

Assignment : 4

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Class:-MSc.CS Part 2

Q.)Working and implementation of Infrastructure as a service

Task 1: Launch Your Amazon EC2 Instance. Write the shell script in User Data box. The script will:

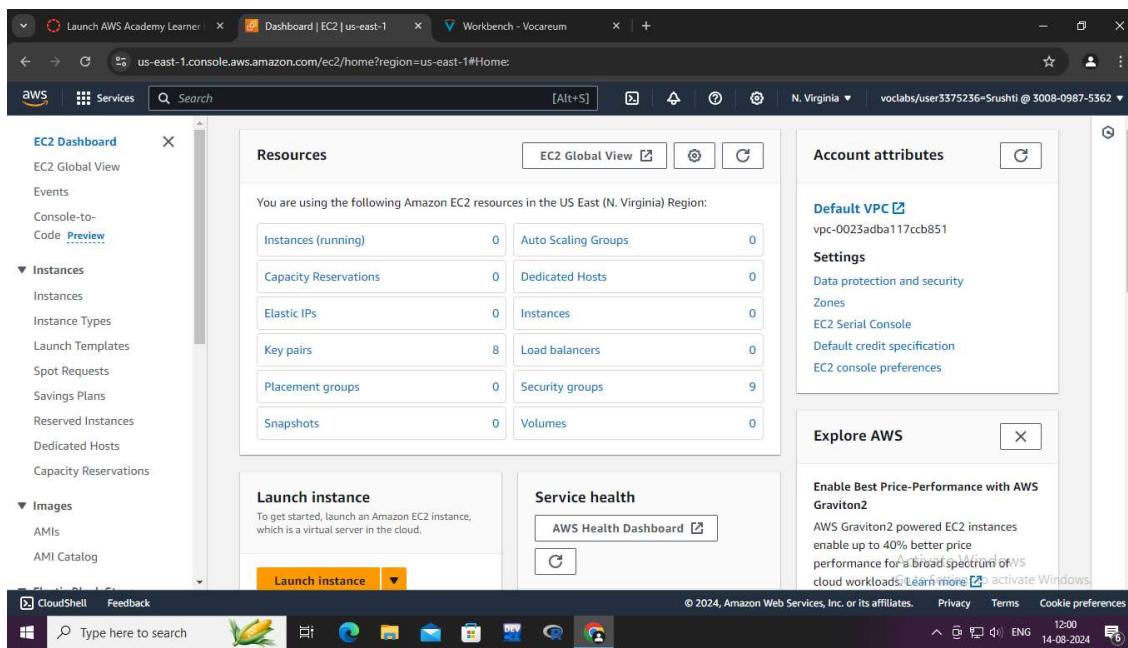
- Install an Apache web server (httpd)
- Configure the web server to automatically start on boot
- Run the Web server once it has finished installing

Task 2: Monitor Your Instance **Task 3: Update Your Security Group** and Access the Web Server **Task 4: Resize Your Instance: Instance Type and EBS Volume** **Task 5: Test Termination Protection.**

(Use AWS Platform)

Step 1:Login in to your AWS account and go to service->Compute->EC2

Step2:Click on Launch Instance



Step3:Now in Name and tags,you can give name to the instance.Here I give name as Web Server

Step 4:Select Linux under QuickStart and select Amazon Linux 2023 AMI

The screenshot shows the AWS Lambda console with the following details:

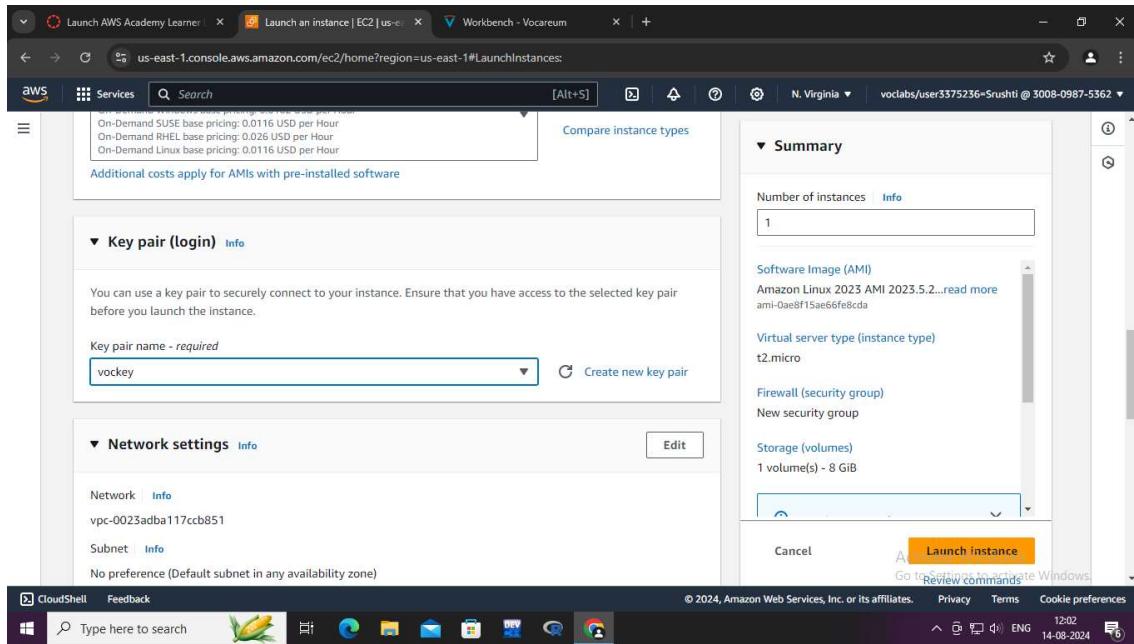
- Function name:** Lambda function
- Runtime:** Python 3.10
- Description:** This function processes logs from CloudWatch Logs and sends them to CloudWatch Metrics.
- Code entry type:** Lambda@Edge
- Code:** A sample Lambda function for CloudWatch Metrics is displayed.
- Test:** A test event is shown with the message "Hello World".
- Logs:** CloudWatch Logs Insights is selected as the log destination.
- Metrics:** CloudWatch Metrics is selected as the metric destination.
- Deployment:** Deployment package is set to "Create a deployment package".
- Environment:** Environment variables are listed: AWS_LAMBDA_FUNCTION_NAME (Lambda function name), AWS_LAMBDA_FUNCTION_MEMORY_SIZE (128), AWS_LAMBDA_FUNCTION_TIMEOUT (3), and AWS_LAMBDA_HANDLER (lambda_function.lambda_handler).
- Role:** Lambda execution role is selected.
- Tags:** Tags are listed: FunctionName (Lambda function), and FunctionVersion (1).
- Configuration:** Configuration is set to "Edit configuration".

Step 5:Select t2.micro instance type

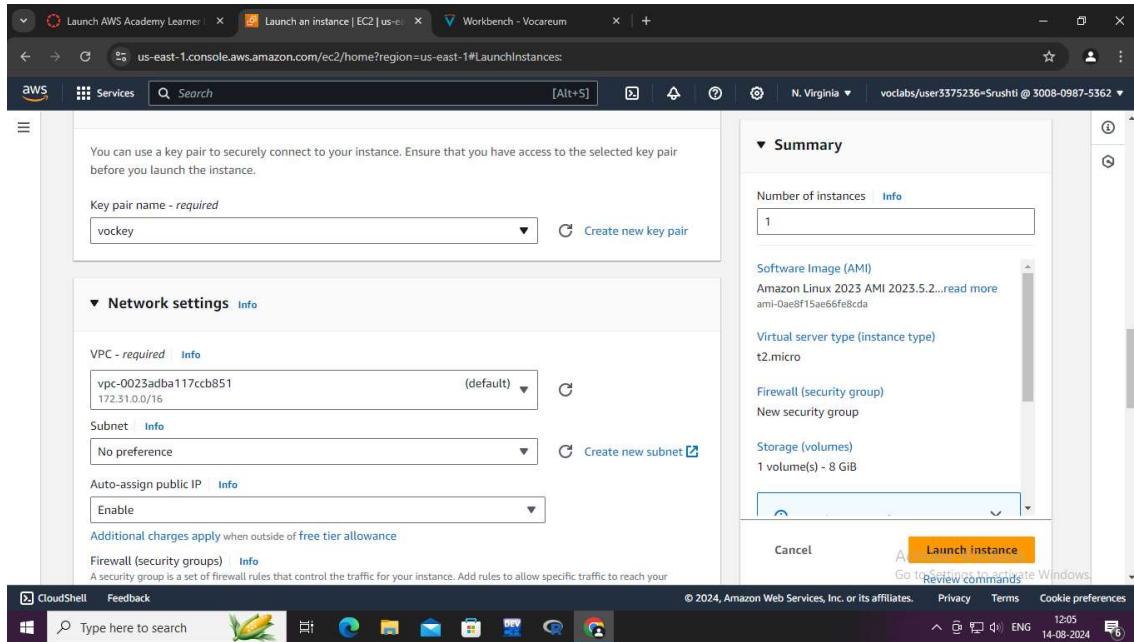
The screenshot shows the AWS Lambda console with the following details:

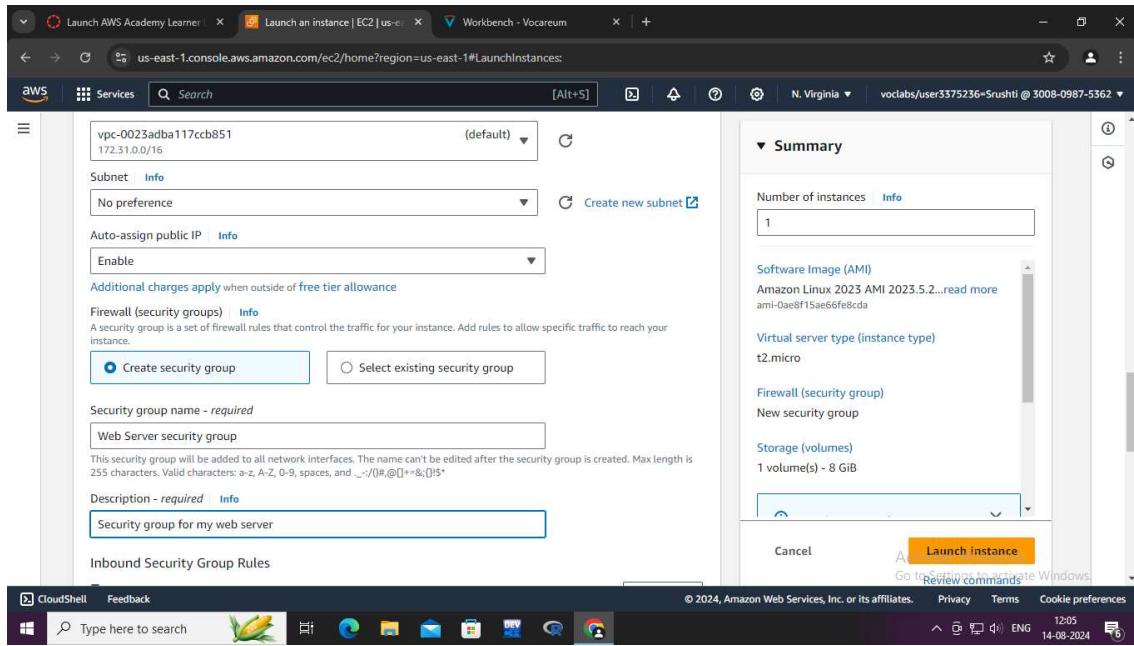
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- Role:** Lambda execution role is selected.
- Tags:** Tags are listed: FunctionName (Lambda function), and FunctionVersion (1).
- Configuration:** Configuration is set to "Edit configuration".

Step 6: In the key pair, select vockey from the dropdown list. And in networking settings, select lab VPC

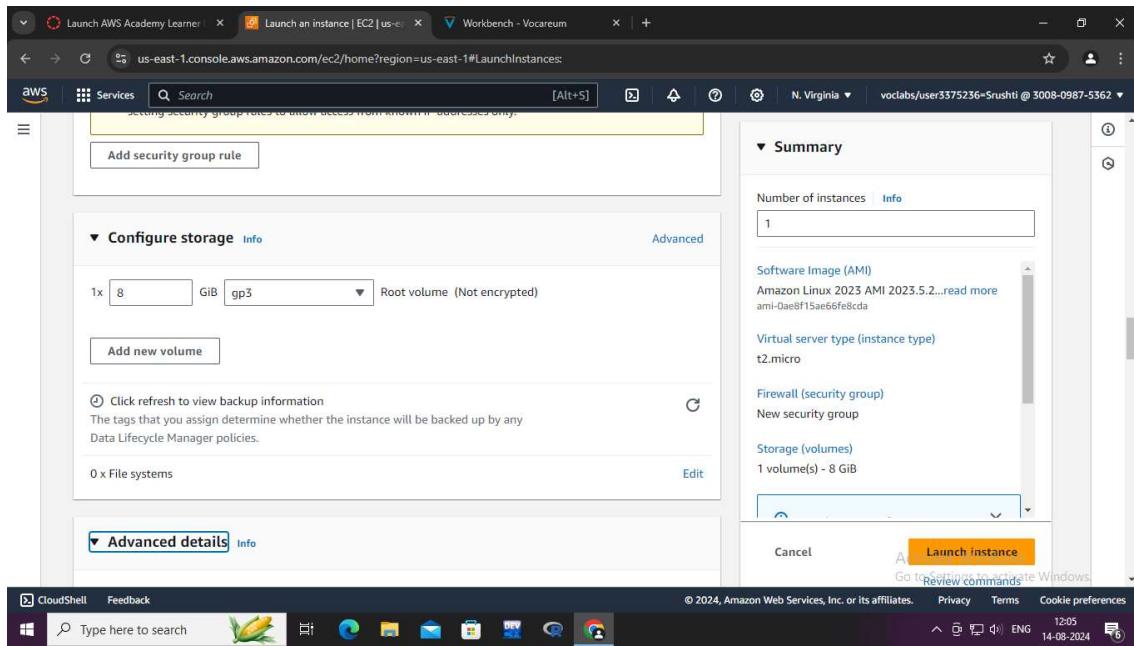


Step 7: Give security group name as Web Server Security Group and description as Security group for my web server





Step 8: Remove the inbound security group rules



Step 9: Keep Termination Protection enable

Shutdown behavior: Stop

Stop - Hibernate behavior: Select

Termination protection: **Enable**

Stop protection: Select

Detailed CloudWatch monitoring: Select

Elastic GPU: Select

Credit specification: Standard

Summary

Number of instances: 1

Software Image (AMI): Amazon Linux 2023.5.2...read more
ami-0ae8f15ae66fe8cda

Virtual server type (instance type): t2.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GiB

Launch Instance

Nitro Enclave: Select

Nitro Enclaves are not compatible with instance types that have less than 2 vCPUs.

License configurations: Select

Specify CPU options:
The selected instance type does not support CPU options.

Metadata accessible: Enabled

Metadata IPv6 endpoint: Select

Metadata version: V2 only (token required)

Summary

Number of instances: 1

Software Image (AMI): Amazon Linux 2023.5.2...read more
ami-0ae8f15ae66fe8cda

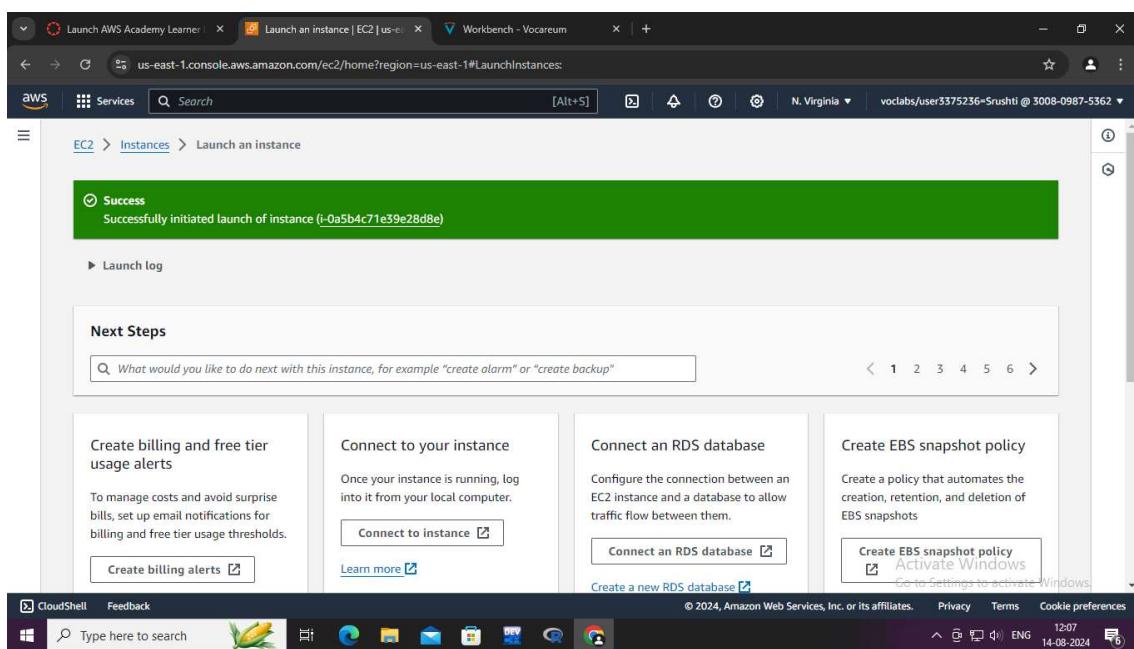
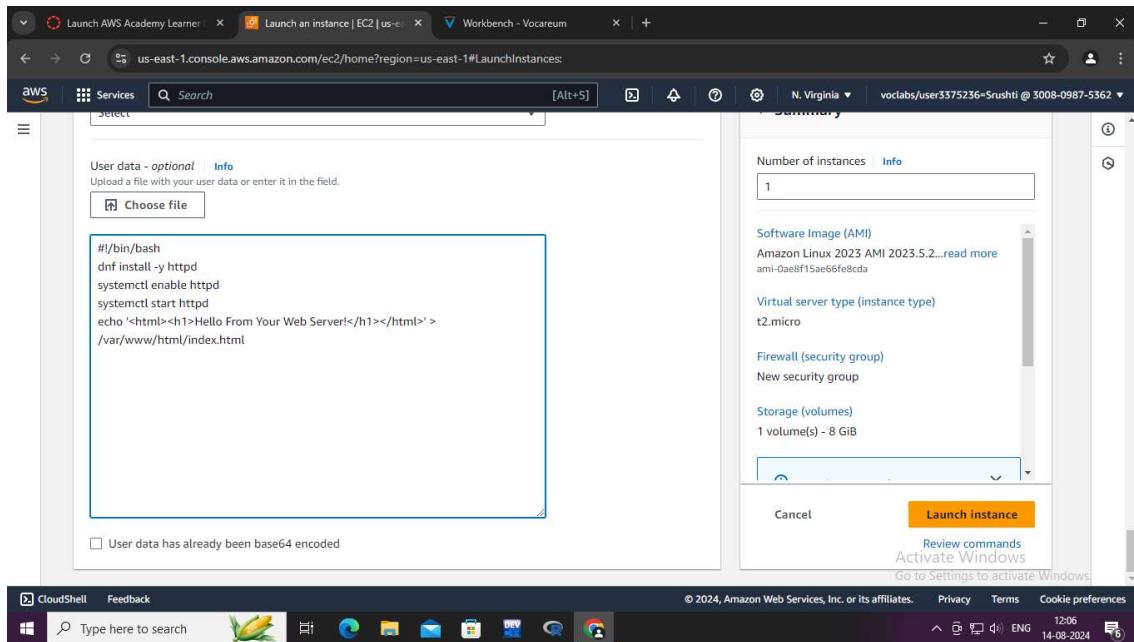
Virtual server type (instance type): t2.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GiB

Launch Instance

Step 10: Enter the user data to install httpd and click->Launch instance



Step 11: Here you can see your instances and wait for some time till status check 2/2 and instance state running.

The screenshot shows the AWS EC2 Instances page. A single instance named "Web Server" is listed, with its instance ID as i-0a5b4c71e39e28d8e. The instance is currently "Running". The status check is 2/2. The instance type is t2.micro. The screenshot also shows the AWS navigation bar and a Windows taskbar at the bottom.

Step 12: Monitor your instance by choosing Actions->Monitor & troubleshoot->Get System log for displaying system log

The screenshot shows the AWS EC2 Instances page with the same instance details. The "Actions" dropdown menu is open, and the "Monitor and troubleshoot" option is highlighted with a blue border. The screenshot also shows the AWS navigation bar and a Windows taskbar at the bottom.

Here, we see our vockey key entry has been displayed under ssh-rsa info, then click->cancel

The image displays three vertically stacked screenshots of the AWS CloudShell interface, showing the system log for an EC2 instance. The screenshots are identical, showing the log output for an EC2 instance launched on Aug 14, 2024.

System Log Output:

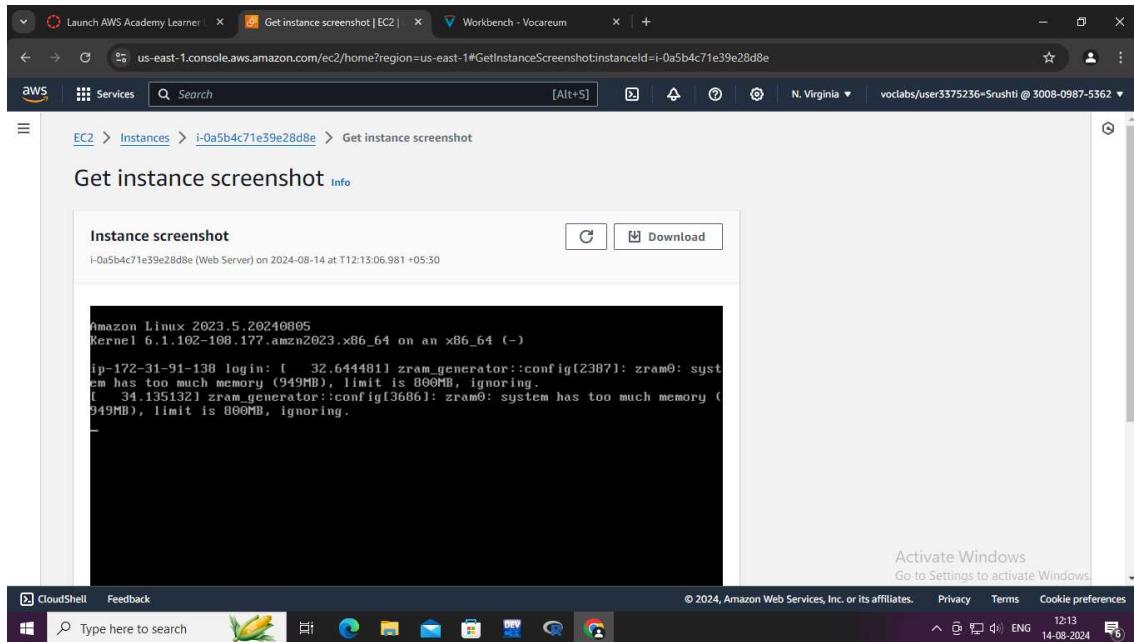
```
[ 33.469797] cloud-init[2203]: Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service
[ 34.135132] zram_generator::config[3686]: zram0: system has too much memory (949MB), limit is 880MB, ignoring.
ci-info: +-----+
ci-info: | Keypair | Fingerprint (sha256)
ci-info: +-----+
ci-info: | ssh-rsa | 4f:f1:85:5c:c3:0e:7e:7f:c3:15:3a:22:4b:1a:55:e9:84:b6:66:b6:00:fc:41:0a:58:95:7e:4e:22:d4:4e:55
ci-info: +-----+
<14>Aug 14 06:38:04 cloud-init: #####
<14>Aug 14 06:38:04 cloud-init: -----BEGIN SSH HOST KEY FINGERPRINTS-----
<14>Aug 14 06:38:04 cloud-init: 256 SHA256:NgbCwIn1phMCHng2wRqbfz1x82UMb51qrCT8owWpQ0 root@ip-172-31-91-138.ec2.internal
<14>Aug 14 06:38:04 cloud-init: 256 SHA256:gm8VE5f6cDFhQhb2dMzy5/mkx1rrxfSngGM/Gx055Yc root@ip-172-31-91-138.ec2.internal
<14>Aug 14 06:38:04 cloud-init: -----END SSH HOST KEY FINGERPRINTS-----
<14>Aug 14 06:38:04 cloud-init: #####
-----REGEN SSH HOST KEY KEYS-----
```

CloudShell Feedback:

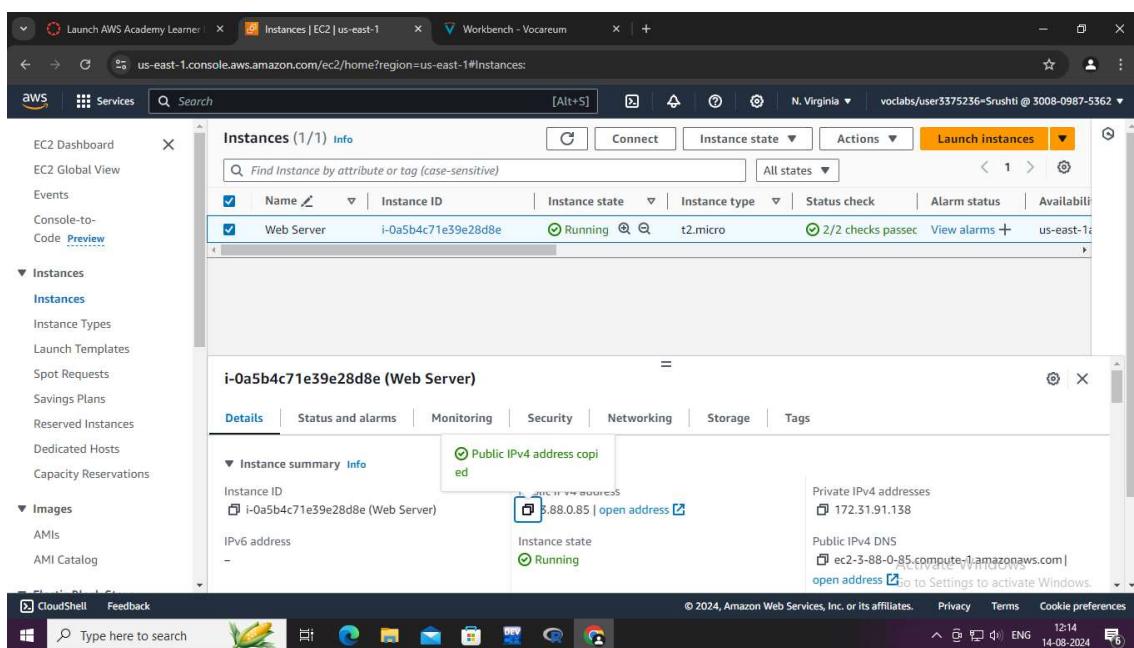
For boot or networking issues, use the EC2 serial console for troubleshooting. Choose the **Connect** button to start a session.

CloudShell Status:

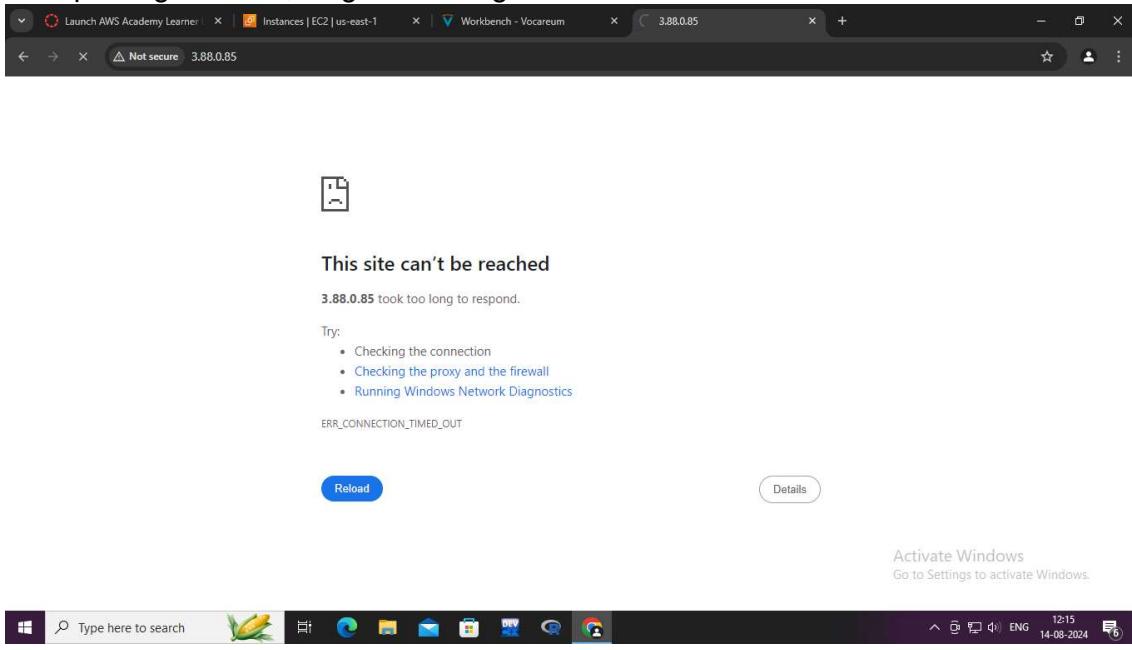
CloudShell is active. You can use the CloudShell interface to run commands and interact with your EC2 instance.



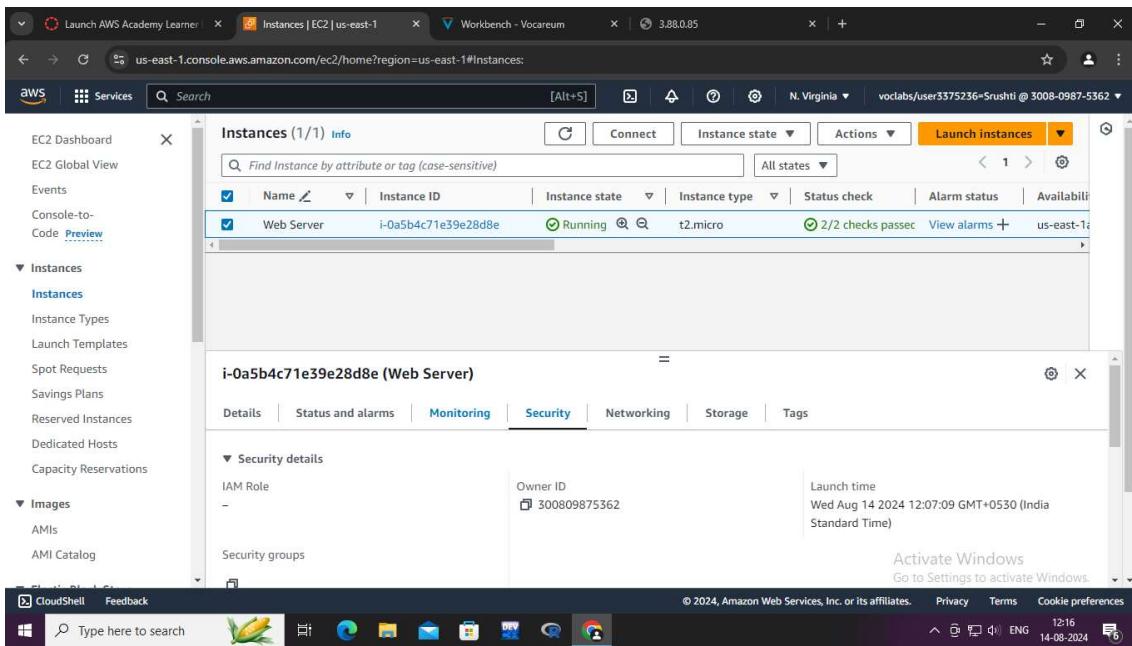
Step 13: Now choose Actions->Monitor & troubleshoot->Get Instance Screenshot



After pasting address, we get following screen



Step 15: Go back to EC2 tab



Step 16: Then click->Security Groups, select Web server security group

The screenshot shows the AWS EC2 Instances page. A single instance named "Web Server" (i-0a5b4c71e39e28d8e) is listed as "Running" in the t2.micro type. The "Inbound rules" section displays a single rule allowing port 22 from 0.0.0.0/0.

Step 17: Under Inbound rules choose Edit inbound rules

The screenshot shows the AWS Security Groups page. The "Web Server security group" (sg-017dc1c9487521634) is selected. The "Edit inbound rules" option is located in the top right corner of the "Details" panel.

Then, click on Add rule

Step 18: Give Security group Type as HTTP and Source as Anywhere IPv4 and click->Save rules

The screenshot shows the 'Edit inbound rules' section of the AWS EC2 ModifyInboundSecurityGroupRules interface. It lists two rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0211a88dd404e2d45	SSH	TCP	22	Cust... ▾	Q 0.0.0.0/0 X
-	HTTP	TCP	80	Any... ▾	Q 0.0.0.0/0 X

A button labeled 'Add rule' is visible at the bottom left. A warning message at the bottom states: 'Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' The browser status bar indicates the URL is `us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ModifyInboundSecurityGroupRules:securityGroupId=sg-017dc1c9487521634`.

The screenshot shows the 'Launch an instance' success page. It displays a green success message: 'Successfully initiated launch of instance (i-0fce53127b91d2343)'. Below this, there's a 'Next Steps' section with several options:

- Create billing and free tier usage alerts
- Connect to your instance
- Connect an RDS database
- Create EBS snapshot policy

Each option has a corresponding button. The browser status bar indicates the URL is `https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances`.

The screenshot shows the AWS EC2 Security Groups page. A success message at the top states: "Inbound security group rules successfully modified on security group (sg-017dc1c9487521634 | Web Server security group) Details". The main table lists three security groups:

Name	Security group ID	Security group name	VPC ID
-	sg-05aa6811f44442ec3	launch-wizard-4	vpc-0023adba117ccb851
-	sg-0f7e243ce8cb11e8b	launch-wizard-8	vpc-0023adba117ccb851
-	sg-078d75612827a85ed	launch-wizard-9	vnr-0023adba117ccb851

The left sidebar includes links for EC2 Dashboard, EC2 Global View, Events, Console-to-Code Preview, Instances, Images, AMIs, and AMI Catalog. The bottom right corner shows system status: Activate Windows, Go to Settings to activate Windows, © 2024, Amazon Web Services, Inc. or its affiliates., Privacy, Terms, Cookie preferences, 12:18, 14-08-2024.

Now we can able to see script that we have written in user data

The screenshot shows a web browser window with the address bar indicating "Not secure" and the IP address "3.88.0.85". The main content area displays the text "Hello From Your Web Server!". The bottom right corner shows system status: Activate Windows, Go to Settings to activate Windows, © 2024, Amazon Web Services, Inc. or its affiliates., Privacy, Terms, Cookie preferences, 12:18, 14-08-2024.

Step 19: Now stop the instance

The screenshot shows the AWS EC2 Instances page. A single instance, "Web Server" (i-0a5b4c71e39e28d8e), is listed as "Running". The "Actions" dropdown menu is open, with "Stop instance" highlighted. Other options include "Start instance", "Reboot instance", "Hibernate instance", and "Terminate instance".

Step 20: Change instance type by clicking->Instance Setting->Change instance type

The screenshot shows the AWS EC2 Instances page with a confirmation dialog titled "Stop instance?". It asks if the user wants to stop the instance, i-0a5b4c71e39e28d8e (Web Server). A note states: "After you stop the instance, you are no longer charged usage or data transfer fees for it. However, you will still be billed for associated resources, such as attached EBS volumes and associated Elastic IP addresses." There are "Cancel" and "Stop" buttons at the bottom.

Step 21:Take instance type as t2.small,then click->change

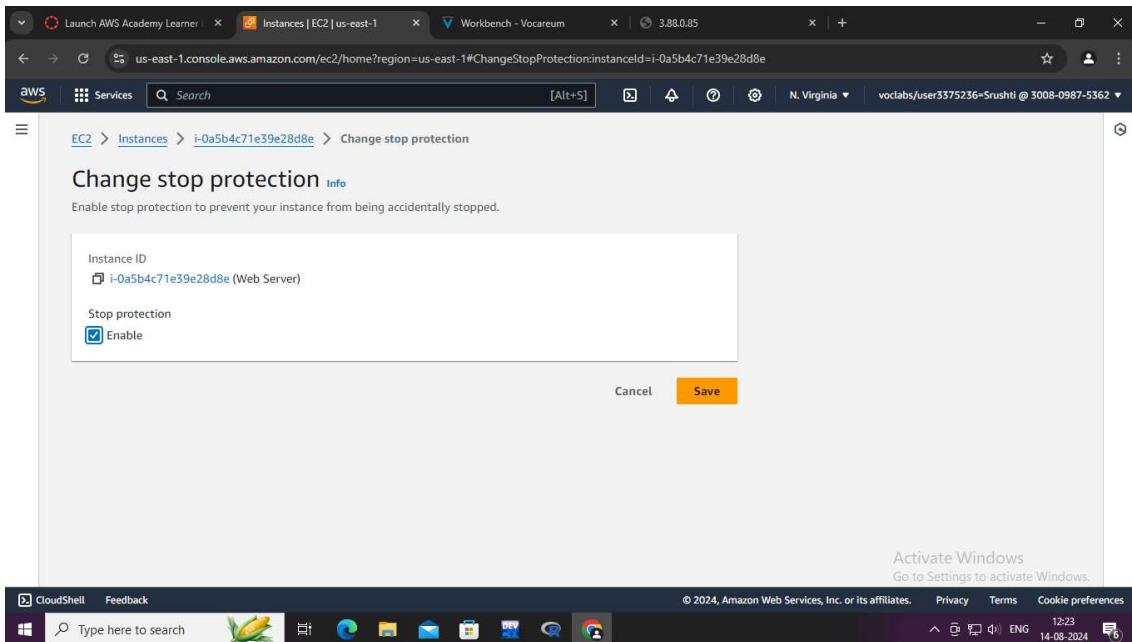
Here Instance type has been changed

Step 22:Now change the stop protection

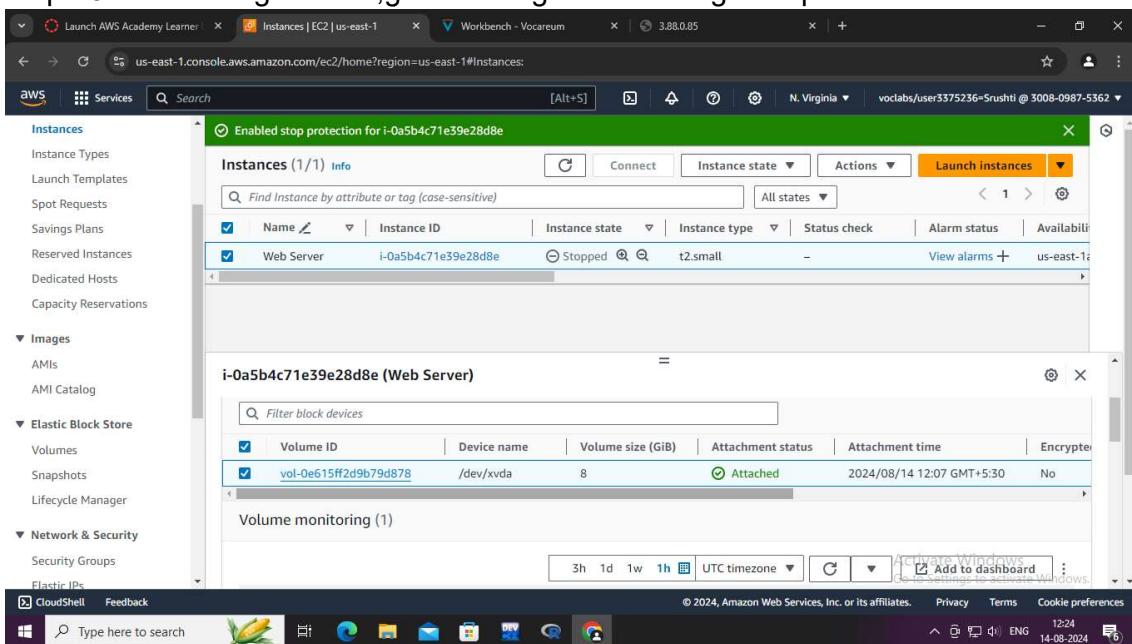
The screenshot shows the AWS EC2 Instances page. A modal window titled "Instance type changed successfully" is open, indicating that the instance type has been updated. The main table shows one instance named "Web Server" with the ID "i-0a5b4c71e39e28d8e". The previous instance type was "t2.small", which is now listed as "Changed". The current instance type is "t2.small". Other columns include "Status check" (indicated by a minus sign), "Alarm status" (indicated by a plus sign), and "Availability zone" (us-east-1a). The sidebar on the left shows navigation links for EC2 Dashboard, EC2 Global View, Events, and Instances.

The screenshot shows the AWS EC2 Instances page with the Actions dropdown menu open. The "Change stop protection" option is highlighted. The main table shows one instance named "Web Server" with the ID "i-0a5b4c71e39e28d8e". The instance state is "Stopped". The sidebar on the left shows navigation links for EC2 Dashboard, EC2 Global View, Events, and Instances.

Select enable and save



Step 23: For resizing volume, go to Storage at left navigation panel



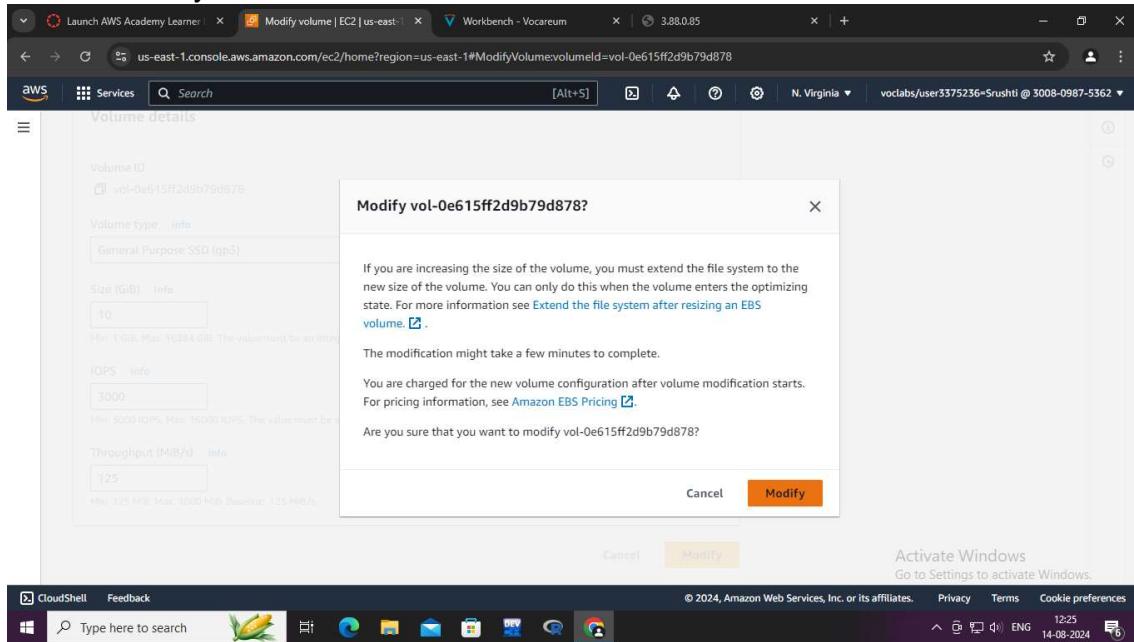
Step 24: Choose Actions->Modify volume

The screenshot shows the AWS Management Console with the Volumes page open. On the left, there's a sidebar with various services like Instances, Instance Types, Launch Templates, etc. The main area shows a table of volumes with one row selected. A context menu is open on the right, with 'Actions' expanded to show options like 'Modify volume', 'Create snapshot', and 'Delete volume'. The volume details pane at the bottom shows the selected volume's ID, type (gp3), size (8 GiB), IOPS (3000), and throughput (125). There's also a note about activating Windows.

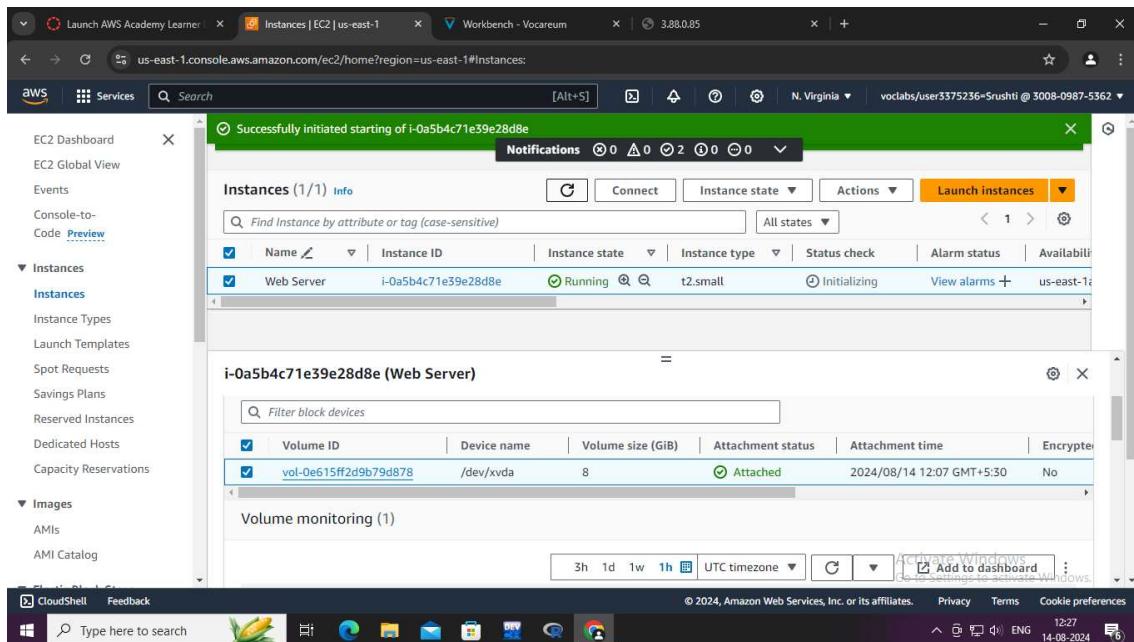
Step 24: Choose Actions->Modify volume

The screenshot shows the 'Modify volume' configuration dialog. It has sections for 'Volume details' where you can change the volume ID, type (set to 'General Purpose SSD (gp3)'), size (set to 10 GiB), IOPS (set to 3000), and throughput (set to 125). There are also sections for 'Encryption' and 'Tags'. At the bottom, there are 'Next Step' and 'Cancel' buttons. A note about activating Windows is present.

Click on modify



Step25:Again Start the resized instance ,by choosing instances state->start instance

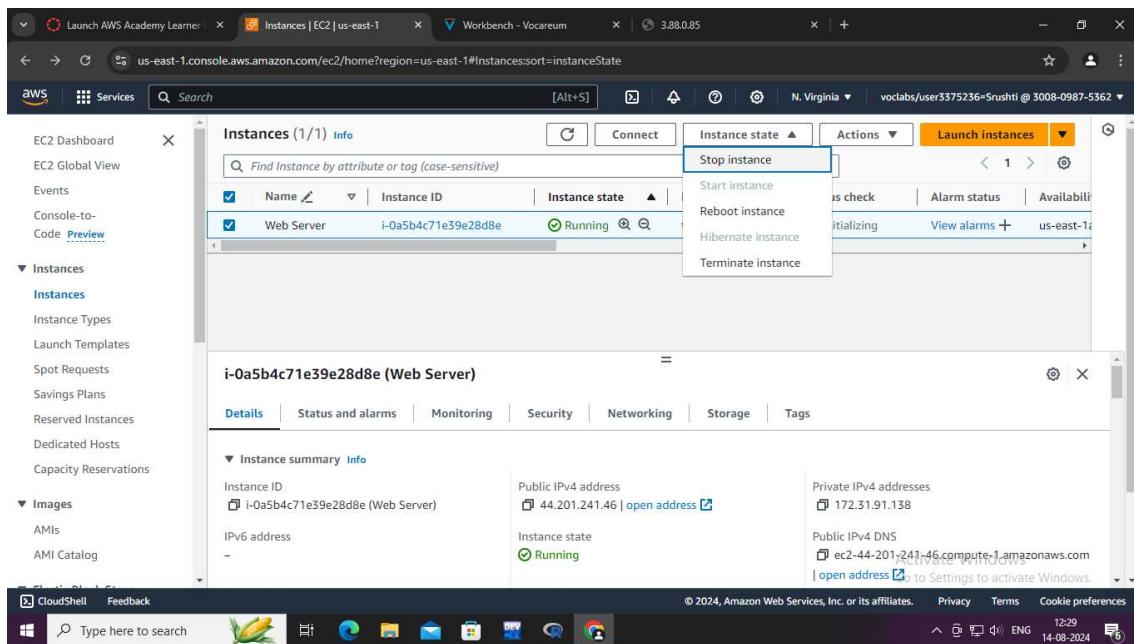


Step 26:Now in service tab search for Service Quotas

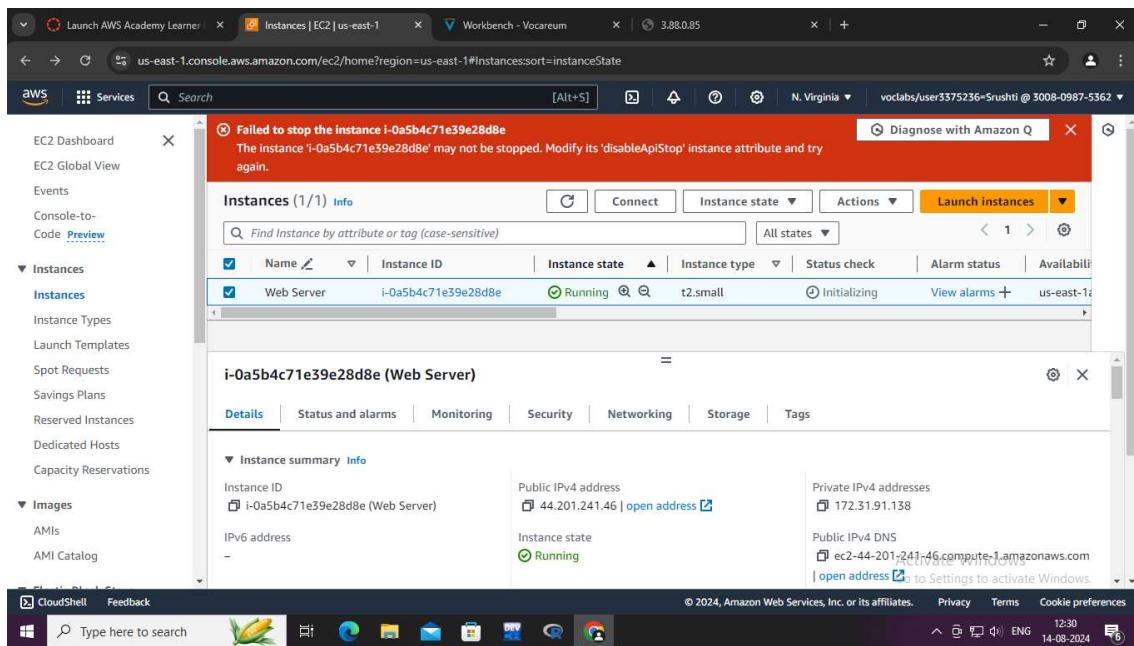
Step 27:Under Service Quotes select AWS services

Step 28:Now go back to Instances, and Stop Web Server.Instance state->Stop instance

Step 28:In AWS services choose Amazon EC2 and search and observe for 'running on-demand'



Step 29: Now change the stop protection



The screenshot shows the AWS EC2 Instances page. A prominent red banner at the top states: "Failed to stop the instance i-0a5b4c71e39e28d8e". Below the banner, the instance details for "Web Server" (i-0a5b4c71e39e28d8e) are displayed. In the Actions menu, the "Change stop protection" option is highlighted. The status bar at the bottom right shows the instance's public IP as 172.31.91.138 and its public DNS as ec2-44-201-241-46.compute-1.amazonaws.com.

We can see that successfully disabled stop protection message has arrived

The screenshot shows the "Change stop protection" dialog box for instance i-0a5b4c71e39e28d8e. The "Stop protection" checkbox is unchecked, indicating it is disabled. At the bottom of the dialog are "Cancel" and "Save" buttons. An "Activate Windows" watermark is visible in the background.

Step 30: Stop Web Server instance

The screenshot shows the AWS EC2 Instances page. A modal window titled "Disabled stop protection for i-0a5b4c71e39e28d8e" is displayed, indicating that the instance cannot be stopped because its "disableApiTermination" attribute is set to true. The main table lists one instance named "Web Server" with the ID "i-0a5b4c71e39e28d8e", which is currently "Running".

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability zone
Web Server	i-0a5b4c71e39e28d8e	Running	t2.small	2/2 checks passed	View alarms +	us-east-1a

i-0a5b4c71e39e28d8e (Web Server)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0a5b4c71e39e28d8e (Web Server)	44.201.241.46 open address	172.31.91.138

Notifications

Failed to terminate an instance: The instance i-0a5b4c71e39e28d8e may not be terminated. Modify its 'disableApiTermination' instance attribute and try again.

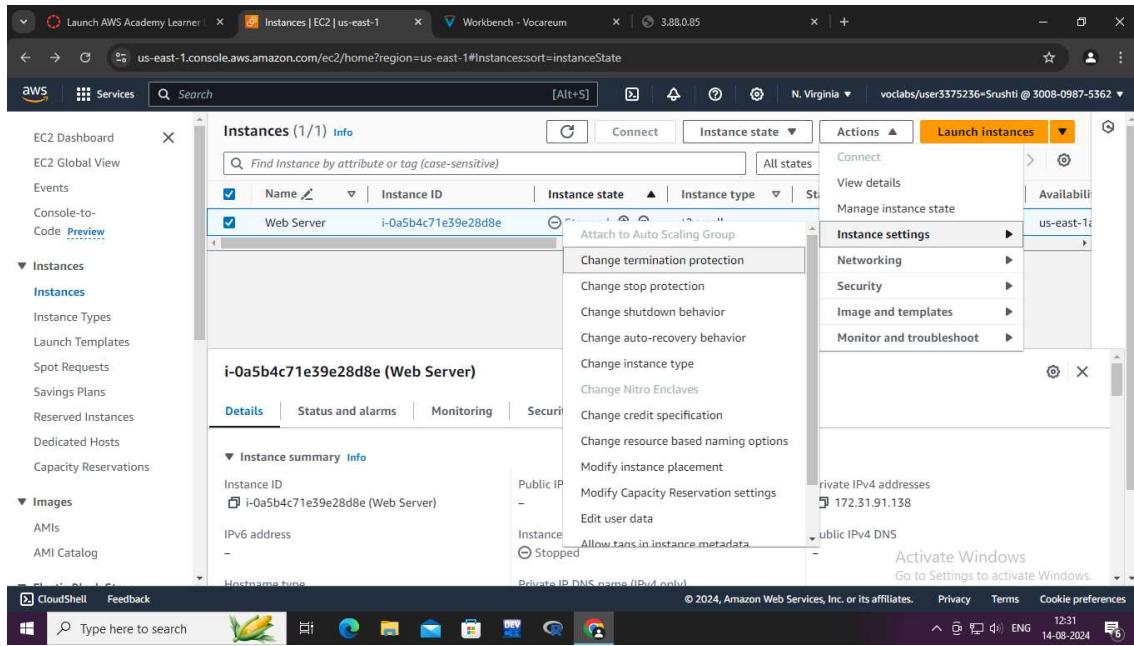
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability zone
Web Server	i-0a5b4c71e39e28d8e	Stopping	t2.small	-	View alarms +	us-east-1a

i-0a5b4c71e39e28d8e (Web Server)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0a5b4c71e39e28d8e (Web Server)	44.201.241.46 open address	172.31.91.138



Step 31:At the end,Terminate the instance.By choosing instance state->Terminate instance

