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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.

The screenshot shows the AWS Management Console home page. At the top, there's a navigation bar with the AWS logo, search bar, and account information for 'United States (N. Virginia)' and 'Samiya'. Below the navigation is the 'Console Home' section with a sidebar for 'Recently visited' services like EC2, VPC, CloudFormation, Lightsail, Simple Queue Service, Simple Notification Service, S3, Billing and Cost Management, Amazon Comprehend, and CloudFront. To the right, there are sections for 'Applications' (0), 'Cost and usage' (with current month costs at \$3.40), and 'AWS Health' (0 open issues). A 'Welcome to AWS' box encourages users to get started with AWS. At the bottom, there are links for CloudShell, Feedback, Privacy, Terms, and Cookie preferences.

Step 2:

Launch an Ec2 instance.(Backup Instance)

The screenshot shows the EC2 Instances page. The left sidebar includes 'Instances' (selected), 'Images', 'Elastic Block Store', and 'Network & Security'. The main area displays a table of instances with columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Public IP. There are six instances listed: 'Samiya Web S...' (terminated), 'WebServer1' (shutting down), 'WebServer2' (shutting down), 'Backup Instance' (running), 'i-0bef0fb8bb153aaa' (shutting down), and 'i-040dba95e48b4e4cc' (terminated). A 'Launch instances' button is at the top right. Below the table, a 'Select an instance' dropdown menu is open, showing 'Instances' as the selected option. At the bottom, there are links for CloudShell, Feedback, Privacy, Terms, and Cookie preferences.

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-1b). Leave the other options as default, then click **Create Volume**. Be sure to note the Volume ID for future reference.

The screenshot shows the AWS EC2 Volumes page. On the left, there's a navigation sidebar with sections like Dashboard, Instances, Images, Elastic Block Store, and Network & Security. The main area displays a single volume named "vol-0bd88e1b0b5cfa864". The volume details are as follows:

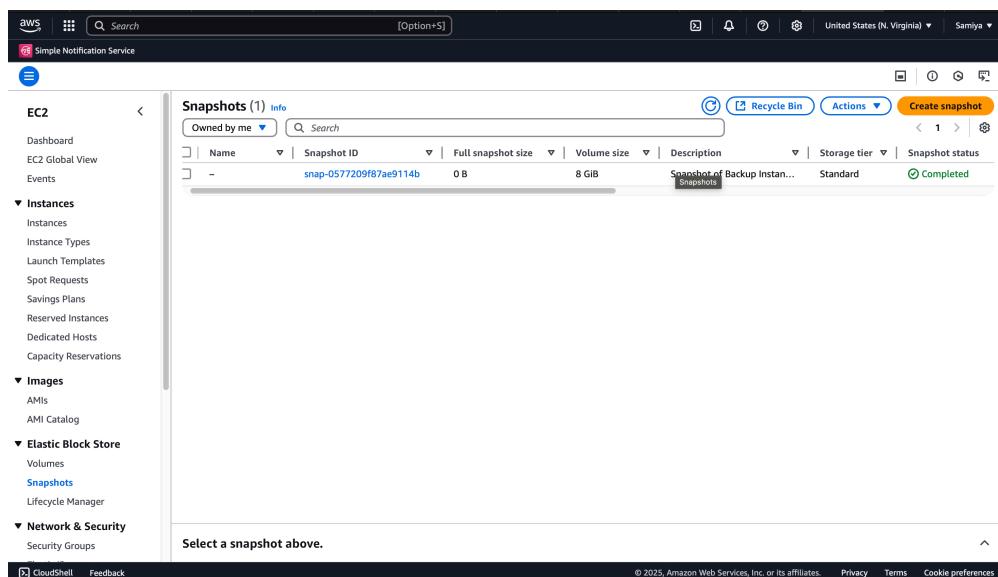
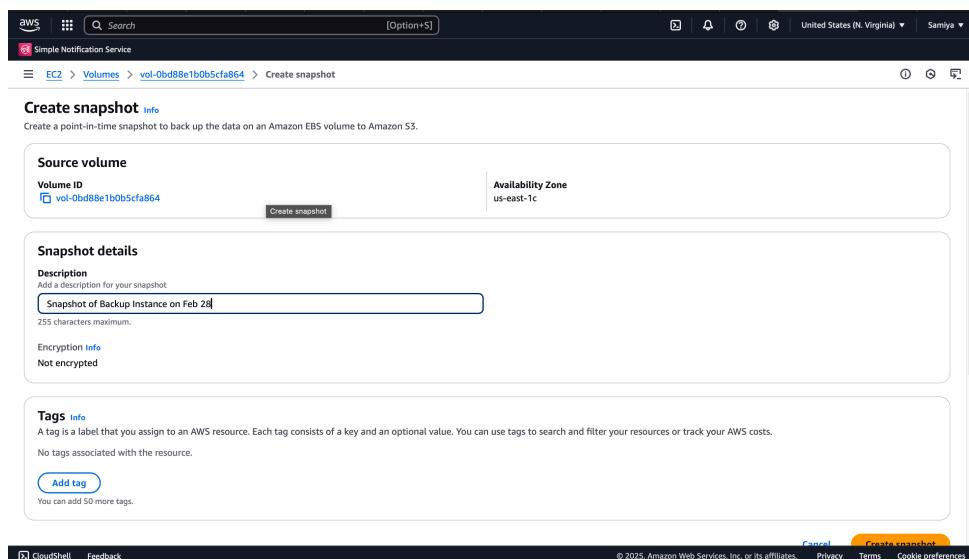
- Volume ID:** vol-0bd88e1b0b5cfa864
- Size:** 8 GiB
- Type:** gp3
- Volume state:** Available
- IOPS:** 3000
- Fast snapshot restored:** No
- Availability Zone:** us-east-1c
- Created:** Fri Feb 28 2025 01:37:34 GMT+0530 (India Standard Time)
- Attached resources:** -
- Outposts ARN:** -
- Managed:** false
- Multi-Attach enabled:** No
- Operator:** -

A context menu is open over the volume, with "Attach volume" highlighted. Other options in the menu include Create snapshot, Detach volume, Force detach volume, Manage auto-enabled I/O, and T2S.

The screenshot shows the "Attach volume" dialog box. It has a section for "Basic details" where the Volume ID is listed as "vol-0bd88e1b0b5cfa864" and the Availability Zone is "us-east-1c". Below this, there's a dropdown for "Instance" containing "i-08c1b9f6ac2b9240 (Backup Instance (running))". There's also a dropdown for "Device name" with "/dev/sdb" selected. A note at the bottom states: "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." At the bottom right, there are "Cancel" and "Attach volume" buttons.

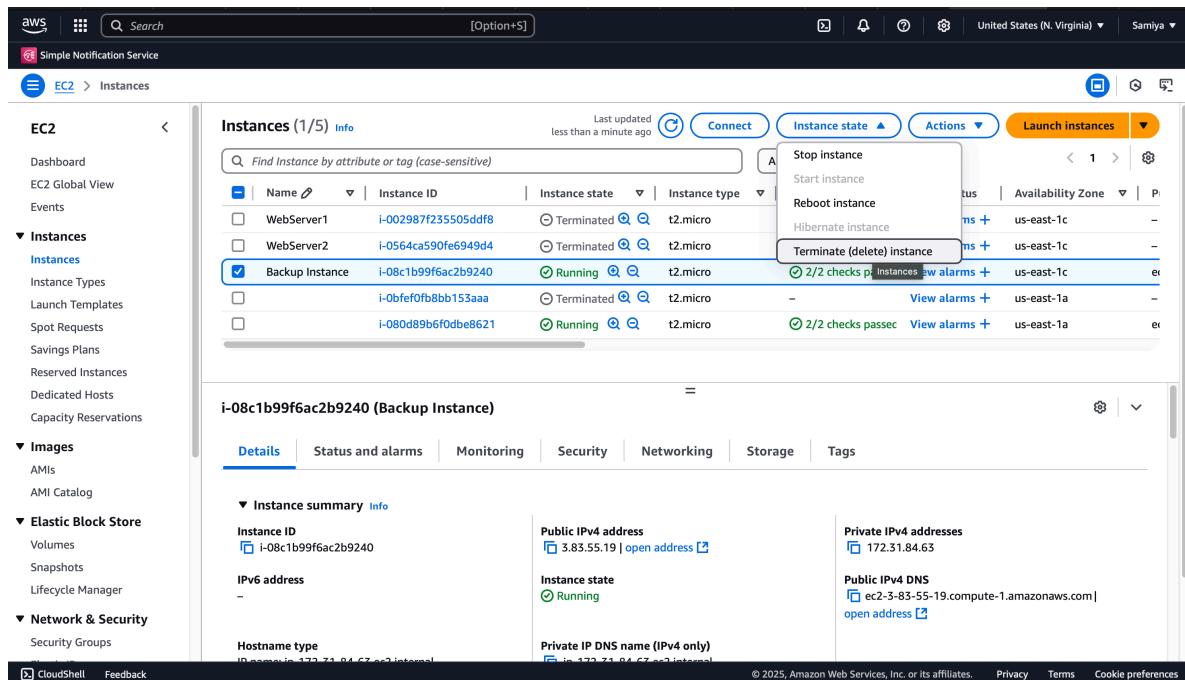
Step 4:

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 Backup Instance on Feb 28") 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.

Snapshots (1/1) [Info](#)

Name	Snapshot ID	Full snapshot size	Volume size	Description
-	snap-0577209f87ae9114b	0 B	8 GiB	Snap

[Create snapshot](#) [Recycle Bin](#) [Actions ▾](#)

[Create volume from snapshot](#) [Create image from snapshot](#)
[Copy snapshot](#) [Launch copy duration calculator](#)
[Delete snapshot](#) [Snapshots settings](#)
[Archiving](#)

[Completed](#)

Snapshot ID: snap-0577209f87ae9114b

Details	Snapshot settings	Storage tier	Tags
Snapshot ID snap-0577209f87ae9114b	Full snapshot size 0 B	Progress 100%	Snapshot status Completed
Owner 762233734761	Started Fri Feb 28 2025 01:43:28 GMT+0530 (India Standard Time)	Product codes -	Fast snapshot restore -
Description Snapshot of Backup Instance on Feb 28			
Source volume Volume ID	Volume size Volume ID		

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[EC2](#) > [Snapshots](#) > [snap-0577209f87ae9114b](#) > Create volume

Create volume [Info](#)

Create an Amazon EBS volume to attach to any EC2 instance in the same Availability Zone.

Volume settings

Snapshot ID [snap-0577209f87ae9114b](#)

Volume type [Info](#) General Purpose SSD (gp3)

Size (GiB) [Info](#) 8

Min: 1 GiB, Max: 16384 GiB.

IOPS [Info](#) 3000

Min: 3000 IOPS, Max: 16000 IOPS.

Throughput (MiB/s) [Info](#) 125

Min: 125 MiB, Max: 1000 MiB, Baseline: 125 MiB/s.

Availability Zone [Info](#) us-east-1b

Fast snapshot restore [Info](#) Not enabled for selected snapshot

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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-POC-VM**) 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.

The screenshot shows the AWS EC2 Instances page. The left sidebar includes options like Dashboard, EC2 Global View, Events, Instances (with sub-options Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations), Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), and Network & Security (Security Groups). The main content area displays a table of instances with columns: Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Pub. The instances listed are:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pub
Restored-POC...	i-0fce596c331abd319	Running	t2.micro	Initializing	View alarms	us-east-1c	ec2-
WebServer1	i-002987f235505ddf8	Terminated	t2.micro	-	View alarms	us-east-1c	-
WebServer2	i-0564ca590fe6949d4	Terminated	t2.micro	-	View alarms	us-east-1c	-
Backup Instance	i-08c1b99f6ac2b9240	Terminated	t2.micro	-	View alarms	us-east-1c	-
	i-0bfef0fb8bb153aaa	Terminated	t2.micro	-	View alarms	us-east-1a	-
	i-080d89b6f0dbe8621	Running	t2.micro	2/2 checks passed	View alarms	us-east-1a	ec2-

At the bottom of the main content area, there is a button labeled "Select an instance". The footer of the page includes links for CloudShell, Feedback, and copyright information: © 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences.

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.

The screenshot shows the AWS EC2 Instances page with a modal dialog titled "Stop instance". The dialog contains the following text:

Stopping your instance allows you to reduce costs, modify settings, and troubleshoot problems.

Instance ID: i-0fce596c331abd319 (Restored-POC-VM) | Stop protection: 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

At the bottom of the dialog are two buttons: "Cancel" and "Stop".

The screenshot shows the AWS Simple Notification Service Volumes page. On the left, there's a navigation sidebar with various AWS services like Capacity Reservations, Images, Elastic Block Store, Network & Security, Load Balancing, and Auto Scaling. The main area displays a table of volumes with columns: Name, Volume ID, Type, Size, IOPS, and Throughput. One volume, 'vol-0bd88e1b0b5cfa864', is selected and highlighted in blue. A context menu is open over this volume, listing options such as 'Actions' (Modify volume, Create snapshot, etc.), 'Create volume', 'Attach volume' (selected), 'Detach volume', 'Force detach volume', 'Manage auto-enabled I/O', 'Manage tags', and 'Fault injection'. Below the table, a detailed view for the selected volume is shown, including its Volume ID, Size (8 GiB), Type (gp3), IOPS (3000), Status check (Okay), and other details like Availability Zone (us-east-1c) and Multi-Attach enabled (No). At the bottom of the page, there are links for CloudShell and Feedback.

The screenshot shows the 'Attach volume' dialog box. It has a header 'Attach volume' with a 'Info' link. Below it, a sub-header says 'Attach a volume to an instance to use it as you would a regular physical hard disk drive.' Under 'Basic details', there are fields for 'Volume ID' (set to 'vol-0bd88e1b0b5cfa864'), 'Availability Zone' (set to 'us-east-1c'), and 'Instance' (set to 'i-0fce596c331abd519 (Restored-POC-VM) (stopped)'). There's also a 'Device name' field set to '/dev/sdb'. A note below the device name field states: '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.' At the bottom right of the dialog are 'Attach volume', 'Cancel', and 'Attach volume' (a yellow button).

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.