Project Title: Re-Architecting Web App on AWS Cloud

Project Overview

The project aims to re-architect a web application on the AWS cloud to enhance agility and improve business continuity. This involves migrating services running on physical, virtual, and cloud machines to AWS services for increased operational efficiency and scalability.

Teams Involved

- Cloud Computing Team: Responsible for designing and implementing the cloud infrastructure.
- Virtualization Team: Involved in migrating services from virtual machines to AWS cloud services.
- DC OPS Team: Manages data center operations and assists in the migration process.
- Monitoring Team: Ensures proper monitoring and alerting mechanisms are in place.
- Sys Admins: Responsible for system administration tasks during the migration process.

Operational Overhead

The project addresses several challenges faced by the current infrastructure:

- Struggling with Uptime & Scaling: Implementing AWS services for better scalability and reliability.
- UpFront CapEx & Regular OpEx: Moving to a pay-as-you-go model to reduce upfront costs and optimize operational expenses.
- Manual Process / Difficult to Automate: Implementing Infrastructure as Code (IAC) for automation and ease of management.

AWS Services Utilized

- Elastic Beanstalk: Used for deploying and managing applications without managing the underlying infrastructure. Utilized for Tomcat application server, NGINX load balancer replacement, and automation for VM scaling.
- Amazon S3/EFS: Used for storage purposes.
- Amazon RDS: Utilized for database management.
- Amazon Elastic Cache: Used instead of Memcached for caching.
- Amazon ActiveMQ: Used instead of RabbitMQ for message queuing.
- Amazon Route53: Used for DNS management.
- Amazon CloudFront: Utilized for content delivery network (CDN) to improve content delivery speed and reduce latency.

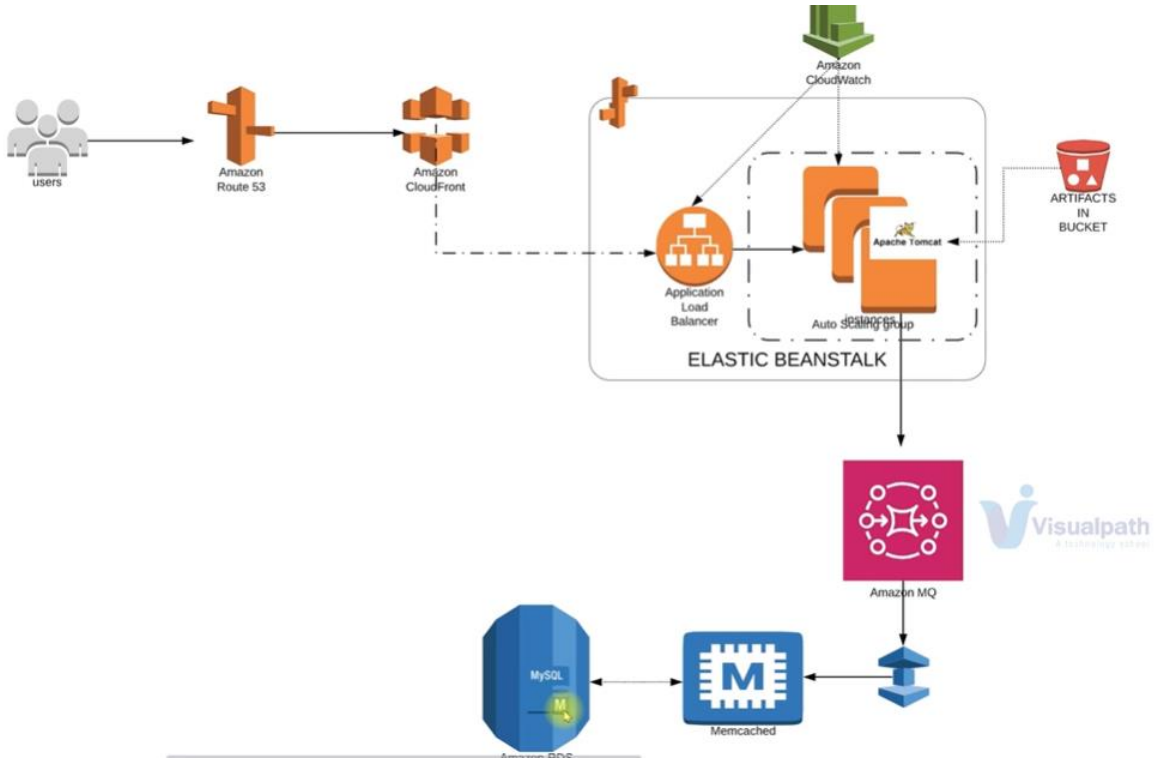
Objectives

- Flexible Infrastructure: Implementing AWS services for flexibility in infrastructure management.
- No Upfront Cost: Moving to a pay-as-you-go model to eliminate upfront capital expenditure.
- Infrastructure as a Service (IAAS): Leveraging AWS for infrastructure provisioning and management.
- Platform as a Service (PAAS): Utilizing AWS services for platform management.
- Software as a Service (SAAS): Improving the web application's availability and scalability.

Comparision:

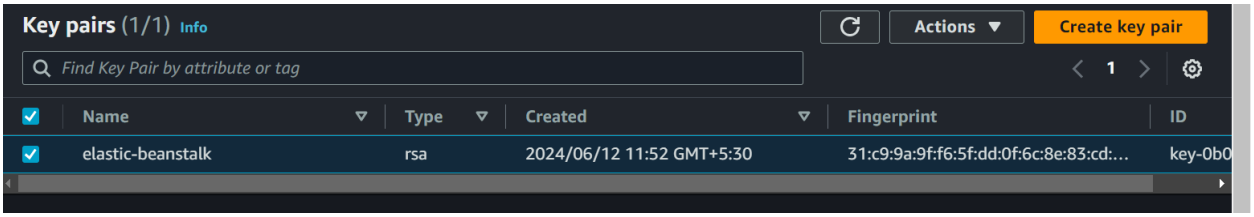
Beanstalk	Tomcat Ec2/VM
ELB IN BEANSTALK	NGINX LB/ELB
AUTOSCALING	NONE / Autoscaling
EFS/S3	NFS / S3/ EFS
RDS	MYSQL ON VM/Ec2
ELASTIC CACHE	MEMCACHED ON VM/Ec2
ACTIVE MQ	RABBITMQ ON VM/Ec2
ROUTE53	GODADDY, LOCAL DNS
CLOUDFRONT	NONE / MULTI DC ACROSS WORLD

Architecture :

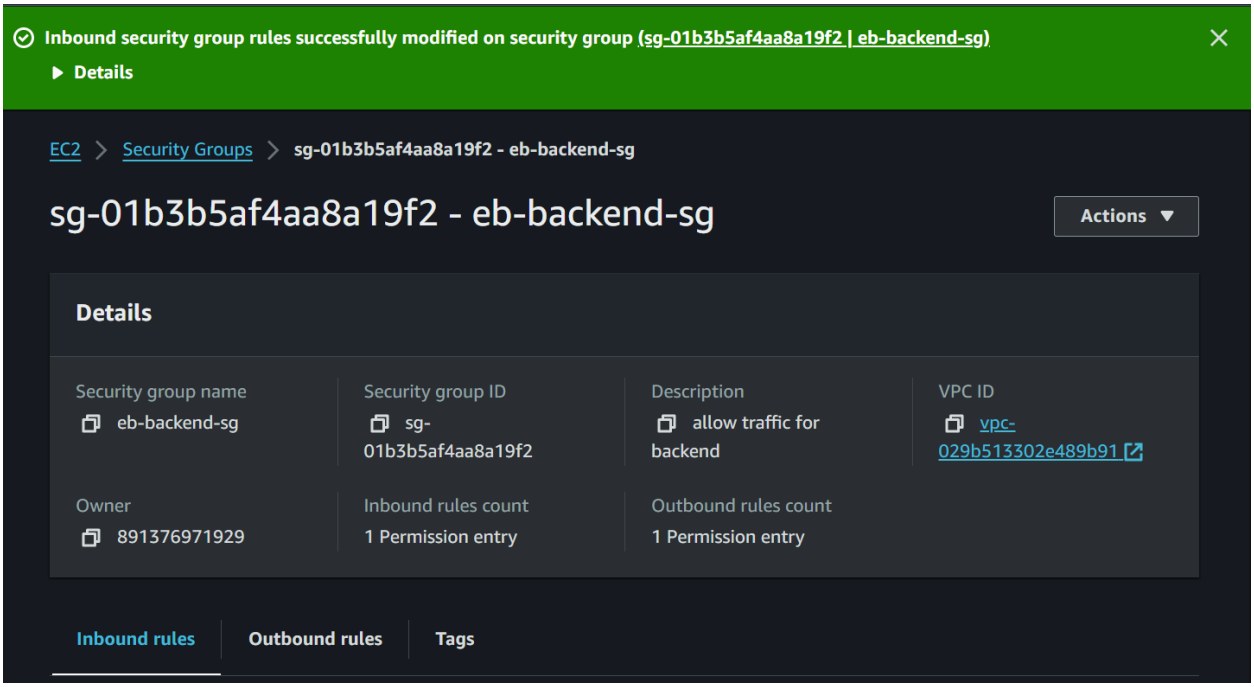


Step of execution :

1) Generate a key pair, which is not mandatory but it will be ok if we do generate it.

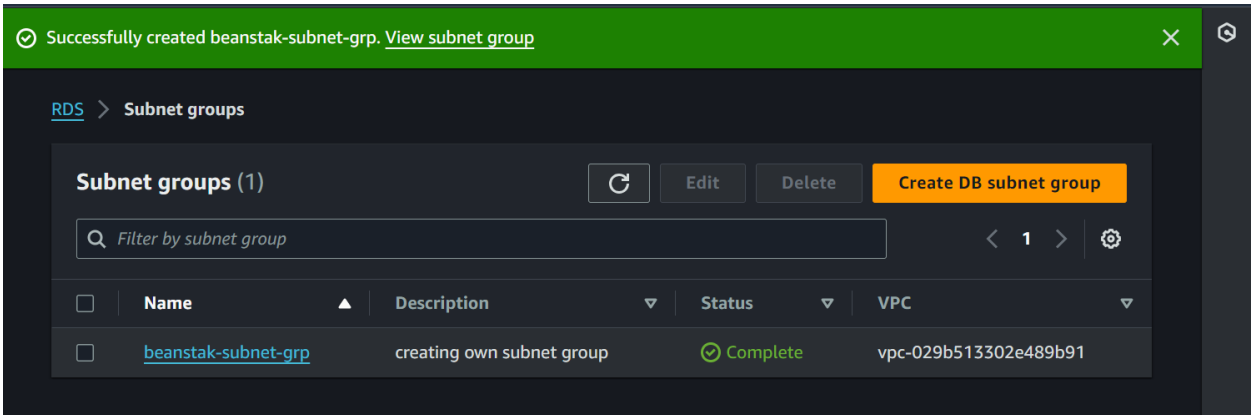


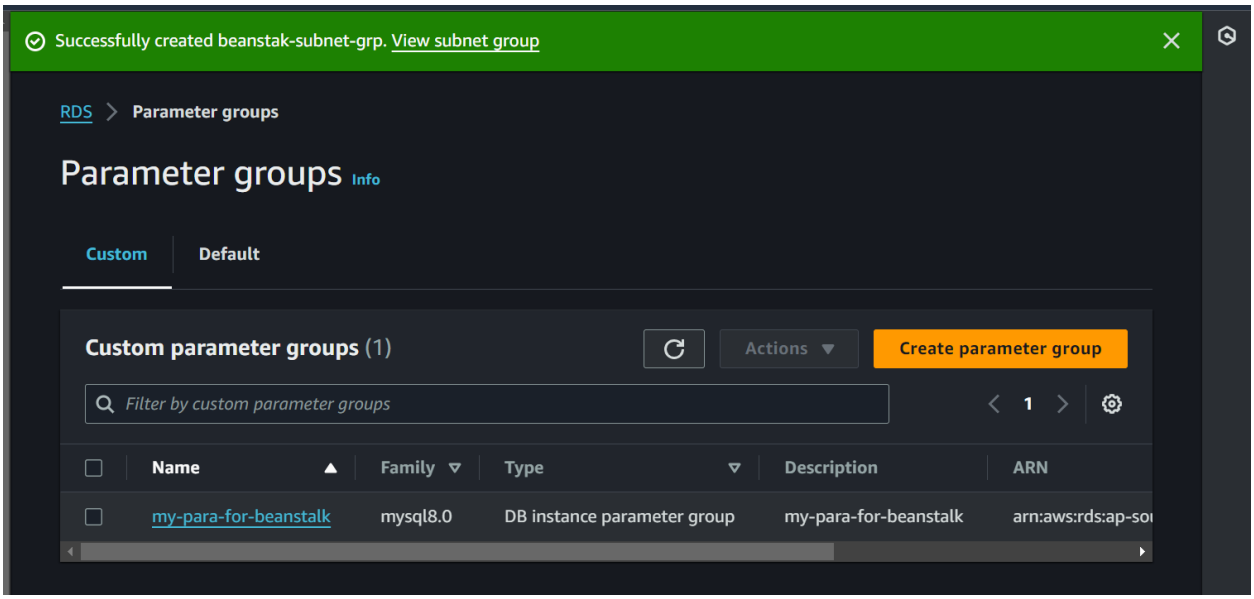
2) Create a security group for backend service.



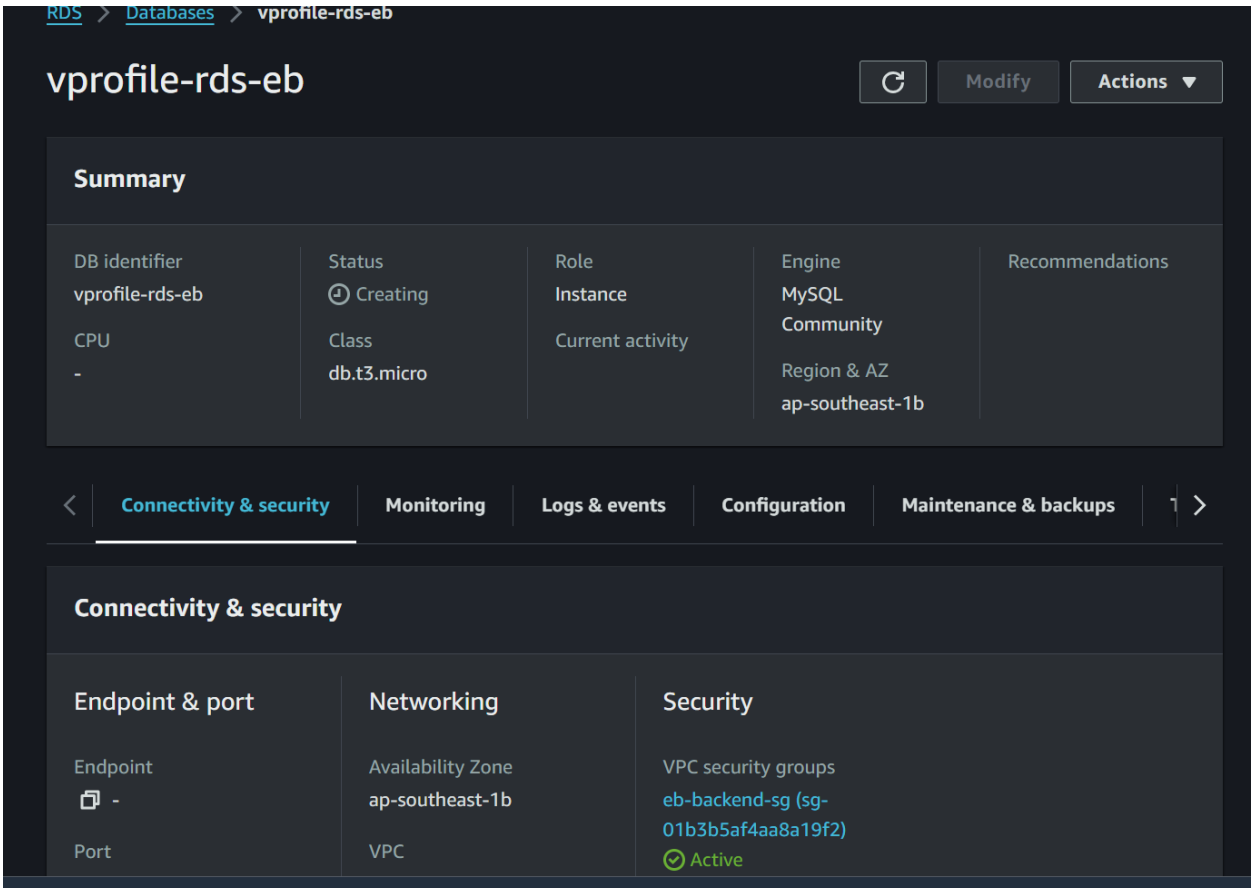
3) Now Create RDS : Relational Database System

- Create subnet group and paramenet group, well this is not mandatory but if we need own customized VPC than we need this

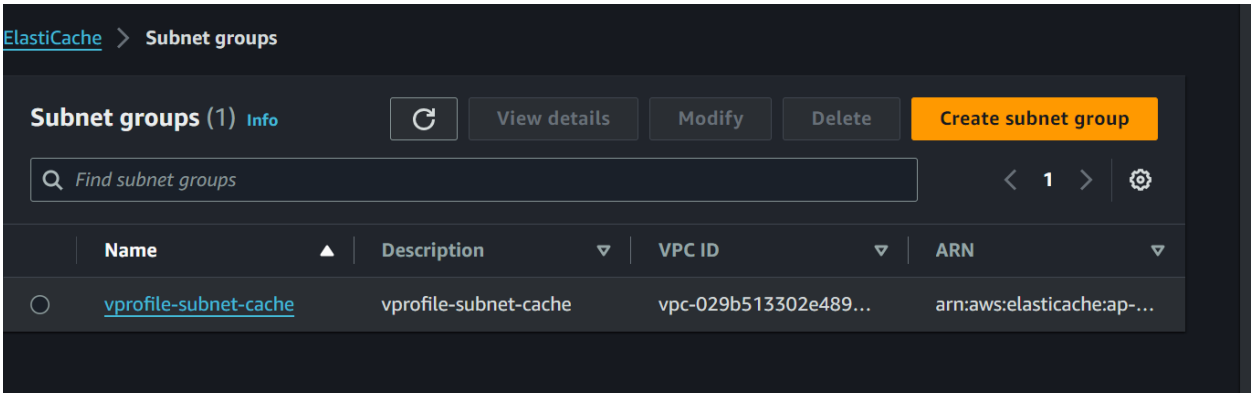


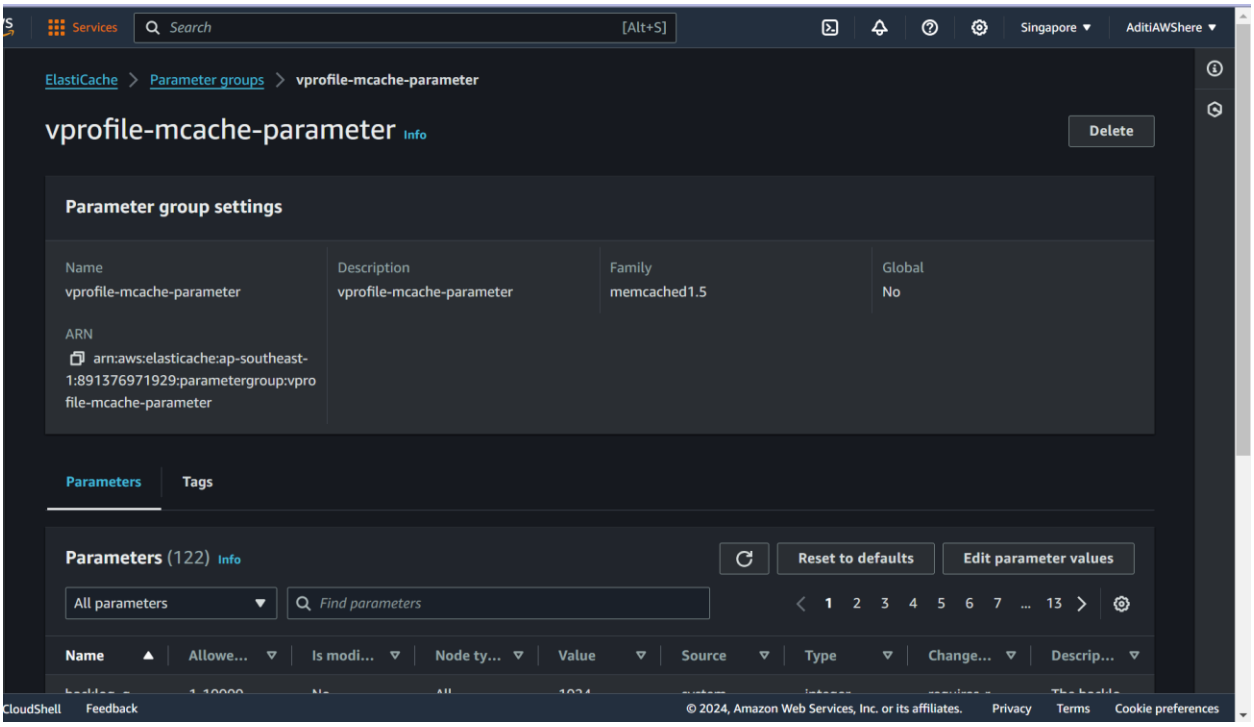


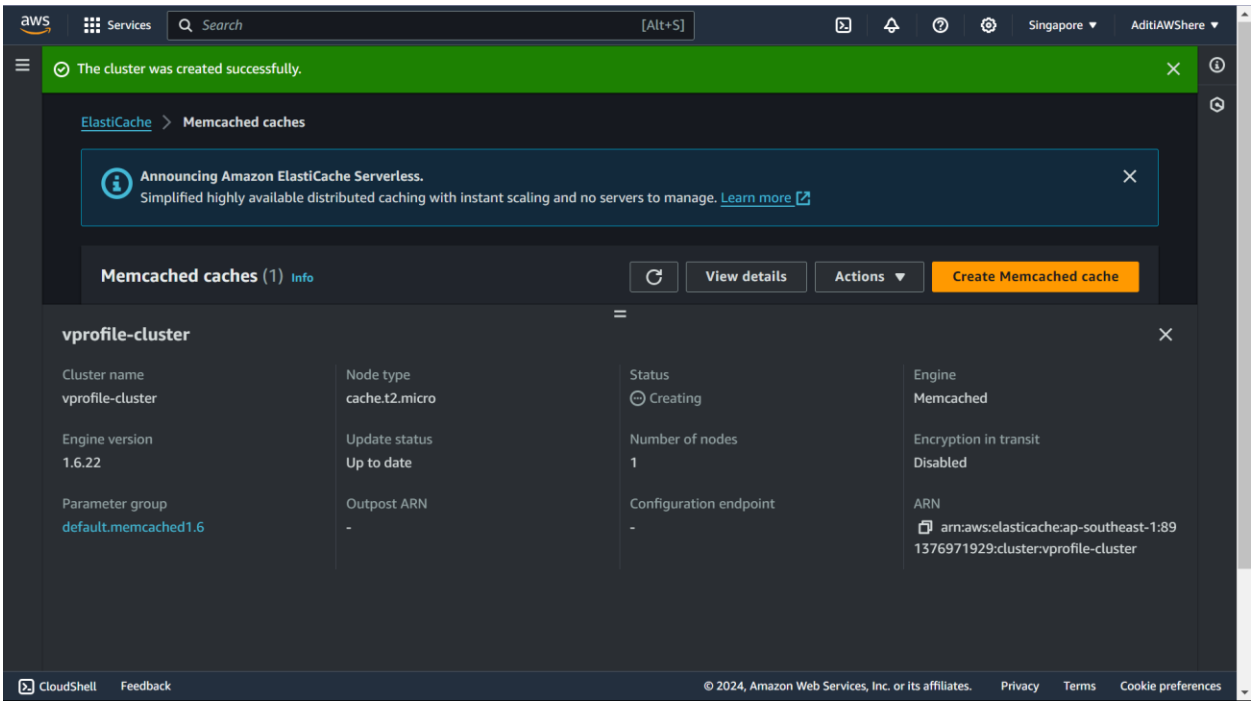
- Go to databases and create a database



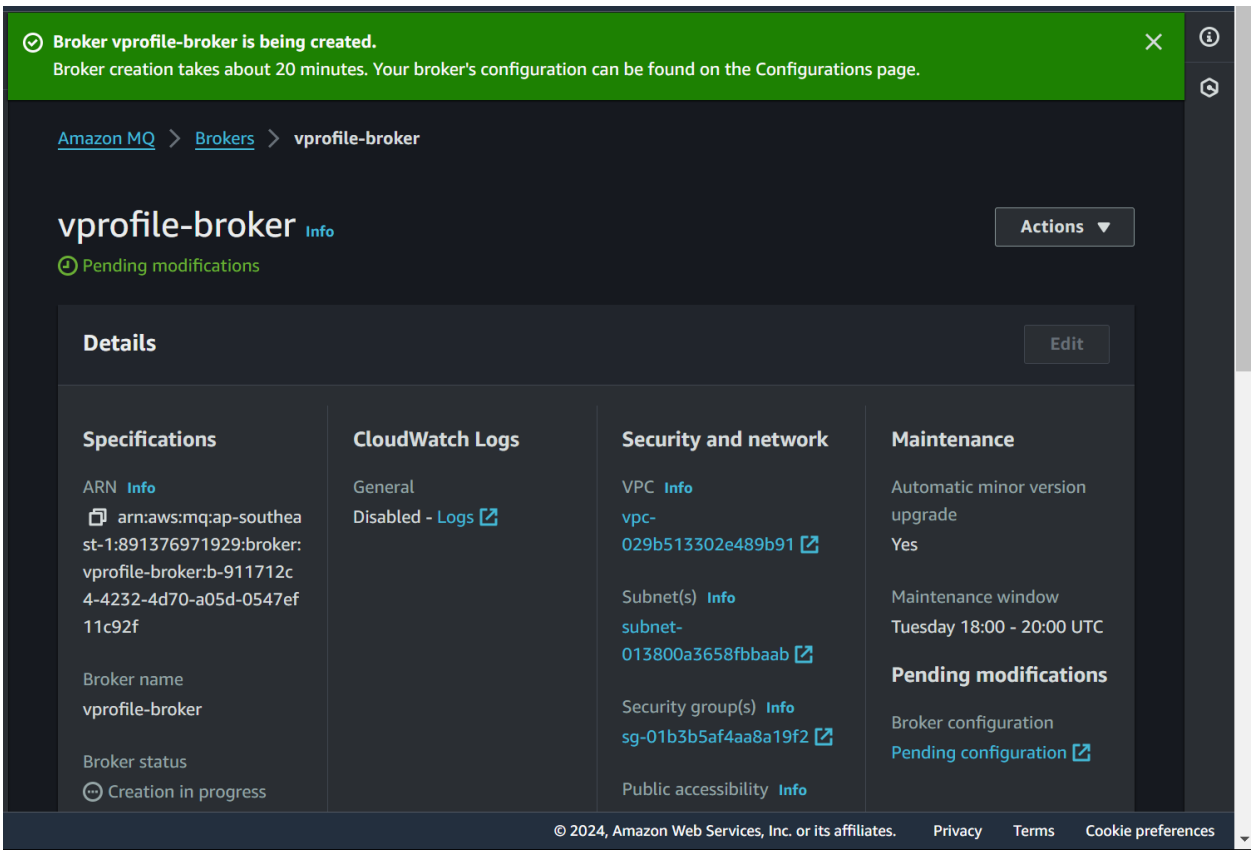
4) Now create elastic cache

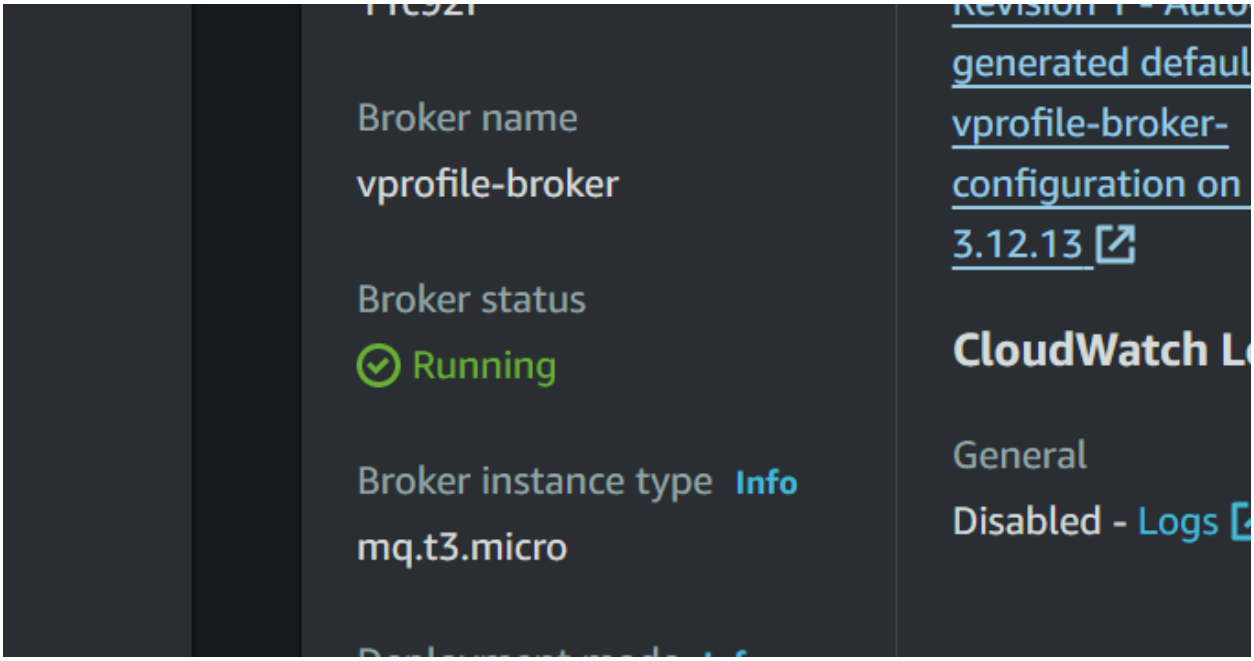






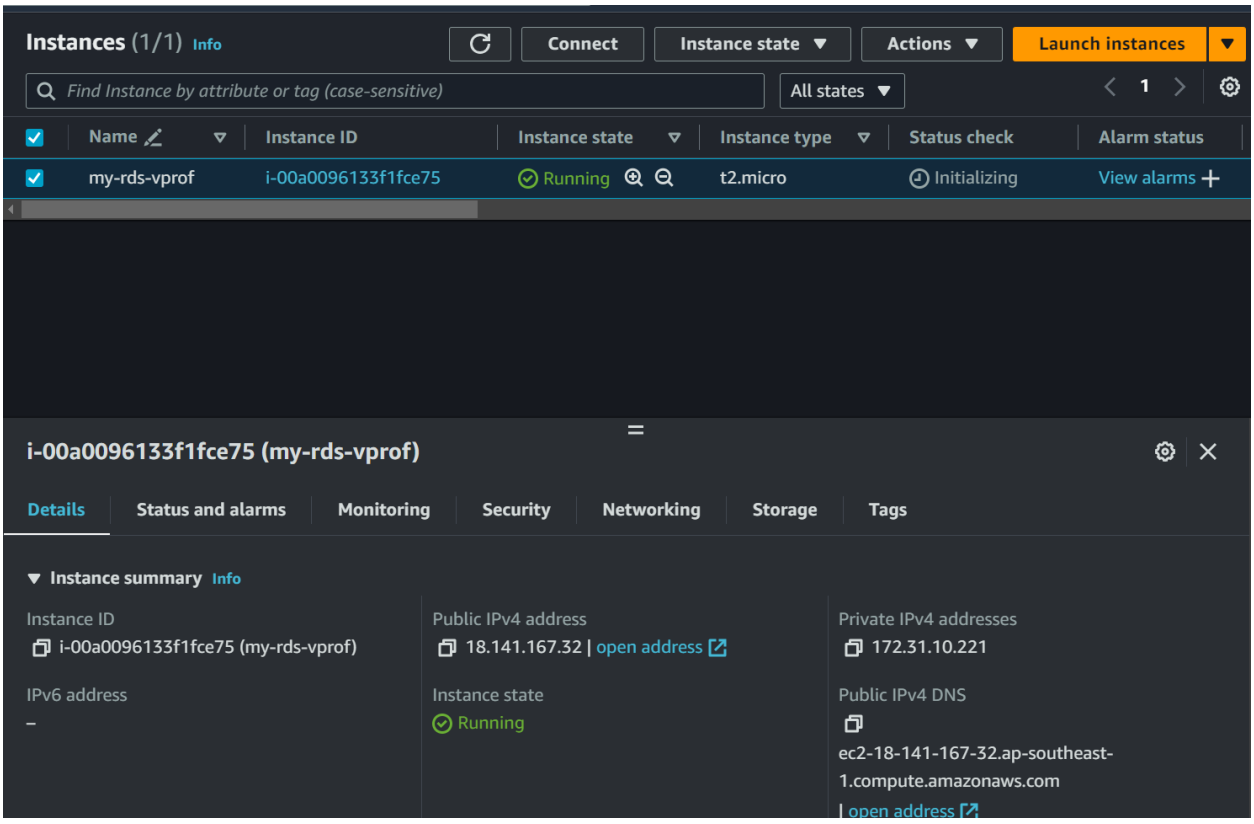
5) Create AmazonMQ



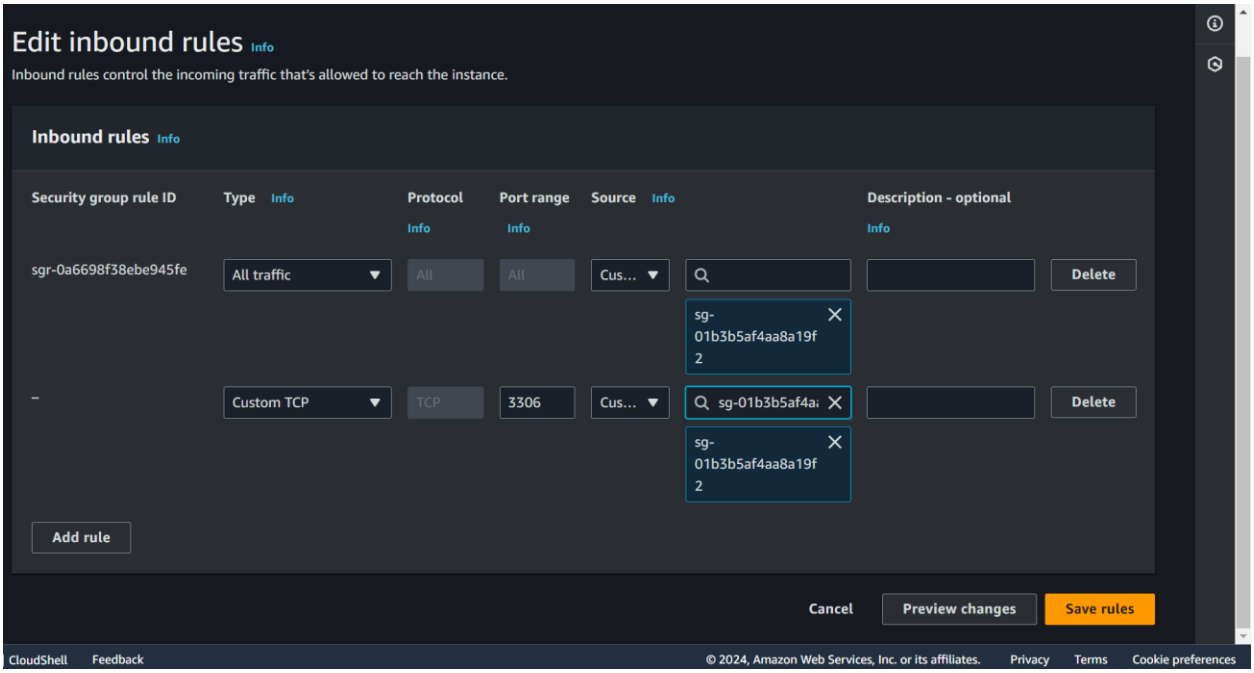


6) DB initialization.

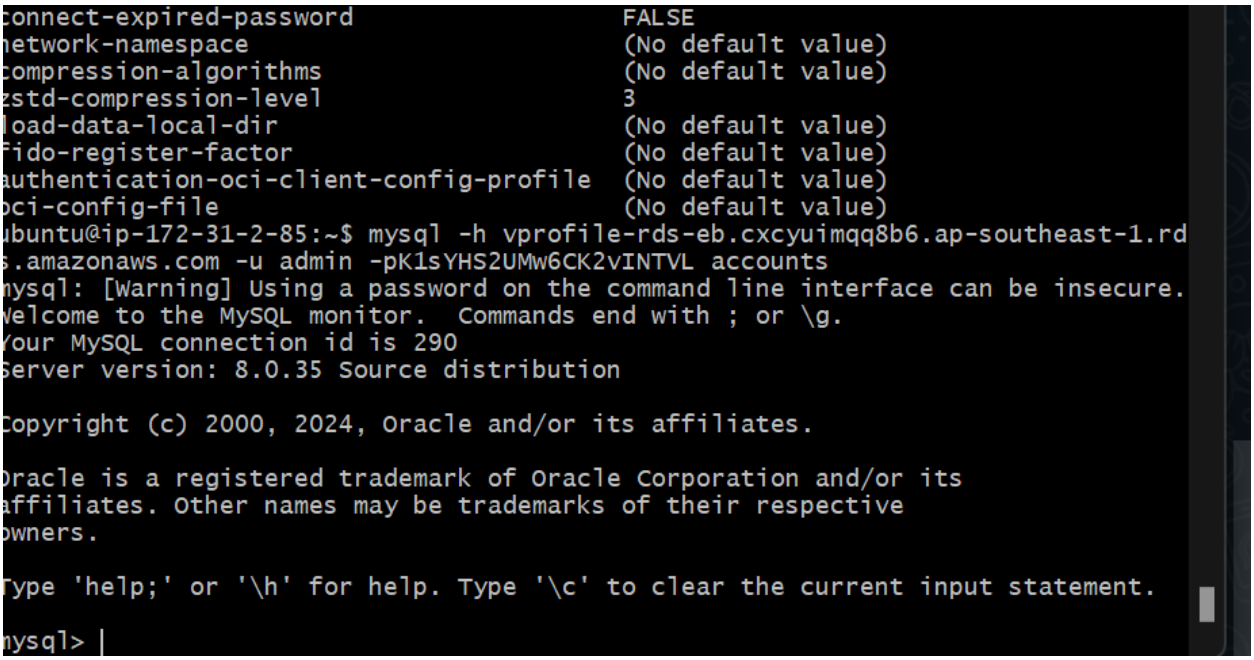
- Go to ec2 and launch instance

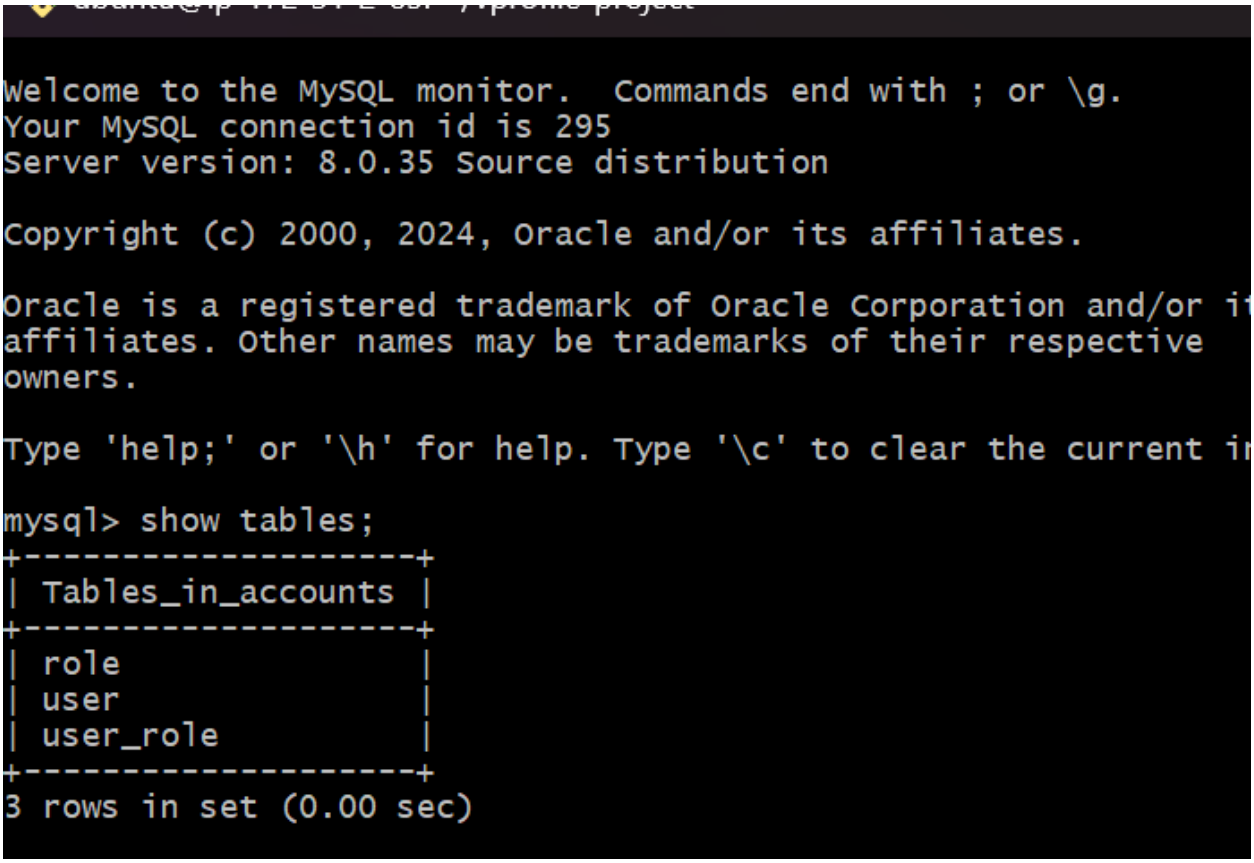


- Allow backend security group allow connection from this instance

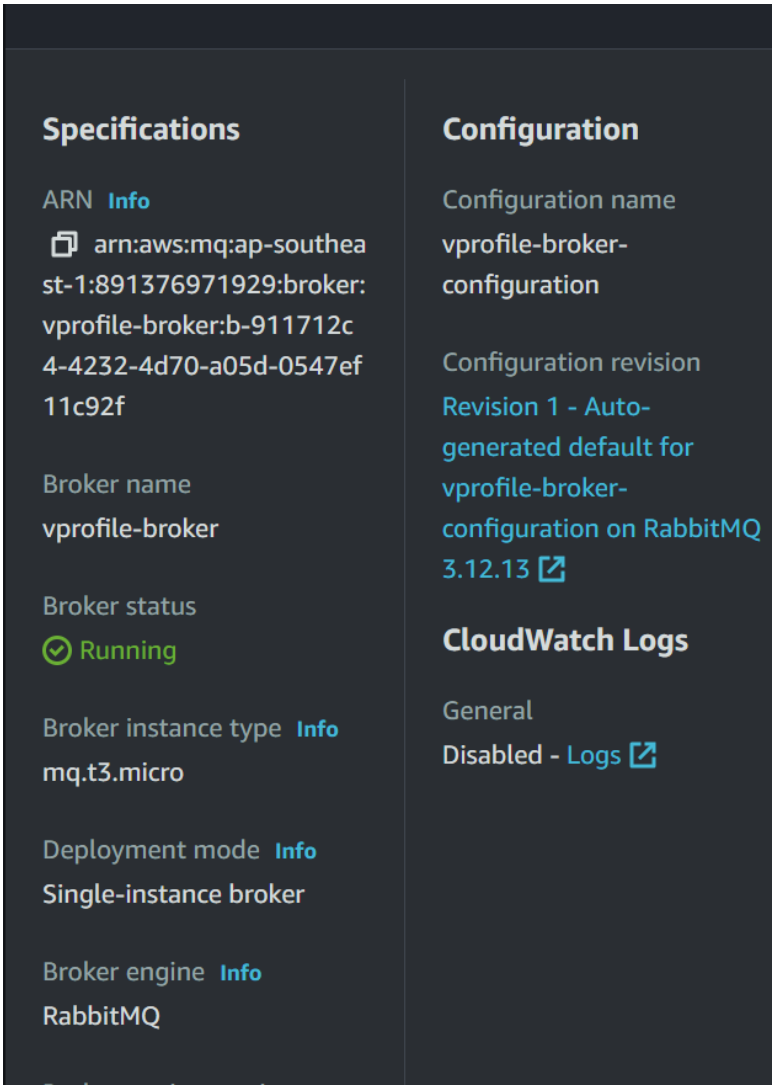


- Connect to the instance and try connecting mysql

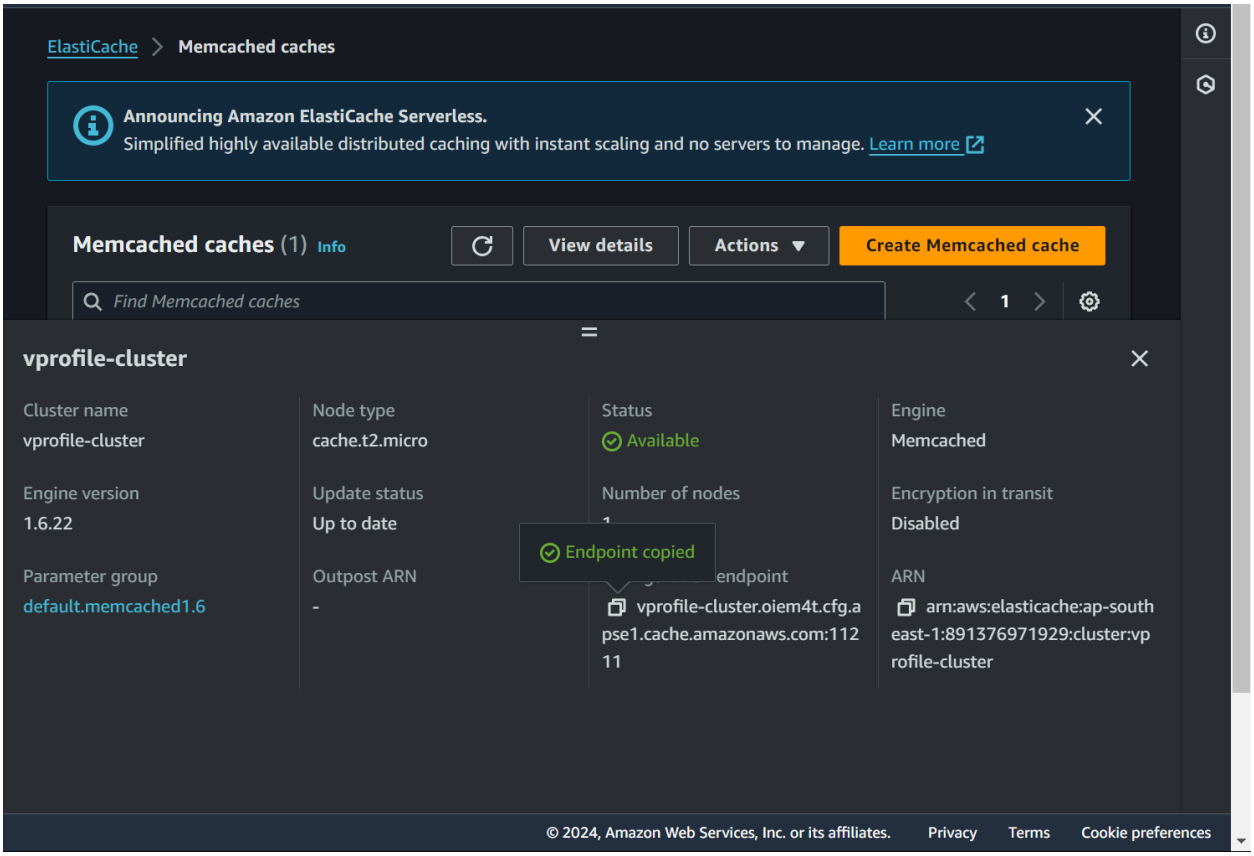




7) Go to broker and check if it running and go to the broker's endpoint.



8) Check Elastic Cache.



broker end point

911712c4-4232-4d70-a05d-0547ef11c92f.mq.ap-southeast-1.amazonaws.com

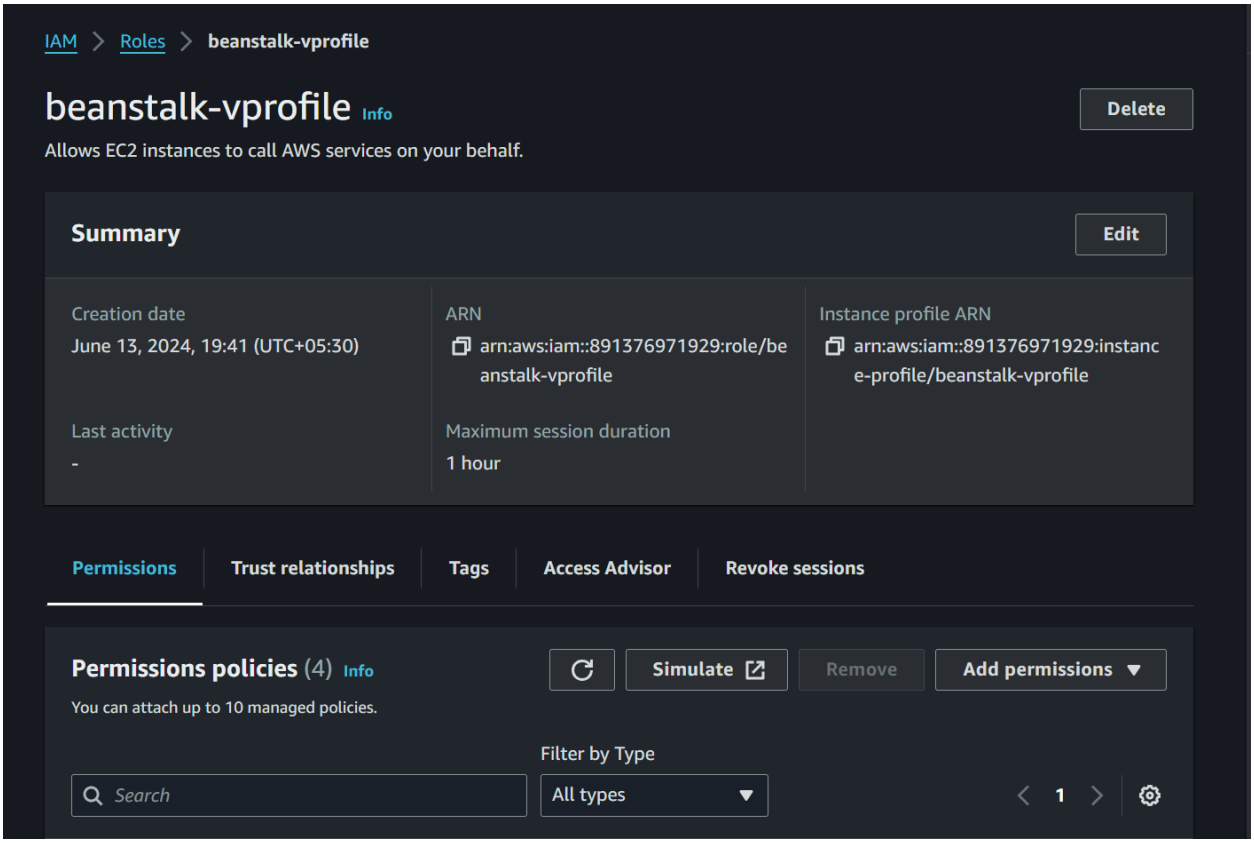
elastic cache ep

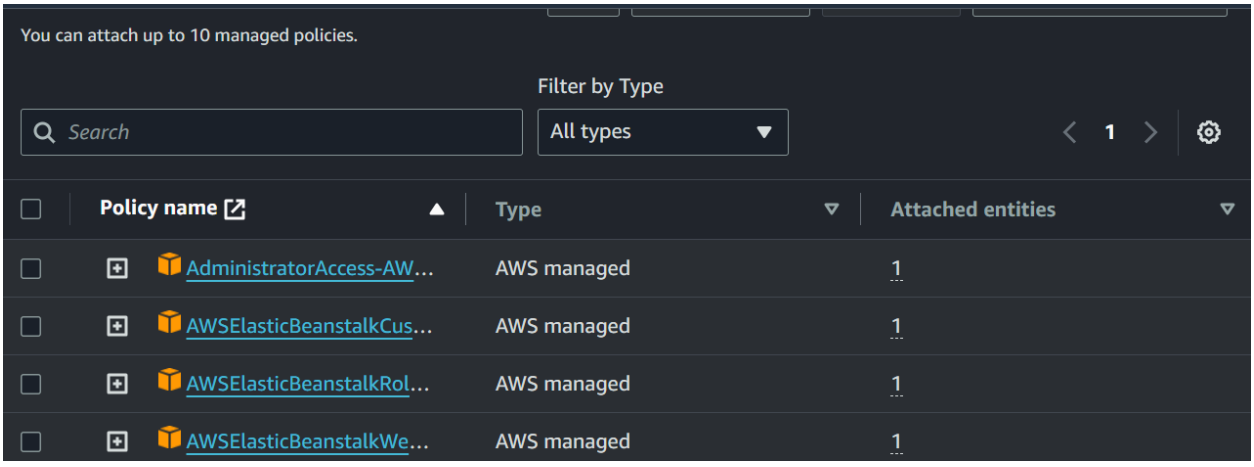
vprofile-cluster.oiem4t.cfg.apse1.cache.amazonaws.com

All our backend is set!

9) Elastic Beanstalk setup

- Make IAM Roles for beanstalk

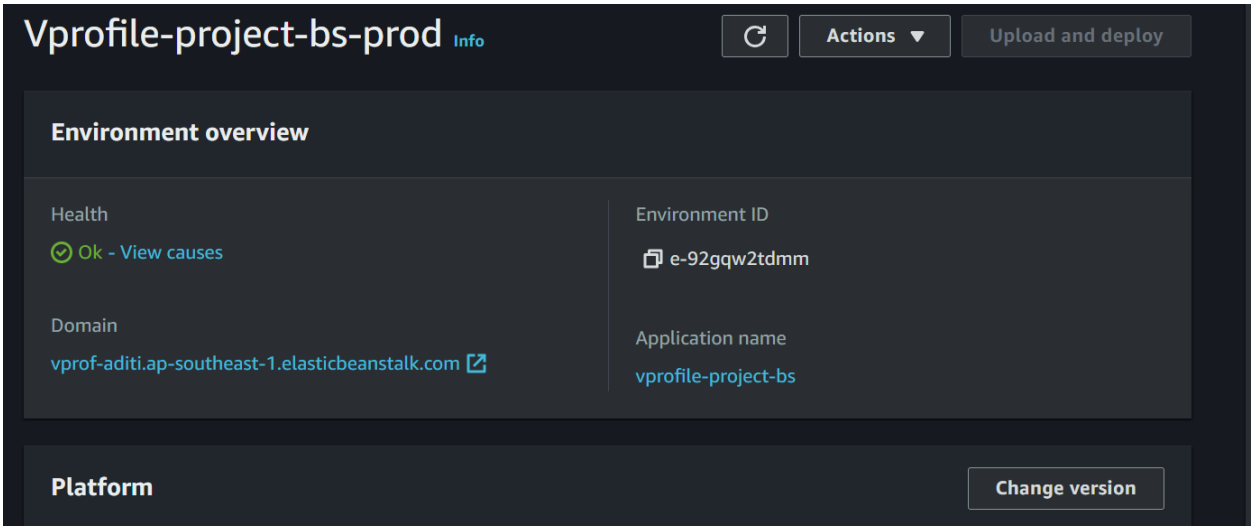




- Important documentation

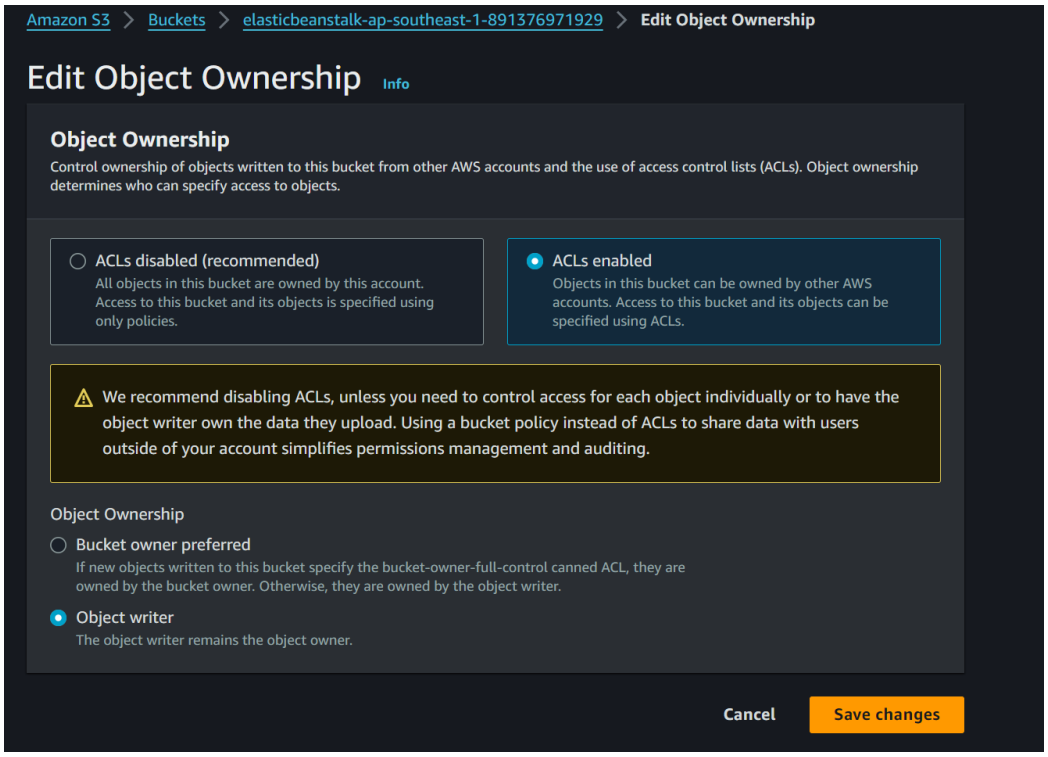
https://docs.aws.amazon.com/elasticbeanstalk/latest/dg/using-features.deploy-existing-version.html

- Beanstalk setup

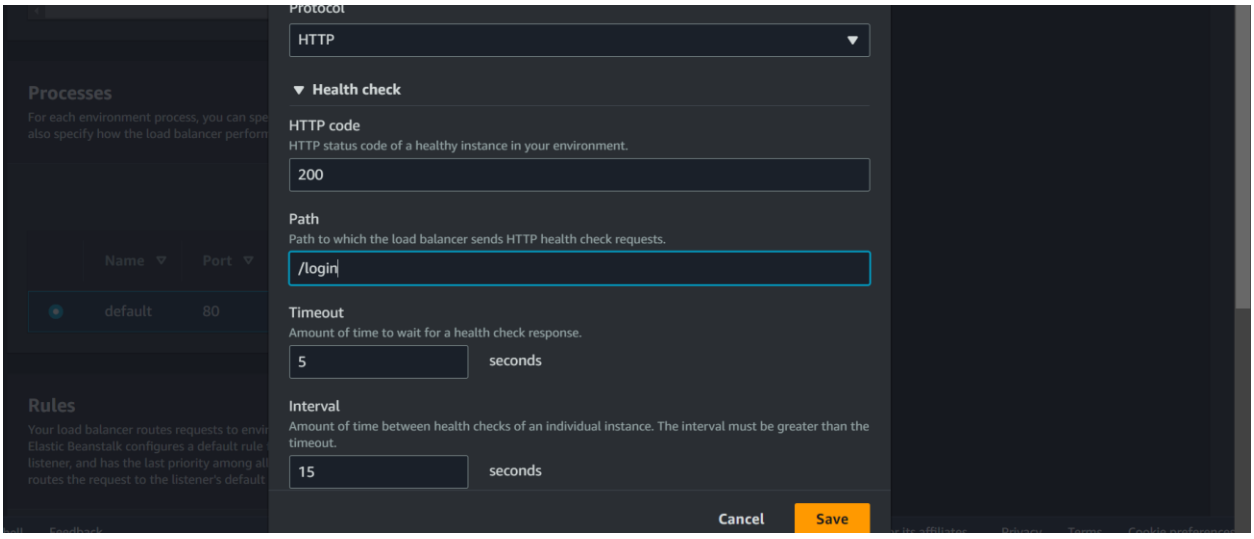


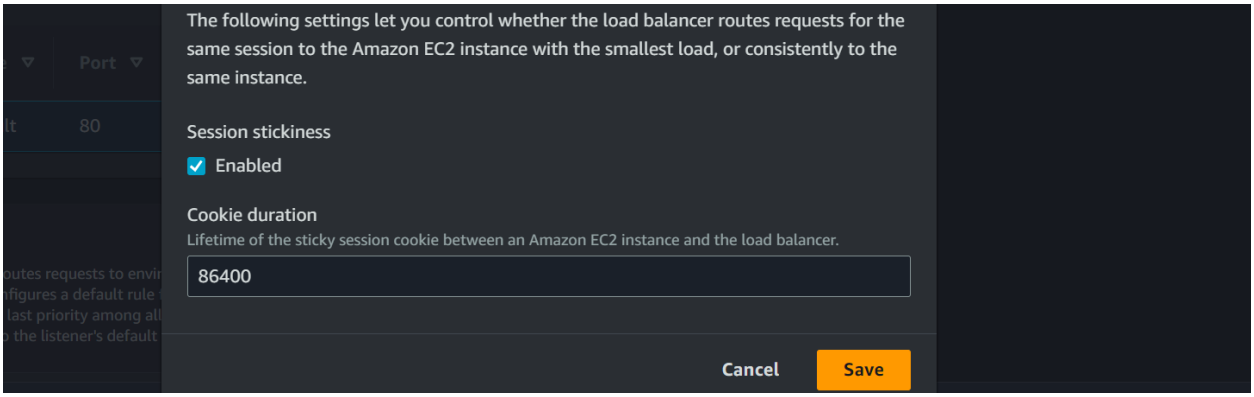
10) Enable ACL on S3 bucket, Update the health check of target groups, update security group

- While deployment of Artifacts in order not to get ACL S3 error, enable ACL from bucket ownership.

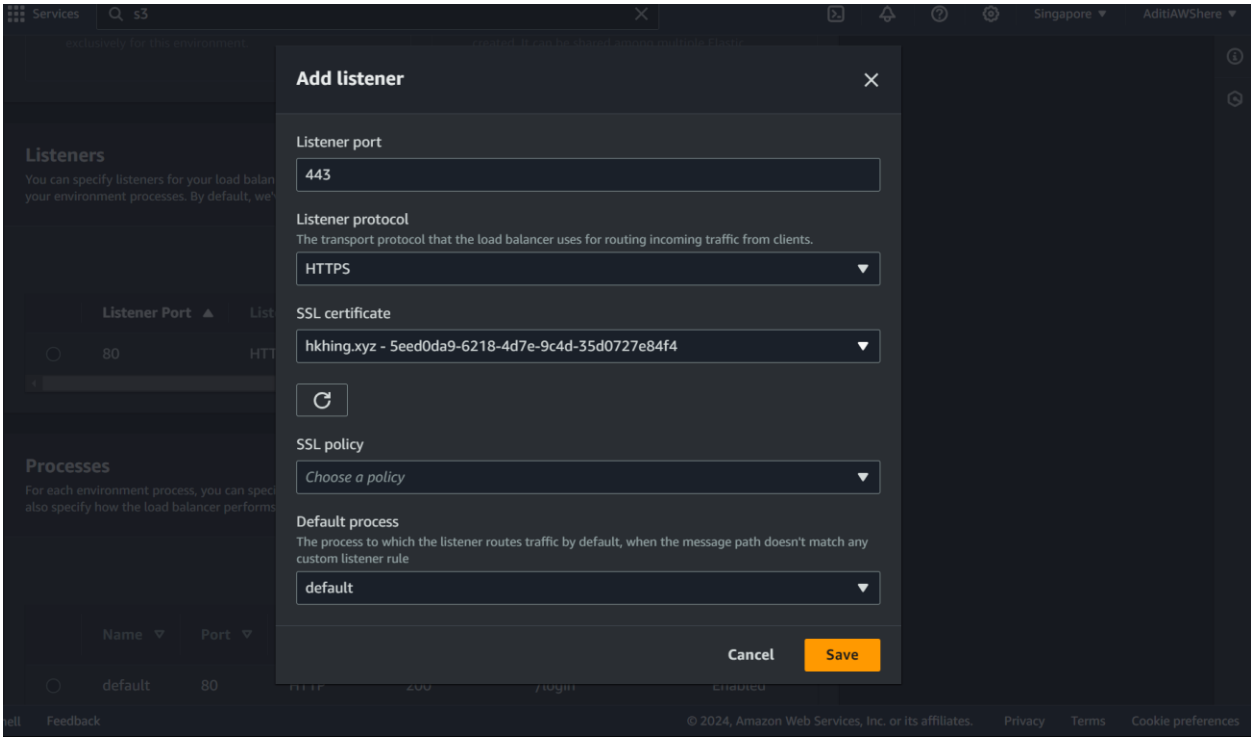


- Go to instance traffic and scaling in Beanstalk environment and go to processes and do changes.

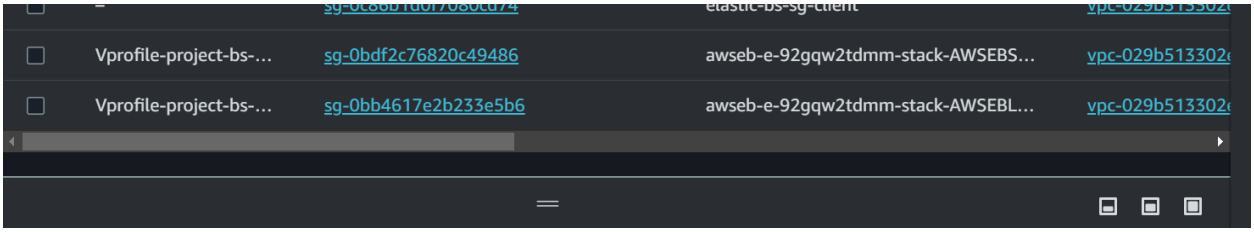


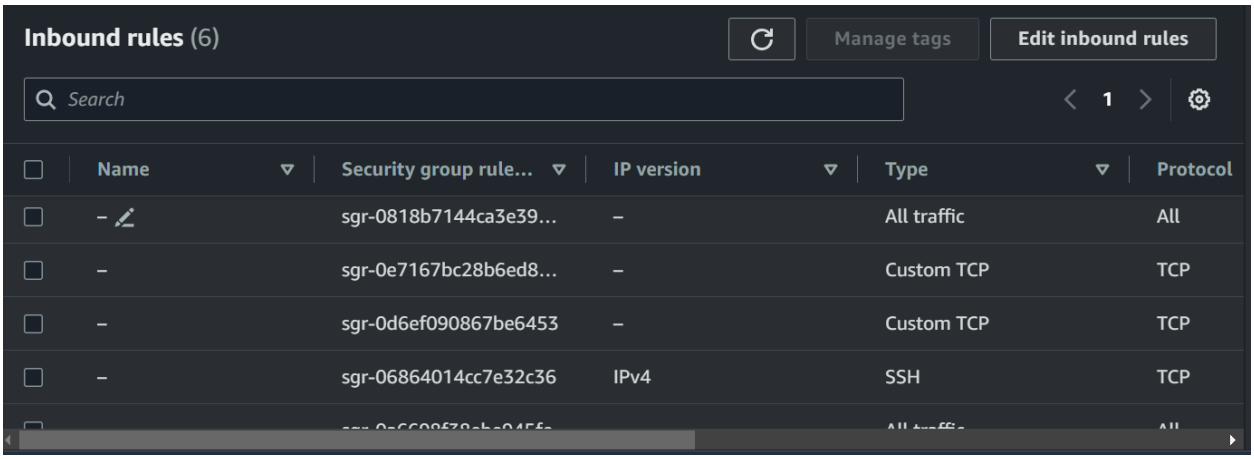


- Next we will add https listener
- Add port 443 https listener. Select SSL certificate from ACM

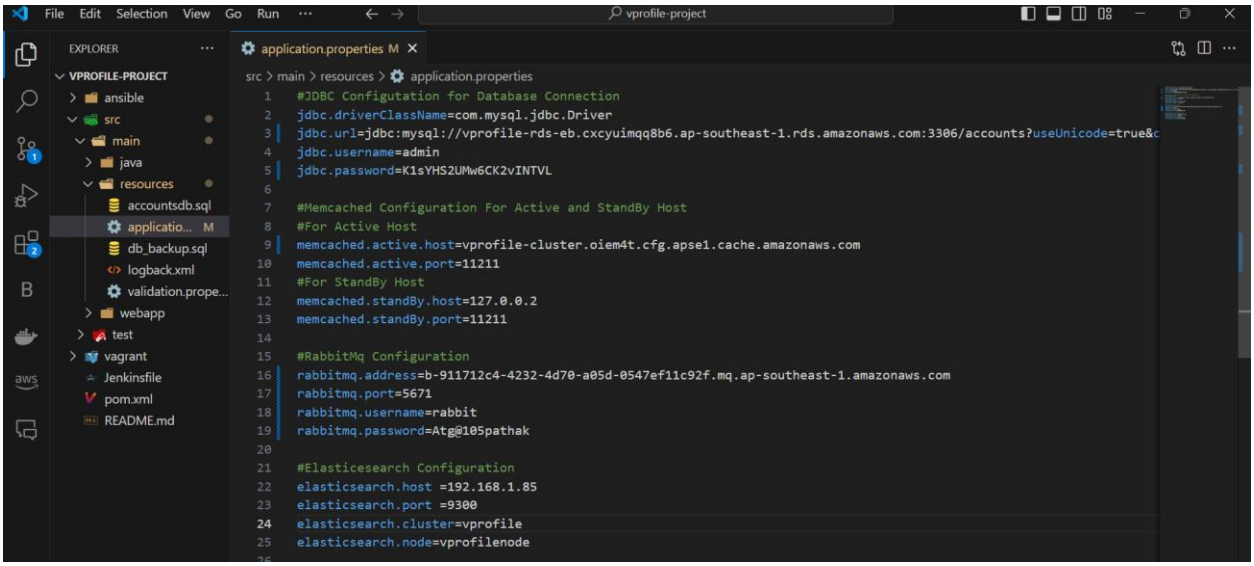


- Security group changes





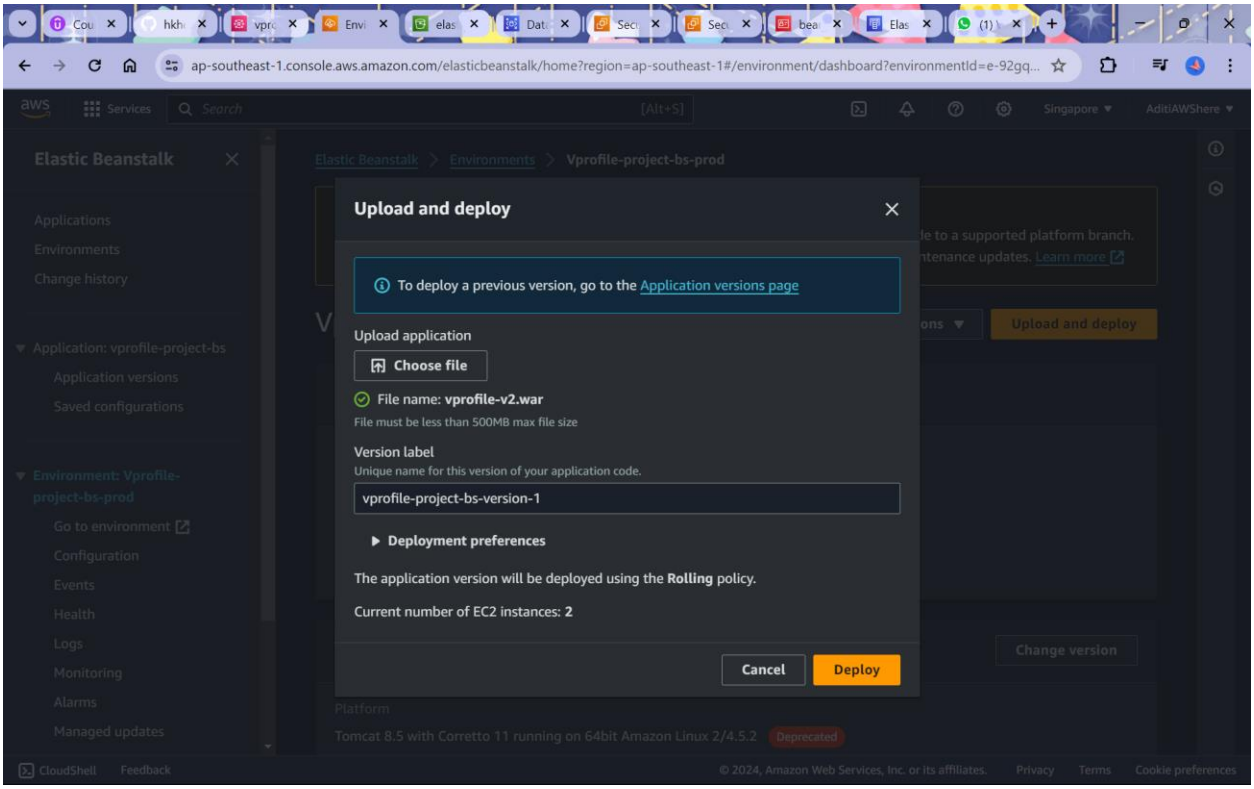
11) Build and Deploy artifacts.

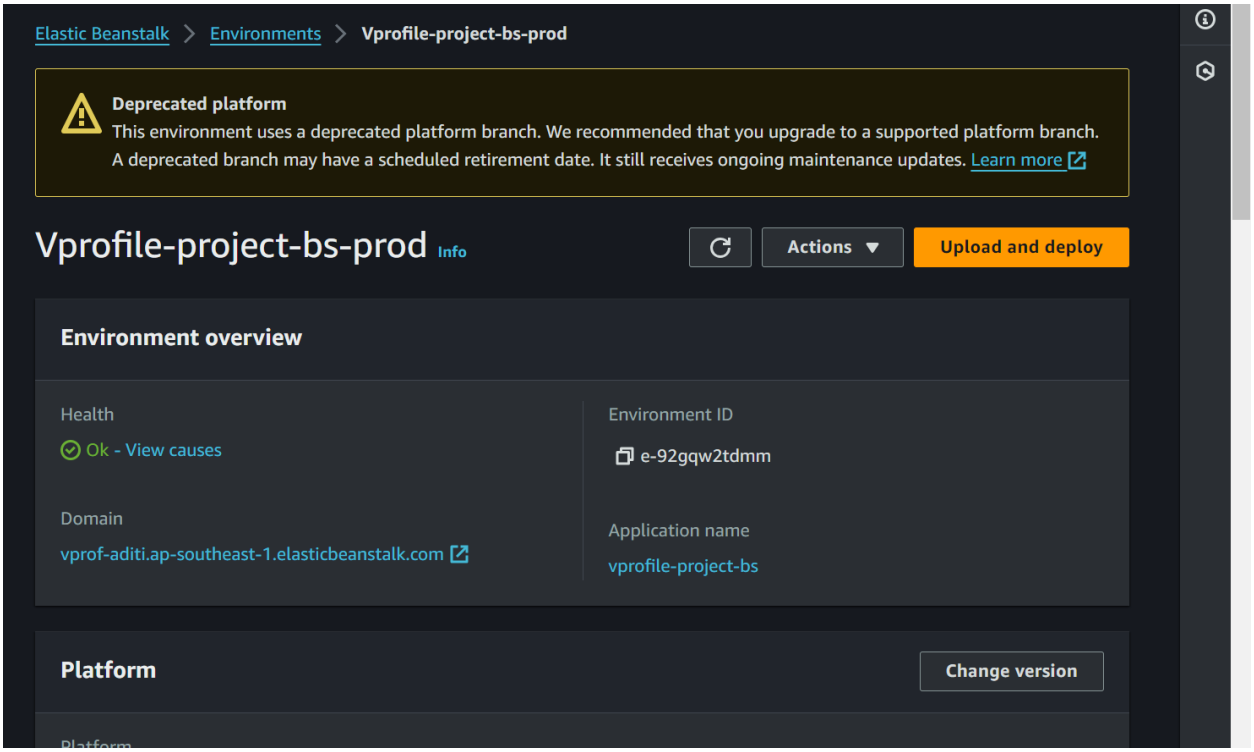


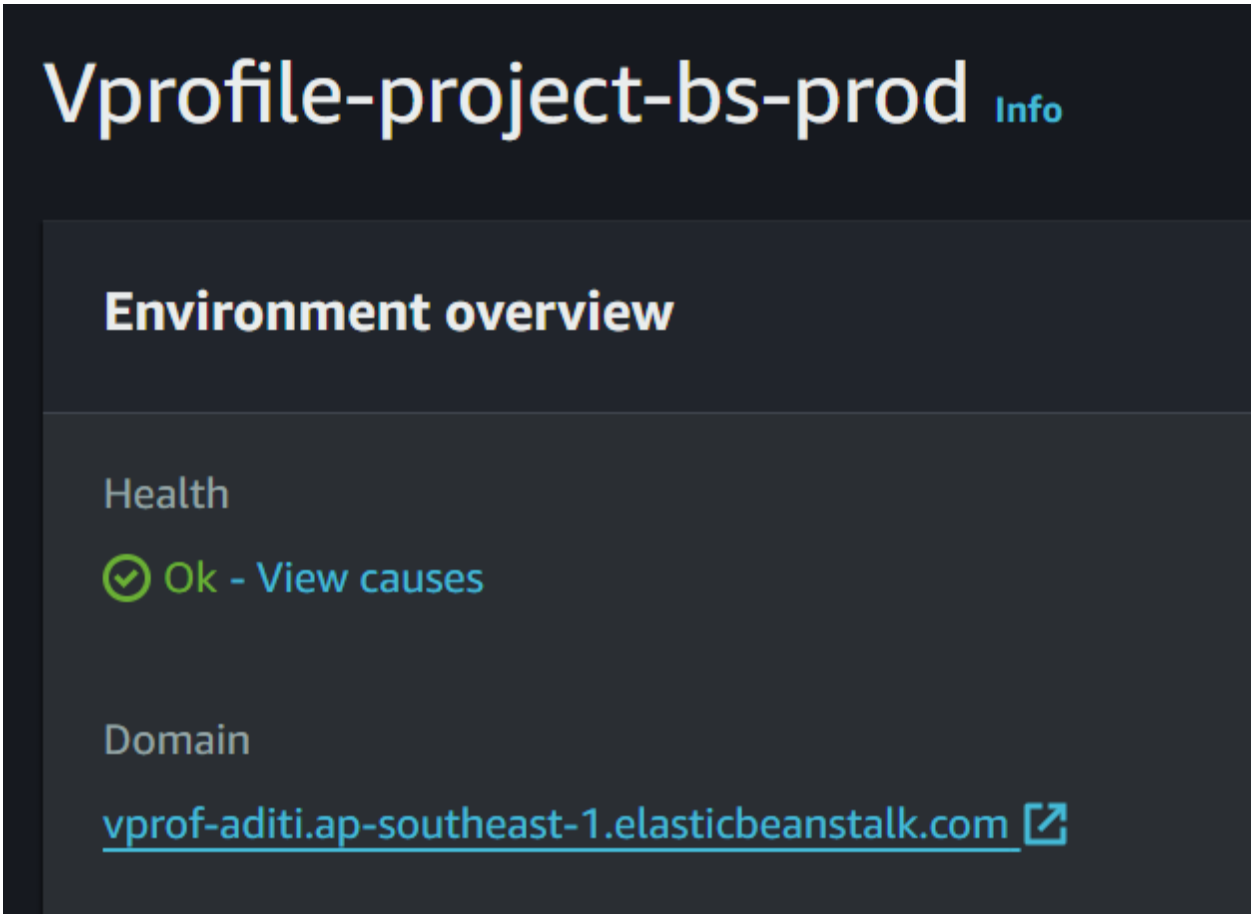
```
aditi@ADITI MINGW64 ~/OneDrive/文档/DevOps/ProjectSetupAWS/vprofile-project (main)
$ mvn -version
Apache Maven 3.9.7 (8b094c9513efc1b9ce2d952b3b9c8eaedaf8cbf0)
Maven home: C:\ProgramData\chocolatey\lib\maven\apache-maven-3.9.7
Java version: 11.0.23, vendor: Amazon.com Inc., runtime: C:\Program Files\Amazon Corretto\jdk11.0.23_9
Default locale: en_US, platform encoding: Cp1252
OS name: "windows 11", version: "10.0", arch: "amd64", family: "windows"

aditi@ADITI MINGW64 ~/OneDrive/文档/DevOps/ProjectSetupAWS/vprofile-project (main)
$
```

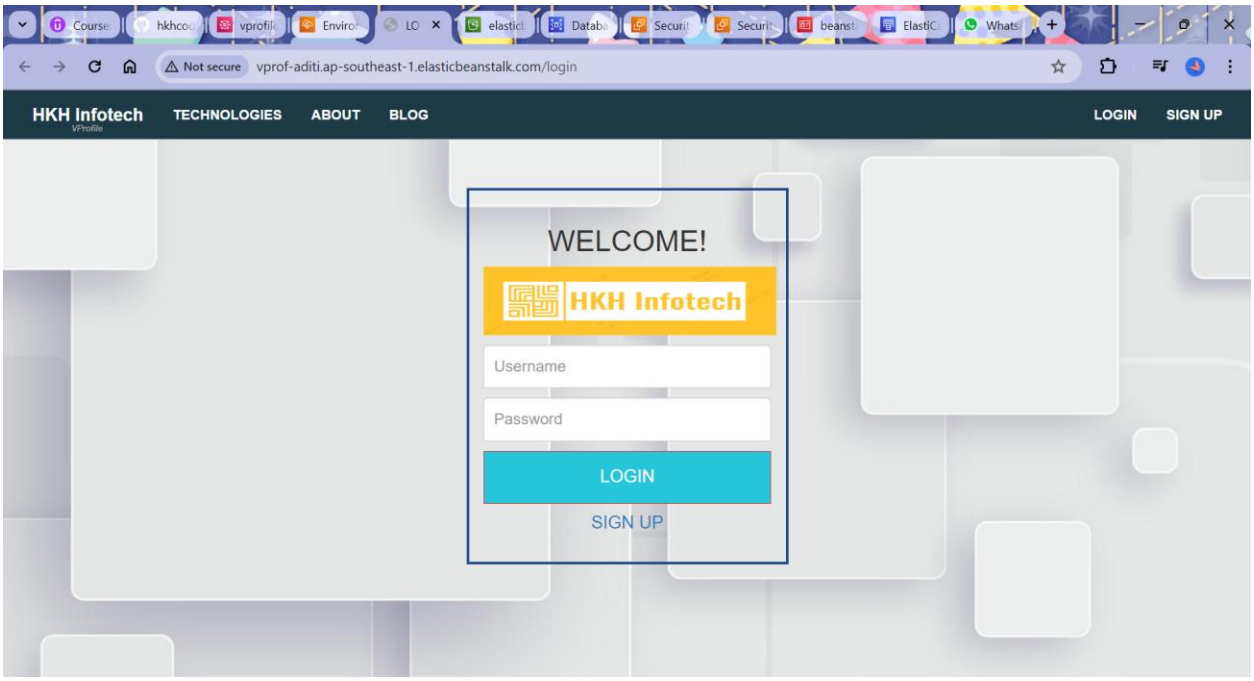
```
aditi@ADITI MINGW64 ~/OneDrive/文档/DevOps/ProjectSetupAWS/vprofile-project (main)
$ mvn install
[INFO] Scanning for projects...
[INFO]
[INFO] ---------------------< com.visualpathit:vprofile >----------------------
[INFO] Building Visualpathit VProfile Webapp v2
[INFO]   from pom.xml
[INFO] --------------------------------[ war ]---------------------------------
[WARNING] The artifact mysql:mysql-connector-java:jar:8.0.32 has been relocated to com.mysql:mysql-connector-j:jar:8.0.32: MySQL Connecto
r/J artifacts moved to reverse-DNS compliant Maven 2+ coordinates.
[INFO]
```



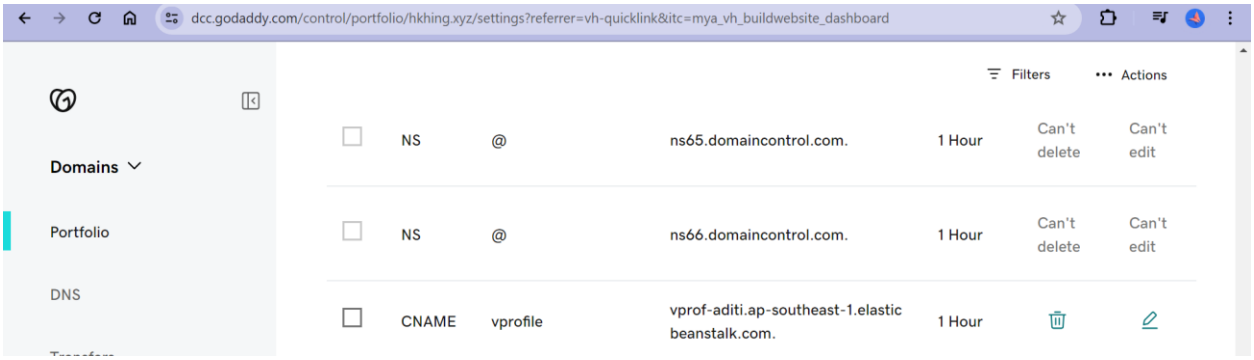

Elastic Beanstalk
Environments
Vprofile-project-bs-prod
Deprecated platform
This environment uses a deprecated platform branch. We recommended that you upgrade to a supported platform branch.
A deprecated branch may have a scheduled retirement date. It still receives ongoing maintenance updates. Learn more
Vprofile-project-bs-prod Info
Actions
Upload and deploy
Environment overview
Health
Ok - View causes
Environment ID
e-92gqw2tdmm
Domain
vprof-aditi.ap-southeast-1.elasticbeanstalk.com
Application name
vprofile-project-bs
Platform
Change version

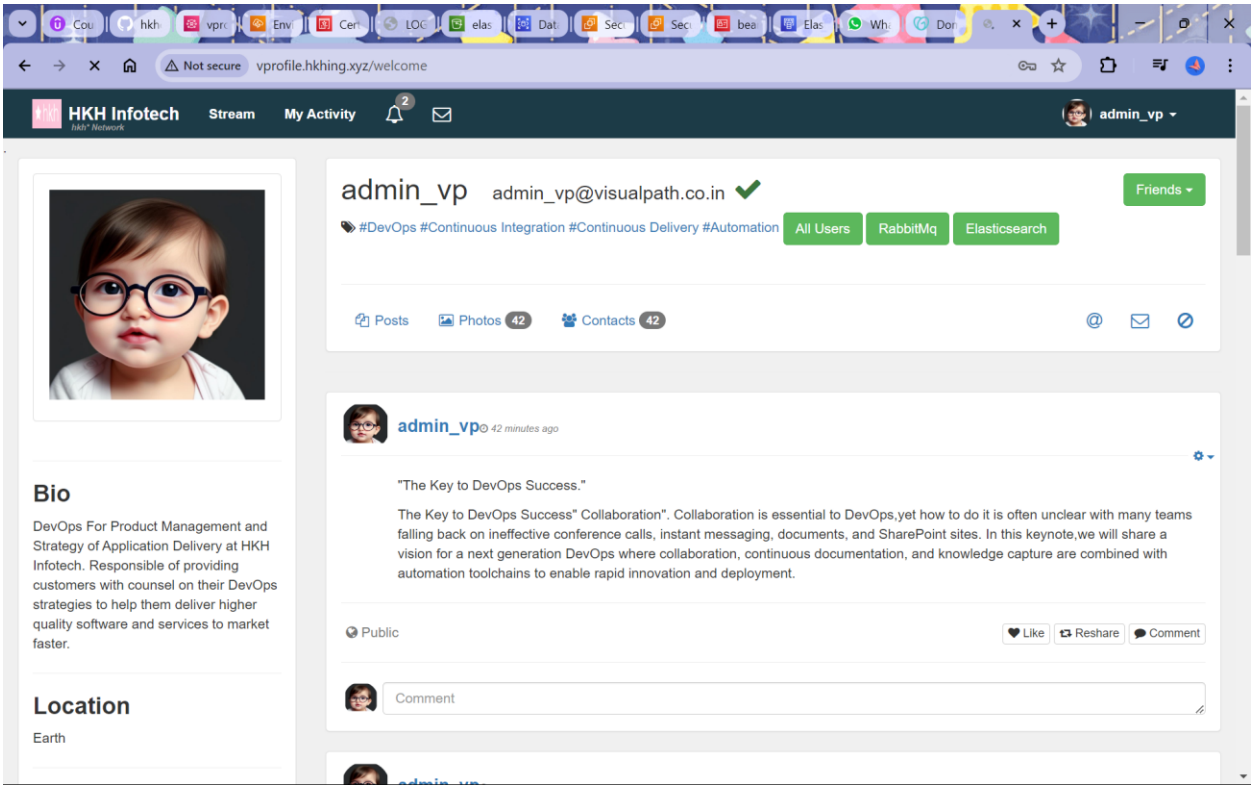

Vprofile-project-bs-prod Info
Environment overview
Health
Ok - View causes
Domain
vprof-aditi.ap-southeast-1.elasticbeanstalk.com

Go to domain :


Not secure
vprof-aditi.ap-southeast-1.elasticbeanstalk.com/login
HKH Infotech
TECHNOLOGIES
ABOUT
BLOG
LOGIN
SIGN UP
WELCOME!
HKH Infotech
Username
Password
LOGIN
SIGN UP

Let us access via deployment using GoDaddy





Rabbitmq initiated

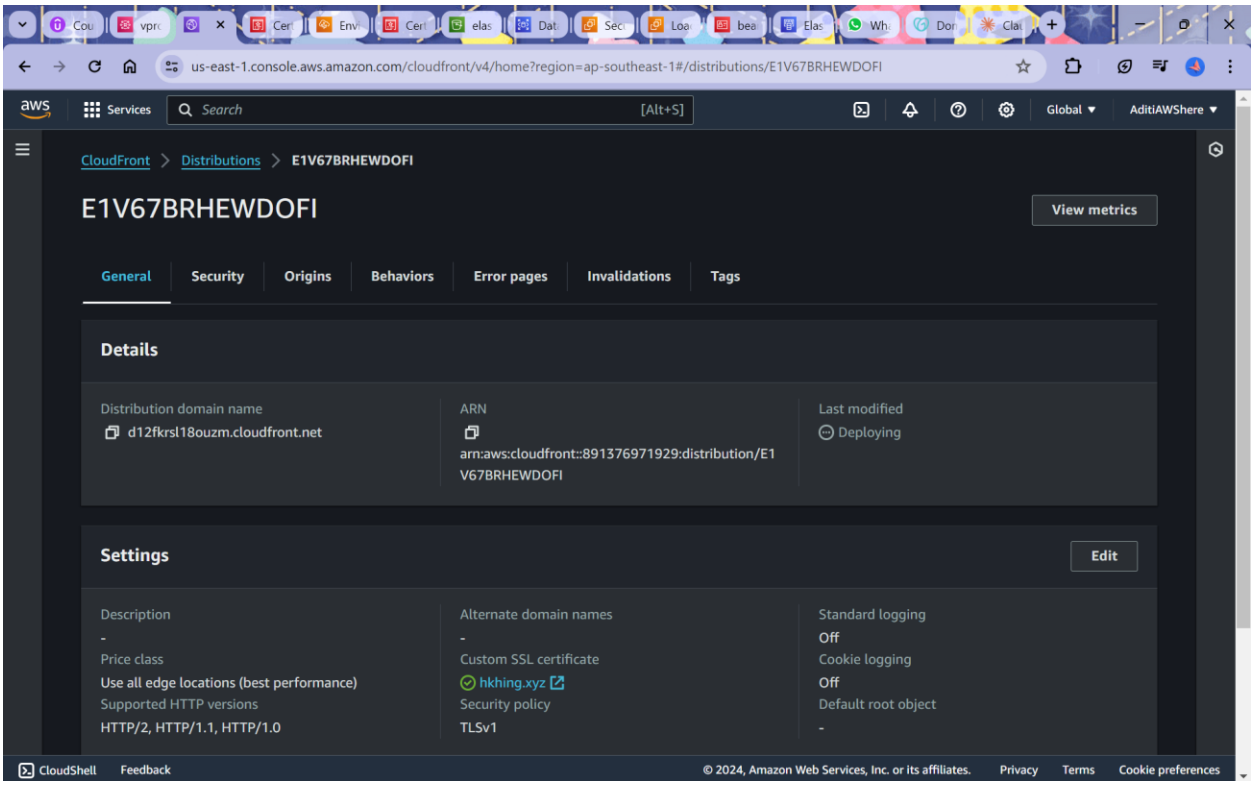
Generated 2 Connections

6 Chanels 1 Exchage and 2 Que

Deployment is successful!!!!!!!!!!!

Let us explore CLOUD FRONT.

Cloud Front is Content Delivery network of AWS



☐	CNAME	vprofileaditi	d12fkrsl18ouzm.cloudfront.net.	1 Hour		

_e83d97122eee7f9cba8ed3980d