National University of Computer & Emerging Sciences



Cloud Computing Project

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Repository link:

https://github.com/kissasium/CloupComputingProject.git

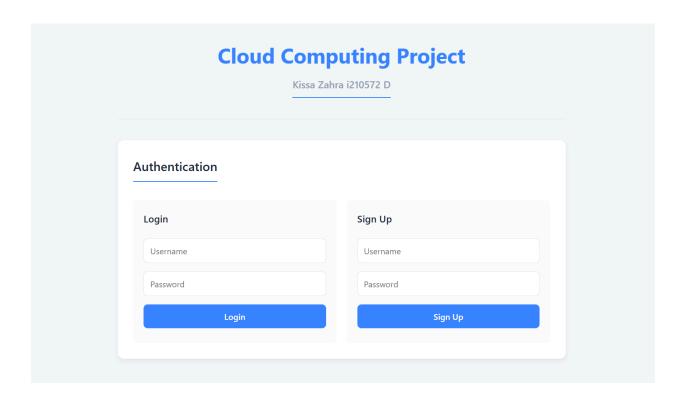
Live URL

Frontend: http://kissaproject0572.eba-hqs3ana7.ap-southeast-2.elasticbeanstalk.com/

Backend: http://3.105.45.13:5000

"curl http://3.105.45.13:5000"

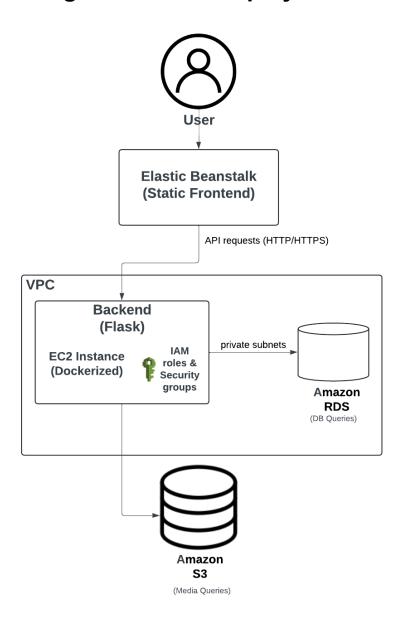
Project



	Logout
Your Items	
New item content	
	Add Item
No items found. Add your first item above!	
Upload File	
Choose file No file chosen	

This project involves deploying a lightweight web application on AWS using a Flask backend and a static HTML/CSS/JavaScript frontend. The backend is containerized and hosted on Amazon EC2 within a VPC, while the frontend is served via Elastic Beanstalk. Amazon RDS (PostgreSQL) handles database operations, and Amazon S3 is used for storing uploaded images. The setup follows AWS best practices for secure, scalable, and modular deployment.

Architecture diagram of AWS deployment



This architecture diagram represents the deployment of a simple web application on AWS using a static HTML frontend and a Flask backend. The design prioritizes simplicity, scalability and security using essential AWS services.

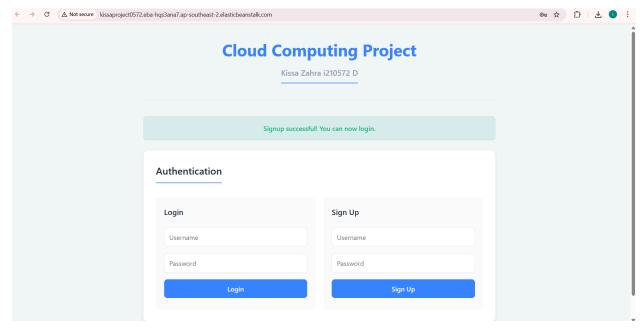
- The frontend (a static index.html file) is deployed on AWS Elastic Beanstalk which
 provides managed hosting for the web interface with automatic provisioning and load
 balancing.
- 2. The backend is a Flask application (app.py) running inside a Docker container on an Amazon EC2 instance. This EC2 instance is part of a Virtual Private Cloud (VPC).
- 3. The EC2 instance has:
 - An IAM Role attached to securely access AWS services like S3 and RDS.
 - A Security Group that controls inbound and outbound traffic to protect the instance.
 - An Elastic Block Store (EBS) volume attached to persist data and container storage.
- 4. Amazon RDS is deployed within the same VPC to store application data securely and is accessible only to the EC2 instance over the private network.
- 5. Amazon S3 is used to store uploaded files.

Flow Direction

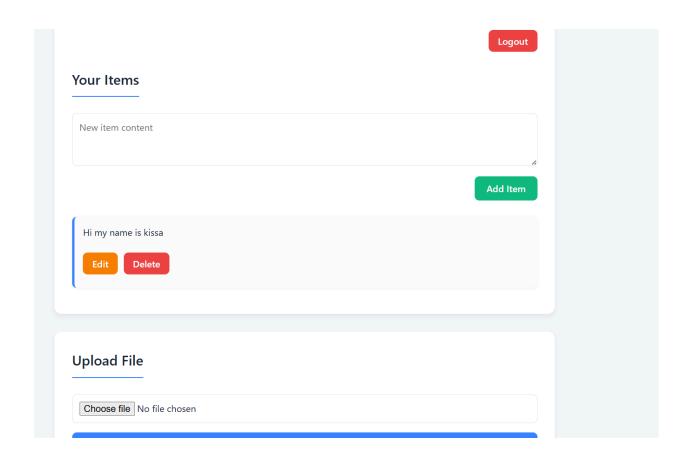
User -> Elastic Beanstalk -> EC2 -> RDS/S3

CURD OPERATIONS

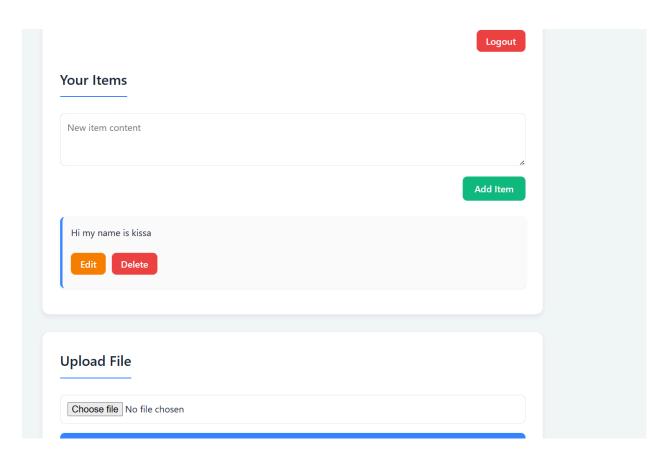
Create

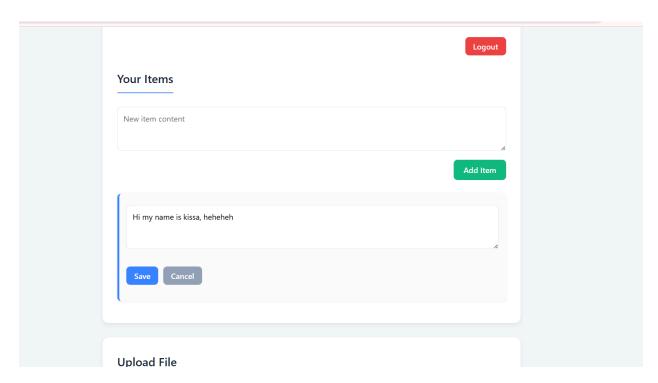


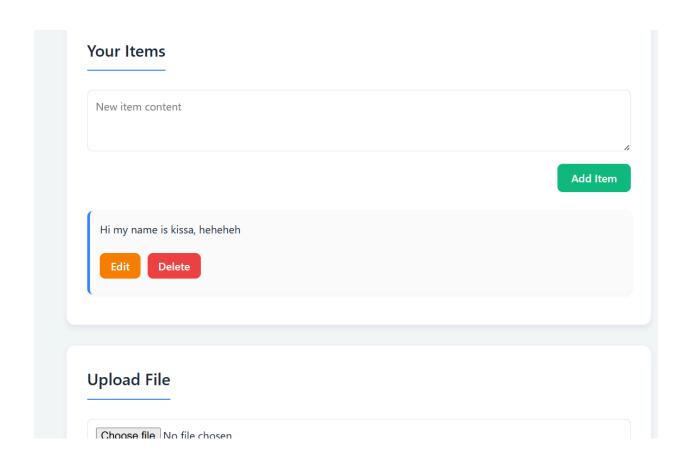
Login successfully!!



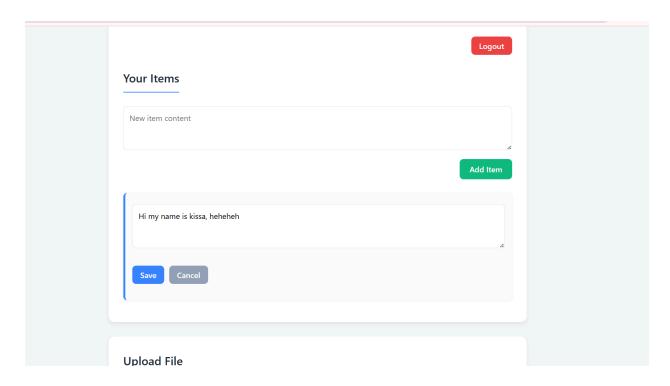
Update







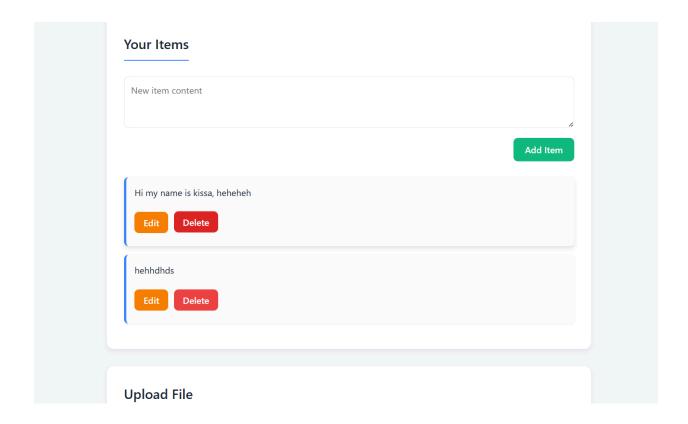
Read

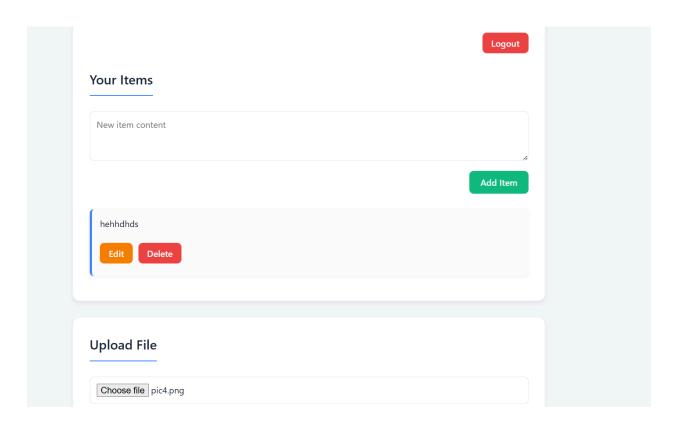


Read anything!!

All files are stored in S3 and all the textual data is stored in RDS

Delete

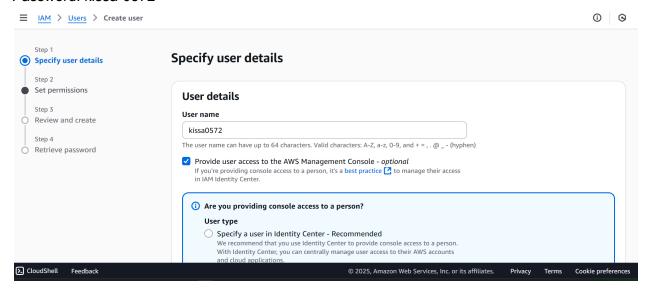




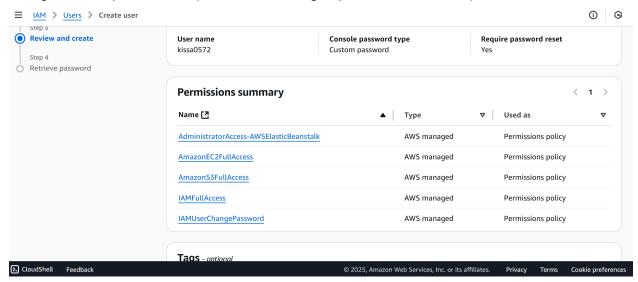
Deleted successfully!

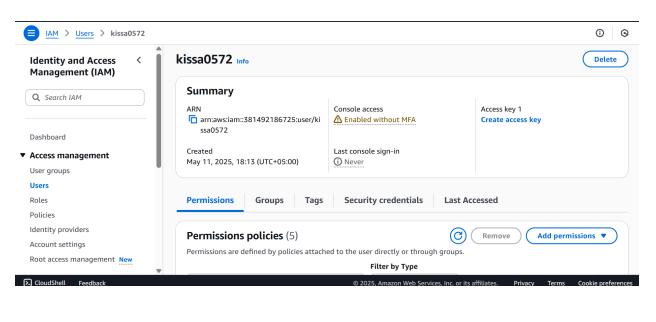
IAM policy Screenshots

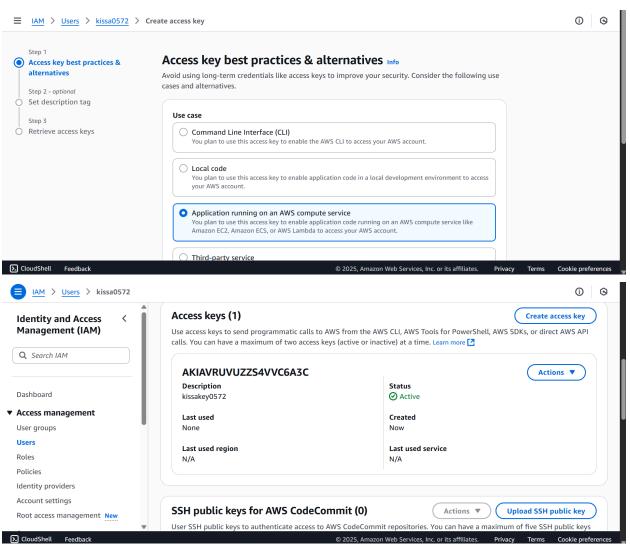
IAM user Creation Name: kissa0572 Password: kissa-0572



Giving this user permissions (Attach and managed policies for that user):







Creating an access key for my IAM user that i will put in my .env file to access S3 and RDS

EBS

Installing Elastic Beanstalk CLI so we can use elastic beanstalk to deploy our frontend

```
A. Installing ERCIT

A. Installing ERCIT

Collecting awsebcli

Using cached awsebcli-3-23.3-py3-none-any.whl

Collecting bottocore(2, 9-1.35.0 (from awsebcli)

Using cached bottocore(2, 9-1.35.0 (from awsebcli)

Using cached cement=2.10-14-py3-none-any.whl.metadata (5.7 kB)

Collecting coloranae(5, 9-0.4.6 (from awsebcli))

Using cached cement=2.10-14-py3-none-any.whl.metadata (17 kB)

Collecting coloranae(5, 9-0.4.6 (from awsebcli))

Using cached pathsper=9, 12.1 (from awsebcli)

Using cached pathsper=9, 23.1 (from awsebcli)

Using cached python-dateutil-2, 9-0, post-poy-2, py3-none-any.whl.metadata (8.4 kB)

Collecting pathsper=3, 12.1 (from awsebcli)

Using cached request=2, 23.3-py3-none-any.whl.metadata (4.6 kB)

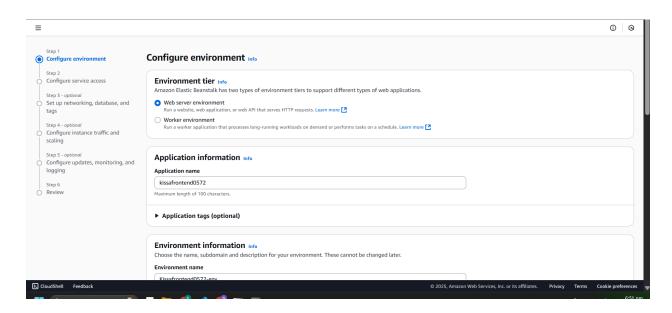
Collecting request=2, 23.3-py3-none-any.whl.metadata (4.6 kB)

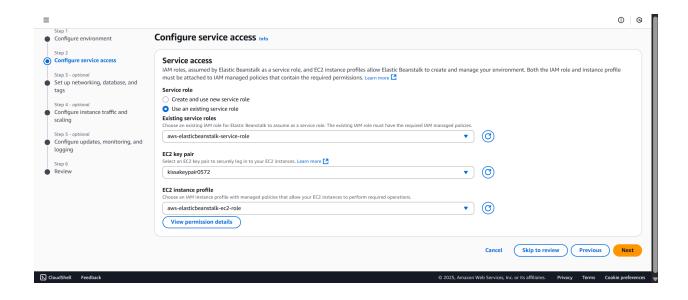
Collecting setuptools=20.0 (from awsebcli)

Using cached setuptools=8, 4.0-py3-none-any.whl.metadata (9.7 kB)

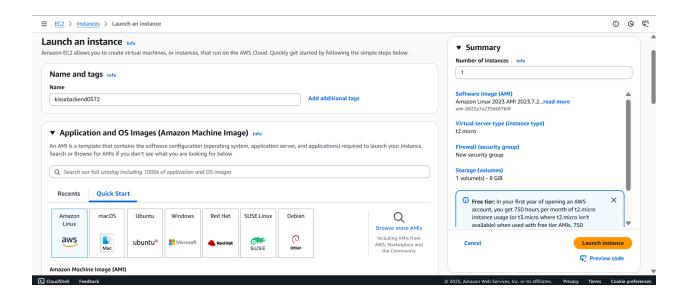
Collecting semantic_version(2.11)-22.30, (from awsebcli)

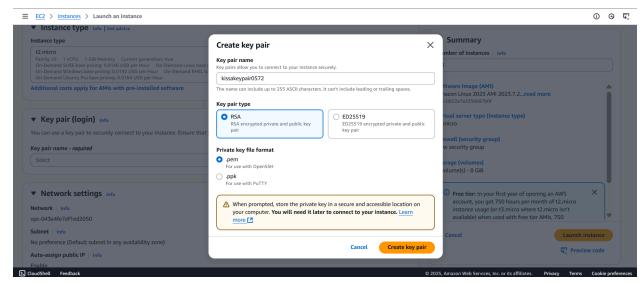
Using cached pathspare=2, 13 (fro
```



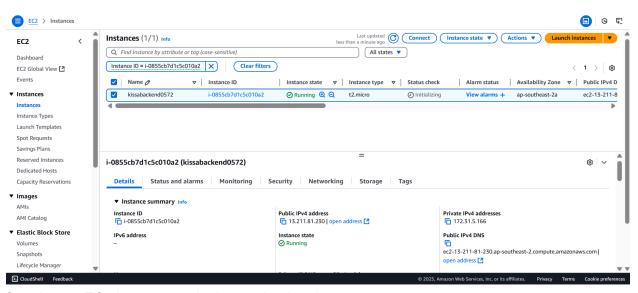


EC₂



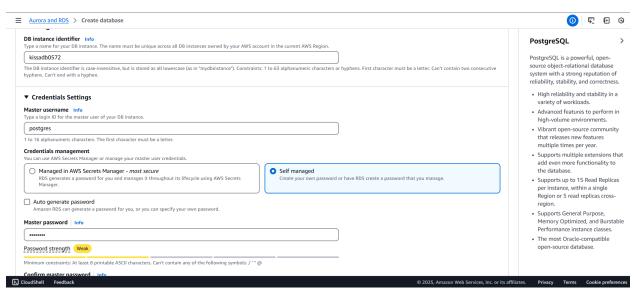


Generating a key pair. Later we will use the key pair .pem file to ssh inside the instance terminal, so we can deploy our containerised application.

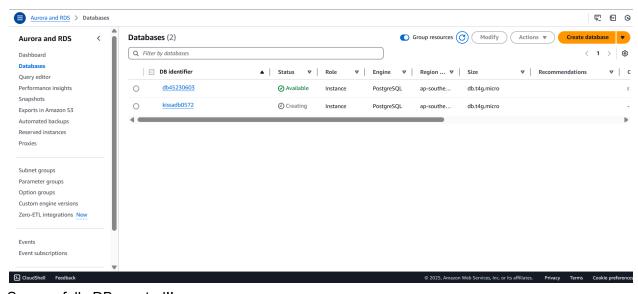


Creating an EC2 instance to deploy our backend.

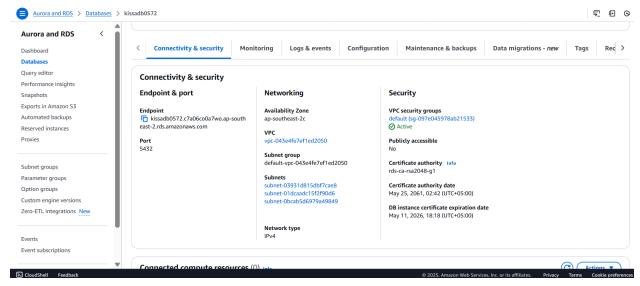
RDS



Choose Postgresql

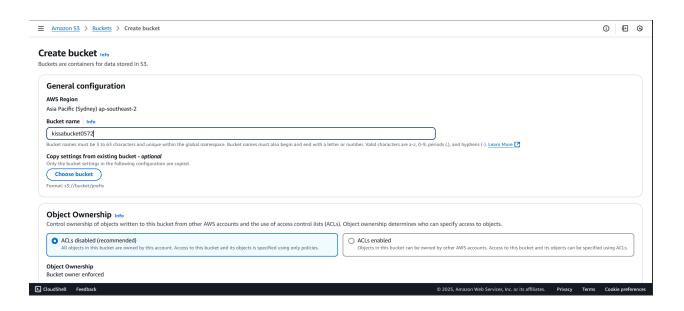


Successfully DB created!!



Created url

S3



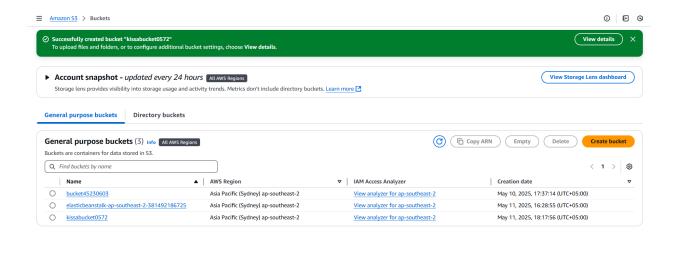
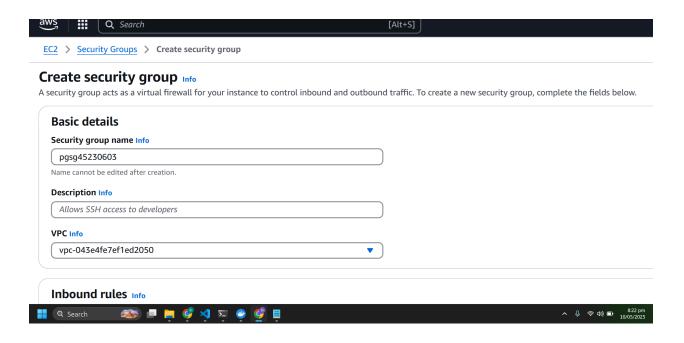
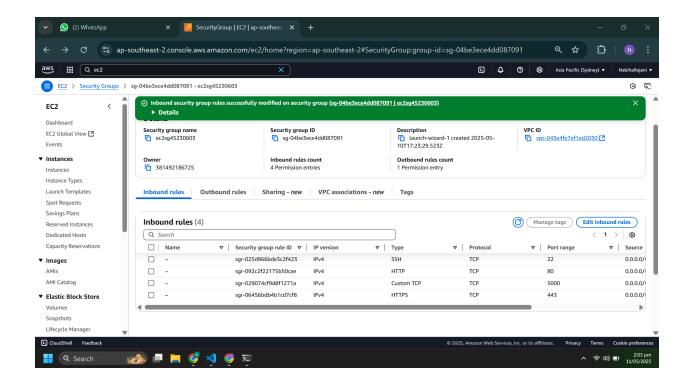


Image uploaded from frontend successfully stored in AWS S3 bucket.

Security Group

Security group created, it will be used for the EC2 instance



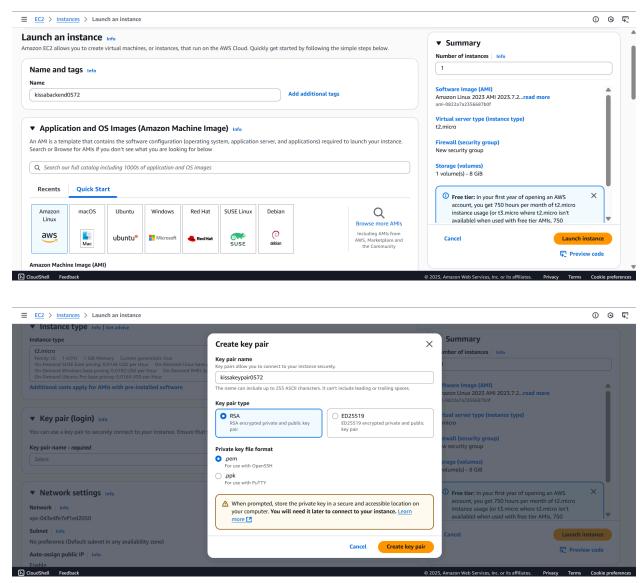


Set up **Security Groups** to manage inbound and outbound traffic for EC2 and other AWS services.

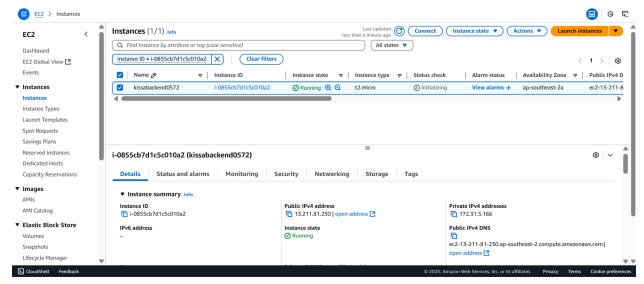
Allow traffic on ports 80 (HTTP), 443 (HTTPS), and 5000 (Flask backend). Ensure that only trusted sources can access the EC2 instance and other resources.

AWS deployment and configurations

Backend



Generating a key pair. Later we will use the key pair .pem file to ssh inside the instance terminal, so we can deploy our containerised application.



Using the key pair to connect to our instance

```
PS Downloads> ssh -i "kissakeypair0572.pem" ec2-user@3.106.214.11
The authenticity of host '3.106.214.11 (3.106.214.11)' can't be established.
ED25519 key fingerprint is SHA256:s5nNzRD9AcmFZlGySok5IUh8NkkdE0Dpaydjpd5yuiM.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '3.106.214.11' (ED25519) to the list of known hosts.

'"" #### Amazon Linux 2023

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```

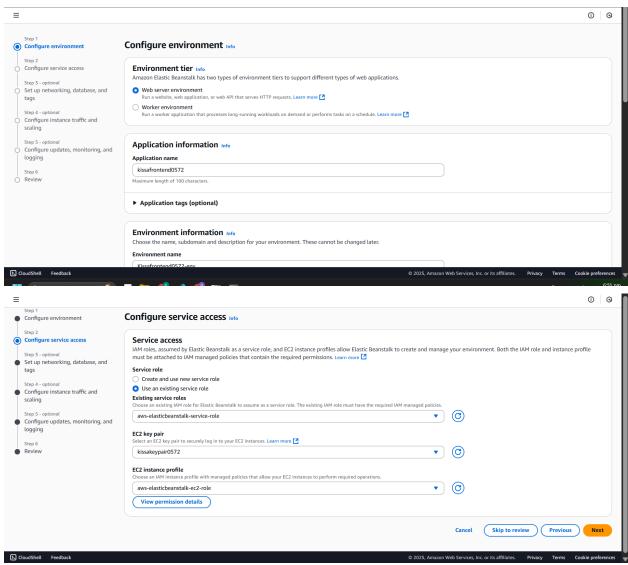
After downloading docker and other necessary dependencies, we can deploy our container

```
[ec2-user@ip-172-31-44-14 ~]$ docker run -d -p 5001:5001 --name kissacontainer0572
cloud-backend
f0d103d013cd394c440f6b201a3714329f4b32f3f9f82b2fd478b3741bdc5735
[ec2-user@ip-172-31-44-14 ~]$ docker ps --filter "name=kissa"
CONTAINER ID
               IMAGE
                               COMMAND
                                                 CREATED
                                                                   STATUS
ORTS
                                                     NAMES
f0d103d013cd
               cloud-backend
                               "python app.py"
                                                 39 seconds ago
                                                                   Up 39 seconds
000/tcp, 0.0.0.0:5001->5001/tcp, :::5001->5001/tcp
                                                     kissacontainer0572
[ec2-user@ip-172-31-44-14 ~]$
```

Container deployed!! (Flask backend running inside a Docker container on EC2)

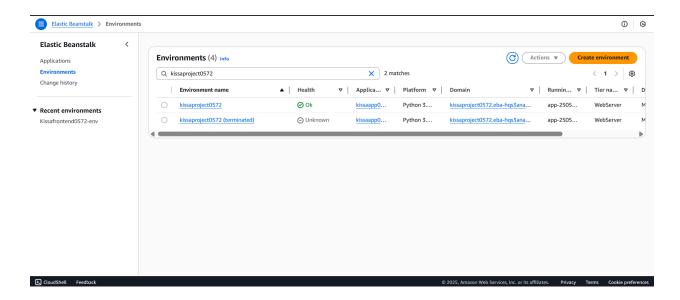
Frontend

Installing ebcli so we can use elastic beanstalk to deploy our frontend



It caused problems so i moved to CLI 🙁

```
🔤 Administrator: C:\WINDOWS\system32\cmd.exe - CALL 🛮 C:\Users\rajan\.ebcli-virtual-env\Scripts\eb.exe init -p static
Uploading kissaapp0572/app-250511_193039170356.zip to S3. This may take a while.
Upload Complete.
Environment details for: kissaproject0572
    Naronment details for: Alssaproject09/2
Application name: kissaapp0972
Region: ap-southeast-2
Deployed Version: app-250511_193039170356
Environment ID: e-a39rxs2qcp
Platform: arn:aws:elasticbeanstalk:ap-southeast-2::platform/Python 3.12 running on 64bit Amazon Linux 2023/4.5.1
    Tier: WebServer-Standard-1.0 CNAME: UNKNOWN
  Updated: 2025-05-11 14:30:44.502000+00:00 rinting Status: 025-05-11 14:30:43 INFO createEnviror
                                                                       createEnvironment is starting.
Using elasticbeanstalk-ap-southeast-2-381492186725 as Amazon S3 storage bucket for environment data. Created security group named: awseb-e-a39rxs2qcp-stack-AWSEBSecurityGroup-CBu4lE58ZHMJ Created EIP: 54.206.202.217
Waiting for EC2 instances to launch. This may take a few minutes.
Instance deployment used the commands in your 'Procfile' to initiate startup of your application.
Instance deployment completed successfully.
Application available at kissaproject0572.eba-hqs3ana7.ap-southeast-2.elasticbeanstalk.com.
Successfully launched environment: kissaproject0572
2025-05-11 14:30:44
2025-05-11 14:31:05
                                                     INFO
 2025-05-11 14:31:21
2025-05-11 14:31:37
2025-05-11 14:32:00
  2025-05-11 14:32:04
2025-05-11 14:32:38
                                                      INFO
  025-05-11 14:32:38
(.ebcli-virtual-env) >eb deploy
Creating application version archive "app-250511_193457742375".
Uploading kissaapp0572/app-250511_193457742375.zip to S3. This may take a while.
Upload Complete.
2025-05-11 14:35:00
2025-05-11 14:35:05
2025-05-11 14:35:08
                                                                         Environment update is starting.
                                                                        Environment update is starting.
Deploying new version to instance(s).
Instance deployment used the commands in your 'Procfile' to initiate startup of your application.
Instance deployment completed successfully.
New application version was deployed to running EC2 instances.
Environment update completed successfully.
                                                      INFO
  025-05-11 14:35:13
                                                      INFO
 2025-05-11 14:35:18
2025-05-11 14:35:18
                                                      INFO
    .ebcli-virtual-env) >
```



LESSS GOO DONE!!

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