Vivekanand Education Society's Institute of Technology, Chembur, Mumbai,

Department of Technology,

Year: 2024-2025(ODD SEM)

Advance DevOps Practical Examination

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Roll No: 34 **Date of exam: 24/10/2024**

Alternative Case Study: Deploying Mini-project on AWS.
Aim: Deployment of mini-project on AWS using Elastic Beanstalk service.
Theory:

AWS Elastic Beanstalk

AWS Elastic Beanstalk is a fully managed service that simplifies the deployment, scaling, and management of web applications and services. It allows developers to upload their application code, and Elastic Beanstalk automatically handles the deployment—from capacity provisioning, load balancing, and auto-scaling to application health monitoring—without the need for deep infrastructure expertise.

How AWS Elastic Beanstalk Works:

1. **Application Upload**: The user uploads their application code, either as a ZIP file or a container image (in case of Docker).
2. **Platform Selection**: The user selects the appropriate platform (e.g., Node.js, Python) for their application.
3. **Environment Creation**: Elastic Beanstalk creates an environment (a collection of AWS resources) based on the uploaded application, platform, and configurations. This includes EC2 instances, security groups, and a load balancer.

4. **Automated Management**: Elastic Beanstalk automatically handles environment provisioning, scaling, and application deployment. It also monitors resource health and makes adjustments if needed.

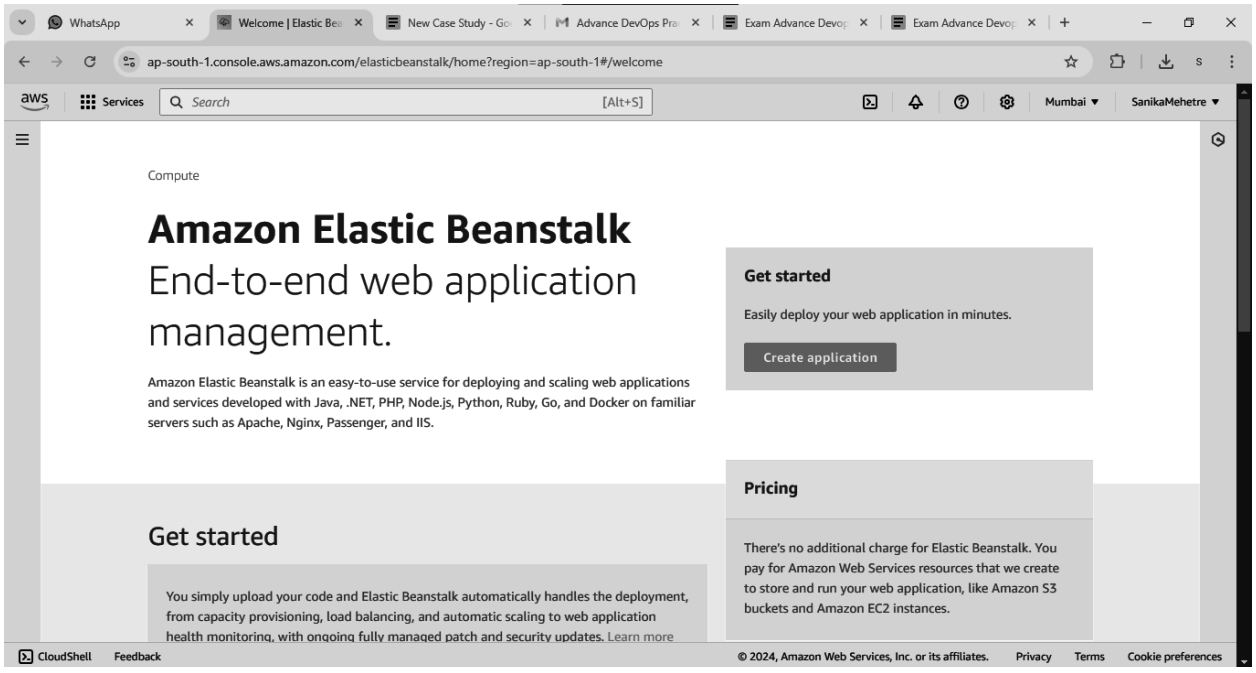
Implementation:

1. **Set up Elastic Beanstalk**:
    - Go to AWS Elastic Beanstalk and create a new application.
    - Choose Node.js as the platform for your backend.
2. **Environment Configuration**:
    - Upload your backend code (Express server).
    - Add environment properties like `NODE_ENV`, `DB_URI`, and `PORT`.
3. **Frontend (React)**:
    - Build the React app (`npm run build`).
    - Serve the frontend via your backend or deploy it separately using AWS S3 (if needed).
4. **Deployment**:
    - Deploy and monitor through Elastic Beanstalk.

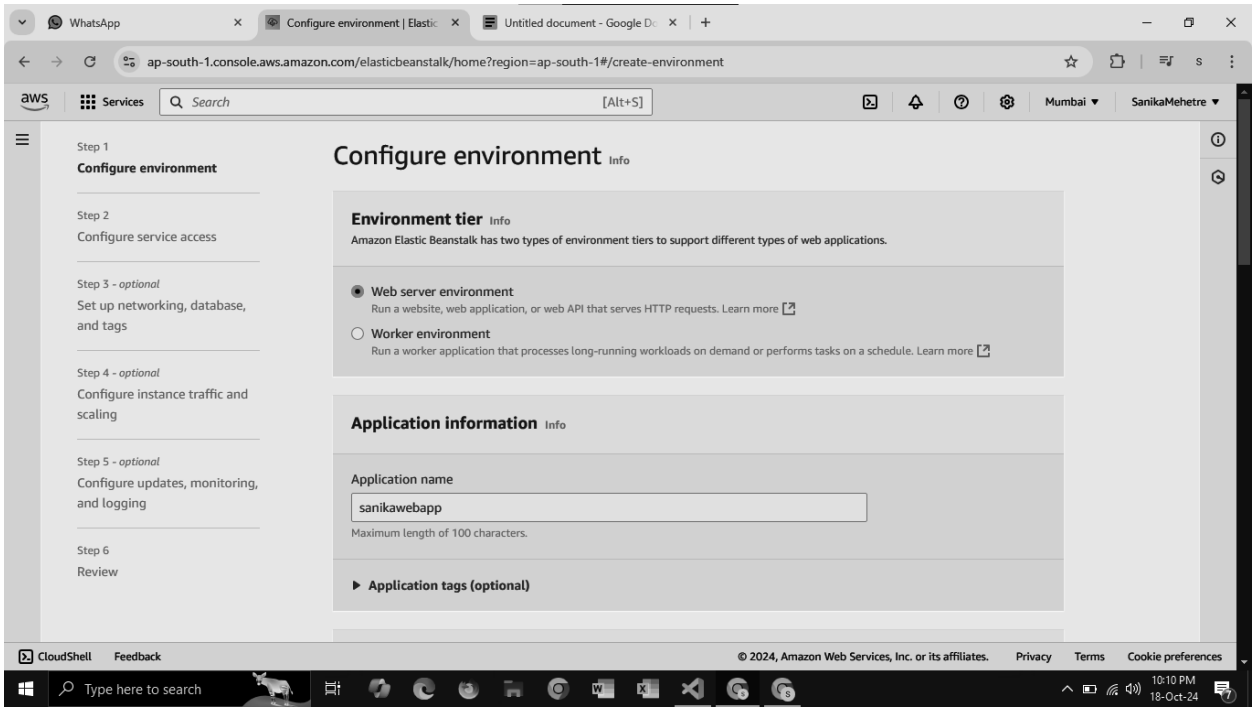
Steps:

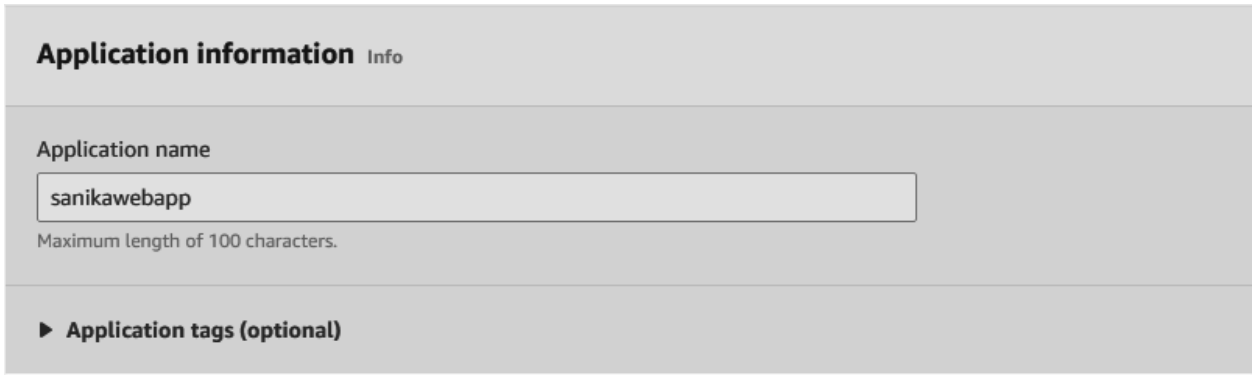
Step 1: Set up Elastic Beanstalk

- Open AWS Management Console.
- Navigate to Elastic Beanstalk and click on “Create application”.

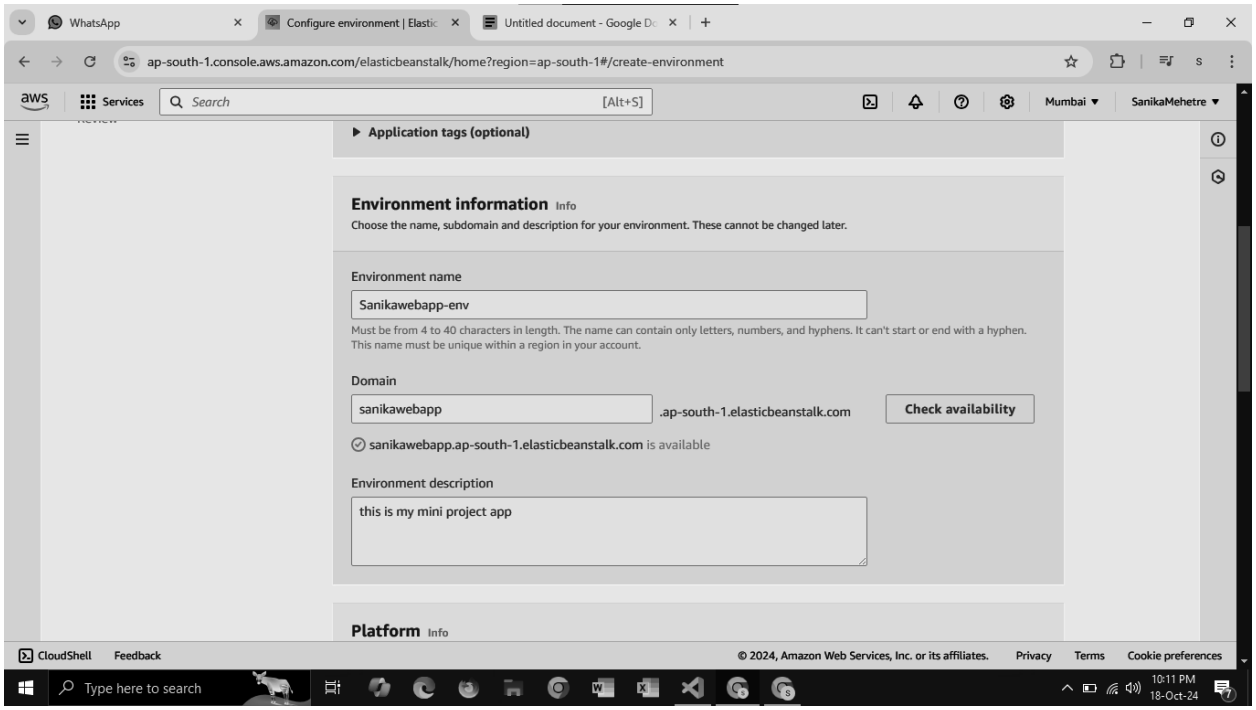


- Then choose the options as shown below and Enter the “Application name” as per your choice.
- Here I’ve named it “sanikawebapp”.

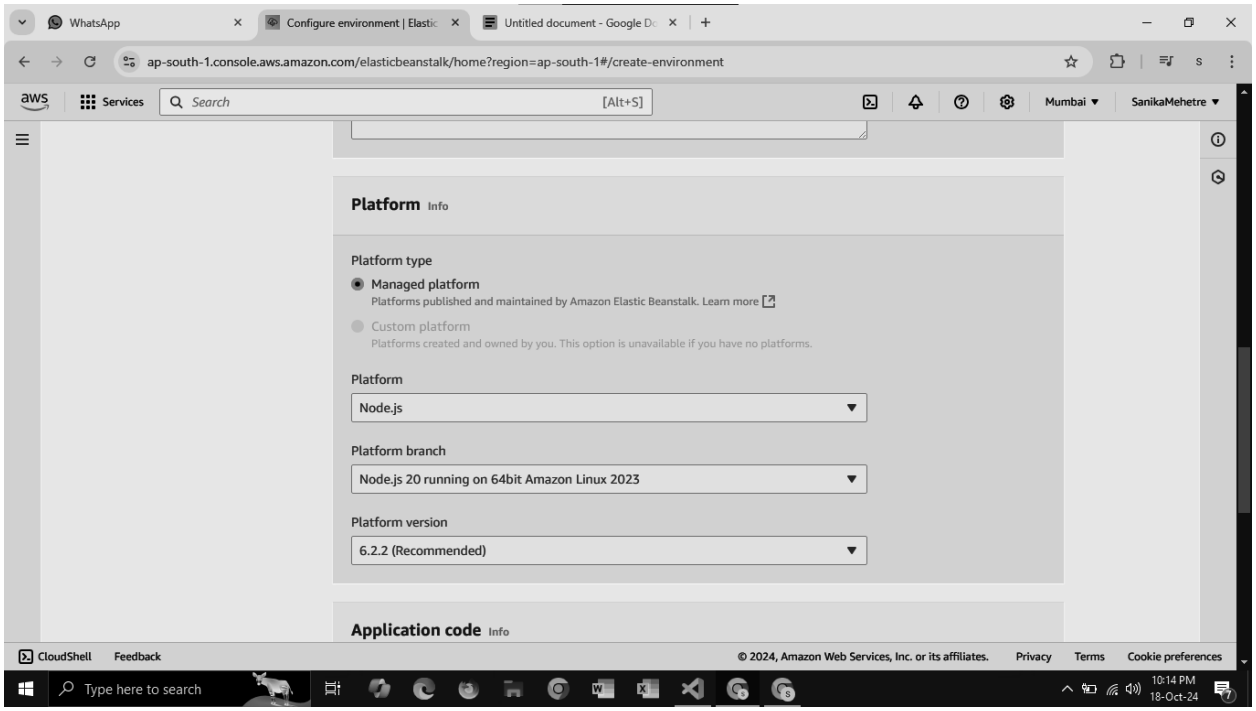




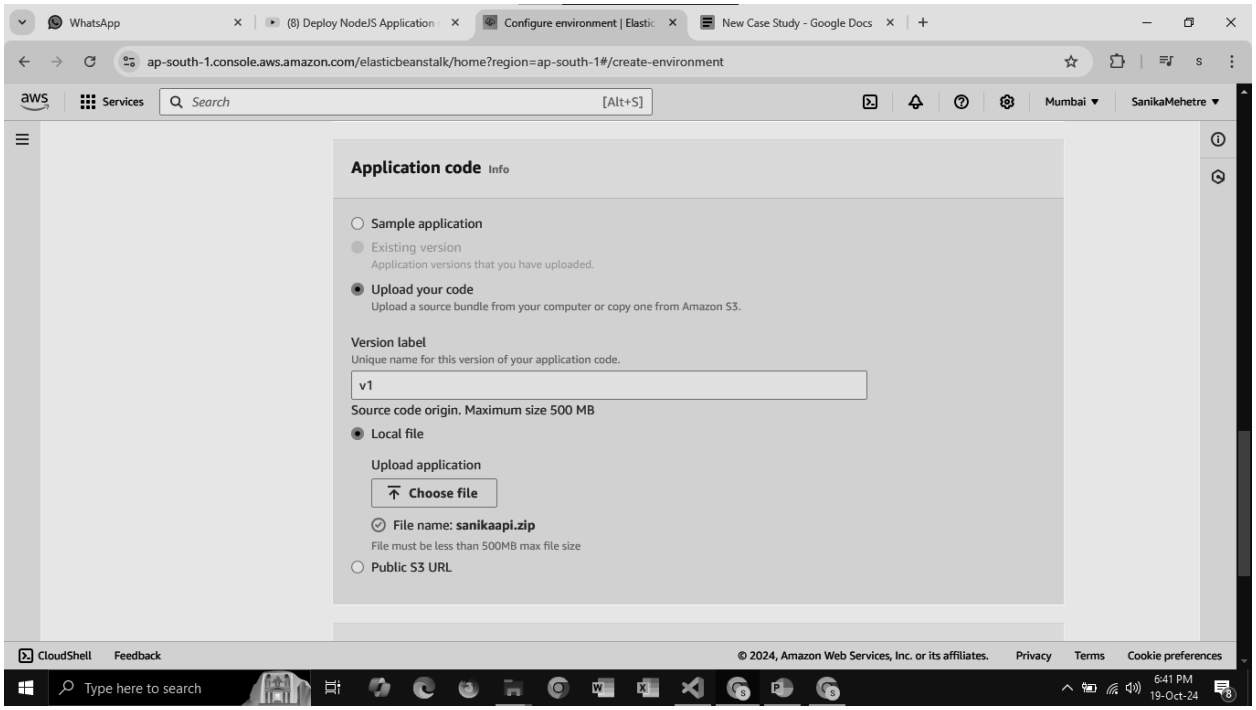
- The environment name is selected by default.
- You can choose the “domain name” as per your choice and check its availability.
- Here I’ve named it as “sanikawebapp” and add the description if you want.



- Select the “Platform” settings very carefully as it will vary for different projects.
- My project is made using MERN stack so I’ve selected “Node.js”.
- You can select the platform depending on your project.



- Leave the others settings as default.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(8) Deploy NodeJS Application
Configure environment | Elastic
New Case Study - Google Docs
ap-south-1.console.aws.amazon.com/elasticbeanstalk/home?region=ap-south-1#/create-environment
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Application code Info
Sample application
Existing version
Application versions that you have uploaded.
Upload your code
Upload a source bundle from your computer or copy one from Amazon S3.
Version label
Unique name for this version of your application code.
v1
Source code origin. Maximum size 500 MB
Local file
Upload application
Choose file
File name: sanikaapi.zip
File must be less than 500MB max file size
Public S3 URL
CloudShell
Feedback
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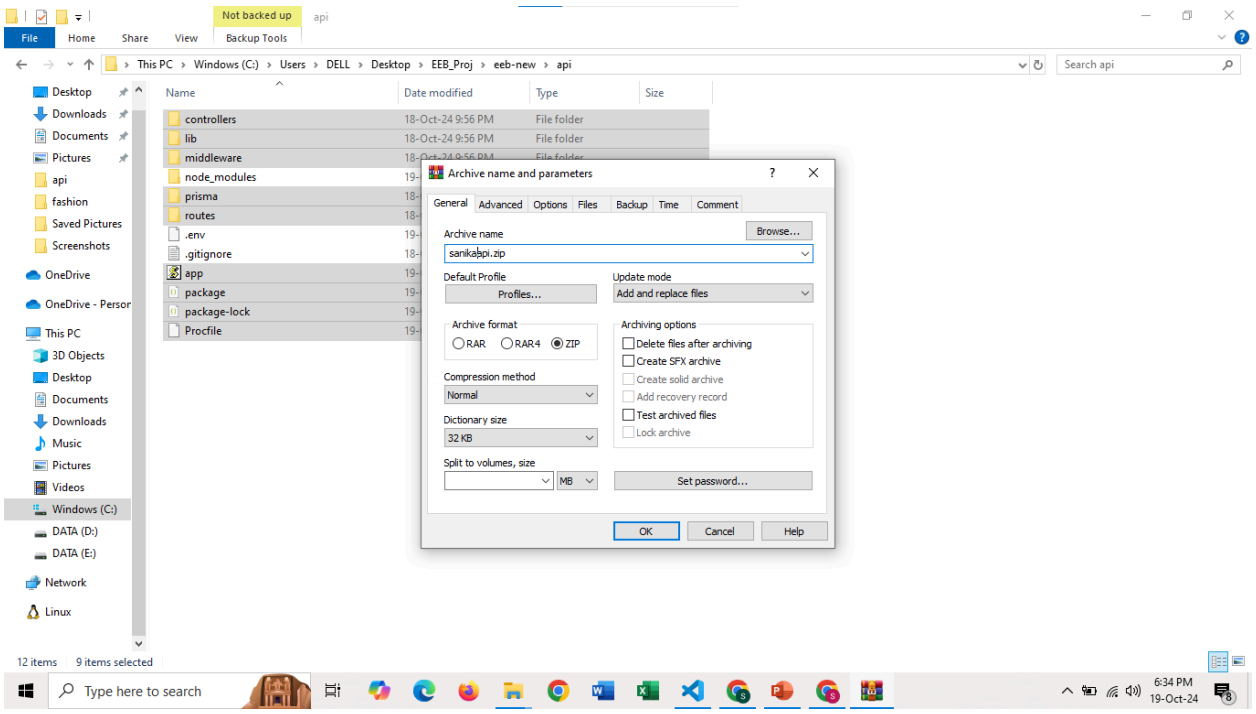
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middleware
node_modules
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package
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File folder
Archive name and parameters
General
Advanced
Options
Files
Backup
Time
Comment
Archive name
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Browse...
Default Profile
Profiles...
Update mode
Add and replace files
Archive format
RAR
RAR4
ZIP
Archiving options
Delete files after archiving
Create SFX archive
Create solid archive
Add recovery record
Test archived files
Lock archive
Compression method
Normal
Dictionary size
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Set password...
OK
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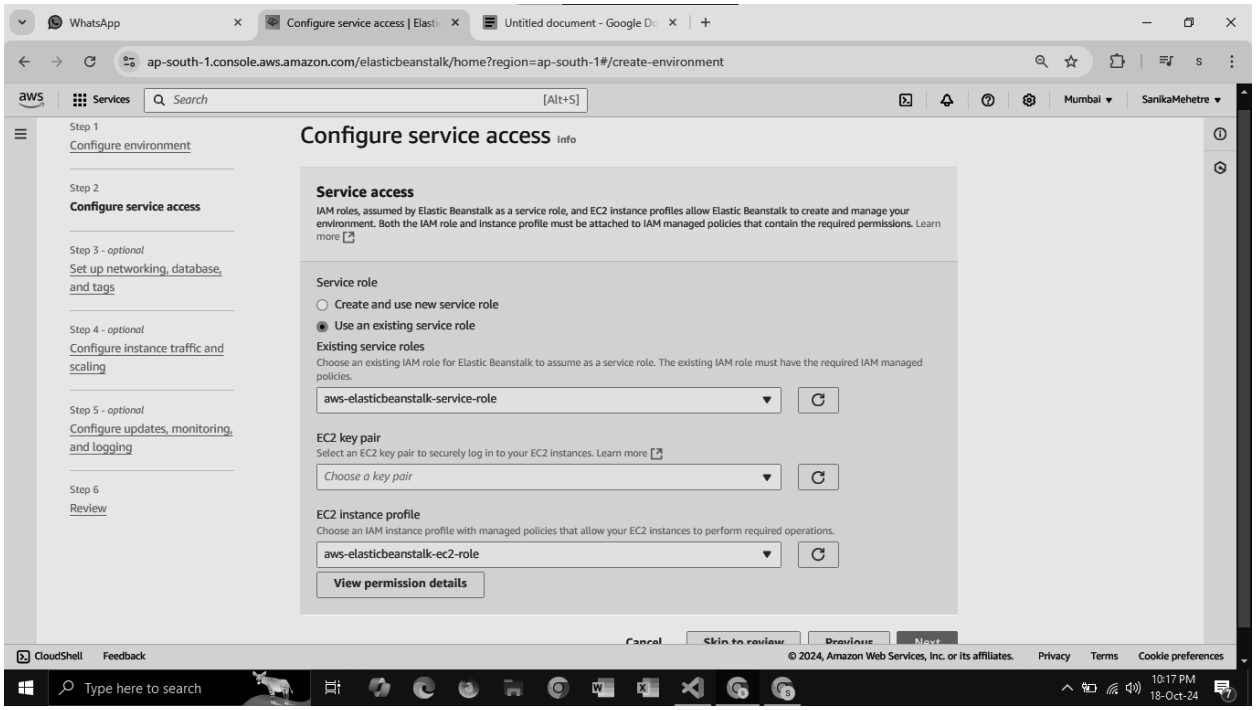
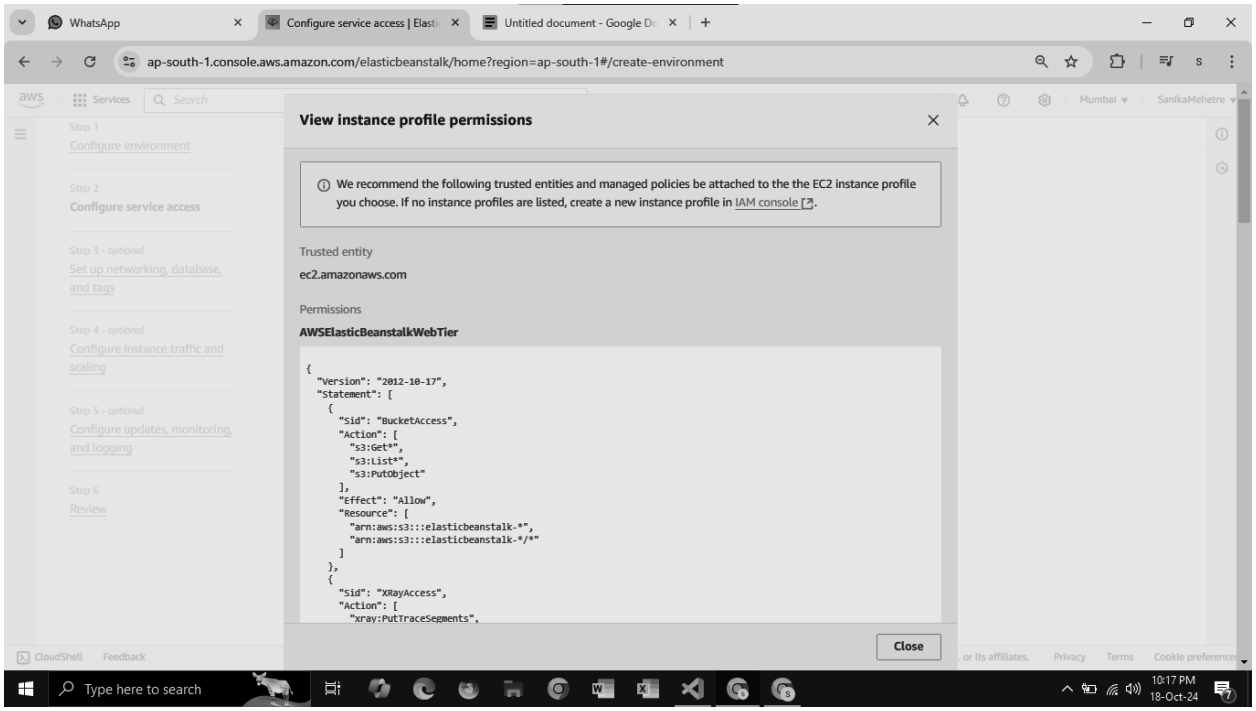
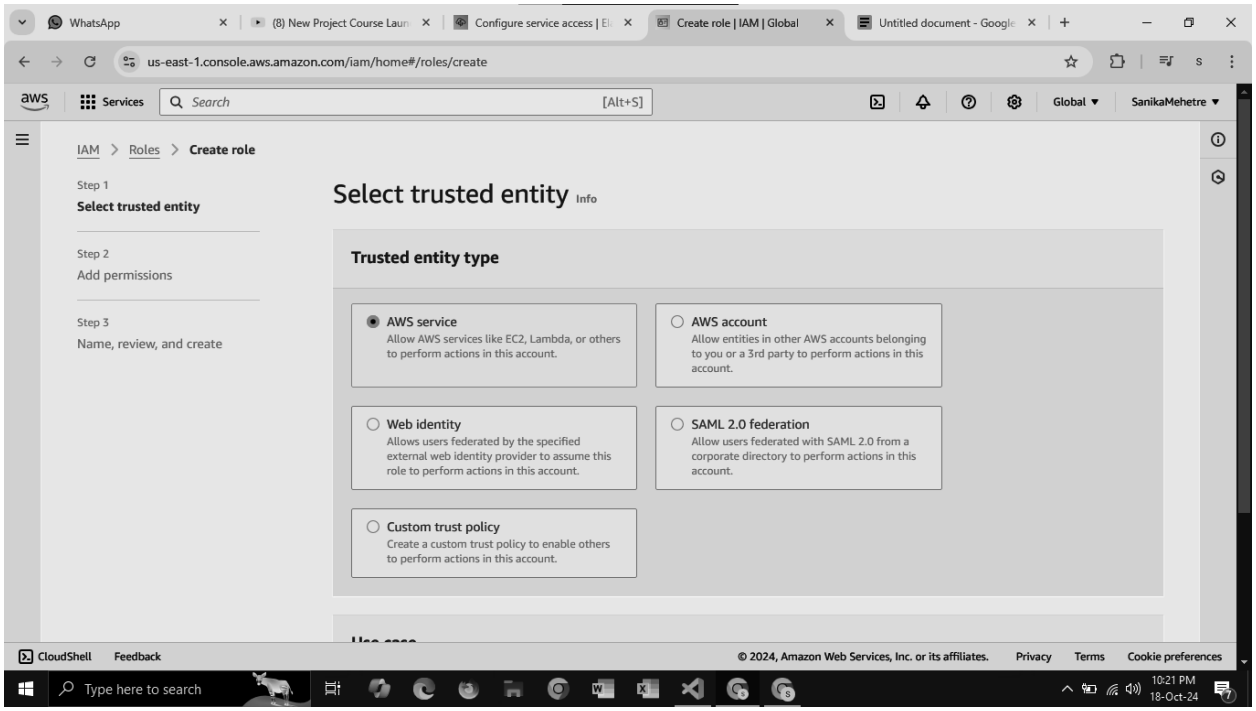


- Here we need to create a new EC2 instance profile. Click on “View permission details” and the below page will open.

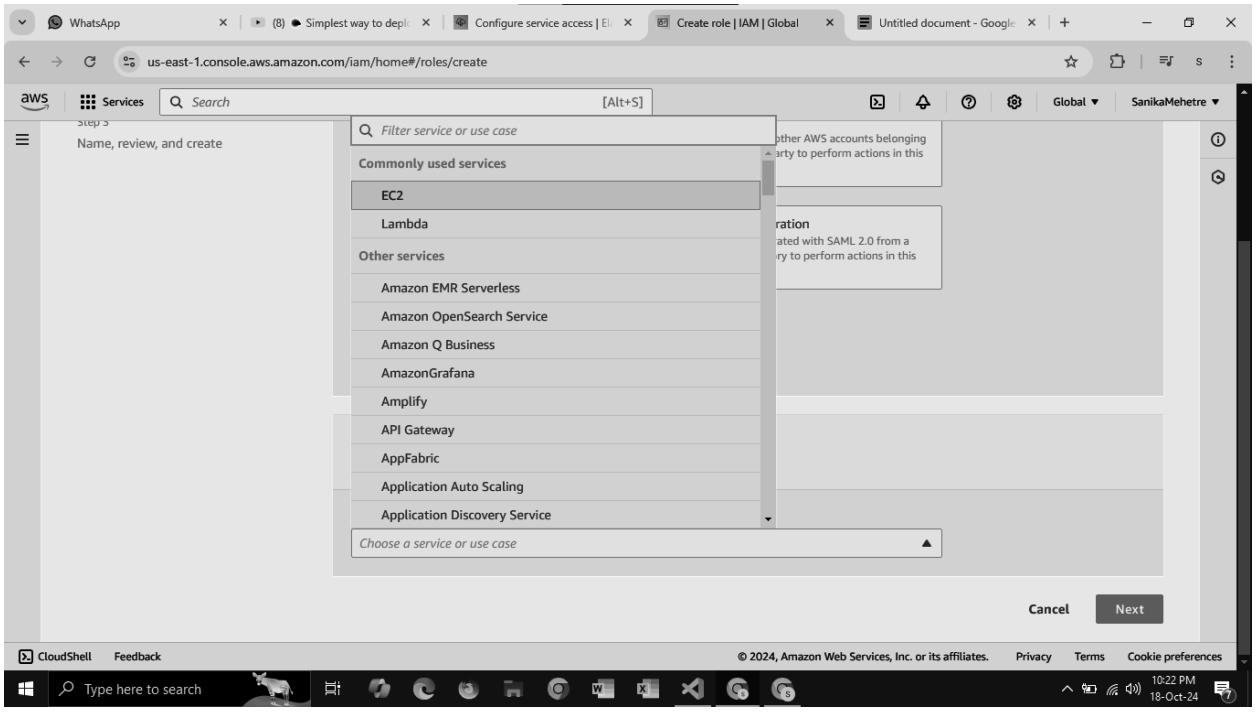


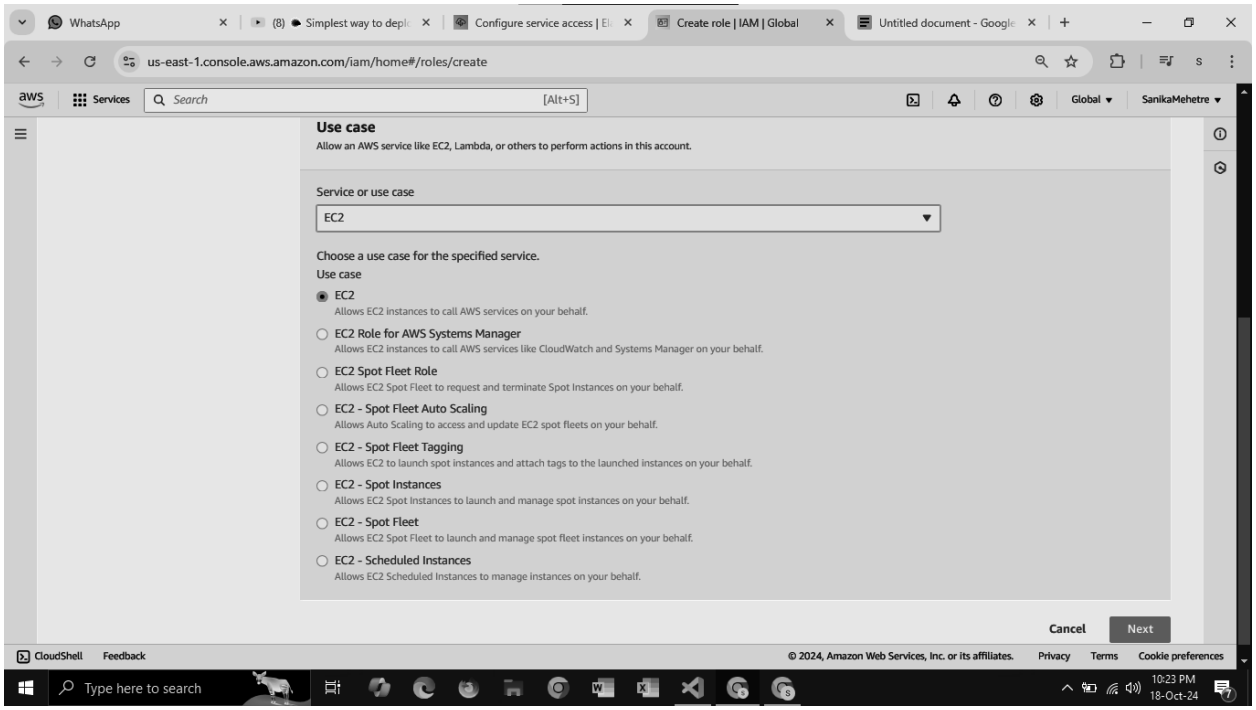
- Click on “IAM Console” and it’ll redirect to IAM Console page.

- Select “AWS Service”.

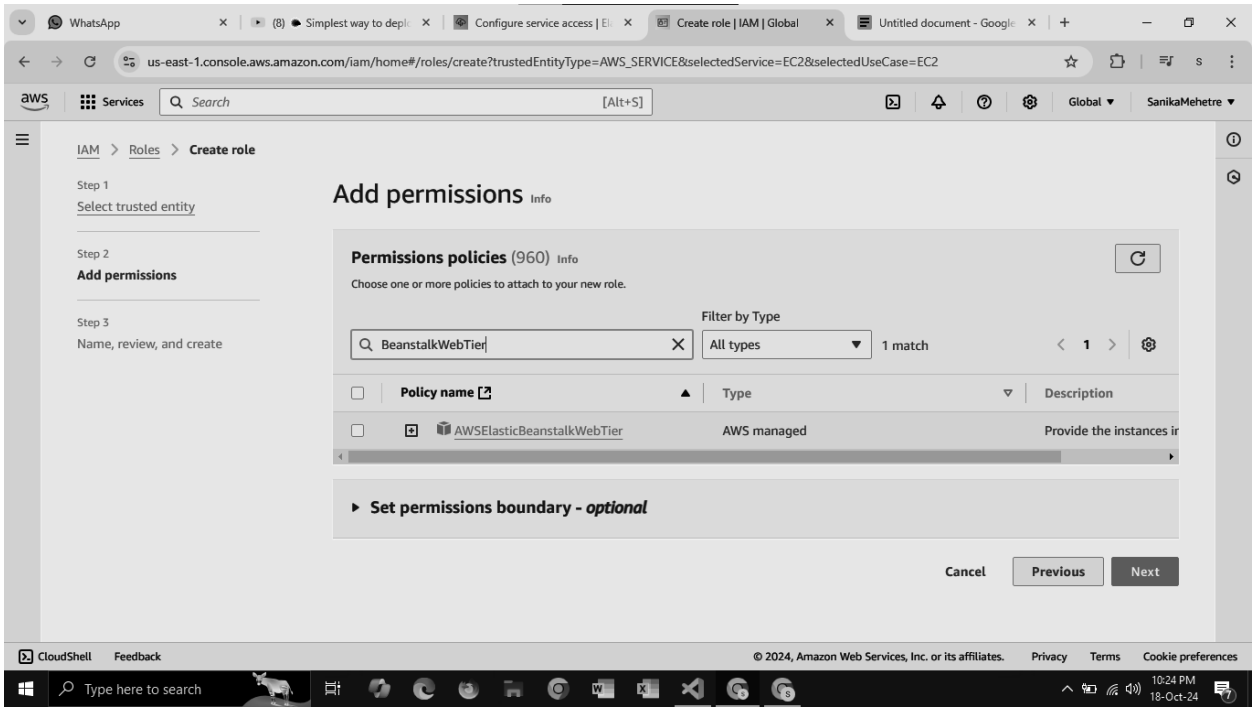


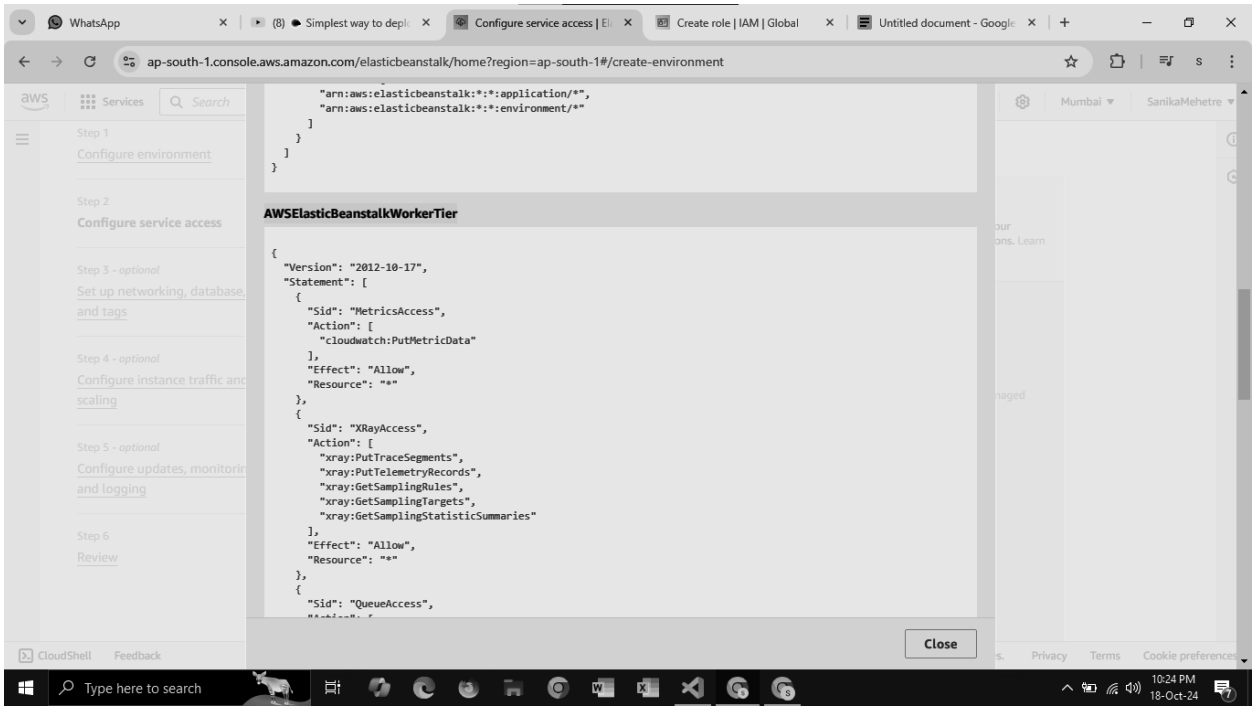
- Under “Service or Use case” select EC2.



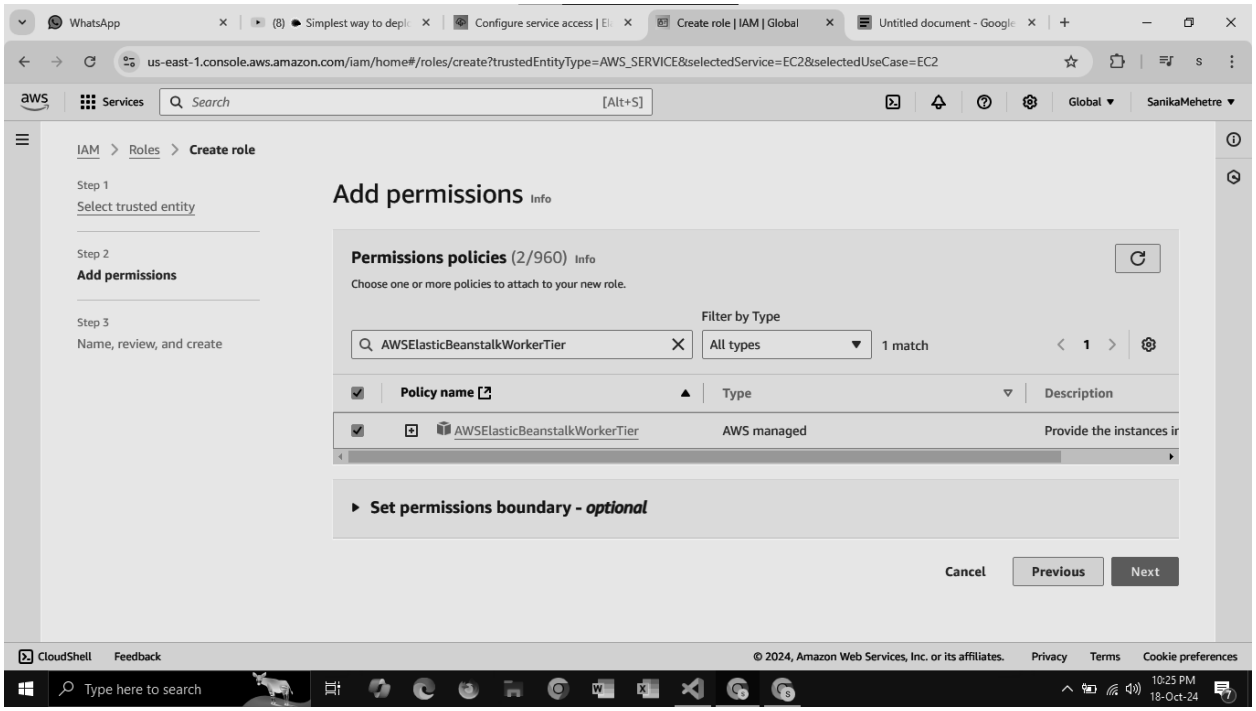


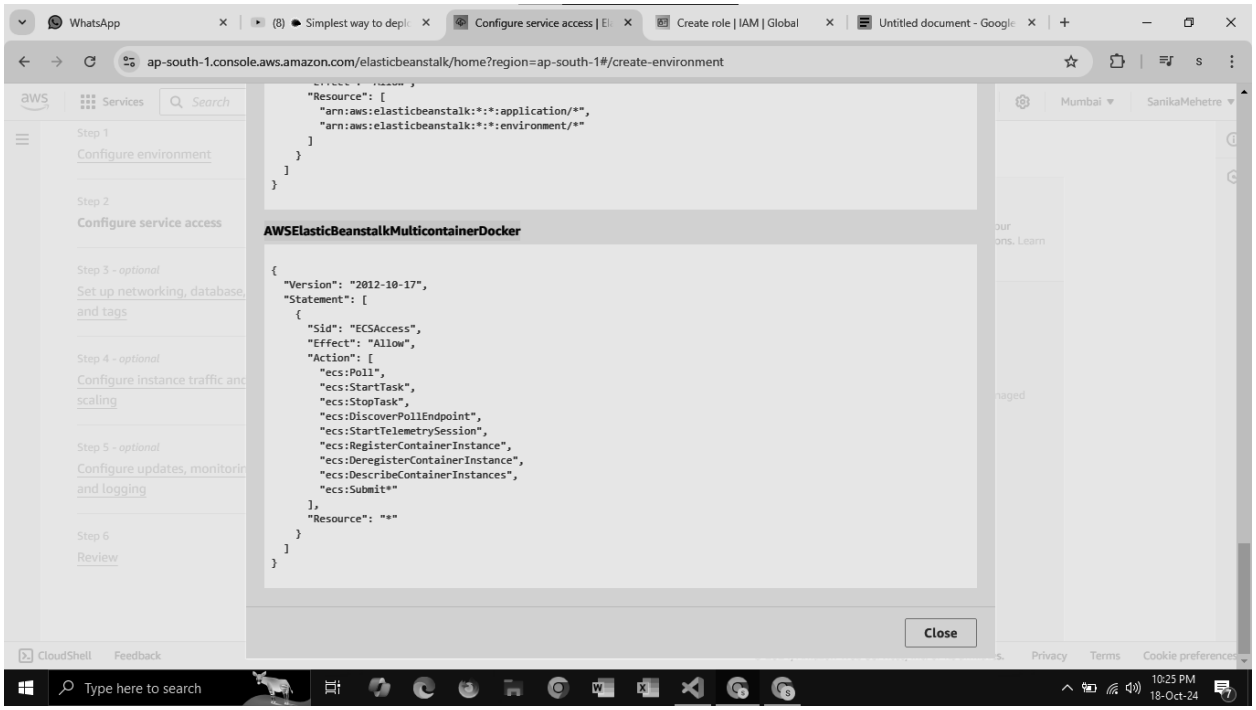
- Click on “Next”.
- Now we have to add permissions to our new role.
    1. AWSElasticBeanstalkWebTier



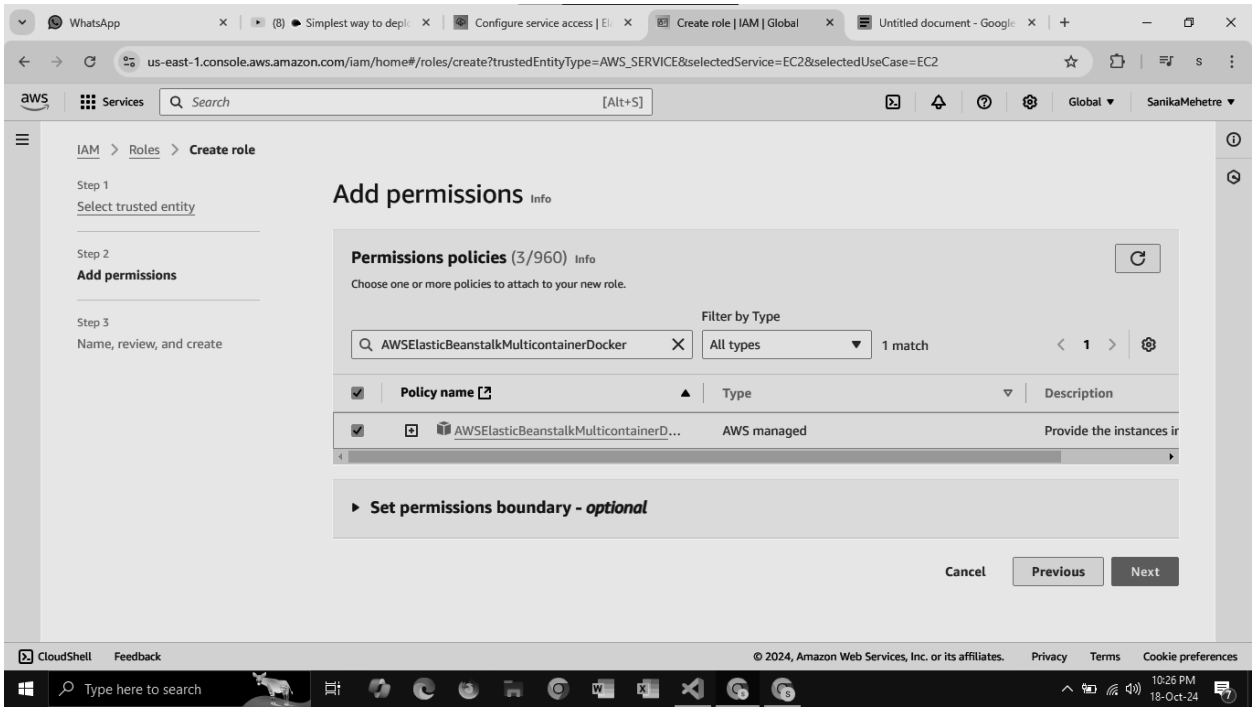


2. AWSElasticBeanstalkWorkerTier

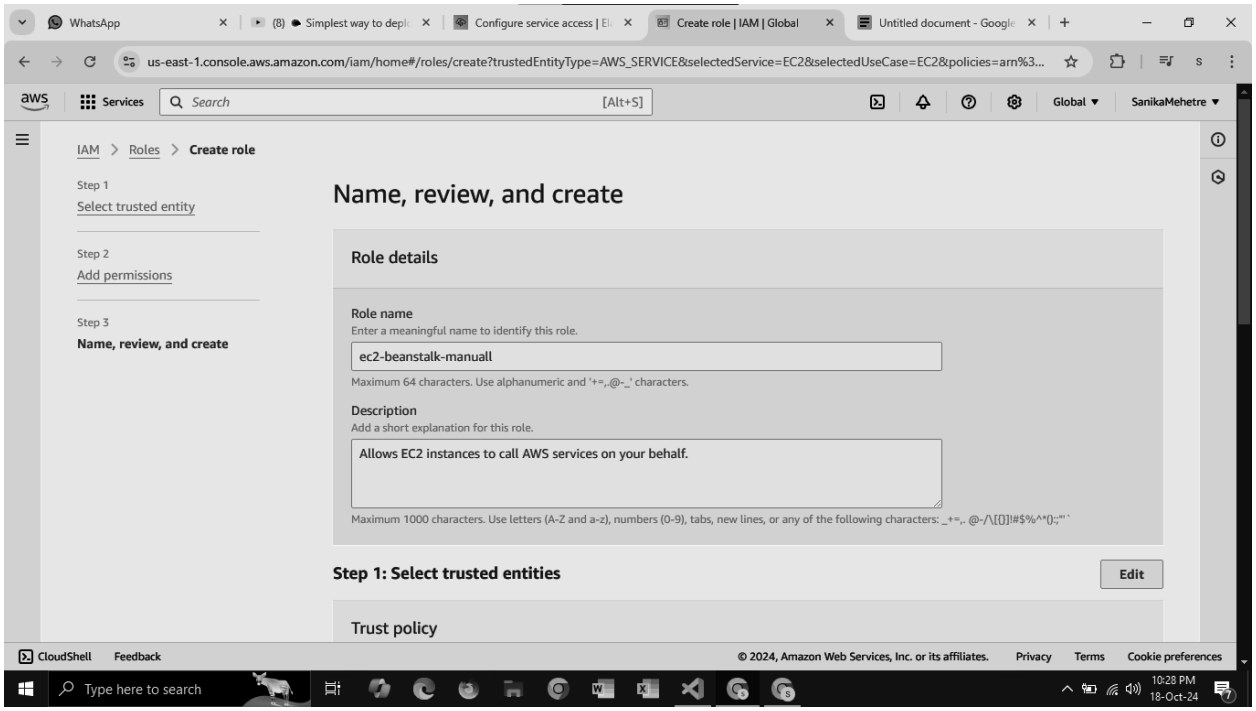


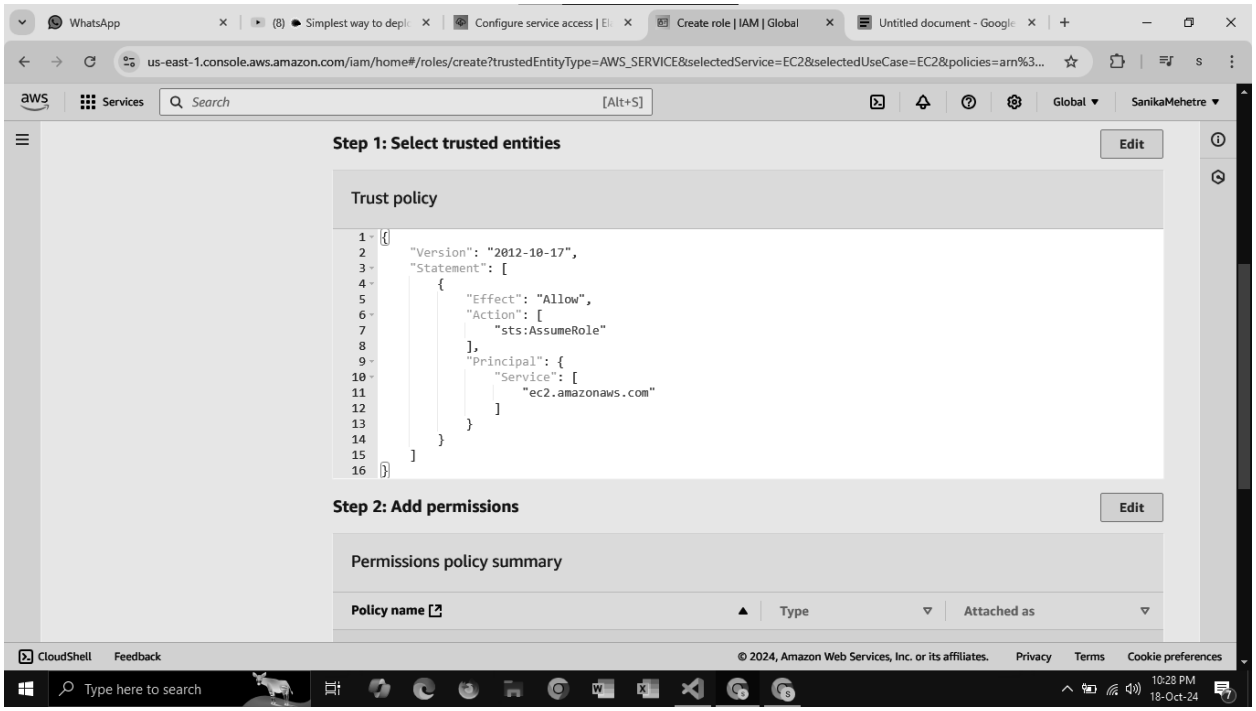


3. AWSElasticBeanstalkMulticontainerDocker

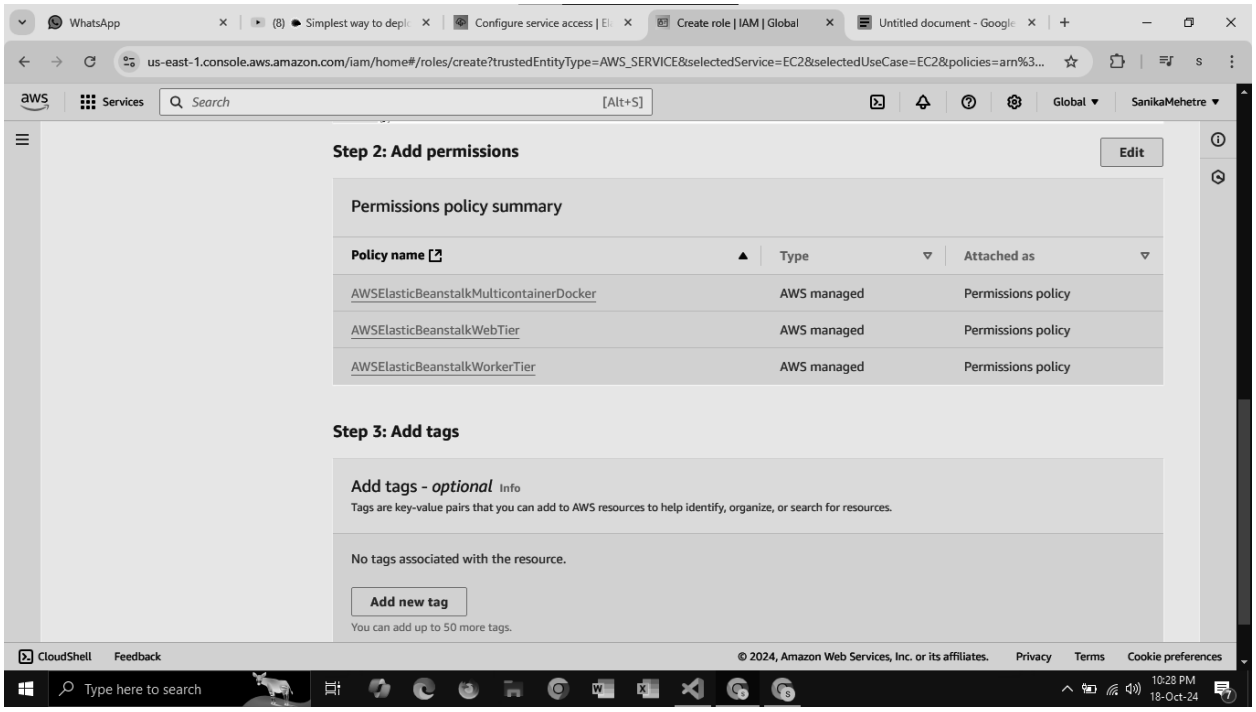


- Click on “Next”.
- Now you’ve to name your role. I have named it “ec2-beanstalk-manuall”.

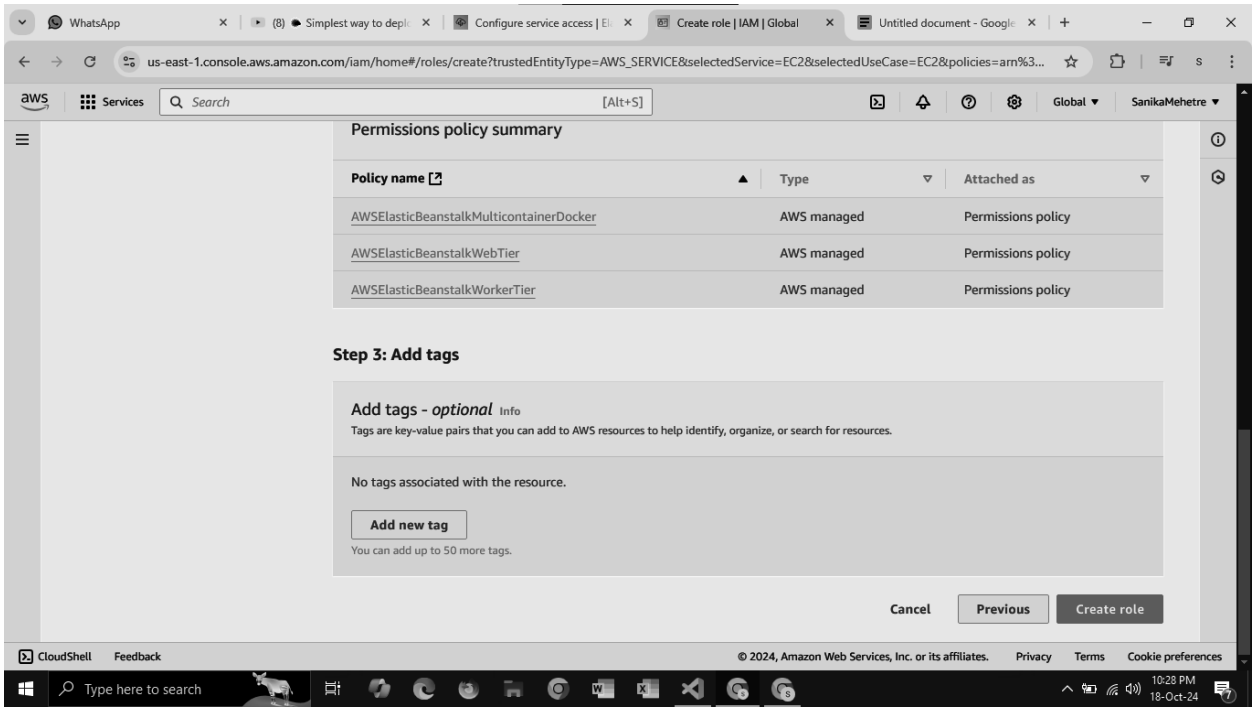




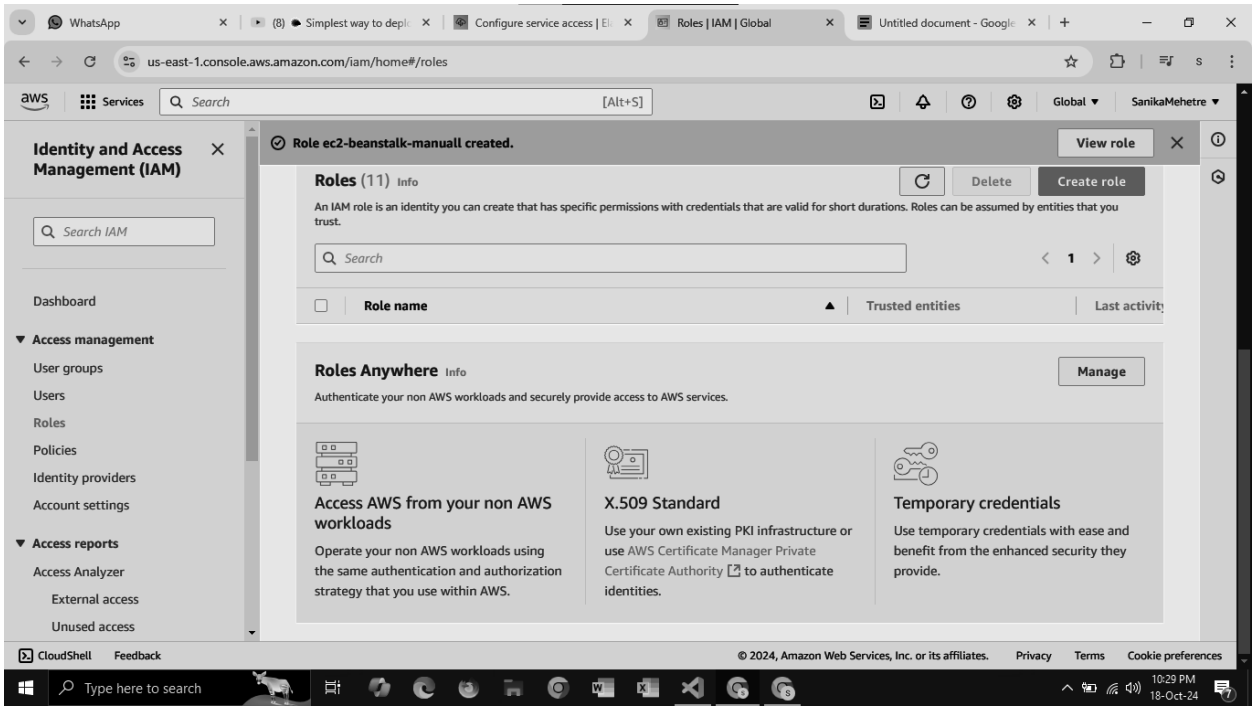
- You can see that the permissions we added are now listed here.



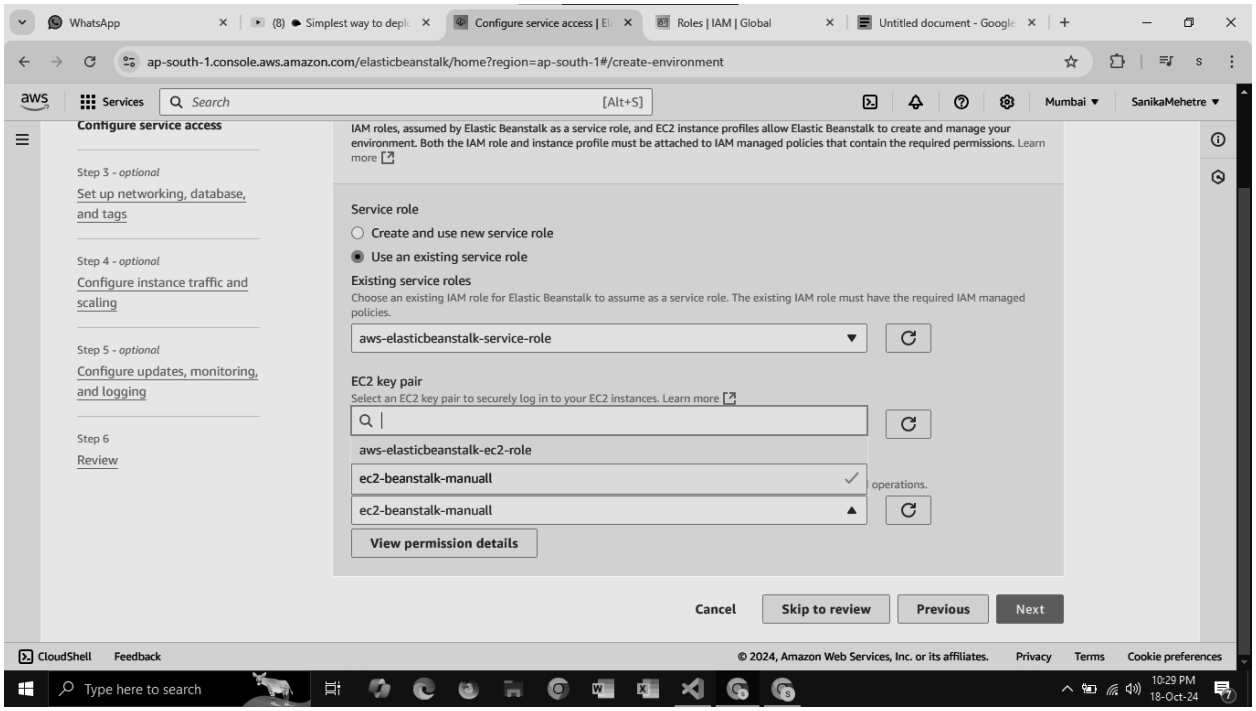
- Click on “Create Role”.



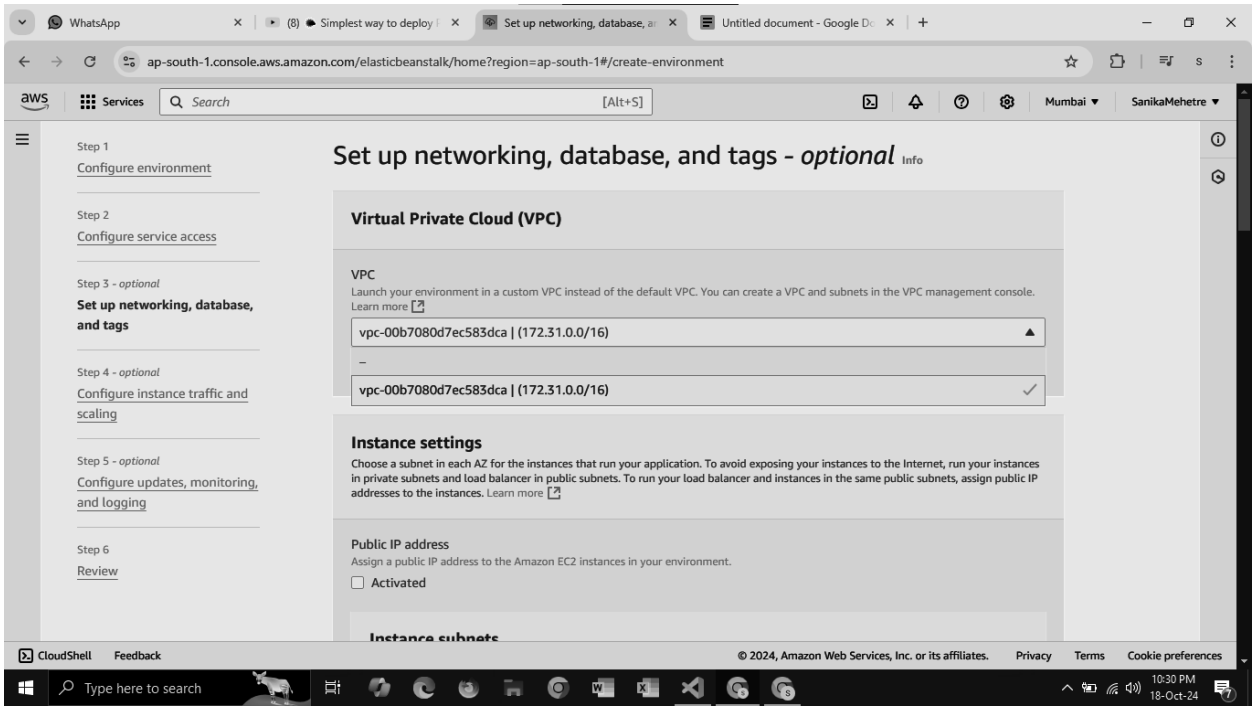
- The role as been successfully created.



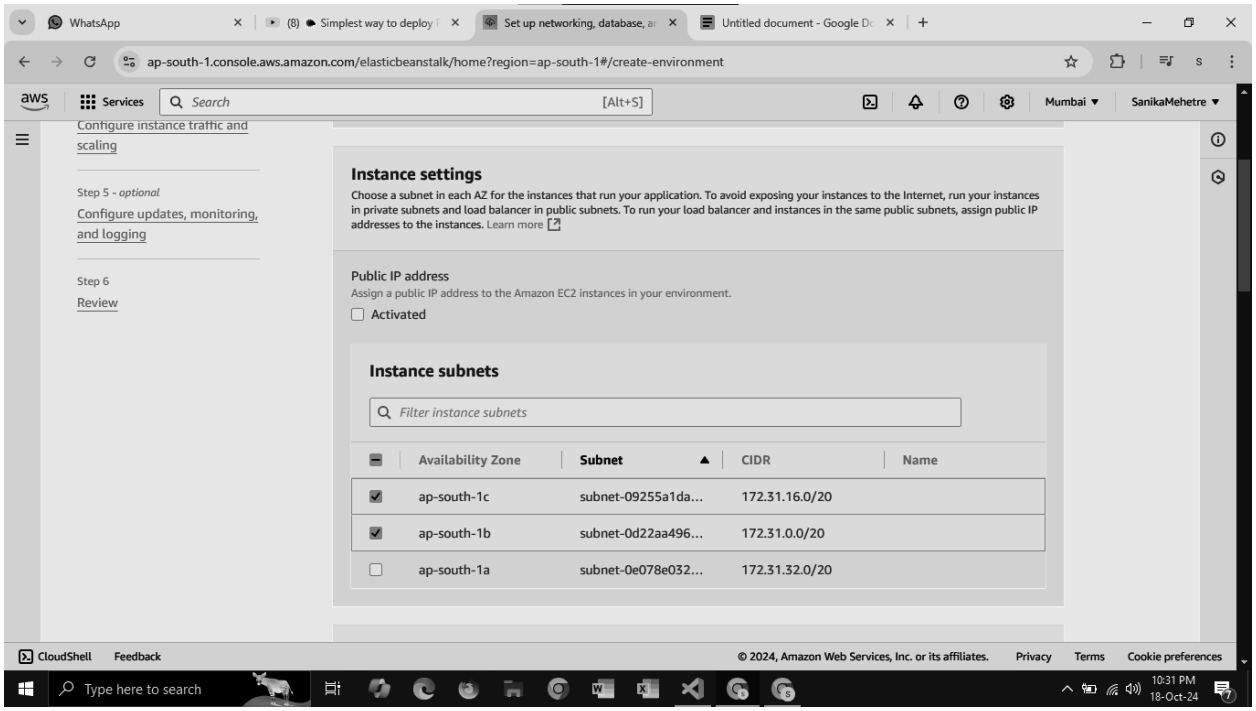
- Now navigate back to AWS Management Console.
- Refresh “EC2 Instance Profile” and now you will be able to see that our new role is listed.

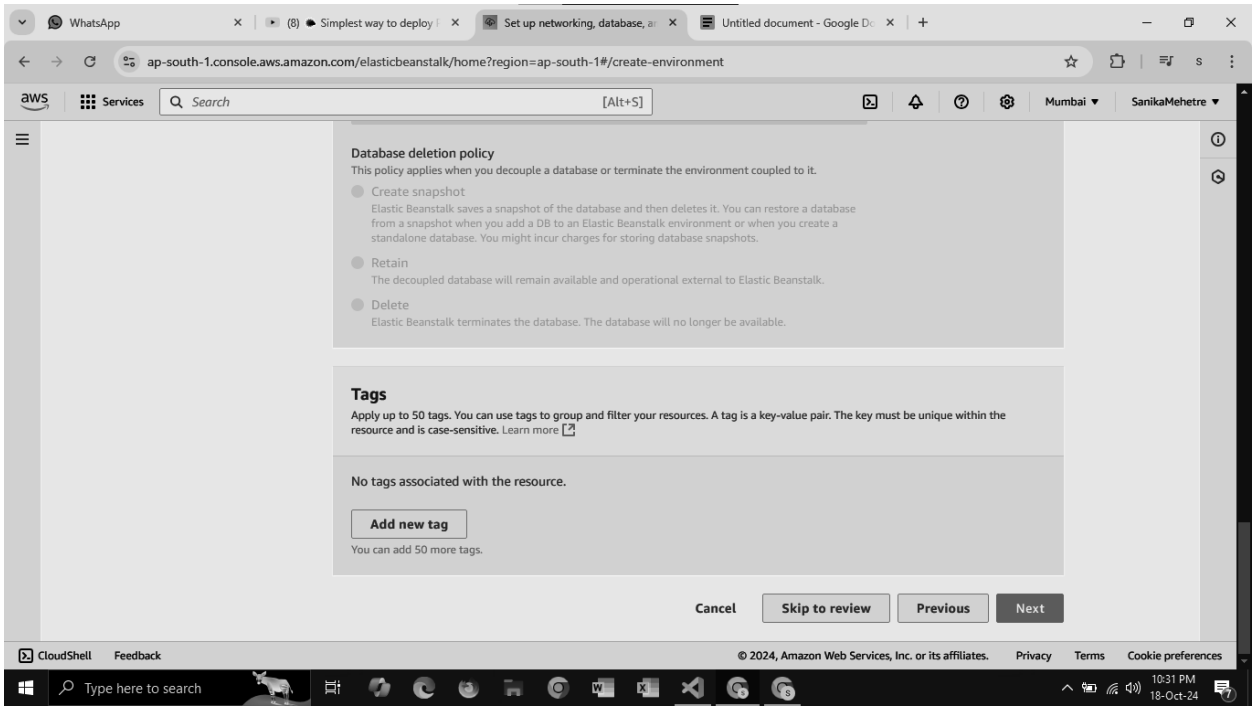


- Click on “Next”.
- Select a VPC as suggested.

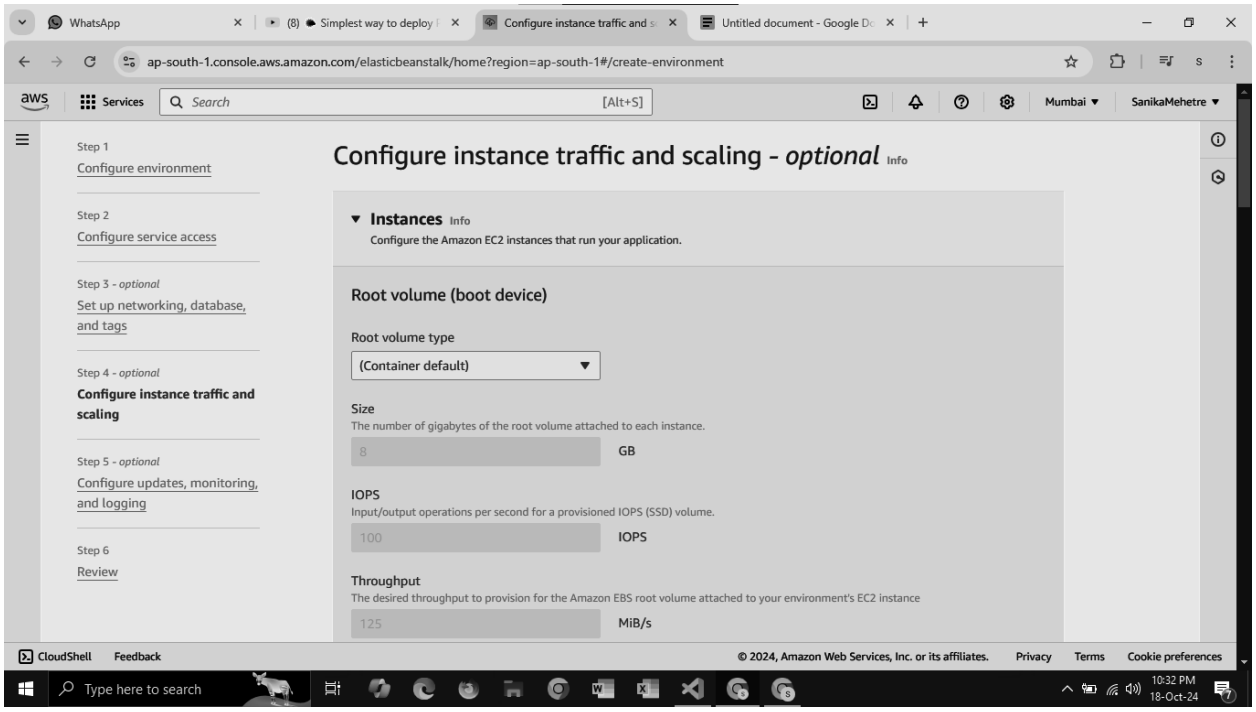


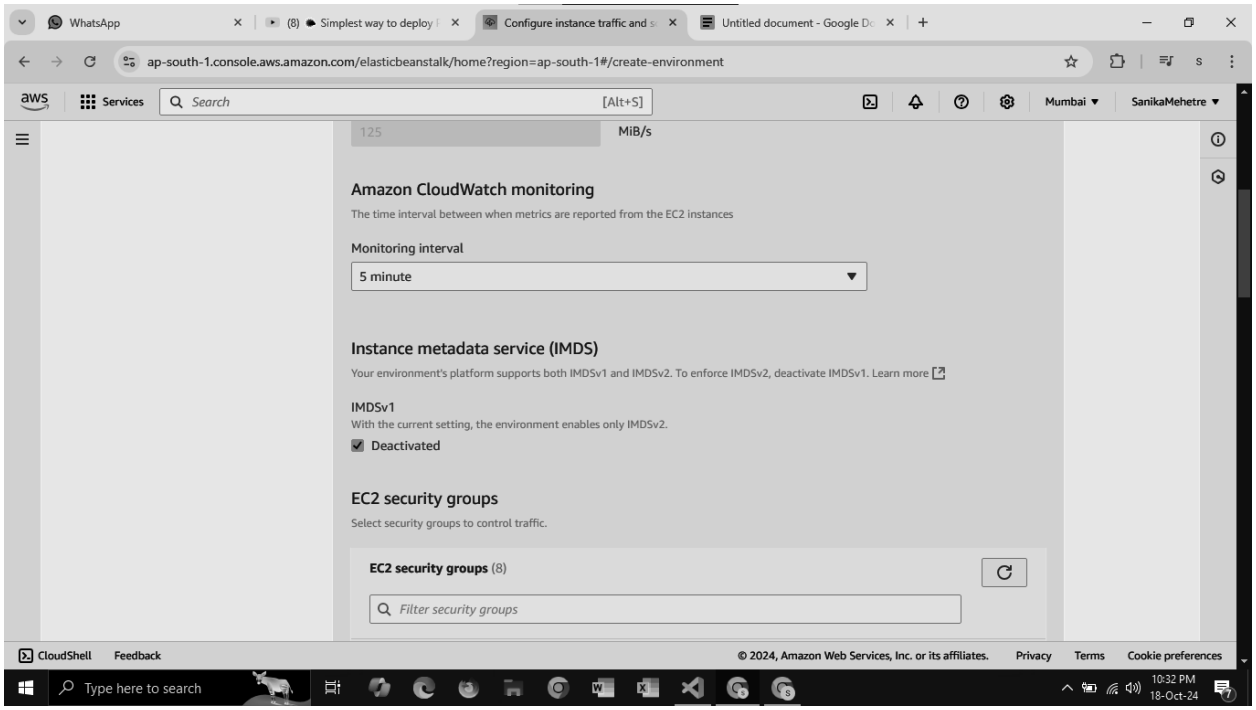
- Select the number of subnets as you wish.
- Here I have selected two subnets.



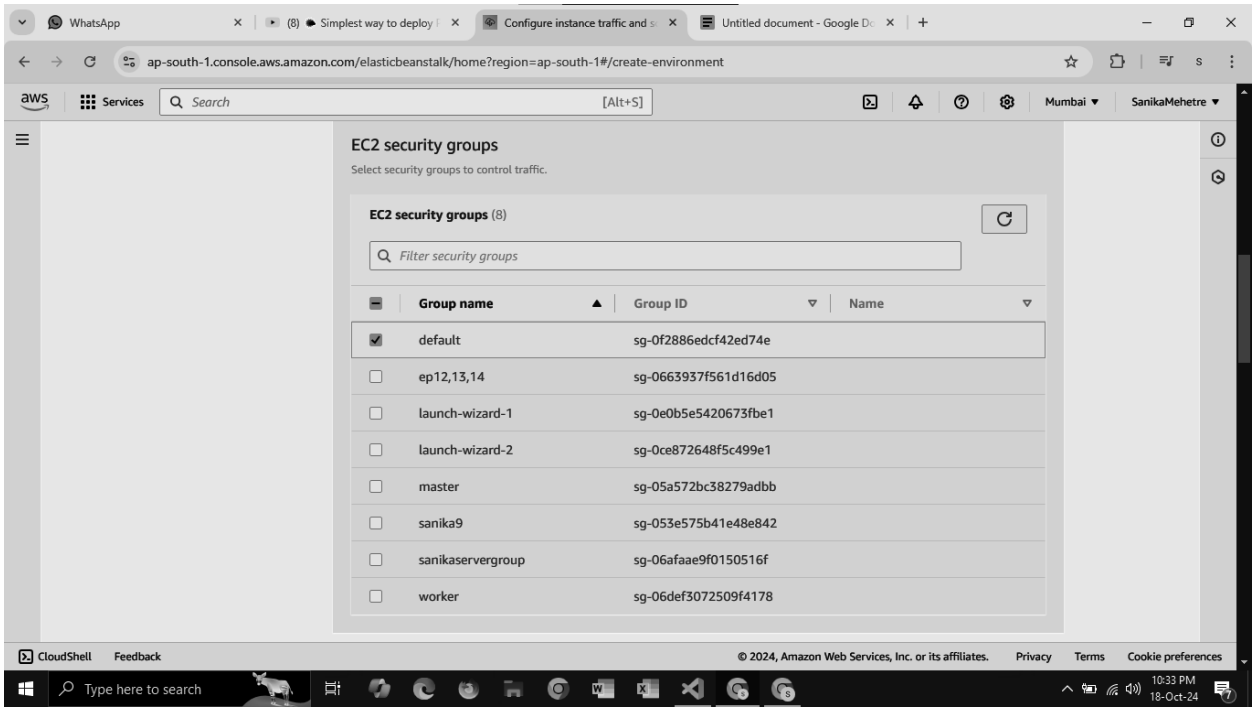


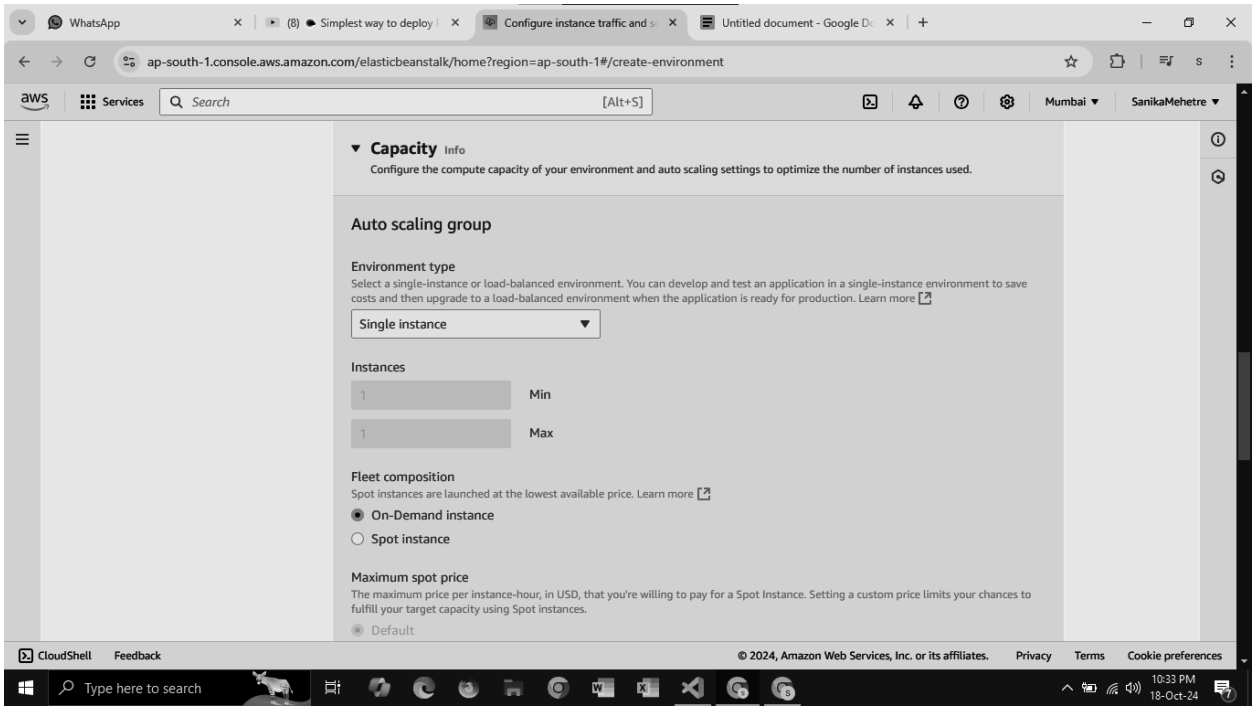
- Click on “Next”.
- Keep these settings as shown





- Select the “default” security group.

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Configure instance traffic and
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ap-south-1.console.aws.amazon.com/elasticbeanstalk/home?region=ap-south-1#/create-environment
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Capacity Info
Configure the compute capacity of your environment and auto scaling settings to optimize the number of instances used.
Auto scaling group
Environment type
Select a single-instance or load-balanced environment. You can develop and test an application in a single-instance environment to save costs and then upgrade to a load-balanced environment when the application is ready for production. Learn more
Single instance
Instances
1
Min
1
Max
Fleet composition
Spot instances are launched at the lowest available price. Learn more
On-Demand instance
Spot instance
Maximum spot price
The maximum price per instance-hour, in USD, that you're willing to pay for a Spot Instance. Setting a custom price limits your chances to fulfill your target capacity using Spot instances.
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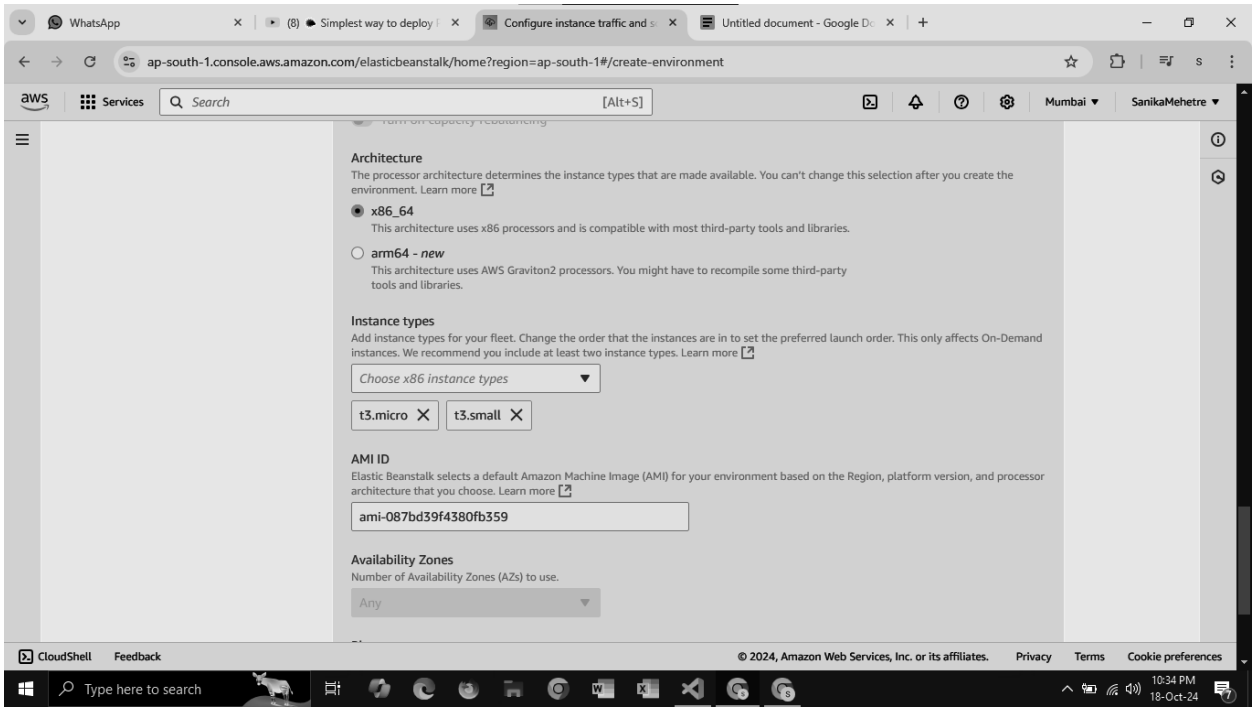
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Configure instance traffic and
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ap-south-1.console.aws.amazon.com/elasticbeanstalk/home?region=ap-south-1#/create-environment
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Architecture
The processor architecture determines the instance types that are made available. You can't change this selection after you create the environment. Learn more
x86_64
This architecture uses x86 processors and is compatible with most third-party tools and libraries.
arm64 - new
This architecture uses AWS Graviton2 processors. You might have to recompile some third-party tools and libraries.
Instance types
Add instance types for your fleet. Change the order that the instances are in to set the preferred launch order. This only affects On-Demand instances. We recommend you include at least two instance types. Learn more
Choose x86 instance types
t3.micro
t3.small
AMI ID
Elastic Beanstalk selects a default Amazon Machine Image (AMI) for your environment based on the Region, platform version, and processor architecture that you choose. Learn more
ami-087bd39f4380fb359
Availability Zones
Number of Availability Zones (AZs) to use.
Any
CloudShell
Feedback
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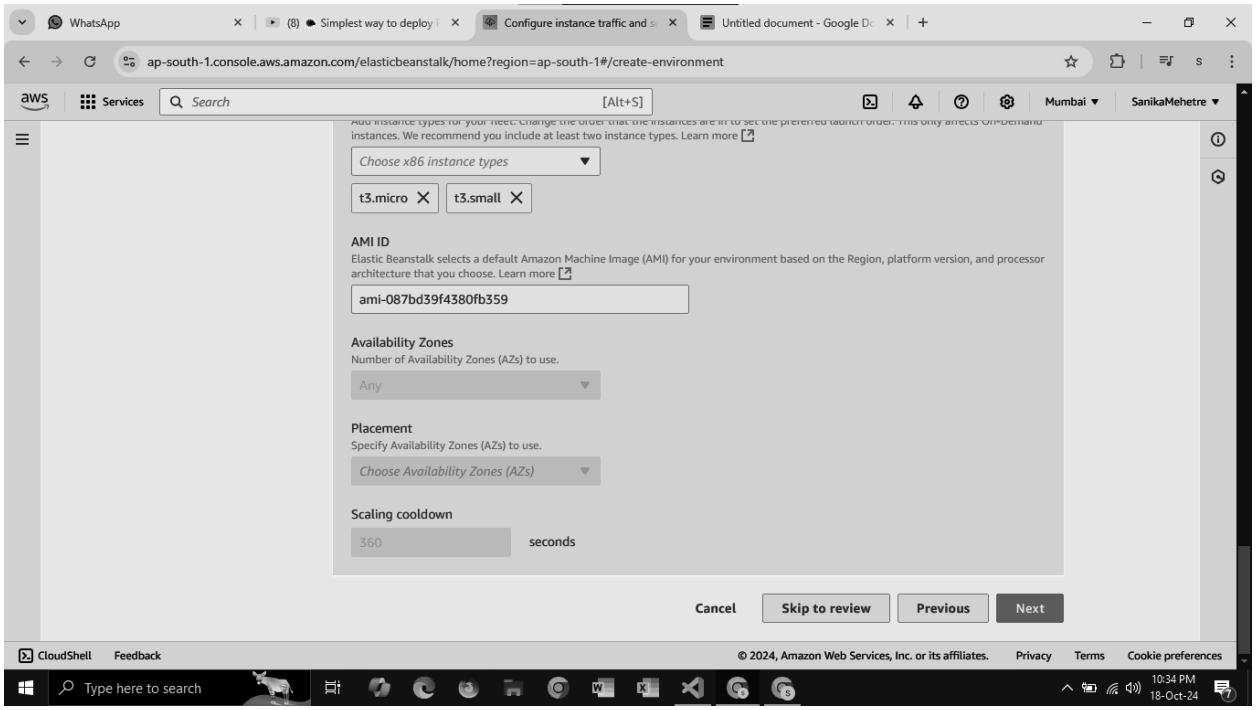
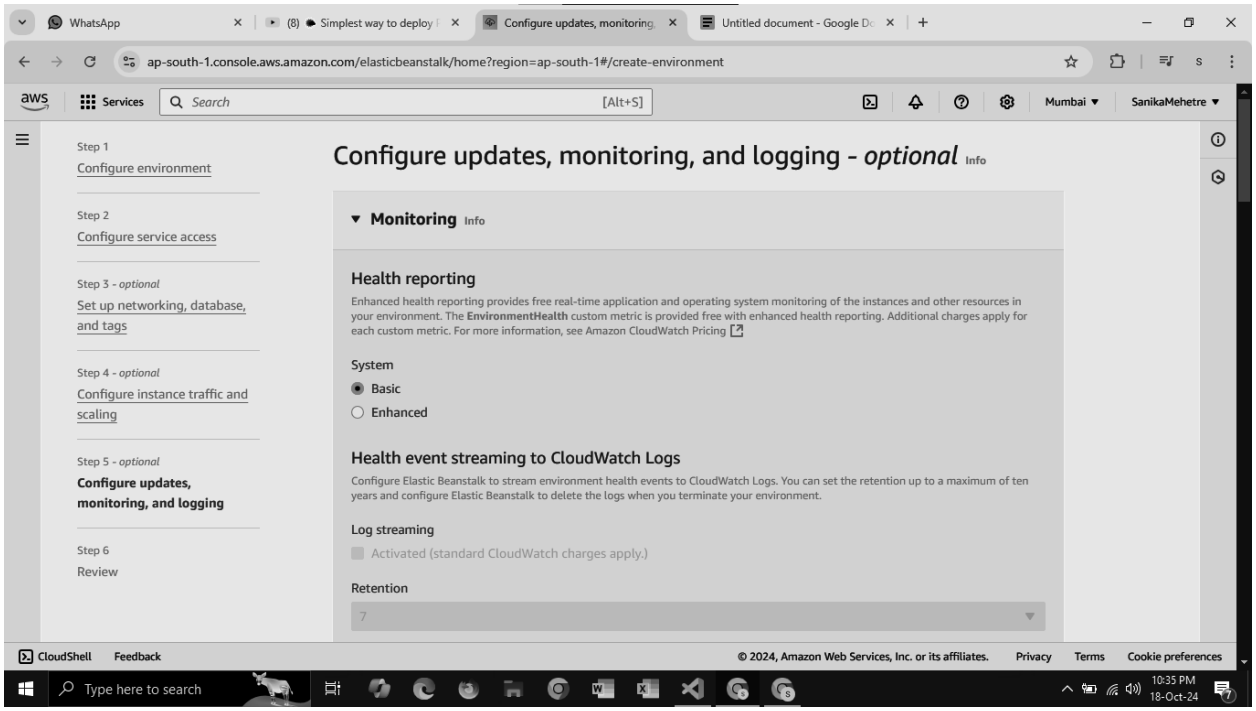
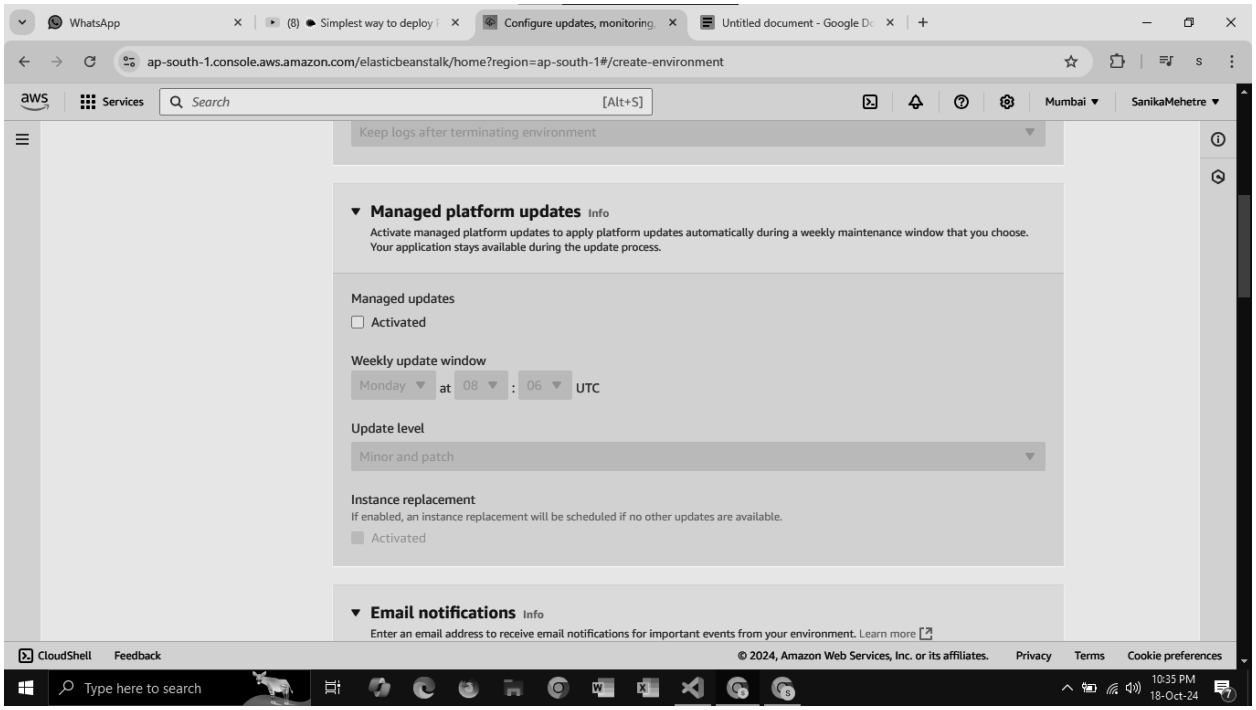


- Click “Next”.

- Choose “Basic” Health Reporting.



Deselect the default Activated option.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Configure updates, monitoring
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ap-south-1.console.aws.amazon.com/elasticbeanstalk/home?region=ap-south-1#/create-environment
Services
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Keep logs after terminating environment
Managed platform updates Info
Activate managed platform updates to apply platform updates automatically during a weekly maintenance window that you choose. Your application stays available during the update process.
Managed updates
Activated
Weekly update window
Monday at 08 : 06 UTC
Update level
Minor and patch
Instance replacement
If enabled, an instance replacement will be scheduled if no other updates are available.
Activated
Email notifications Info
Enter an email address to receive email notifications for important events from your environment. Learn more
CloudShell
Feedback
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Terms
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Type here to search
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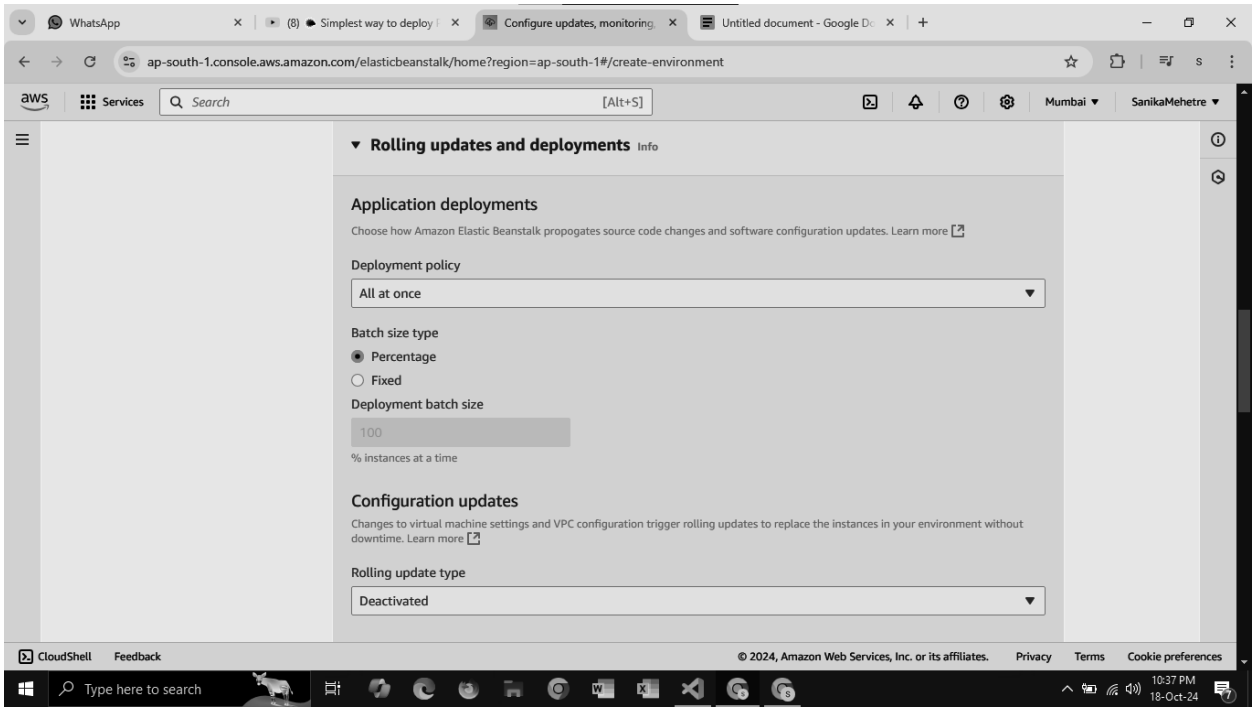
WhatsApp
(8) Simplest way to deploy
Configure updates, monitoring
Untitled document - Google Do
ap-south-1.console.aws.amazon.com/elasticbeanstalk/home?region=ap-south-1#/create-environment
Services
Search
[Alt+S]
Mumbai
SanikaMehetre
Rolling updates and deployments Info
Application deployments
Choose how Amazon Elastic Beanstalk propogates source code changes and software configuration updates. Learn more
Deployment policy
All at once
Batch size type
Percentage
Fixed
Deployment batch size
100
% instances at a time
Configuration updates
Changes to virtual machine settings and VPC configuration trigger rolling updates to replace the instances in your environment without downtime. Learn more
Rolling update type
Deactivated
CloudShell
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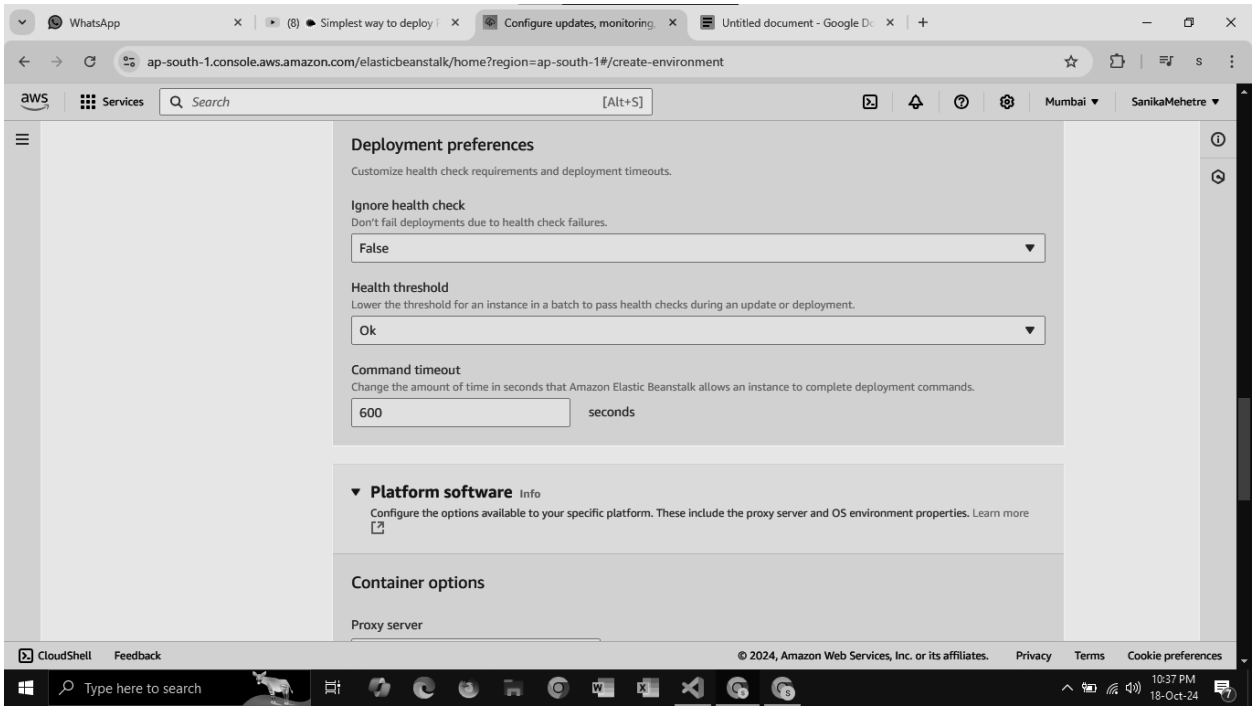
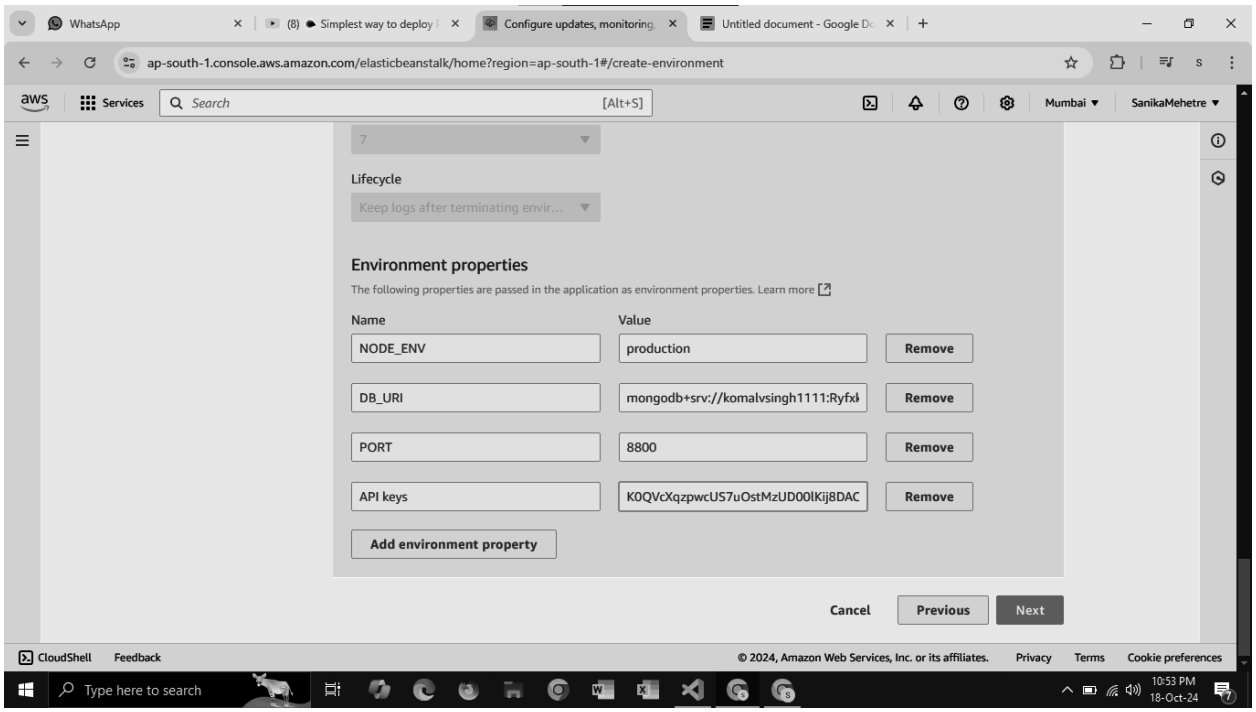
10:37 PM
18-Oct-24



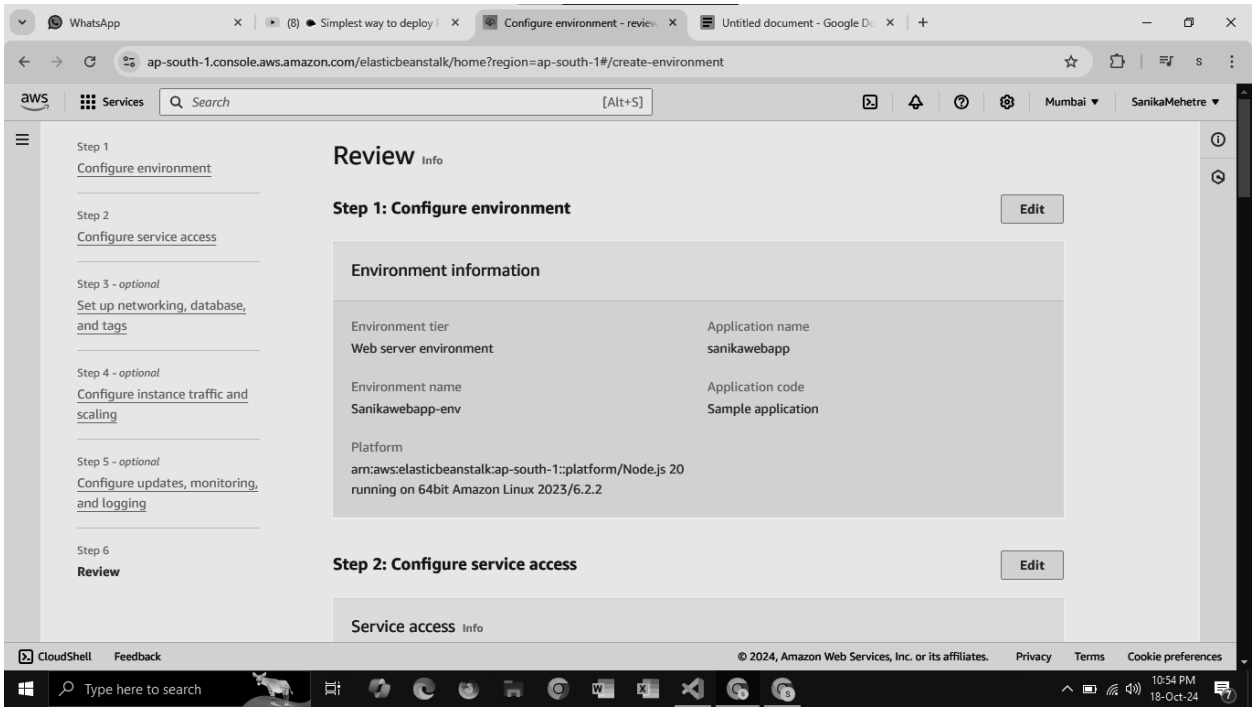
Step 2: Environment Configuration

This is an important step

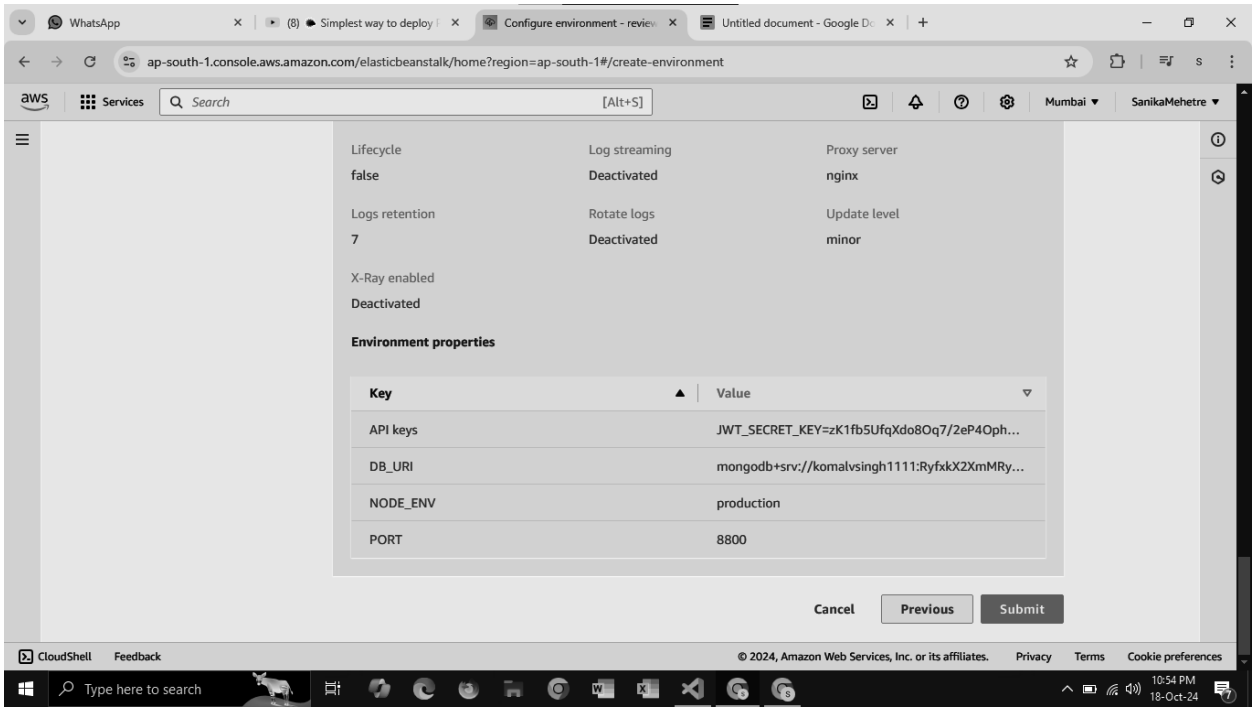
- Add the environment properties here, as they are in the ".env" file of your code.



- Now, review all the settings.

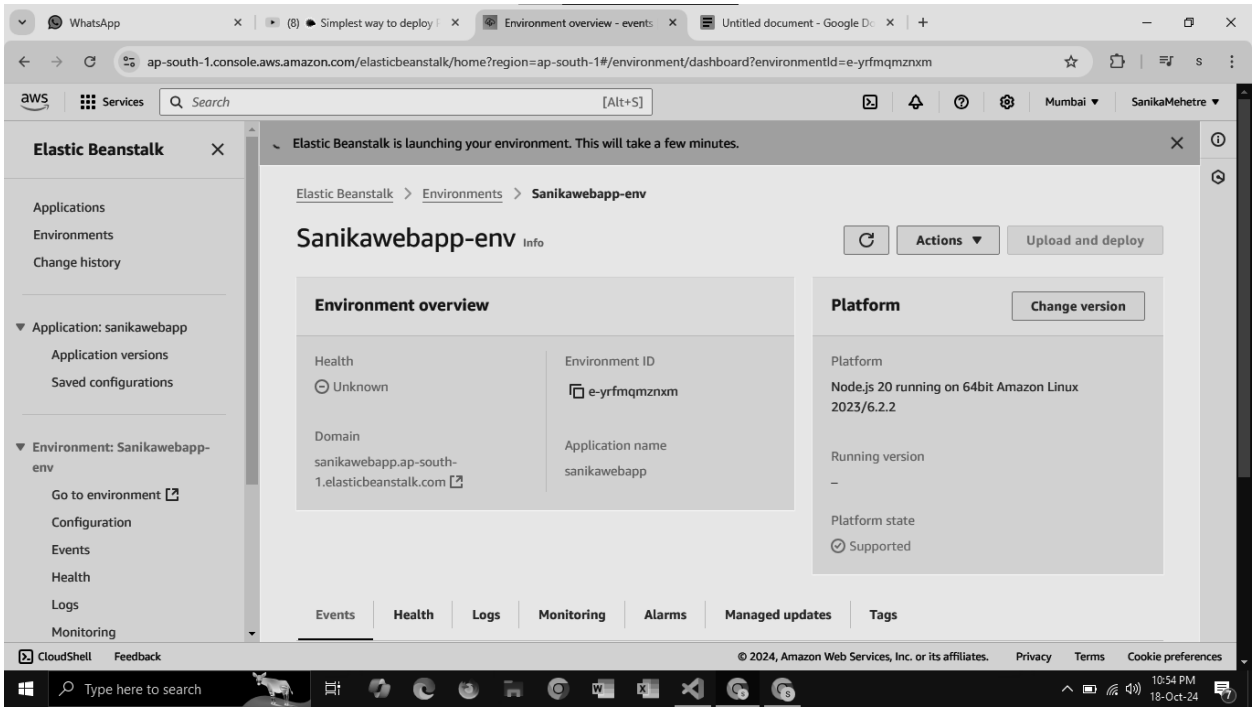


- If everything is correct, click on submit.
- If you wish to make any changes, you can simply edit here itself.

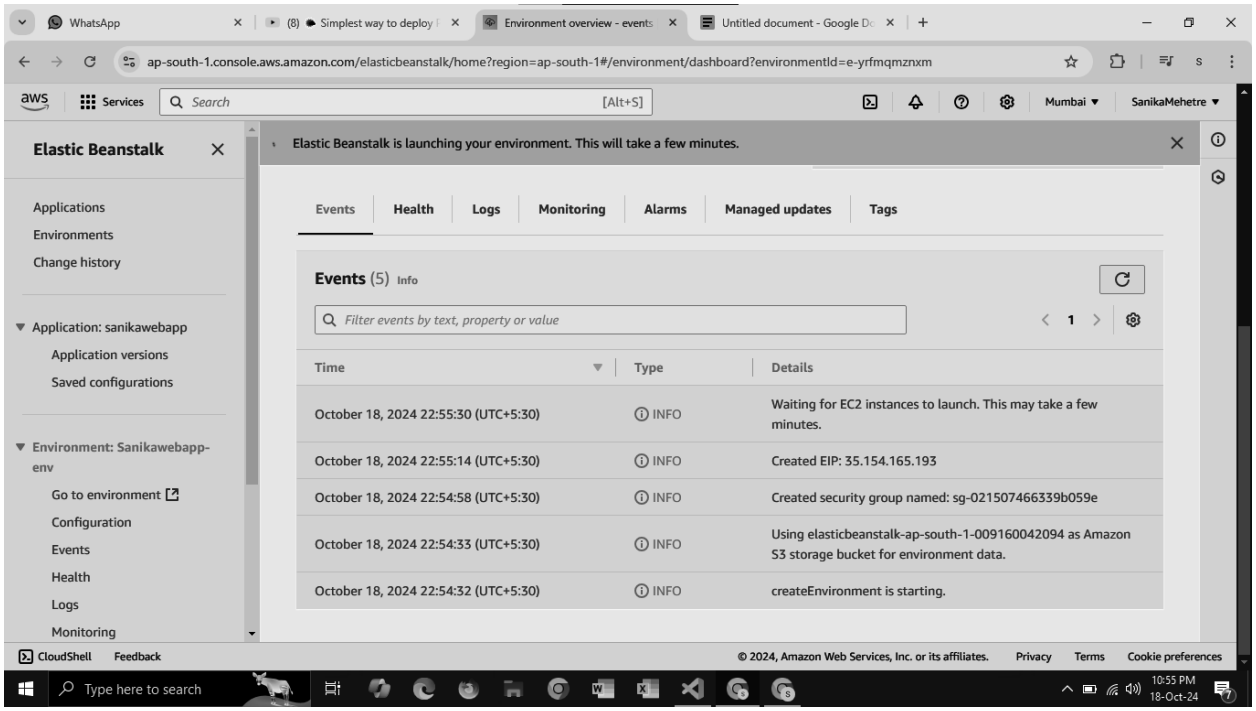


Step 3: Deployment

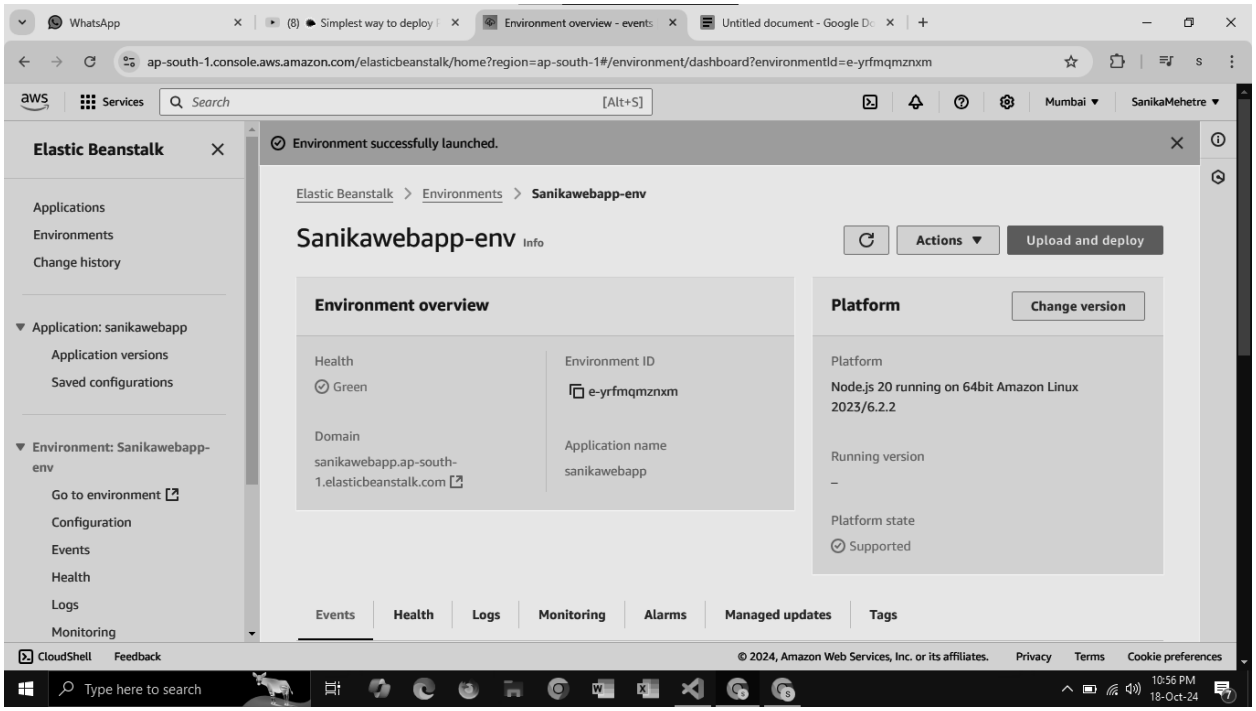
- Now, the Elastic Beanstalk is launching the environment.



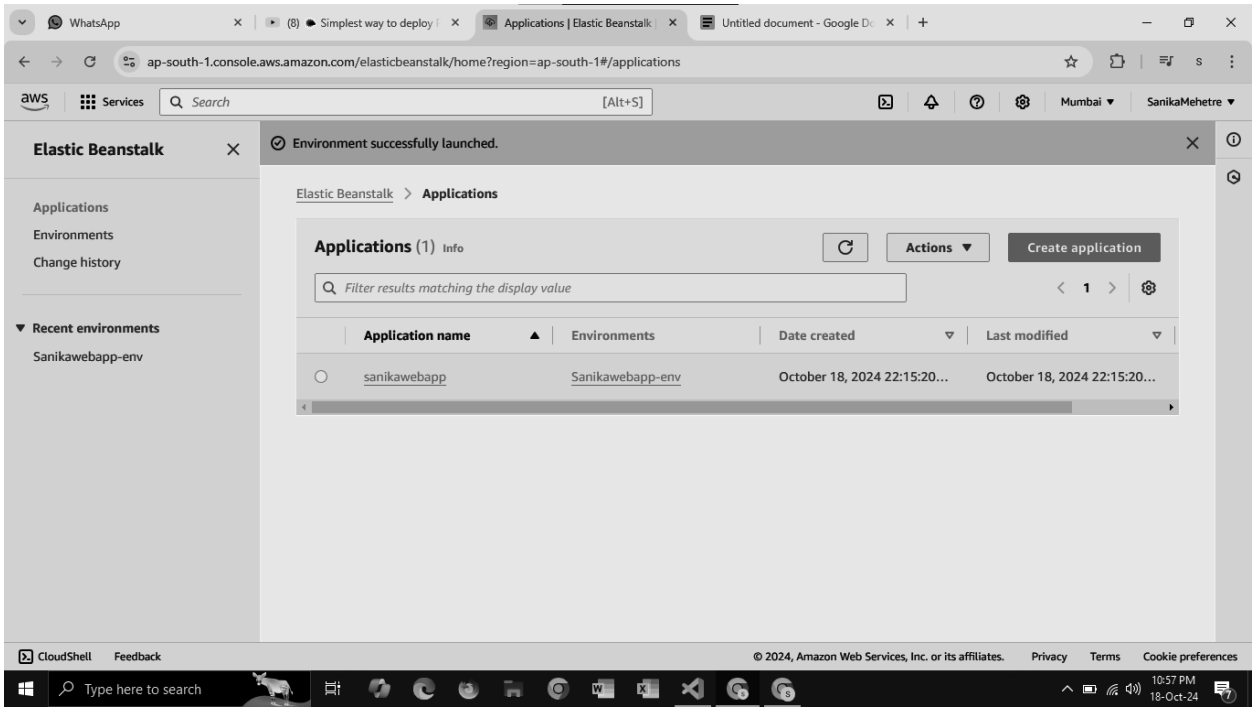
- Events will start firing up, during the creation of the environment



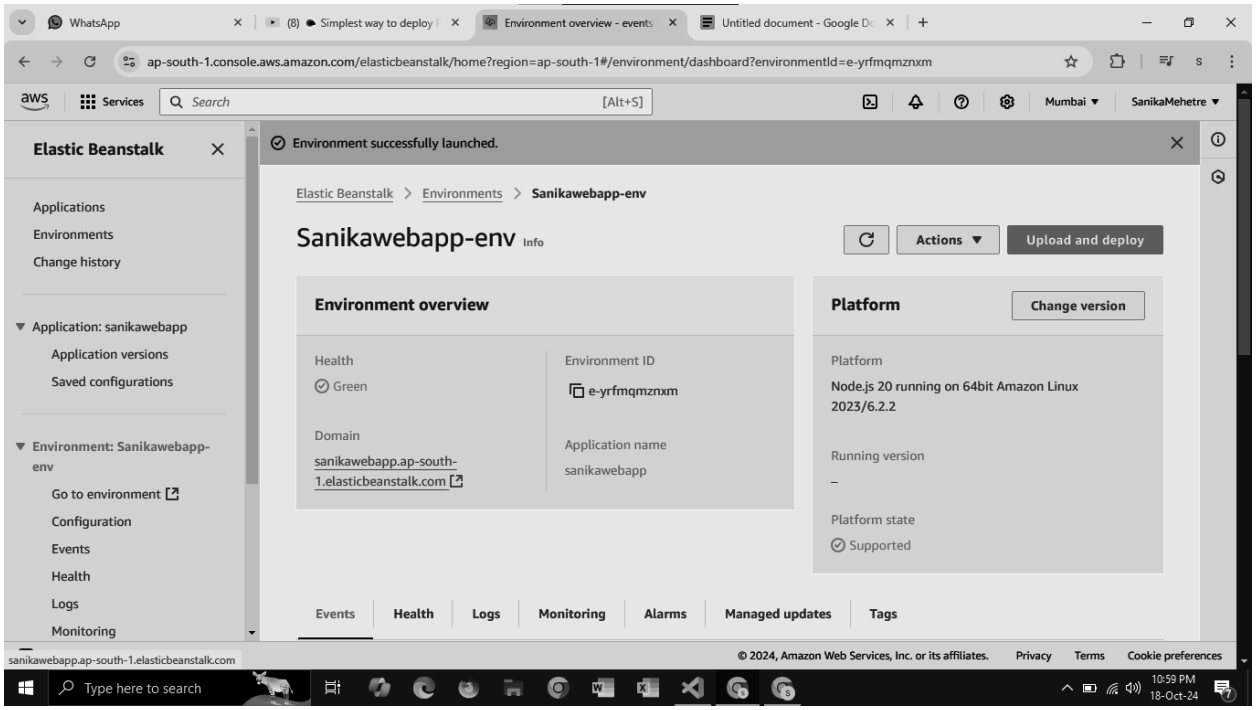
- The environment is now successfully launched.



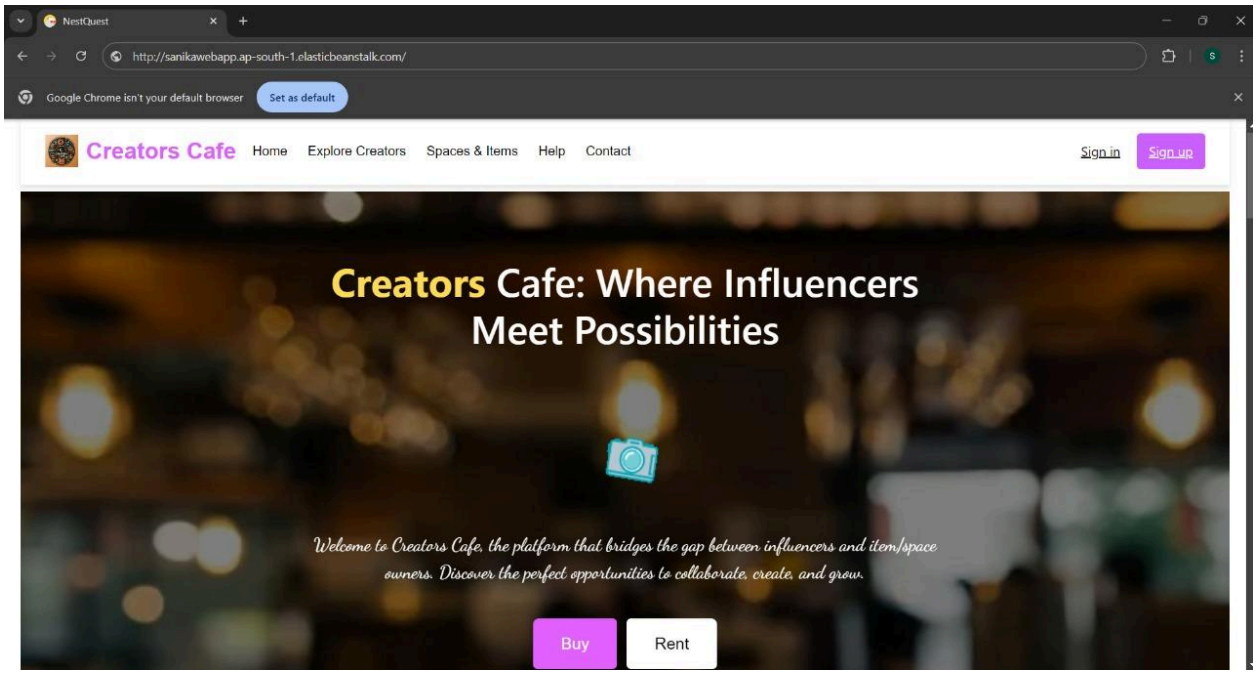
- We can now see our web application in “Applications” and our environment beside it.

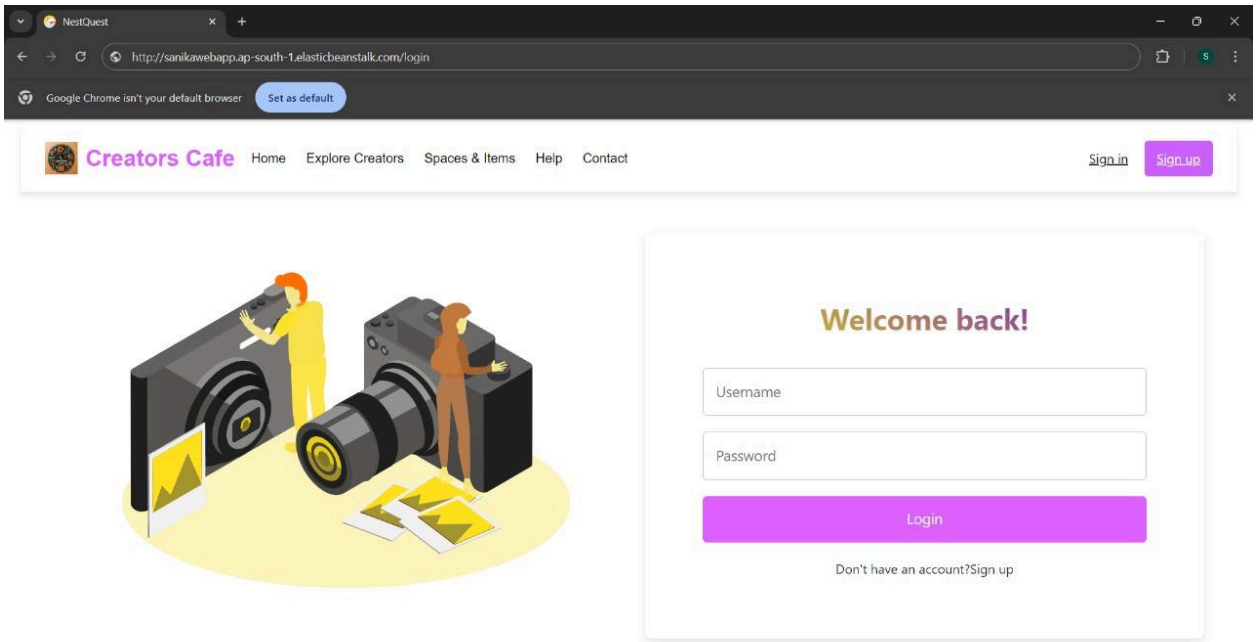


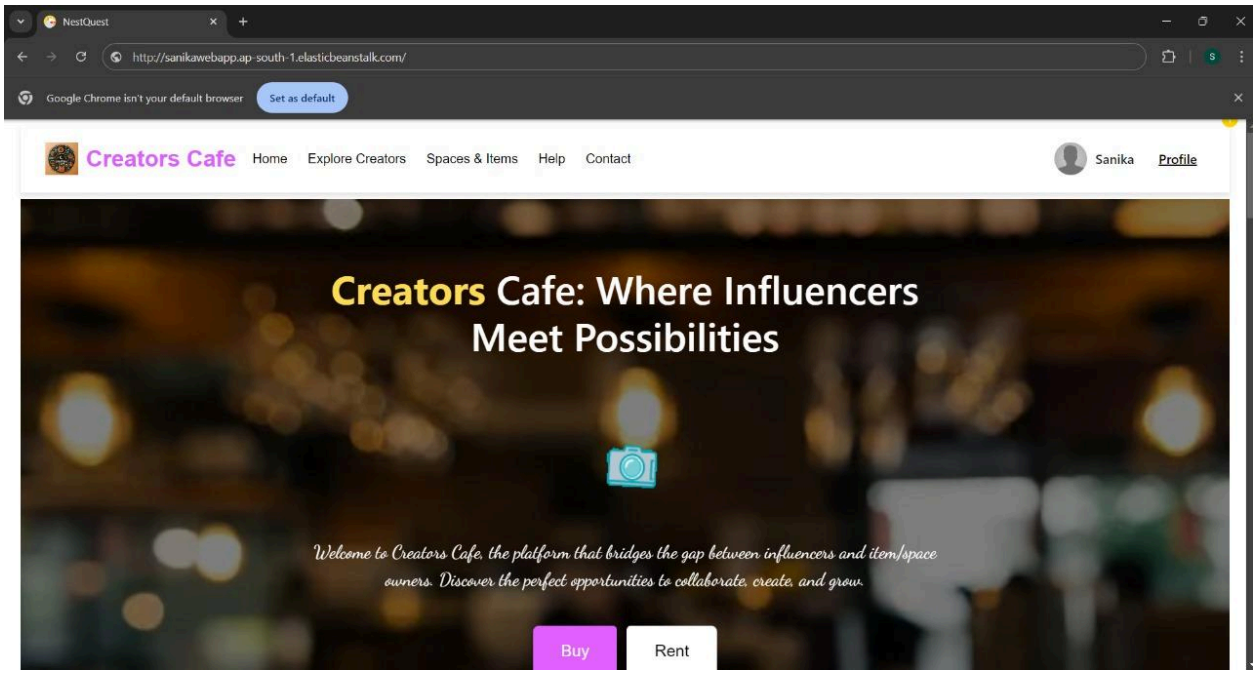
- Click on the link under “Domain”.



- After much error solving, and deploying the application multiple times it was successful.
- You can see your web application, if the deployment process was successful.




NestQuest
http://sanikawebapp.ap-south-1.elasticbeanstalk.com/login
Google Chrome isn't your default browser
Set as default
Creators Cafe
Home
Explore Creators
Spaces & Items
Help
Contact
Sign in
Sign up
Welcome back!
Username
Password
Login
Don't have an account?Sign up


NestQuest
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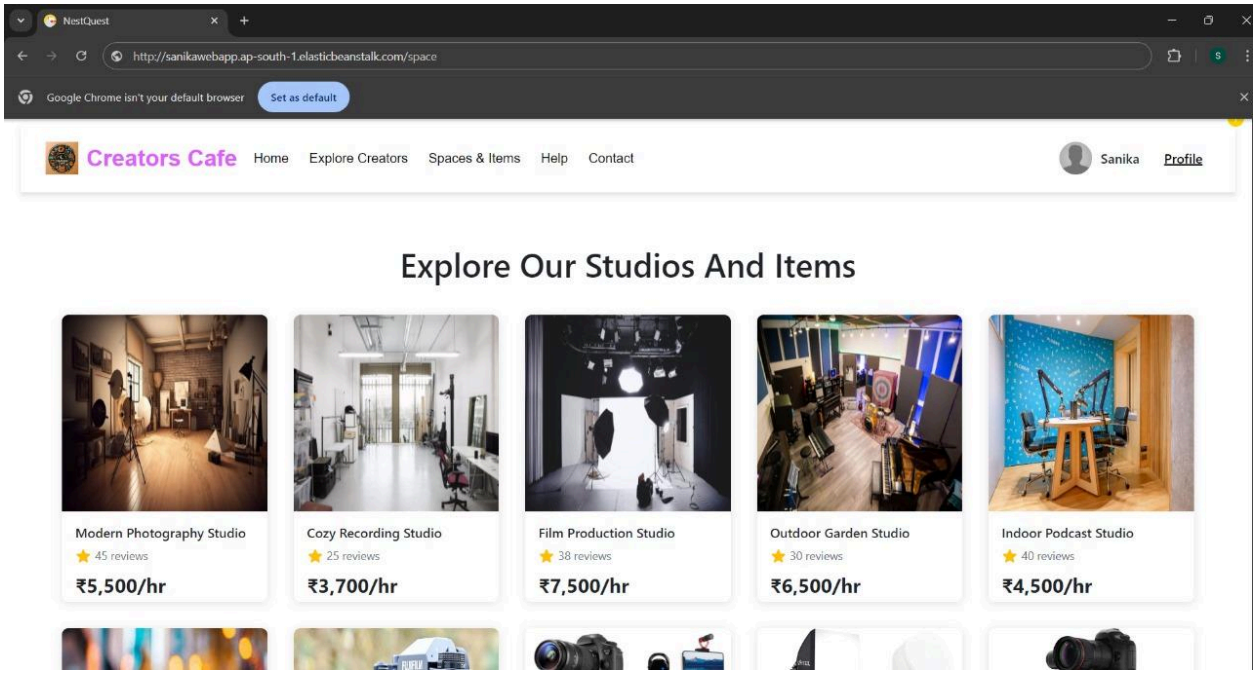
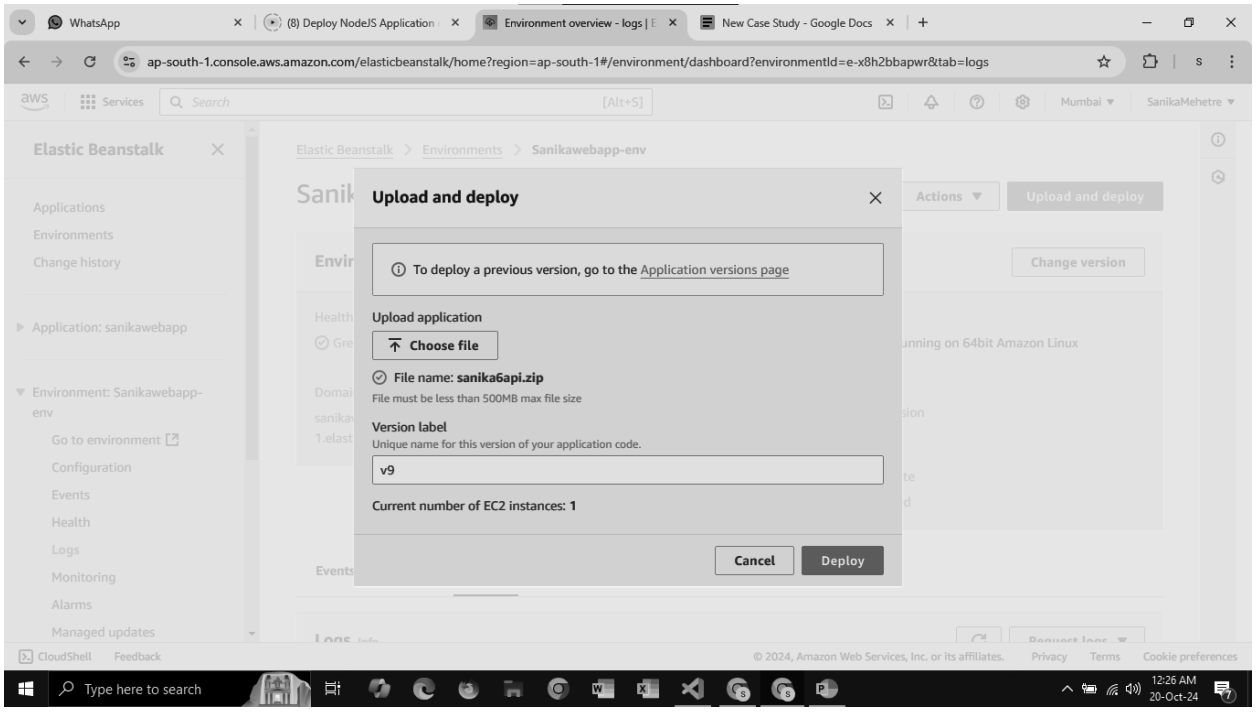
Google Chrome isn't your default browser
Set as default
Creators Cafe
Home
Explore Creators
Spaces & Items
Help
Contact
Sanika
Profile
Creators Cafe: Where Influencers Meet Possibilities
Welcome to Creators Cafe, the platform that bridges the gap between influencers and item/space owners. Discover the perfect opportunities to collaborate, create, and grow.
Buy
Rent



- In case of errors, navigate to “Logs” and click on “Request Logs”.
- Here you easily check the errors and solve them.
- After solving the errors, click on “Upload and Deploy”.
- You can now upload the new zip file of your code and update the version.



Conclusion:

After trying different methods for deploying the application,such as AWS CLI, etc. the AWS Elastic Beanstalk service completed the task successfully. I faced numerous errors while doing this case study, such as errors regarding the zip file structure(which needed the entire project structure to be changed and an additional Procfile), errors regarding permissions(for which i created a new role and attached the required policies to that role), errors due to nginx which acts as reverse proxy(502 Bad Gateway error), errors due to the size of type_hash_bucket(for which i added a file in the project directory specifying the size of the hash_bucket and max_bucket), the application also crashed several times due to unavailability of the specific port which was caused by firewall/ antivirus software, i even had to make changes in the node modules which required excessive scanning through code. After making all these changes, the application was successfully deployed on AWS.