https://github.com/suvaatnbu/Orchestration-Scaling

Description
Notes:
Jenkins Credentials:

URL: http://3.111.188.91:8080/
Username: herovired
Password: herovired
Project Link: https://github.com/UnpredictablePrashant/SampleMERNwithMicroservices
Fork this repository. For the update from the main repository, you can refer to this link: https://stackoverflow.com/questions/3903817/pull-new-updates-from-original-github-repository-into-forked-github-repository
Project Steps:

Step 1: Set Up the AWS Environment

1. Set Up AWS CLI and Boto3:

   - Install AWS CLI and configure it with AWS credentials.
   - Install Boto3 for Python and configure it.

Step 2: Prepare the MERN Application
1. Containerize the MERN Application:
   - Ensure the MERN application is containerized using Docker. Create a Dockerfile for each component (frontend and backend).
2. Push Docker Images to Amazon ECR:
   - Build Docker images for the frontend and backend.
   - Create an Amazon ECR repository for each image.
   - Push the Docker images to their respective ECR repositories.

Step 3: Version Control
1. Use AWS CodeCommit:
   - Create a CodeCommit repository.
   - Push the MERN application source code to the CodeCommit repository.

Step 4: Continuous Integration with Jenkins
1. Set Up Jenkins:
   - Install Jenkins on an EC2 instance.
   - Configure Jenkins with necessary plugins.
2. Create Jenkins Jobs:
   - Create Jenkins jobs for building and pushing Docker images to ECR.
   - Trigger the Jenkins jobs whenever there's a new commit in the CodeCommit repository.

Step 5: Infrastructure as Code (IaC) with Boto3
1. Define Infrastructure with Boto3 (Python Script):
   - Use Boto3 to define the infrastructure (VPC, subnets, security groups).
   - Define an Auto Scaling Group (ASG) for the backend.
   - Create AWS Lambda functions if needed.

Step 6: Deploying Backend Services

1. Deploy Backend on EC2 with ASG:
   - Use Boto3 to deploy EC2 instances with the Dockerized backend application in the ASG.

Step 7: Set Up Networking

1. Create Load Balancer:
   - Set up an Elastic Load Balancer (ELB) for the backend ASG.
2. Configure DNS:
   - Set up DNS using Route 53 or any other DNS service.

Step 8: Deploying Frontend Services

1. Deploy Frontend on EC2:
   - Use Boto3 to deploy EC2 instances with the Dockerized frontend application.

Step 9: AWS Lambda Deployment

1. Create Lambda Functions:

- Use Boto3 to create AWS Lambda functions for specific tasks within the application.
- Backup of Db using Lambda Functions and store in S3 bucket - put time stamping on the backup

Step 10: Kubernetes (EKS) Deployment

1. Create EKS Cluster:
   - Use eksctl or other tools to create an Amazon EKS cluster.
2. Deploy Application with Helm:
   - Use Helm to package and deploy the MERN application on EKS.

Step 11: Monitoring and Logging

1. Set Up Monitoring:
   - Use CloudWatch for monitoring and setting up alarms.

2. Configure Logging:
   - Use CloudWatch Logs or another logging solution for collecting logs.

Step 12: Documentation

1. Document the Architecture:

- Instruct learners to create documentation for the entire architecture and deployment process.
- Put everything on the GitHub

Step 13: Final Checks

1. Validate the Deployment:
   - Ensure that the MERN application is accessible and functions correctly.

BONUS: ChatOps

Step 14: ChatOps Integration

Create SNS Topics:

1. Use Boto3 to create SNS topics for different events (e.g., deployment success, failure).

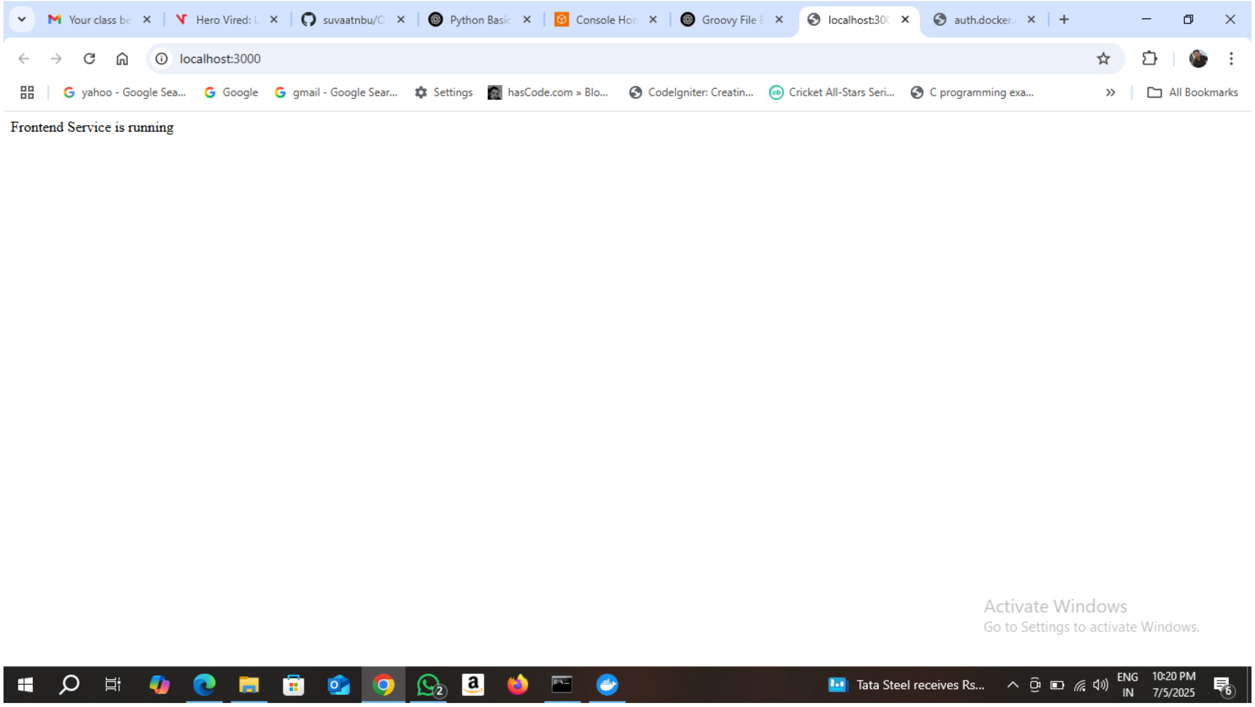
2. Create Lambda for ChatOps:
1. Write a Lambda function that sends notifications to the appropriate SNS topics based on deployment events.
2. Integrate ChatOps with Messaging Platform:
3. Configure integrations with a messaging platform (e.g., Slack/MS Teams/ Telegram) to receive notifications from SNS.
4. Configure SES

Submission Instructions:

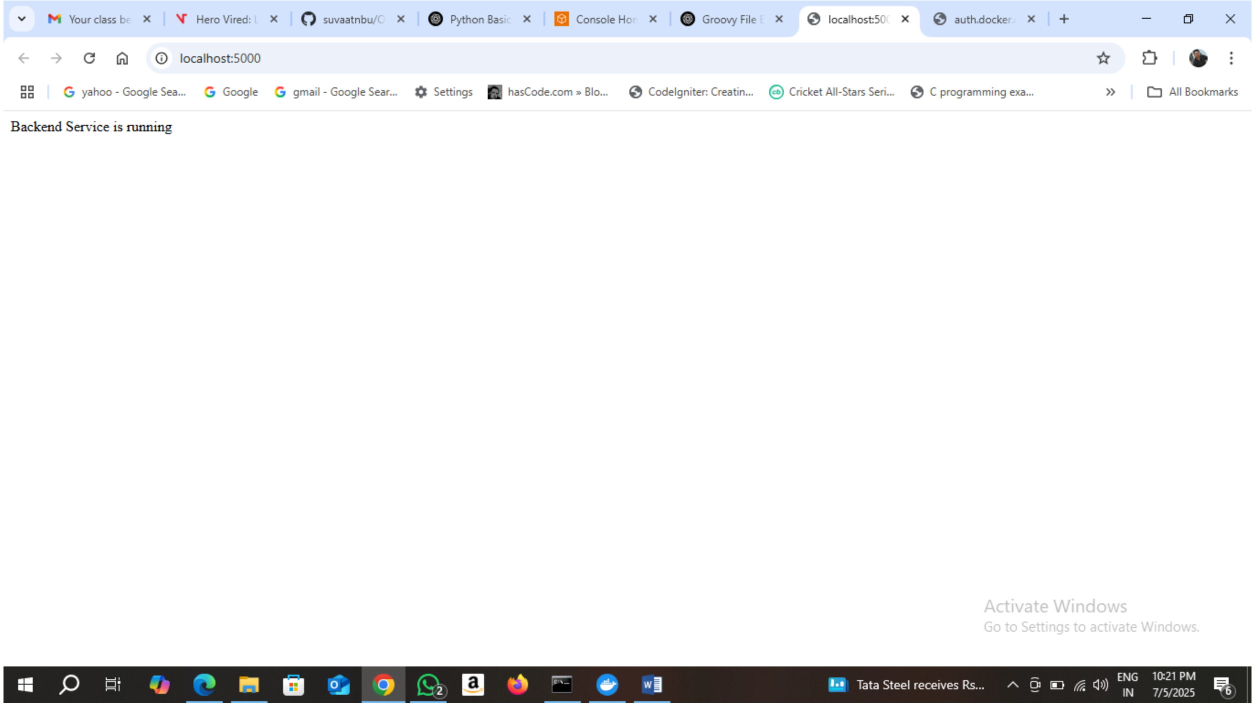
To submit your assignment, please follow these guidelines:

- Ensure that your assignment is fully completed.
- Push your code to a GitHub repository.
- Share the repository link by including it in a text, Word, or PDF file format.

Submit the file/text containing the repository link via Vlearn.

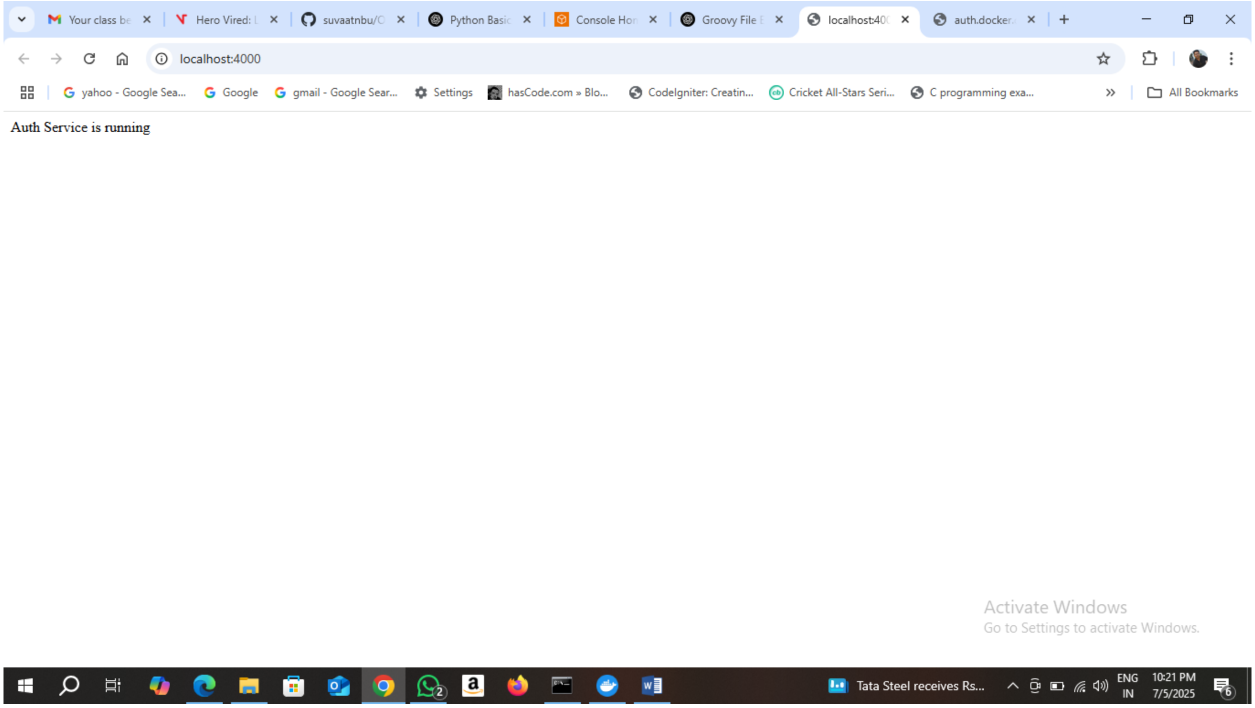


Frontend Service is running



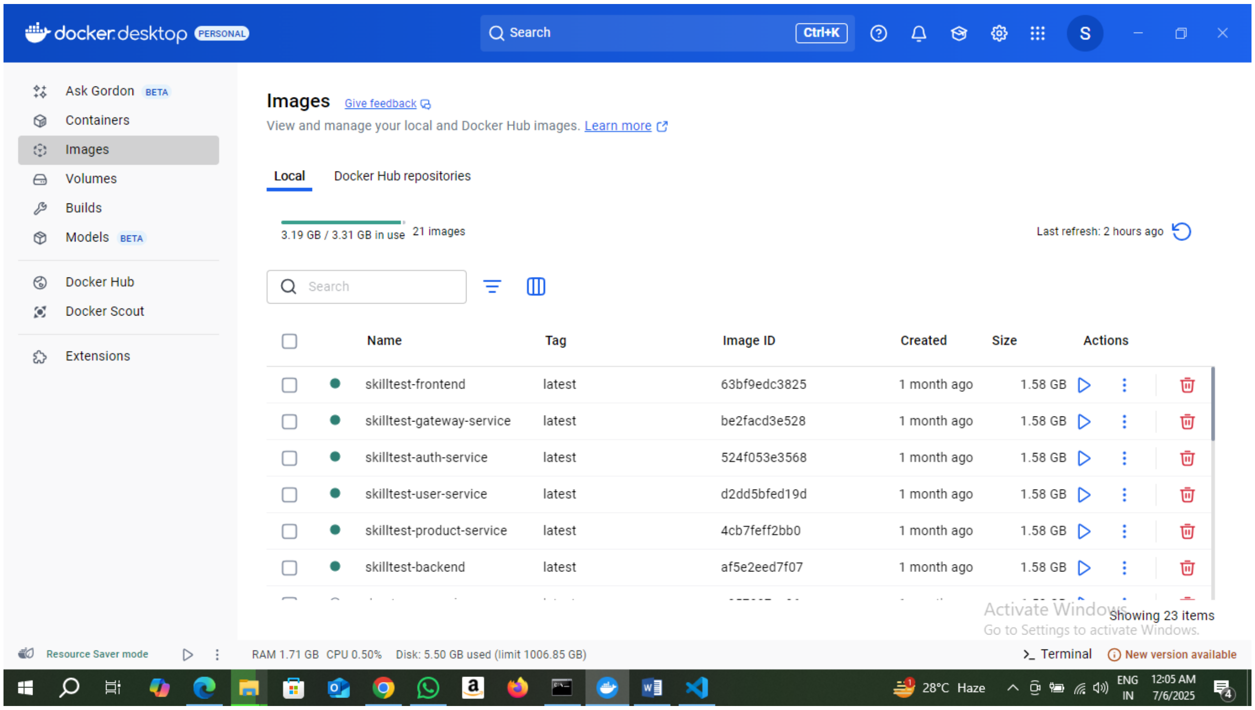
localhost:5000

Backend Service is running



localhost:4000

Auth Service is running



Images

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3.19 GB / 3.31 GB in use 21 images

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□		Name	Tag	Image ID	Created	Size	Actions
□	●	skilltest-frontend	latest	63bf9edc3825	1 month ago	1.58 GB	
□	●	skilltest-gateway-service	latest	be2facd3e528	1 month ago	1.58 GB	
□	●	skilltest-auth-service	latest	524f053e3568	1 month ago	1.58 GB	
□	●	skilltest-user-service	latest	d2dd5bfed19d	1 month ago	1.58 GB	
□	●	skilltest-product-service	latest	4cb7feff2bb0	1 month ago	1.58 GB	
□	●	skilltest-backend	latest	af5e2eed7f07	1 month ago	1.58 GB	

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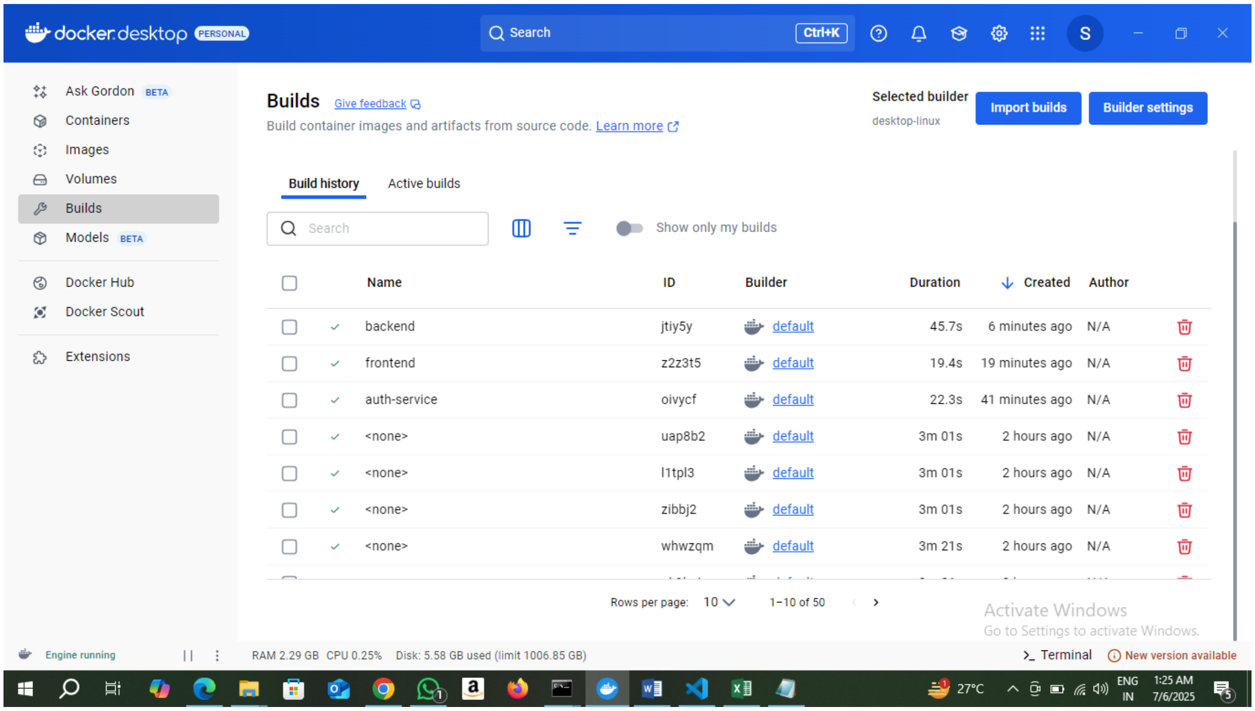
Activate Windows
Go to Settings to activate Windows.

Resource Saver mode RAM 1.71 GB CPU 0.50% Disk: 5.50 GB used (limit 1006.85 GB) Terminal New version available

28°C Haze ENG IN 12:05 AM 7/6/2025



Builds

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□	✓	backend	jtiy5y	default	45.7s	6 minutes ago	N/A
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□	✓	auth-service	oivycf	default	22.3s	41 minutes ago	N/A
□	✓	<none>	uap8b2	default	3m 01s	2 hours ago	N/A
□	✓	<none>	l1tpl3	default	3m 01s	2 hours ago	N/A
□	✓	<none>	zibbj2	default	3m 01s	2 hours ago	N/A
□	✓	<none>	whwzqm	default	3m 21s	2 hours ago	N/A

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Activate Windows
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Engine running RAM 2.29 GB CPU 0.25% Disk: 5.58 GB used (limit 1006.85 GB) Terminal New version available

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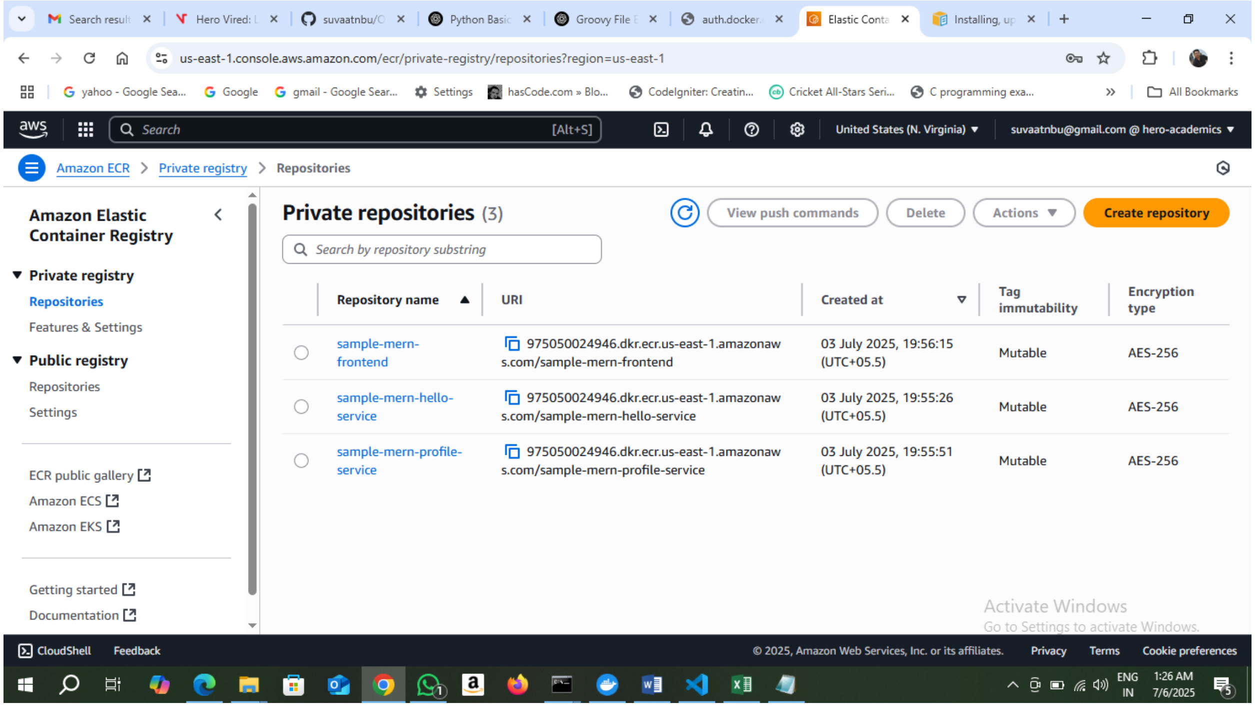

us-east-1.console.aws.amazon.com/ecr/private-registry/repositories?region=us-east-1

Amazon ECR > Private registry > Repositories

Amazon Elastic Container Registry

- Private registry
  - Repositories
  - Features & Settings
- Public registry
  - Repositories
  - Settings

ECR public gallery
Amazon ECS
Amazon EKS
Getting started
Documentation

Private repositories (3)

View push commands | Delete | Actions | Create repository

Search by repository substring

Repository name	URI	Created at	Tag immutability	Encryption type
○ sample-mern-frontend	975050024946.dkr.ecr.us-east-1.amazonaws.com/sample-mern-frontend	03 July 2025, 19:56:15 (UTC+05.5)	Mutable	AES-256
○ sample-mern-hello-service	975050024946.dkr.ecr.us-east-1.amazonaws.com/sample-mern-hello-service	03 July 2025, 19:55:26 (UTC+05.5)	Mutable	AES-256
○ sample-mern-profile-service	975050024946.dkr.ecr.us-east-1.amazonaws.com/sample-mern-profile-service	03 July 2025, 19:55:51 (UTC+05.5)	Mutable	AES-256

United States (N. Virginia)
suvaatnbu@gmail.com @ hero-academics
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1:26 AM
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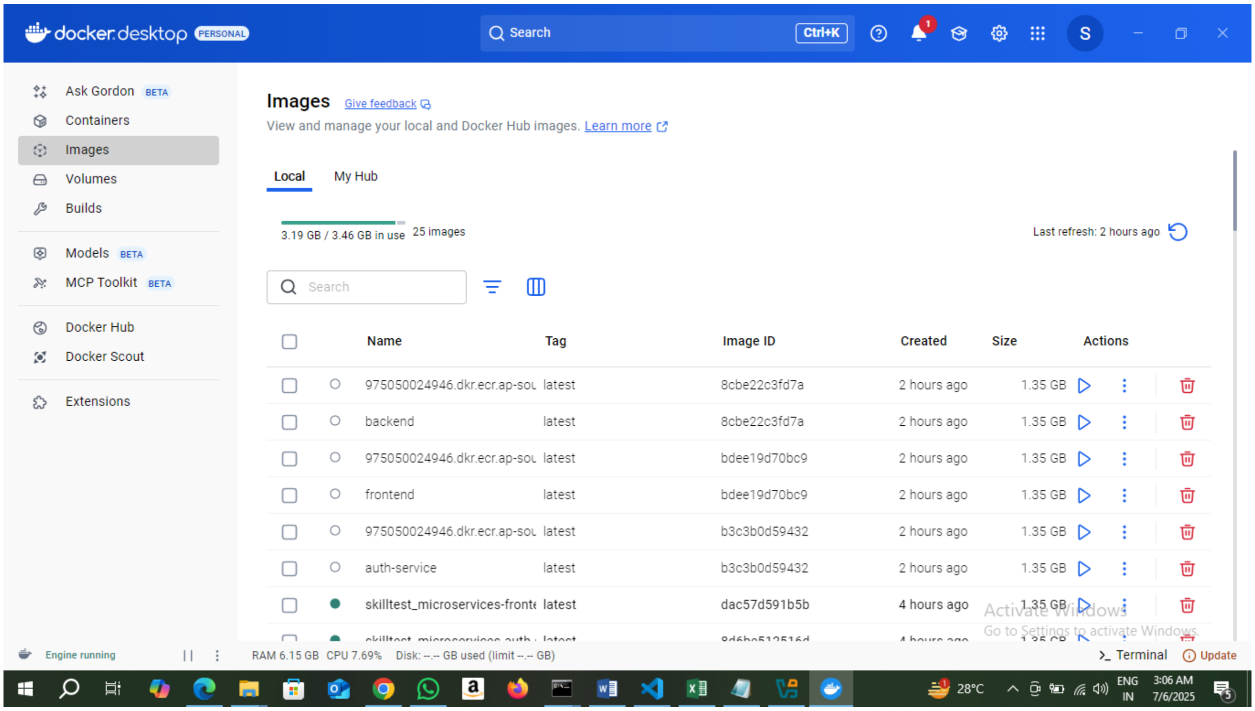

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☐	○	975050024946.dkr.ecr.ap-sou	latest	8cbe22c3fd7a	2 hours ago	1.35 GB	
☐	○	backend	latest	8cbe22c3fd7a	2 hours ago	1.35 GB	
☐	○	975050024946.dkr.ecr.ap-sou	latest	bdee19d70bc9	2 hours ago	1.35 GB	
☐	○	frontend	latest	bdee19d70bc9	2 hours ago	1.35 GB	
☐	○	975050024946.dkr.ecr.ap-sou	latest	b3c3b0d59432	2 hours ago	1.35 GB	
☐	○	auth-service	latest	b3c3b0d59432	2 hours ago	1.35 GB	
☐	●	skilltest_microservices-fronte	latest	dac57d591b5b	4 hours ago	1.35 GB	
☐	●	skilltest_microservices-auth-	latest	8d6be512516d	4 hours ago	1.35 GB	

Engine running

RAM 6.15 GB CPU 7.69% Disk: --.-- GB used (limit --.-- GB)