Placement Empowerment Program

Cloud Computing and DevOps Centre

Back Up and Restore a Cloud Instance : Take a snapshot of your cloud VM. Terminate the VM and restore it from the snapshot.

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Introduction

In today's cloud-driven world, ensuring data availability and reliability is paramount. This Proof of Concept (POC) focuses on the **Backup and Restore** process for a cloud instance, showcasing how critical data can be safeguarded and restored efficiently in AWS. By taking a snapshot, terminating the instance, and restoring it from the snapshot, this POC demonstrates the ease and reliability of AWS Elastic Block Store (EBS).

Overview

This POC involves working with Amazon Web Services (AWS) to perform the following tasks:

1. Launching an EC2 instance.
2. Creating an EBS snapshot of the instance's volume to back up its data.
3. Terminating the instance to simulate a failure or cost-saving scenario.
4. Restoring the instance using the snapshot by creating a new volume and attaching it to a new EC2 instance.

The step-by-step approach ensures no unnecessary charges while maintaining data integrity and availability.

Objective

The objective of this POC is to:

1. Demonstrate the process of creating and managing backups in AWS.
2. Explore the capabilities of EBS snapshots for disaster recovery.
3. Understand how to restore a terminated instance and verify data integrity.
4. Highlight cost-saving techniques using AWS Free Tier while ensuring operational readiness.

Importance

1. Disaster Recovery: Ensures that critical data can be restored quickly in case of an unexpected failure.

2. Cost Optimization: Demonstrates terminating unused instances and restoring them only when required.

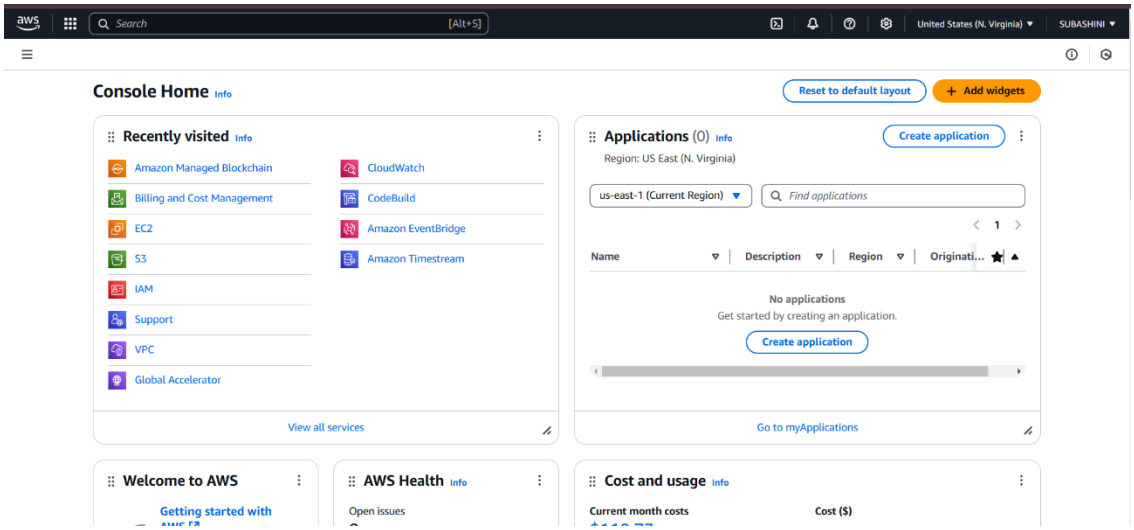
3. Scalability and Flexibility: Showcases AWS's ability to manage snapshots and volumes across regions and availability zones.

4. Practical Knowledge: Provides hands-on experience in working with EC2, EBS, and snapshot-based recovery processes.

Step-by-Step Overview

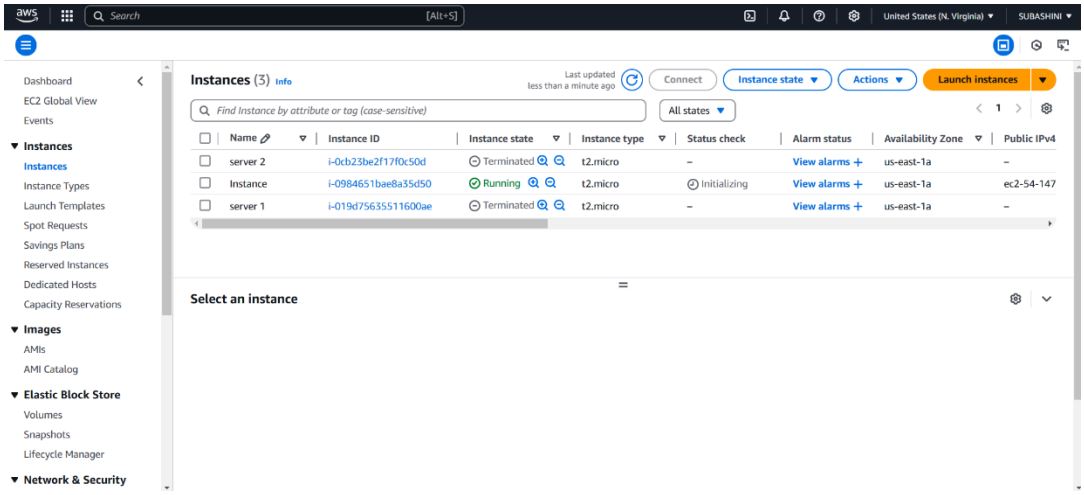
Step 1:

1. Go to AWS Management Console.
2. Enter your username and password to log in.



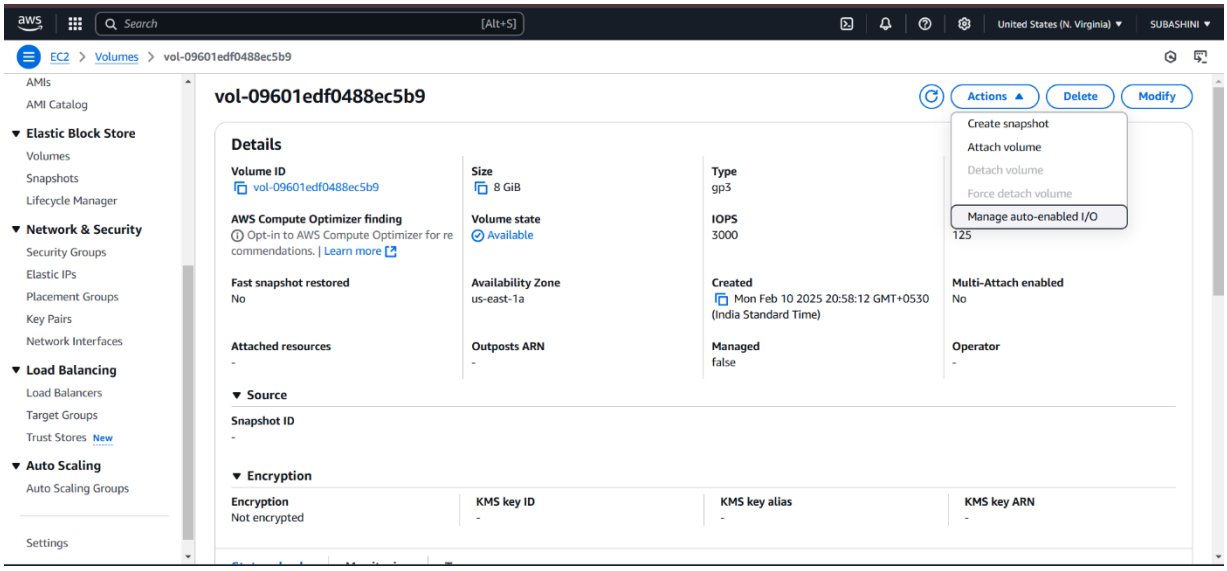
Step 2:

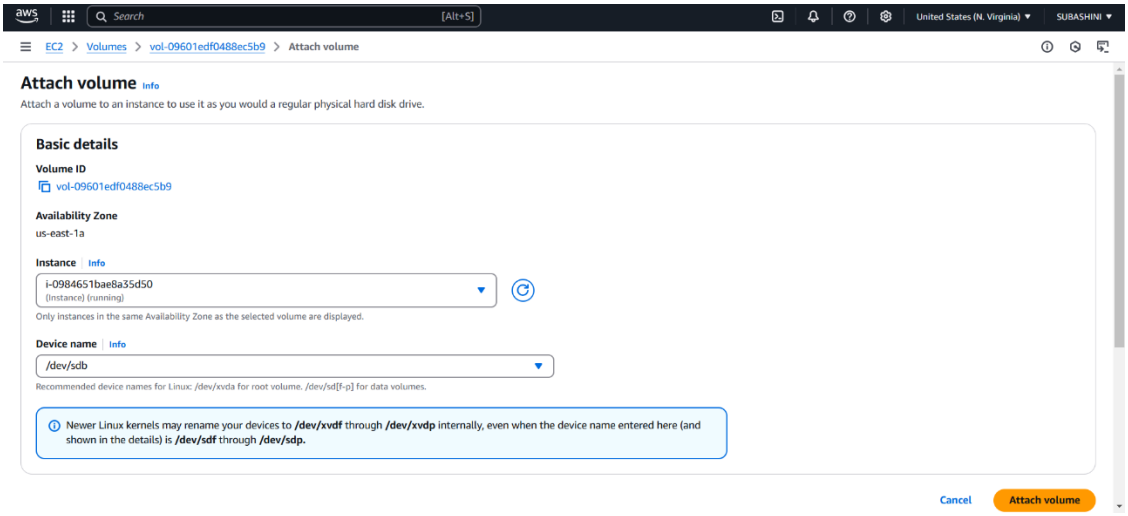
Launch an Ec2 instance.(Instance)



Step 3:

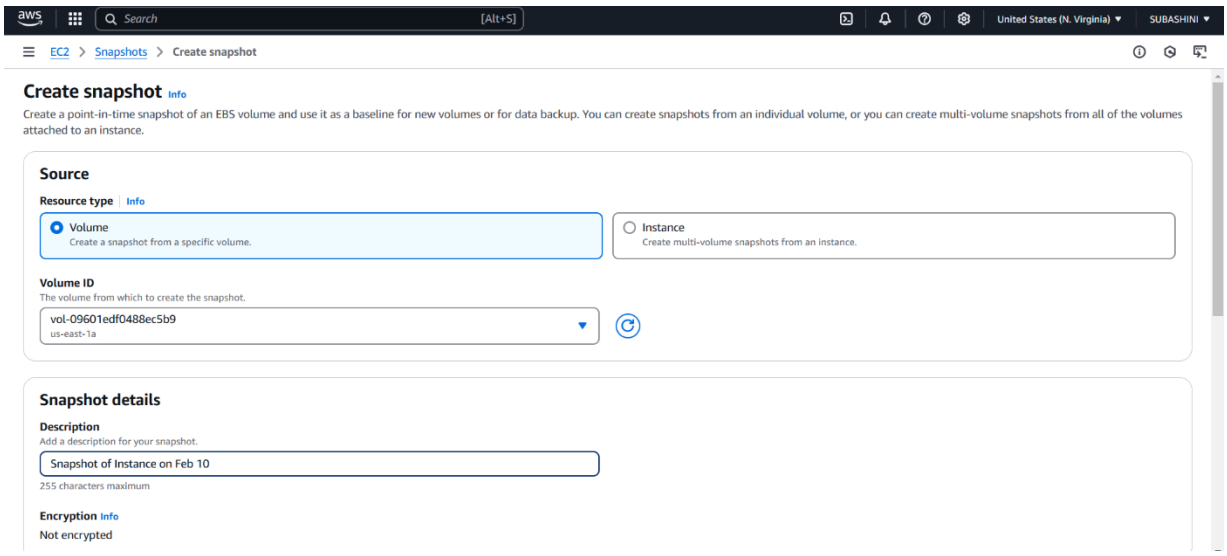
To create a new EBS volume in AWS, go to the EC2 Dashboard in the AWS Management Console by selecting **EC2** from the Services menu. In the left-hand menu, under **Elastic Block Store**, click on **Volumes**, then click the **Create Volume** button. Select **General Purpose SSD (gp3)** for the volume type, set the size (e.g., 8 GiB, within Free Tier limits), and choose the availability zone that matches your EC2 instance (e.g., us-east-1a). Leave the other options as default, then click **Create Volume**. Be sure to note the Volume ID for future reference.

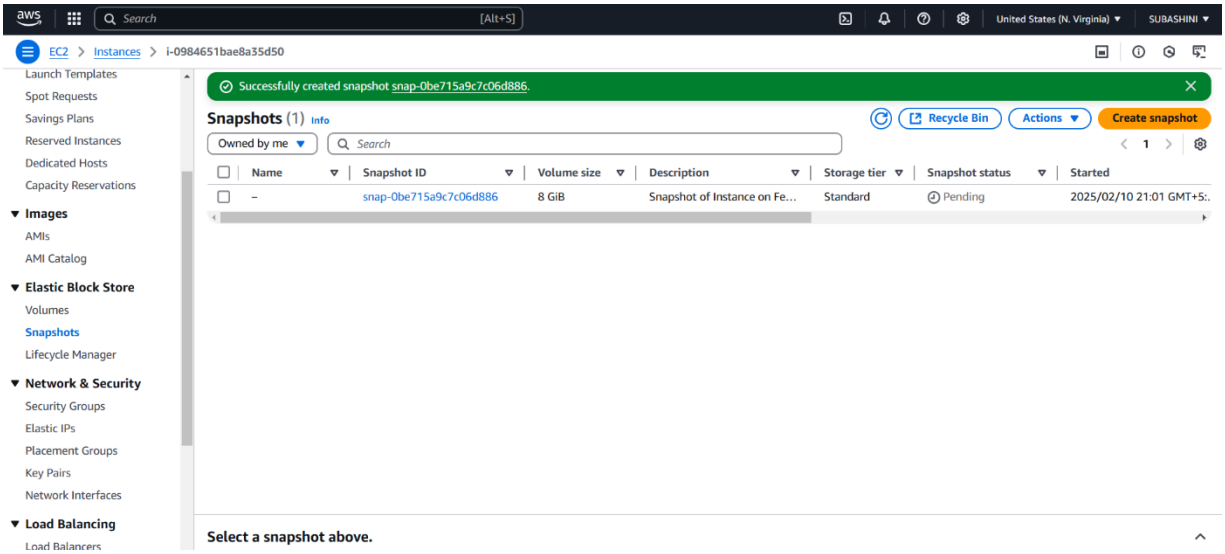




Step 4:

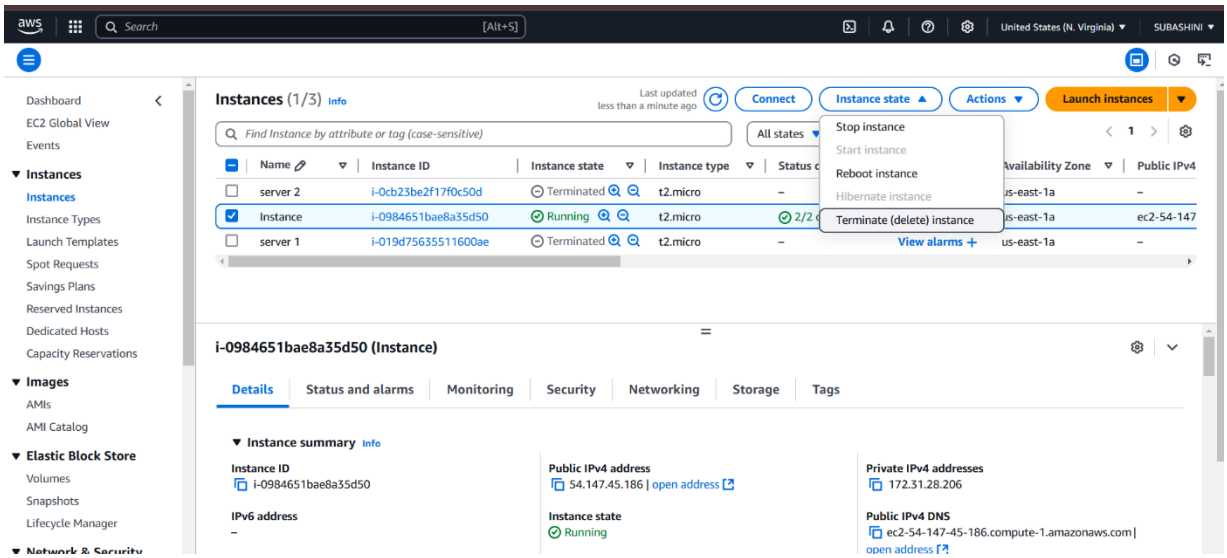
To create a snapshot of your EBS volume, navigate to the EC2 Dashboard in the AWS Management Console and click on **Volumes** under the **Elastic Block Store** section. Locate the volume attached to your instance (it should match the instance name or ID), select it, then click **Actions** > **Create Snapshot**. Add a meaningful description (e.g., "Snapshot of Instance on Feb 10") and click **Create Snapshot**. To monitor its status, go to **Snapshots** under Elastic Block Store in the left menu and wait for the status to change to **Completed**.





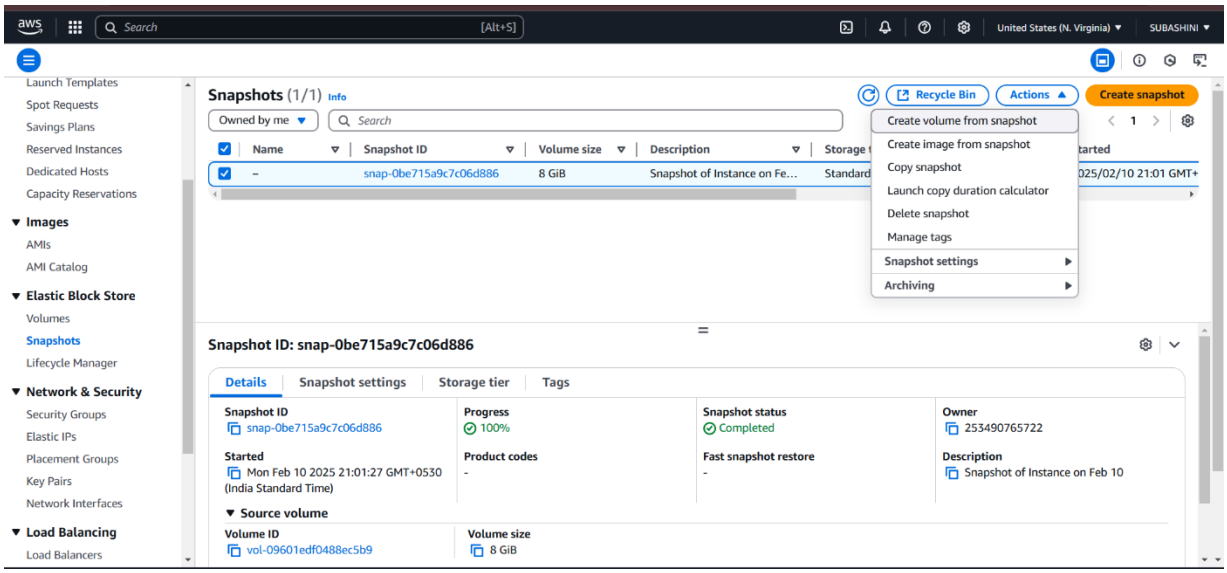
Step 5:

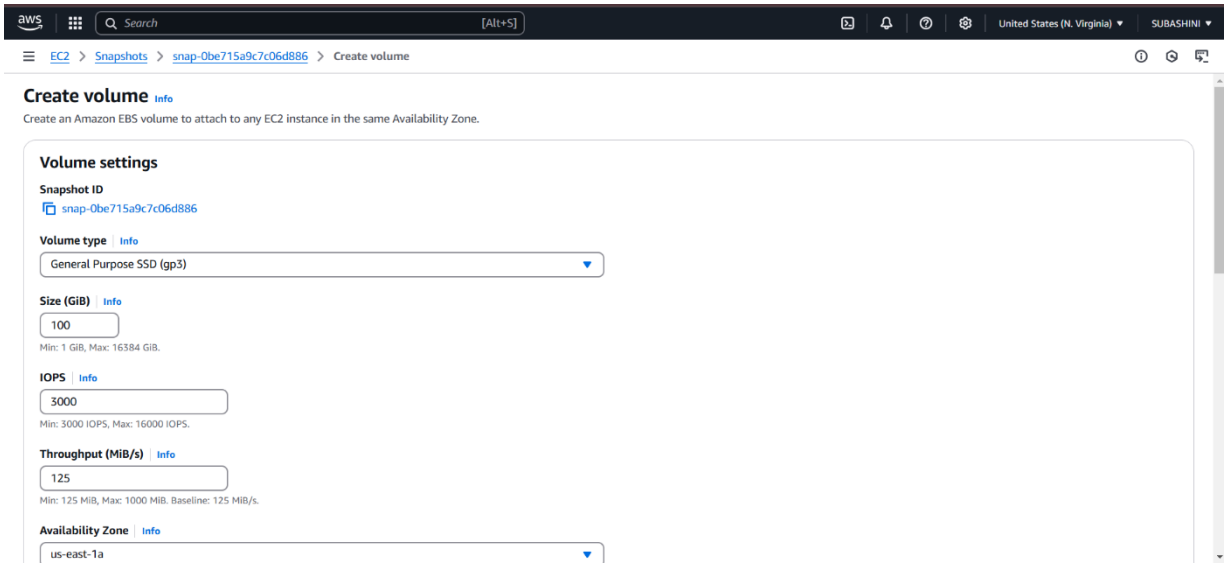
To terminate an EC2 instance, navigate to the EC2 Dashboard in the AWS Management Console and click on **Instances** under the **Instances** section. Locate the instance you want to terminate, then select it and click **Actions** > **Instance State** > **Terminate Instance**. Confirm the termination by clicking **Terminate**, and refresh the page after a few moments to see the instance state change to **Terminated**.



Step 6:

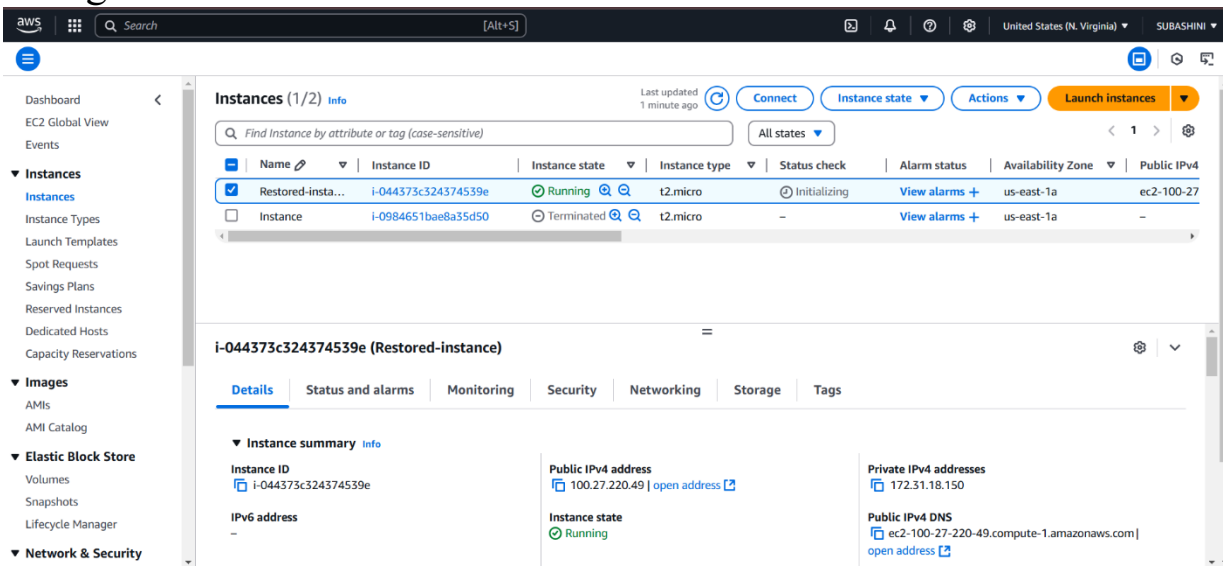
To create a new volume from the snapshot, go to the EC2 Dashboard and click on **Snapshots** under the **Elastic Block Store** section in the left menu. Select the snapshot you created earlier, then click **Actions** at the top and choose **Create Volume**. In the configuration settings, leave the **Size** as is (it will match the snapshot size) and select the same **Availability Zone** where you want to restore your instance (e.g., us-east-1a). Finally, click **Create Volume** to complete the process.





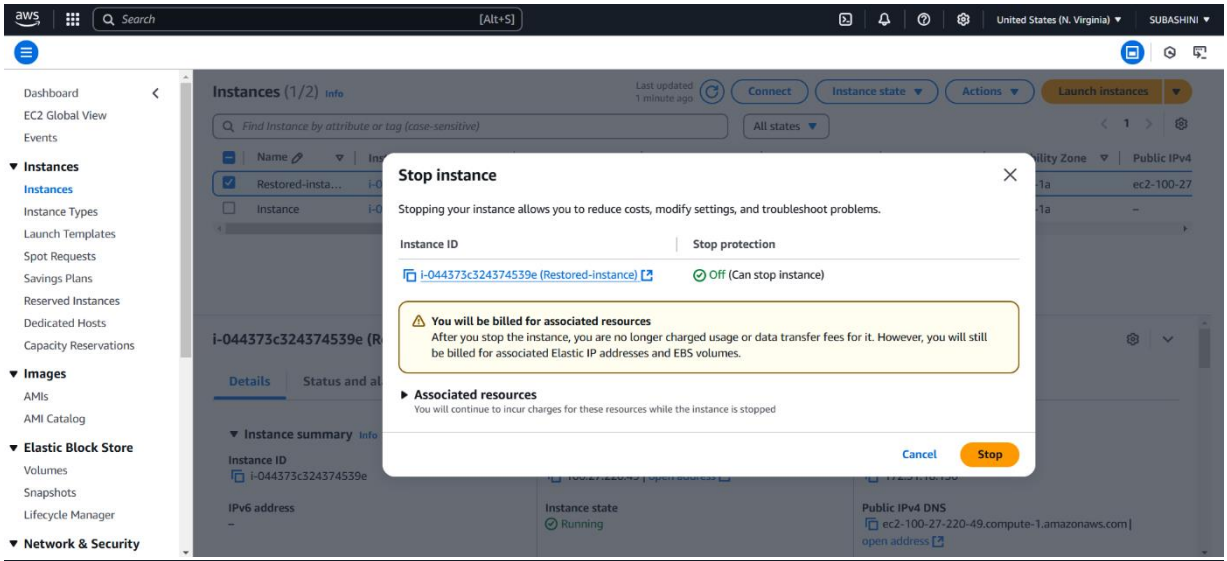
Step 7:

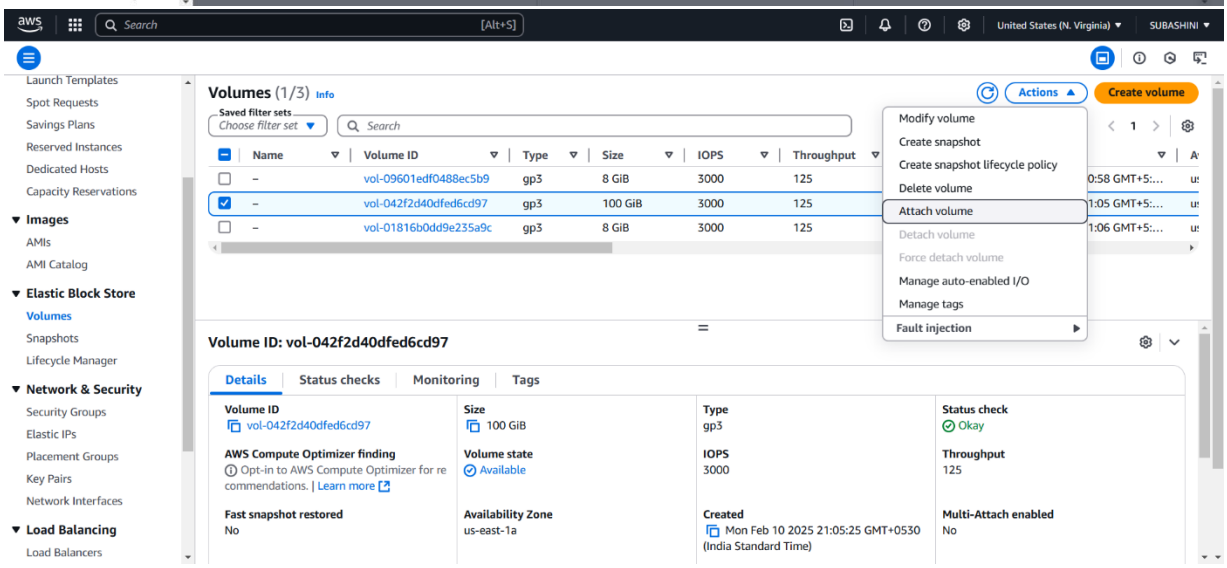
To launch a new instance, go to the EC2 Dashboard and click **Launch Instances**. Set the name of the new instance (e.g., **Restored-instance**) and choose the same AMI (e.g., **Amazon Linux 2023 Free Tier eligible**) as the original instance. Select **t2.micro** for the instance type (Free Tier eligible). Configure the instance as needed, but skip the storage section for now.

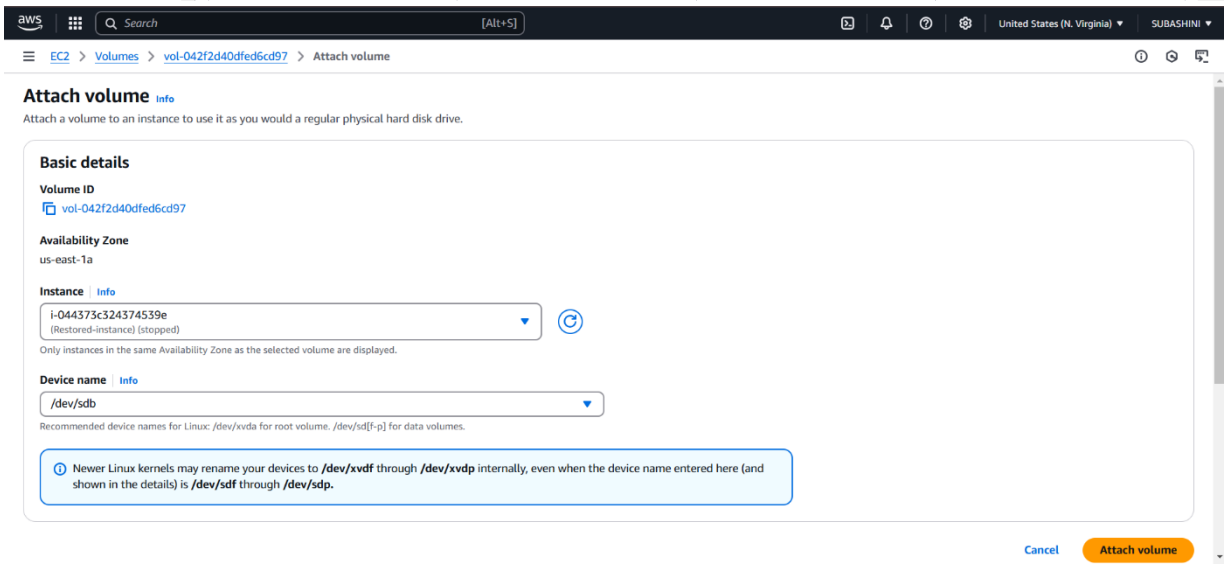


Step 8:

To attach the volume to the instance, first, stop the instance temporarily after it is launched by selecting the new instance, then click **Actions** > **Instance State** > **Stop Instance**. Next, go to **Volumes** in the left menu and select the new volume created from the snapshot. Click **Actions** > **Attach Volume**, and in the pop-up window, choose the new instance to attach the volume.


Stop instance
Stopping your instance allows you to reduce costs, modify settings, and troubleshoot problems.
Instance ID
Stop protection
i-044373c324374539e (Restored-instance)
Off (Can stop instance)
You will be billed for associated resources
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 Elastic IP addresses and EBS volumes.
Associated resources
You will continue to incur charges for these resources while the instance is stopped
Cancel
Stop


Volumes (1/3)
Actions
Create volume
Modify volume
Create snapshot
Create snapshot lifecycle policy
Delete volume
Attach volume
Detach volume
Force detach volume
Manage auto-enabled I/O
Manage tags
Fault injection
vol-09601edf0488ec5b9
vol-042f2d40dfed6cd97
vol-01816b0dd9e235a9c
Volume ID: vol-042f2d40dfed6cd97
Details
Status checks
Monitoring
Tags


EC2 > Volumes > vol-042f2d40dfed6cd97 > Attach volume
Attach volume
Attach a volume to an instance to use it as you would a regular physical hard disk drive.
Basic details
Volume ID
vol-042f2d40dfed6cd97
Availability Zone
us-east-1a
Instance
i-044373c324374539e
(Restored-instance) (stopped)
Only instances in the same Availability Zone as the selected volume are displayed.
Device name
/dev/sdb
Recommended device names for Linux: /dev/xvda for root volume. /dev/sd[f-p] for data volumes.
Newer Linux kernels may rename your devices to /dev/xvdf through /dev/xvdp internally, even when the device name entered here (and shown in the details) is /dev/sdf through /dev/sdp.
Cancel
Attach volume

Verify the Restoration

1. Connect to the instance using SSH or other methods.
2. Check if the files, data, and configurations match the original setup.

POC is **completed** successfully:

1. **Created a Snapshot** of your instance.
2. **Terminated the Instance** to avoid extra charges.
3. **Restored the Instance** using the snapshot by creating a volume and attaching it to a new VM.

Outcome

By completing this POC of **Back Up and Restore a Cloud Instance** in AWS, you will:

1. **Create and manage snapshots** of EC2 instances, enabling easy backup of instance data without manual intervention.
2. **Terminate instances** while ensuring that important data remains intact through the backup snapshot.
3. **Restore an instance** from a snapshot by creating a new EBS volume and attaching it to a fresh EC2 instance.
4. **Verify the restoration process**, ensuring data integrity and proper functionality after the instance is restored.
5. **Gain practical knowledge** of AWS services like EC2, EBS snapshots, and how to use them for backup and recovery, which is vital for disaster recovery and business continuity in the cloud.