTML Docu... 17 KB
job-list 17/9/2024 9:49 AM Brave HTML Docu... 39 KB
job-portal-website-template 17/9/2024 9:49 AM JPG File 72 KB
LICENSE 17/9/2024 9:49 AM Text Document 2 KB
README 17/9/2024 9:52 AM MD File 1 KB
READ-ME 17/9/2024 9:49 AM Text Document 1 KB
testimonial 17/9/2024 9:49 AM Brave HTML Docu... 13 KB


File
Edit
View
Repository
Branch
Help
Current repository
job-portal-website
Current branch
main
Publish repository
Publish this repository to GitHub
Changes
History
0 changed files
No local changes
Publish repository
GitHub.com
GitHub Enterprise
Name
job-portal-website
Description
Job Portal Website for CCSD Course
Keep this code private
Publish repository
Cancel
Init
Initialize repo with main source code
Commit to main
Committed just now
Initial commit
Undo
Select your editor in Options
Open in Android Studio
Repository menu or Ctrl + Shift + A
View the files of your repository in Explorer
Show in Explorer
Repository menu or Ctrl + Shift + F

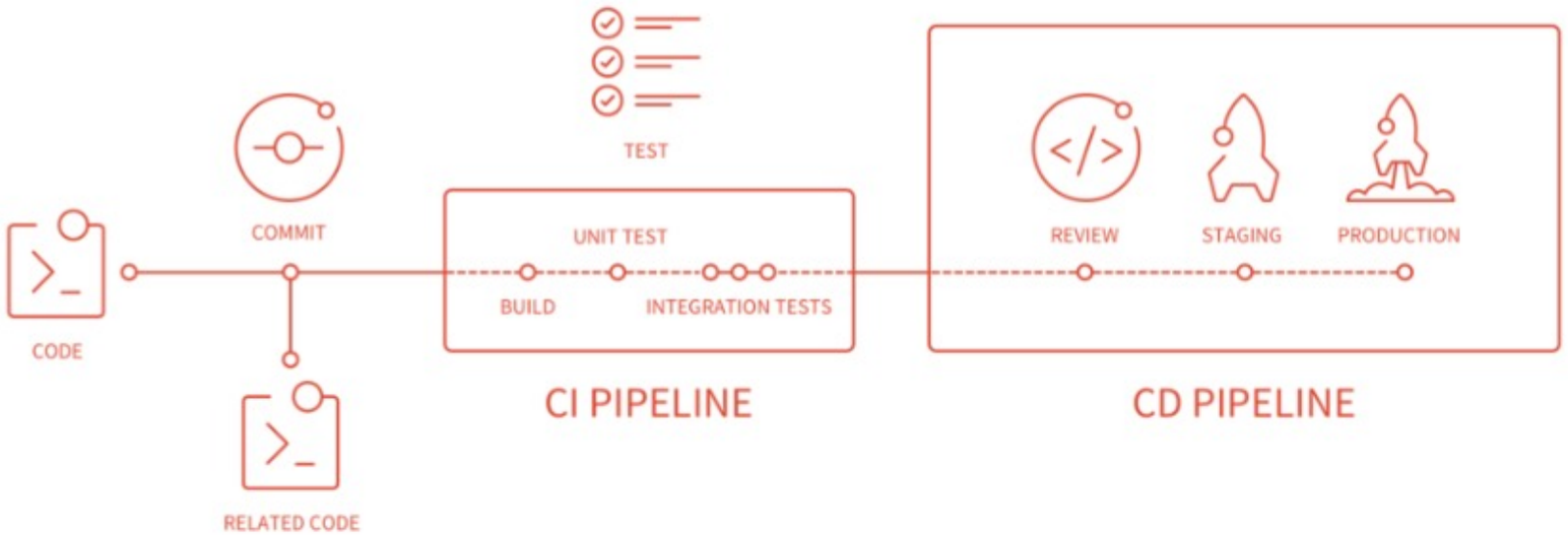


https://github.com/FarzanaJeffri96/job-portal-website


edit image for backend test #3
Merged
daisylaa merged 1 commit into main from feature/backend 1 hour ago
Conversation 0
Commits 1
Checks 0
Files changed 3
daisylaa commented 1 hour ago
Collaborator
No description provided.
edit image for backend test
16e0a22
daisylaa merged commit d95fe80 into main 1 hour ago
Revert
Pull request successfully merged and closed
You're all set—the feature/backend branch can be safely deleted.
Delete branch
Add a comment
Write
Preview
Add your comment here...
Markdown is supported
Paste, drop, or click to add files
Comment


Branches
New branch
Overview
Yours
Active
Stale
All
Search branches...
Default
Branch
Updated
Check status
Behind
Ahead
Pull request
main
1 hour ago
Default
Active branches
Branch
Updated
Check status
Behind
Ahead
Pull request
feature/backend
1 hour ago
3
0
#3

GitLab CI



Reference: [optimizing-gitlab-ci-cd-pipelines-for-high-efficiency]

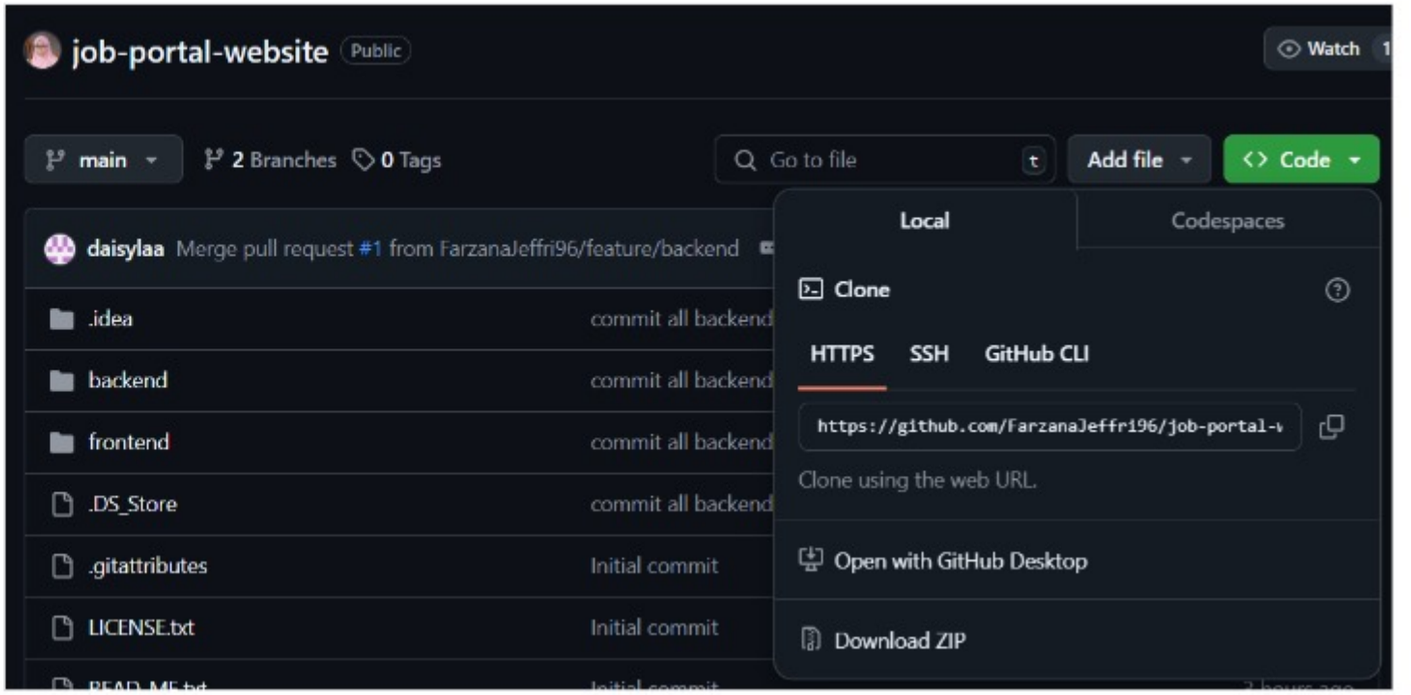
CLONING REPOSITORY FROM GITHUB TO LOCAL DIRECTORY

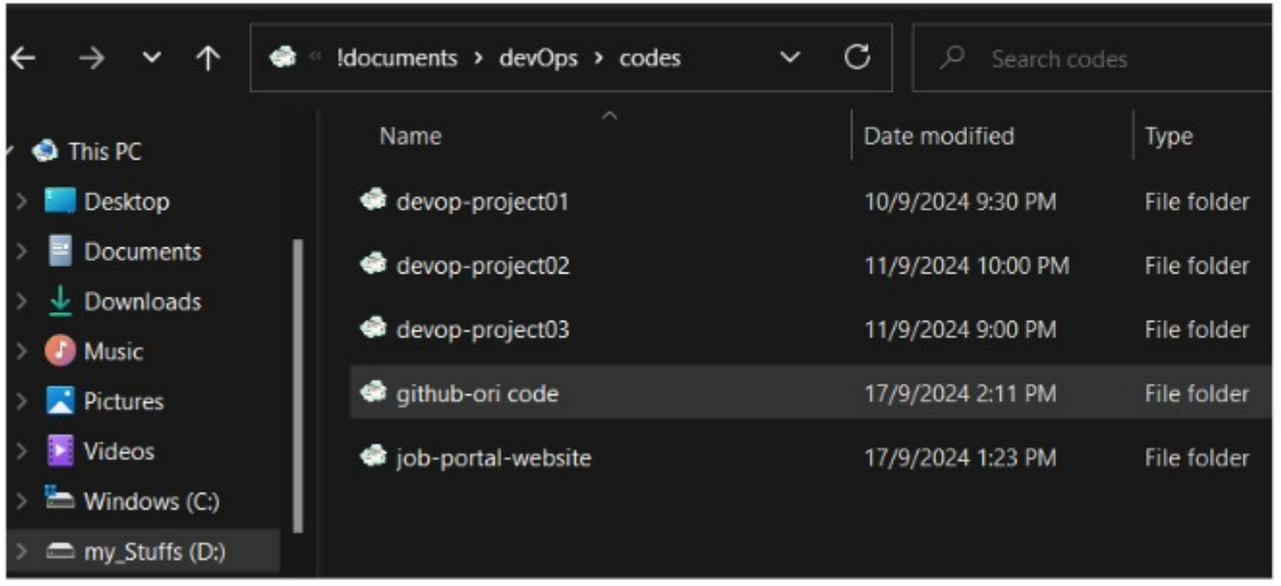
1. Copied HTTPS path from gitHub repository: https://github.com/FarzanaJeffri96/job-portal-website
2. Open your terminal and clone the repository from GitHub to your local machine.

```
git clone https://github.com/FarzanaJeffri96/job-portal-website.git
```

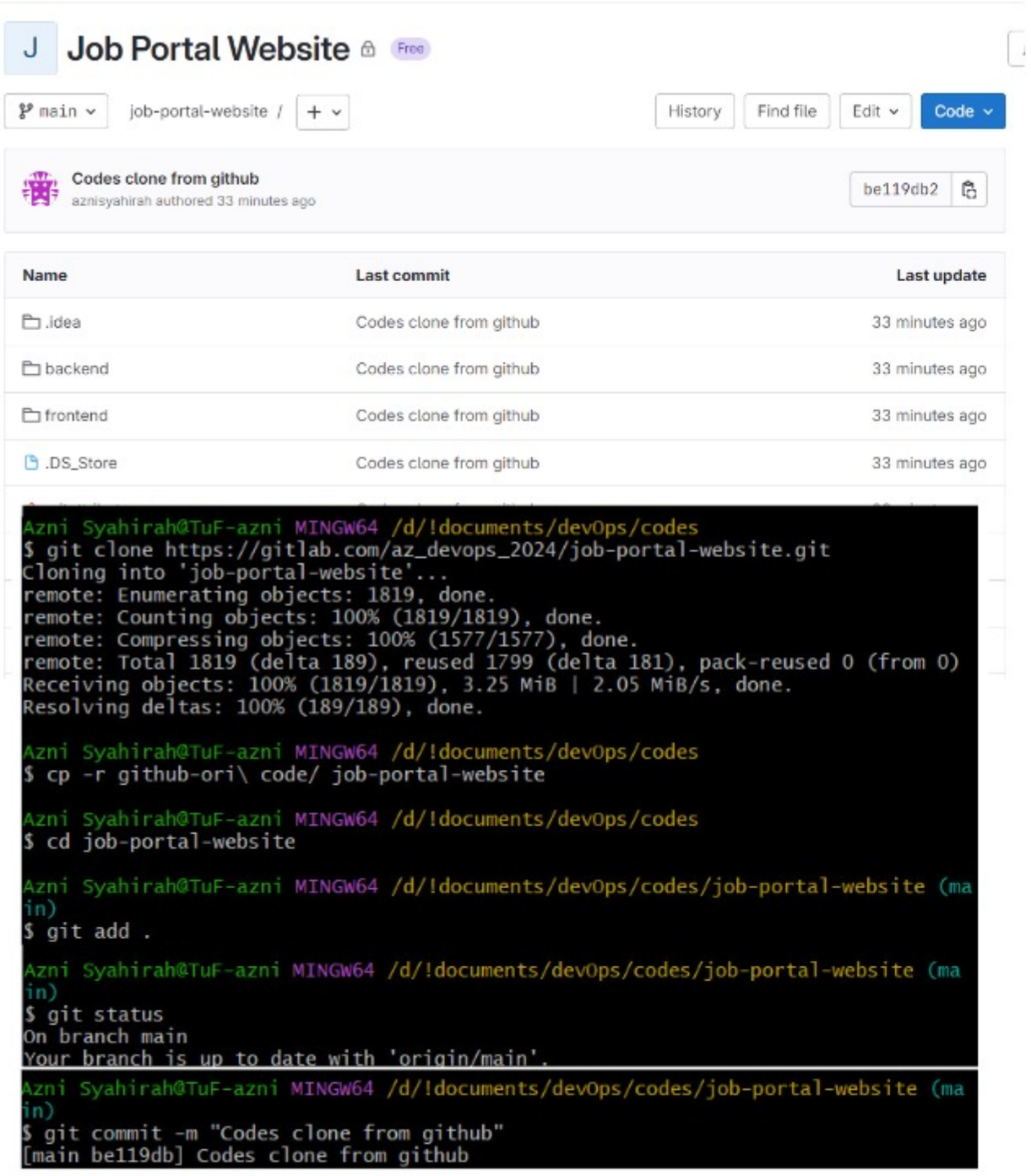
3. Rename the directory if the folder name from your github is the same as your gitlab repository. eg.

```
mv job-portal-website github-ori\ code/
```






```
Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes
$ git clone https://github.com/FarzanaJeffri96/job-portal-website.git
Cloning into 'job-portal-website'...
remote: Enumerating objects: 1805, done.
remote: Counting objects: 100% (1805/1805), done.
remote: Compressing objects: 100% (1561/1561), done.
remote: Total 1805 (delta 186), reused 1801 (delta 183), pack-reused 0 (from 0)
Receiving objects: 100% (1805/1805), 3.25 MiB | 370.00 KiB/s, done.
Resolving deltas: 100% (186/186), done.

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes
$ mv job-portal-website github-ori\ code/

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes
$ cd github-ori\ code

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/github-ori code (main)
$ git remote -v
origin  https://github.com/FarzanaJeffri96/job-portal-website.git (fetch)
origin  https://github.com/FarzanaJeffri96/job-portal-website.git (push)

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/github-ori code (main)
$
```



MOVING FROM LOCAL DIRECTORY TO GITLAB REPOSITORY

1. Create a blank repository on gitlab and named it as;

job-portal-website

2. Open your terminal and clone the repository from Gitlab to your local machine.

git clone https://gitlab.com/az_devops_2024/job-portal-website.git

3. Copied codes from github directory to new gitlab repository.

cp -r github-ori\ code/ job-portal-website

4. Change to working directory.

cd job-portal-website

5. Add and commit codes to git repository

git add .
git commit -m "Codes clone from github"

6. Push committed codes to git repository

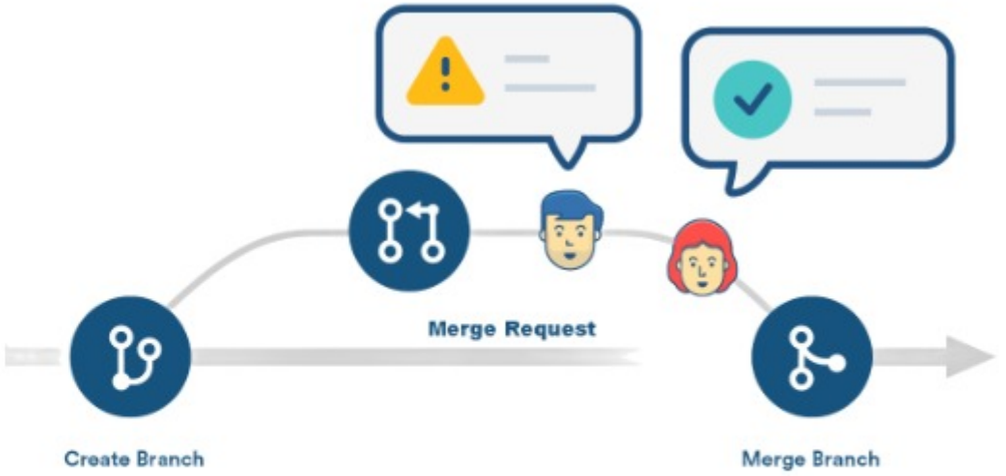
git push origin main

GitLab

CREATING NEW BRANCH AND MERGING IT TO MAIN BRANCH

GitLab Repository:
https://gitlab.com/az_devops_2024/job-portal-website

```
Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (ma
in)
$ git checkout update_overview
Switched to branch 'update_overview'

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ gti status
bash: gti: command not found

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ git status
On branch update_overview
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   README.md

no changes added to commit (use "git add" and/or "git commit -a")

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ git add .

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ git commit -m "update readme"
[update_overview c3b5f94] update readme
 1 file changed, 105 insertions(+), 2 deletions(-)

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ git pull origin update_overview
fatal: couldn't find remote ref update_overview

Azni Syahirah@TuF-azni MINGW64 /d/!documents/devOps/codes/job-portal-website (up
date_overview)
$ git push origin update_overview
```



az_devOps_2024 / Job Portal Website / **Graph**

main

You can move around the graph by using the arrow keys.

Git revision

Begin with the selected commit

Sep 17

main

Update .gitlab-ci.yml file

Merge branch 'update_overview' into 'main'

Update .gitlab-ci.yml file

Update .gitlab-ci.yml file

update git repo link

update git link

update readme

Codes clone from github

Initial commit

CREATING A .GITLAB-CI.YML FILE

```yaml
# Use Docker as the base image for all stages
image: docker:latest

# Define the stages for the pipeline in the order they should run
stages:
  - build
  - test
  - deploy

# Build stage: Compile code and handle artifacts
build-job:
  stage: build
  script:
    - echo "Compiling the code..."
    - echo "Compile complete."
  artifacts:
    paths:
      - docker-compose.yml  # Store docker-compose.yml as an artifact for use in later stages
      - prometheus.yml      # Store prometheus.yml as an artifact for use in later stages
      - Dockerfile           # Store Dockerfile as an artifact (optional, if needed later)

# Test stage: Run tests and check for necessary files
unit-test-job:
  stage: test
  script:
    - echo "Running unit tests..."
```

CREATING A .GITLAB-CI.YML FILE

CI/CD Catalog | Help

```
  script:
    - echo "Running unit tests..."
    - echo "Checking if necessary files are present..."
    - if [ -f docker-compose.yml ]; then echo "docker-compose.yml found"; else exit 1; fi
    - if [ -f prometheus.yml ]; then echo "prometheus.yml found"; else exit 1; fi
    - if [ -f Dockerfile ]; then echo "Dockerfile found"; else echo "Dockerfile not found, but continuing..."; fi
    - sleep 8
    - echo "Code coverage is 90%"
  dependencies:
    - build-job  # Ensure this job uses artifacts from the build-job

# Lint stage: Perform code linting
lint-test-job:
  stage: test
  script:
    - echo "Linting code... This will take about 6 seconds."
    - sleep 3
    - echo "No lint issues found."
  dependencies:
    - build-job  # Ensure this job uses artifacts from the build-job

# Deploy stage: Deploy the application
deploy-job:
  stage: deploy
  environment: production
```

SAMPLE MERGE REQUEST WITH SUCCESSFUL PIPELINE

Merged **Update overview** `update_overview` into `main`

Overview 0 | Commits 5 | Pipelines 2 | Changes 2

Pipeline #1456216467 passed

Pipeline passed for `6a21da62` on `update_overview` 3 hours ago

Deployed to production 3 hours ago

Approval is optional

Merged by Azni 2 hours ago — Revert | Cherry-pick

Merge details

- Changes merged into `main` with `e736b9e2`.
- Did not delete the source branch.

Pipeline #1456257104 passed

Pipeline passed for `e736b9e2` on `main` 2 hours ago

Deployed to production 2 hours ago

Activity

update git-cli.yml file with dependecies

Passed **Azni** created pipeline for commit `c35ef95e` 52 minutes ago, finished 50 minutes

For `main`

Scheduled | latest | 4 jobs | 2.62 | 2 minutes 9 seconds, queued for 6 seconds

Pipeline | Jobs 4 | Tests 0

All 19 | Finished | Branches | Tags

Filter pipelines

Status	Pipeline	Created by	Stages
Passed 00:02:09 53 minutes ago	update git-cli.yml file with dependecies #1456834811 `main` `c35ef95e` scheduled latest		
Passed 00:01:08 1 hour ago	update git-cli.yml file with dependecies #1456784553 `main` `c35ef95e` latest		
Failed 00:03:17 1 hour ago	Update .gitlab-ci.yml file #1456760060 `main` `958b98c5`		

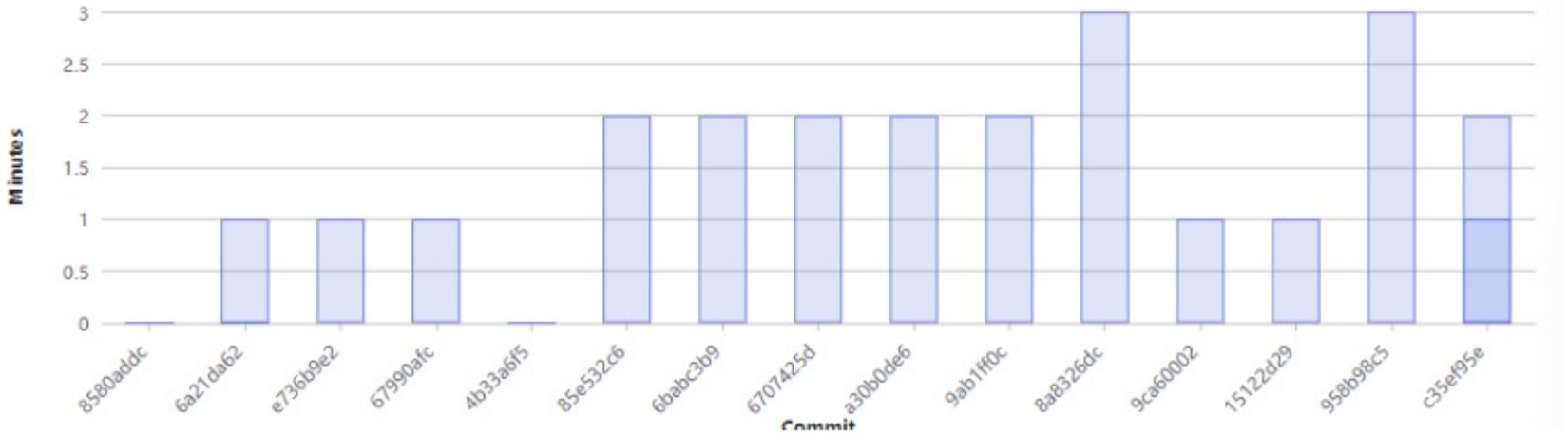
GITLAB CI\CD ANALYTICS

Pipelines charts

Last week | Last month | Last year

Date range: Sep 18, 2023 - Sep 17, 2024

Pipeline durations for the last 30 commits



docker-compose.yml

```yaml
services:
  mongodb:
    image: mongo:latest
    container_name: mongodb
    ports:
      - "27017:27017"
    volumes:
      - mongodb_data:/data/db

  backend:
    build:
      context: ./backend
    container_name: backend
    ports:
      - "3000:3000"
    depends_on:
      - mongodb

  frontend:
    build:
      context: ./frontend
    container_name: frontend
    ports:
      - "80:80"
    depends_on:
      - backend

  mongodb_exporter:
    image: bitnami/mongodb-exporter:latest
    container_name: mongodb-exporter
    ports:
      - "9216:9216"
    environment:
      - MONGODB_URI=mongodb://mongodb:27017

  prometheus:
    image: prom/prometheus:latest
    container_name: prometheus
    ports:
      - "9090:9090"
    volumes:
      - ./prometheus.yml:/etc/prometheus/prometheus.yml

  grafana:
    image: grafana/grafana:latest
    container_name: grafana
    ports:
      - "3001:3000"
    environment:
      - GF_SECURITY_ADMIN_PASSWORD=admin  # Set a password for the Grafana admin user

  test-backend:
    build:
      context: ./backend
      dockerfile: Dockerfile.test
    depends_on:
      - mongodb
    environment:
      - NODE_ENV=test

volumes:
  mongodb_data:
```

Frontend Dockerfile

```
1    # Use the official Nginx image from the Docker Hub.
2    FROM nginx:alpine
3
4    # Copy the HTML file to the Nginx HTML directory.
5    COPY . /usr/share/nginx/html
6
7    # Expose port 80 to access the web server.
8    EXPOSE 80
9
```

Backend Dockerfile

```
# Use the official Node.js image from the Docker Hub
FROM node:22

# Copy package.json and install dependencies
COPY package.json ./
RUN npm install
RUN npm install cors

# Copy the rest of the application code
COPY . .

# Expose the port the app runs on
EXPOSE 3000

# Command to run the application
CMD ["node", "index.js"]
```

Dockerfile.test

```
2     FROM node:22
3
4     # Set the working directory
5     WORKDIR /app
6
7     # Copy package.json and package-lock.json
8     COPY package*.json ./
9
10    # Install dependencies
11    RUN npm install
12    RUN npm install --save-dev jest supertest
13
14    # Copy the rest of the application code
15    COPY . .
16
17    # Run the tests
18    CMD ["npm", "test"]
```

Images


```
~/Desktop/programming/job-portal-website> docker-compose up --build
[+] Building 3.1s (29/29) FINISHED                                                                    docker:desktop-linux
 => [backend internal] load build definition from Dockerfile                                                      0.0s
 => => transferring dockerfile: 495B                                                                              0.0s
 => [test-backend internal] load build definition from Dockerfile.test                                            0.0s
 => => transferring dockerfile: 422B                                                                              0.0s
 => [backend internal] load metadata for docker.io/library/node:22                                                1.0s
 => [backend internal] load .dockerignore                                                                         0.0s
 => => transferring context: 2B                                                                                   0.0s
 => [test-backend internal] load .dockerignore                                                                    0.0s
 => => transferring context: 2B                                                                                   0.0s
 => [test-backend 1/6] FROM docker.io/library/node:22@sha256:bd00c03095f7586432805dbf7989be10361d27987f93de904b1fc003949a4794      0.0s
```

Images

Give feedback

Local | Hub

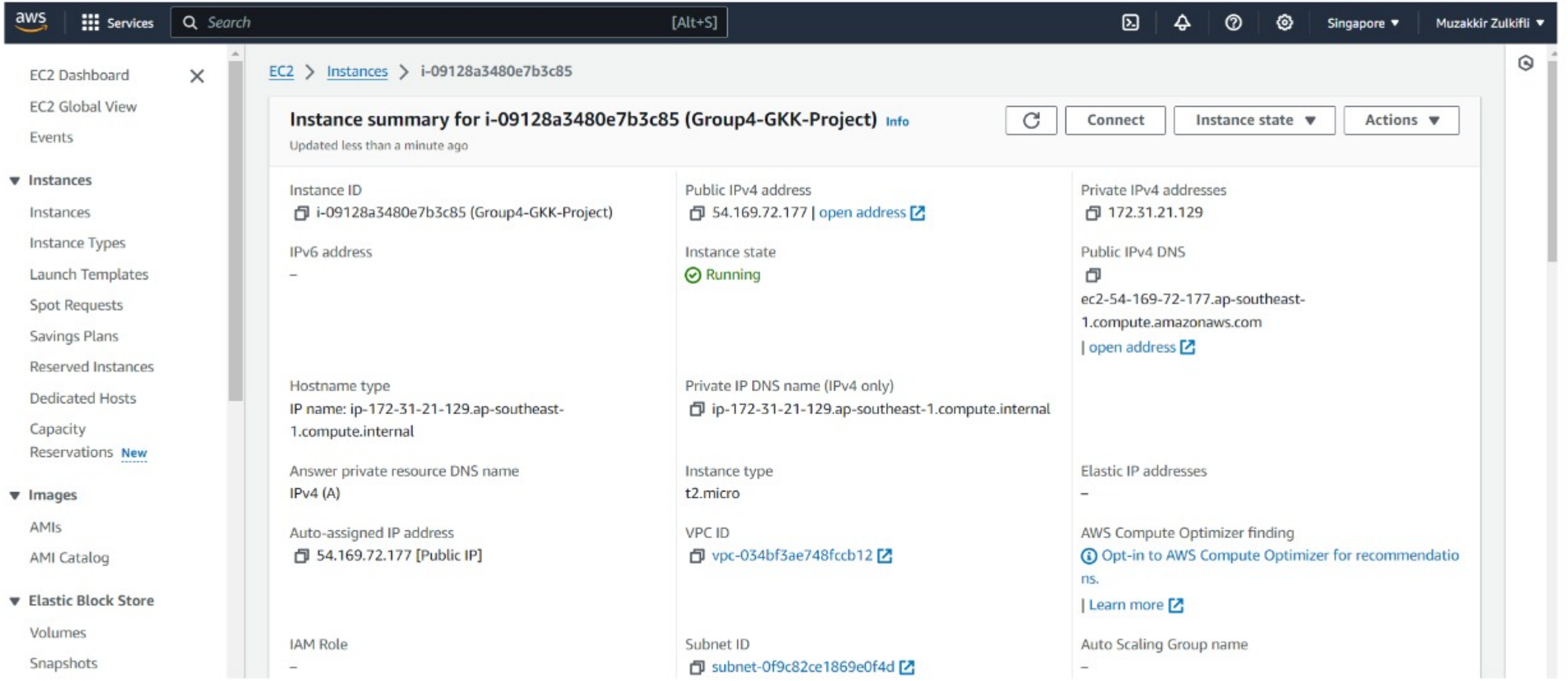
3.12 GB / 2.88 GB in use — 8 images

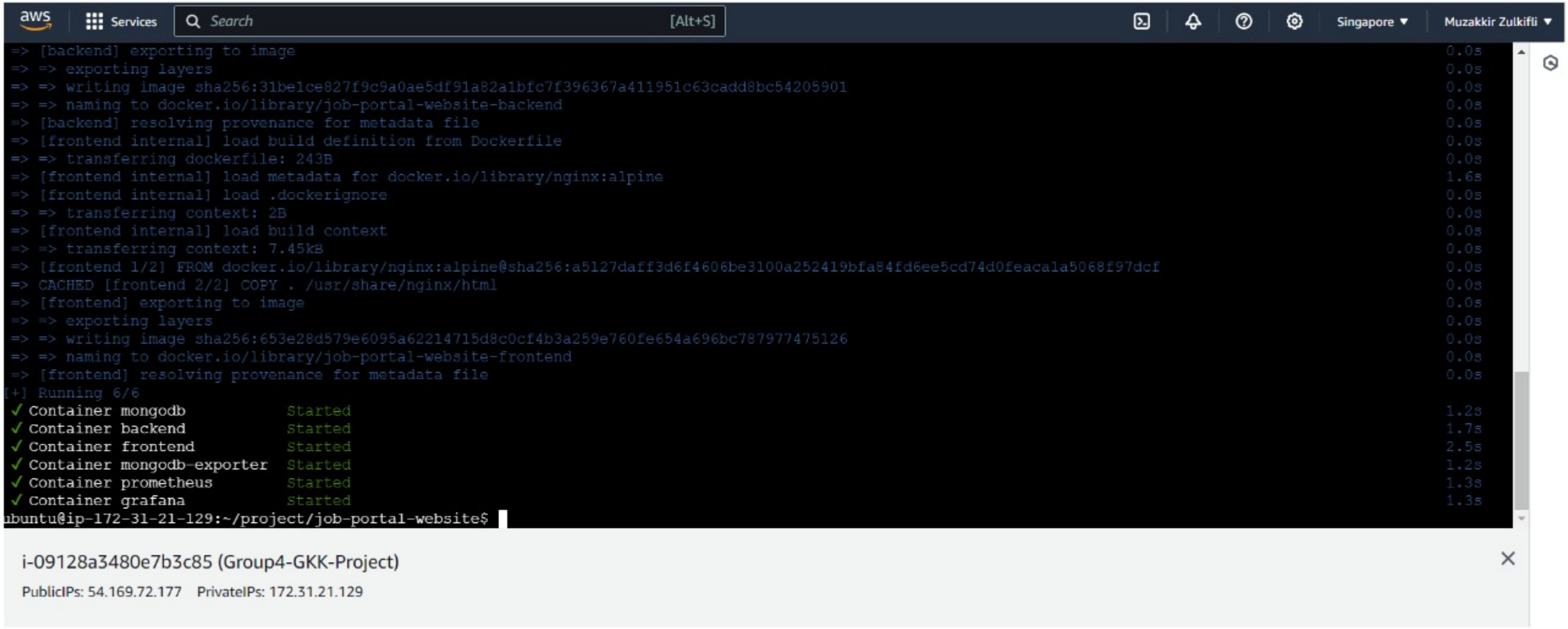
Last refresh: 7 hours ago

Search

Name	Tag	Status	Created	Size	Actions
job-portal-website-frontend 28782494b809	latest	In use	52 minutes ag	100.76 MB	
job-portal-website-backend 6eee6d28d613	latest	In use	52 minutes ag	1.29 GB	
job-portal-website-test-backend 4a5ca33c1aa9	latest	In use	52 minutes ag	1.19 GB	
job-portal-website-backend_test 6b580c0e3222	latest	In use	3 hours ago	1.25 GB	
bitnami/mongodb-exporter 6ecd6ba95596	latest	In use	11 days ago	170.69 MB	
grafana/grafana 9f82e9bb37c0	latest	In use	21 days ago	467.26 MB	

System deployed at AWS




aws
Services
Search
[Alt+S]
Singapore
Muzakkir Zulkifli
=> [backend] exporting to image 0.0s
=> => exporting layers 0.0s
=> => writing image sha256:31be1ce827f9c9a0ae5df91a82a1bfc7f396367a411951c63cadd8bc54205901 0.0s
=> => naming to docker.io/library/job-portal-website-backend 0.0s
=> [backend] resolving provenance for metadata file 0.0s
=> [frontend internal] load build definition from Dockerfile 0.0s
=> => transferring dockerfile: 243B 0.0s
=> [frontend internal] load metadata for docker.io/library/nginx:alpine 1.6s
=> [frontend internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> [frontend internal] load build context 0.0s
=> => transferring context: 7.45kB 0.0s
=> [frontend 1/2] FROM docker.io/library/nginx:alpine@sha256:a5127daff3d6f4606be3100a252419bfa84fd6ee5cd74d0feaca1a5068f97dcf 0.0s
=> CACHED [frontend 2/2] COPY . /usr/share/nginx/html 0.0s
=> [frontend] exporting to image 0.0s
=> => exporting layers 0.0s
=> => writing image sha256:653e28d579e6095a62214715d8c0cf4b3a259e760fe654a696bc787977475126 0.0s
=> => naming to docker.io/library/job-portal-website-frontend 0.0s
=> [frontend] resolving provenance for metadata file 0.0s
[+] Running 6/6
✓ Container mongodb Started 1.2s
✓ Container backend Started 1.7s
✓ Container frontend Started 2.5s
✓ Container mongodb-exporter Started 1.2s
✓ Container prometheus Started 1.3s
✓ Container grafana Started 1.3s
ubuntu@ip-172-31-21-129:~/project/job-portal-website$
i-09128a3480e7b3c85 (Group4-GKK-Project)
PublicIPs: 54.169.72.177 PrivateIPs: 172.31.21.129

Using Cloudflare as the DNS provider

CLOUDFLARE®

gkk-group4-project

Overview | Public Hostname | Private Network

Public hostnames

+ Add a public hostname

	Public hostname	Path	Service	Origin configurations	Menu
1	gkk-project-group4.entrypass-apps.xyz	*	http://127.0.0.1	0	⋮
2	gkk-group4-grafana.entrypass-apps.xyz	*	http://127.0.0.1:3001	0	⋮
3	gkk-group4-prometheus.entrypass-apps.xyz	*	http://127.0.0.1:9090	0	⋮

Catch-all rule: **http_status:404** Edit

Grafana & Prometheus