Cost Optimisation in AWS

Cost Optimisation cannot be done only by moving towards the cloud, but some practices need to be followed, for example when we create an EC2 instance, by default volume is created and for the backup snapshots are also stored, when we delete the EC2 instance and forgot to delete the volume and snapshots and AWS keeps charging for volumes and snapshots. If the DevOps Engineer has found any such resources, they can send notifications or they can delete the instance. They will use Lambda function to write python code which will talk to API of AWS.

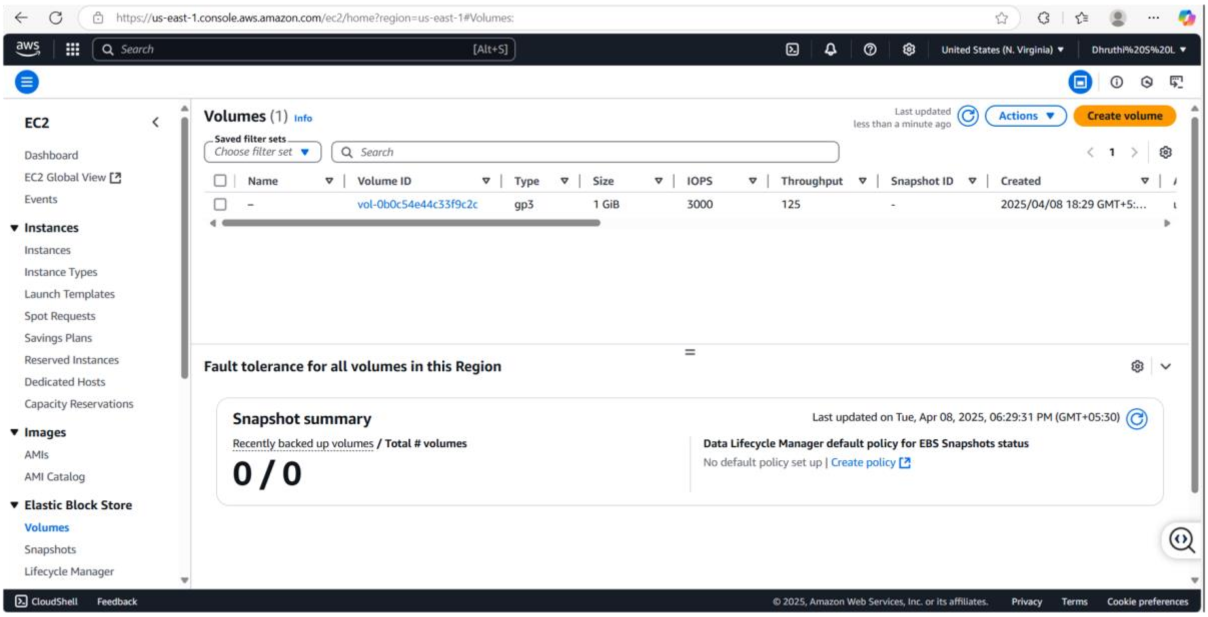
Steps:

1. Find all the EBS snapshots
2. To filter out the snapshots that are stale.

Steps:

1. Creating an EC2 instance

Volume is created along with EC2 instance



Volumes (1) Info

☐	Name	Volume ID	Type	Size	IOPS	Throughput	Snapshot ID	Created
☐	–	vol-0b0c54e44c33f9c2c	gp3	1 GiB	3000	125	-	2025/04/08 18:29 GMT+5:...

Fault tolerance for all volumes in this Region

Snapshot summary

Last updated on Tue, Apr 08, 2025, 06:29:31 PM (GMT+05:30)

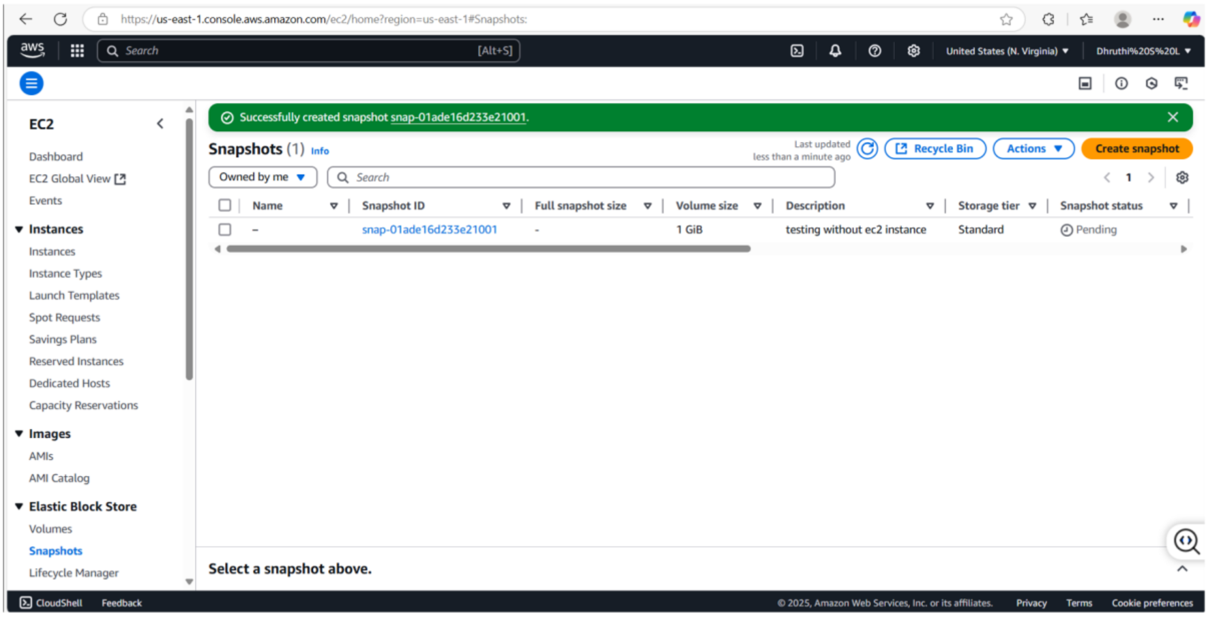
Recently backed up volumes / Total # volumes

0 / 0

Data Lifecycle Manager default policy for EBS Snapshots status

No default policy set up | Create policy

2. Create a snapshot, where it is like storing the image.



Successfully created snapshot snap-01ade16d233e21001.

Snapshots (1) Info

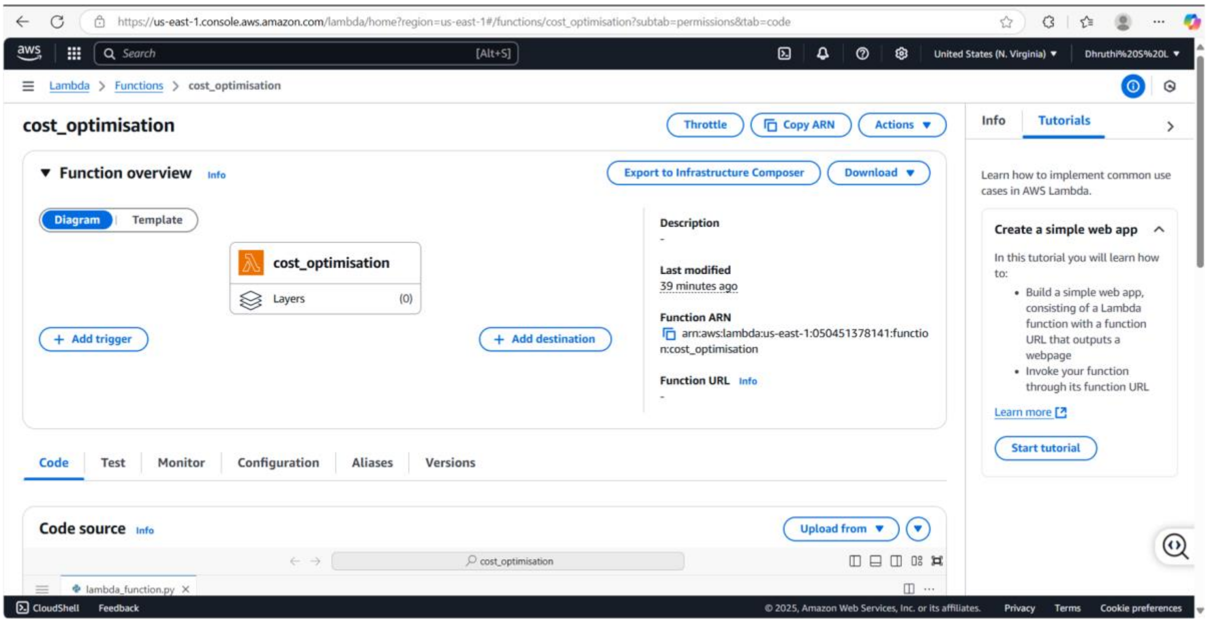
Last updated less than a minute ago

Name	Snapshot ID	Full snapshot size	Volume size	Description	Storage tier	Snapshot status
–	snap-01ade16d233e21001	-	1 GiB	testing without ec2 instance	Standard	Pending

Select a snapshot above.

But the person forgot to delete the snapshot and deleted the volume and instance.

3. Create a lambda function.


https://us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/cost_optimisation?subtab=permissions&tab=code
Lambda > Functions > cost_optimisation
Throttle
Copy ARN
Actions
Export to Infrastructure Composer
Download
Diagram
Template
Layers (0)
Add trigger
Add destination
Code
Test
Monitor
Configuration
Aliases
Versions
Upload from
lambda_function.py
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cost_optimisation

Function overview Info

Description
-

Last modified
39 minutes ago

Function ARN
arn:aws:lambda:us-east-1:050451378141:function:cost_optimisation

Function URL Info
-

Code source Info

Learn how to implement common use cases in AWS Lambda.

Create a simple web app

In this tutorial you will learn how to:

- Build a simple web app, consisting of a Lambda function with a function URL that outputs a webpage
- Invoke your function through its function URL

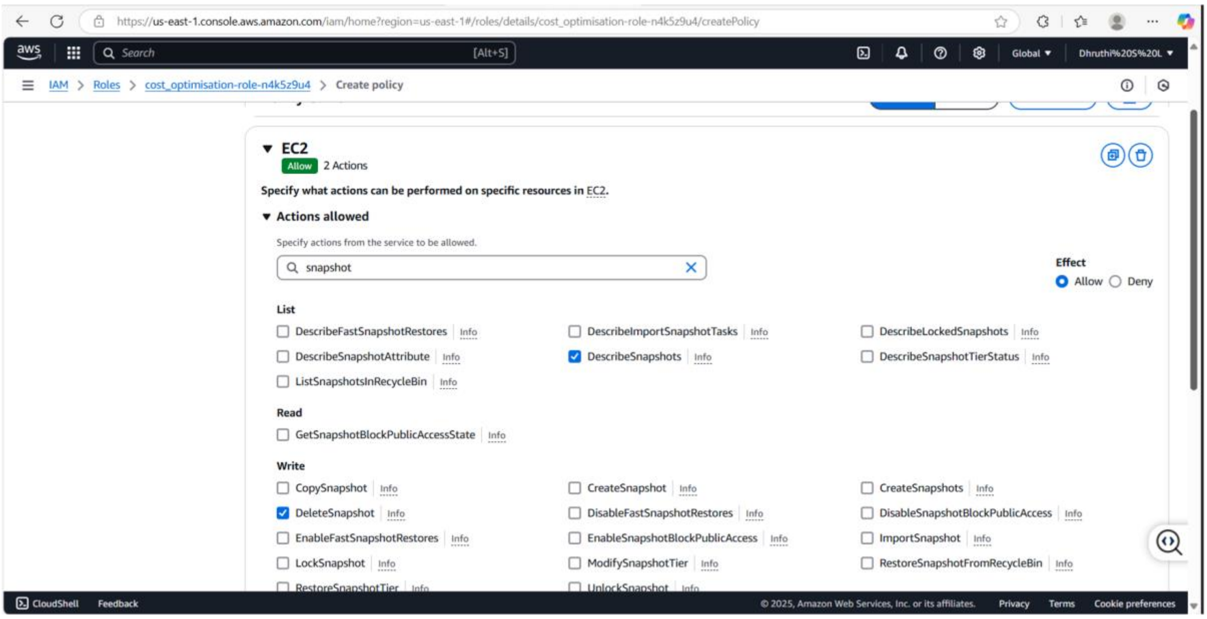
In the code source update the code.

```
import boto3

def lambda_handler(event, context):
    ec2 = boto3.client('ec2')

    # Get all EBS snapshots
    response = ec2.describe_snapshots(OwnerIds=['self'])

    # Get all active EC2 instance IDs
    instances_response = ec2.describe_instances(Filters=[{'Name': 'instance-state-name', 'Values': ['running']}])
    active_instance_ids = set()

    for reservation in instances_response['Reservations']:
        for instance in reservation['Instances']:
            active_instance_ids.add(instance['InstanceId'])

    # Iterate through each snapshot and delete if it's not attached to any volume or the volume is not attached to a running instance
    for snapshot in response['Snapshots']:
        snapshot_id = snapshot['SnapshotId']
        volume_id = snapshot.get('VolumeId')

        if not volume_id:
            # Delete the snapshot if it's not attached to any volume
            ec2.delete_snapshot(SnapshotId=snapshot_id)
            print(f"Deleted EBS snapshot {snapshot_id} as it was not attached to any volume.")
        else:
            # Check if the volume still exists
            try:
                volume_response = ec2.describe_volumes(VolumeIds=[volume_id])
                if not volume_response['Volumes'][0]['Attachments']:
                    ec2.delete_snapshot(SnapshotId=snapshot_id)
                    print(f"Deleted EBS snapshot {snapshot_id} as it was taken from a volume not attached to any running instance.")
            except ec2.exceptions.ClientError as e:
                if e.response['Error']['Code'] == 'InvalidVolume.NotFound':
                    # The volume associated with the snapshot is not found (it might have been deleted)
                    ec2.delete_snapshot(SnapshotId=snapshot_id)
        print(f"Deleted EBS snapshot {snapshot_id} as its associated volume was not found.")
```

Execution time for the lambda function needs to be increased, in this case it can be increased up to 10 seconds.
AWS considers execution time for billing hence try to keep it as less as possible.
When one service tries to talk to other service it happens with the IAM roles.

4. Attach policies to IAM.

Some policies were not available; hence we need to create it.
Select service as EC2 for creating policy.
Attach the created policy



https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles/details/cost_optimisation-role-n4k5z9u4/createPolicy

IAM > Roles > cost_optimisation-role-n4k5z9u4 > Create policy

EC2

Allow 2 Actions

Specify what actions can be performed on specific resources in EC2.

Actions allowed

Specify actions from the service to be allowed.

snapshot

Effect: ● Allow ○ Deny

List

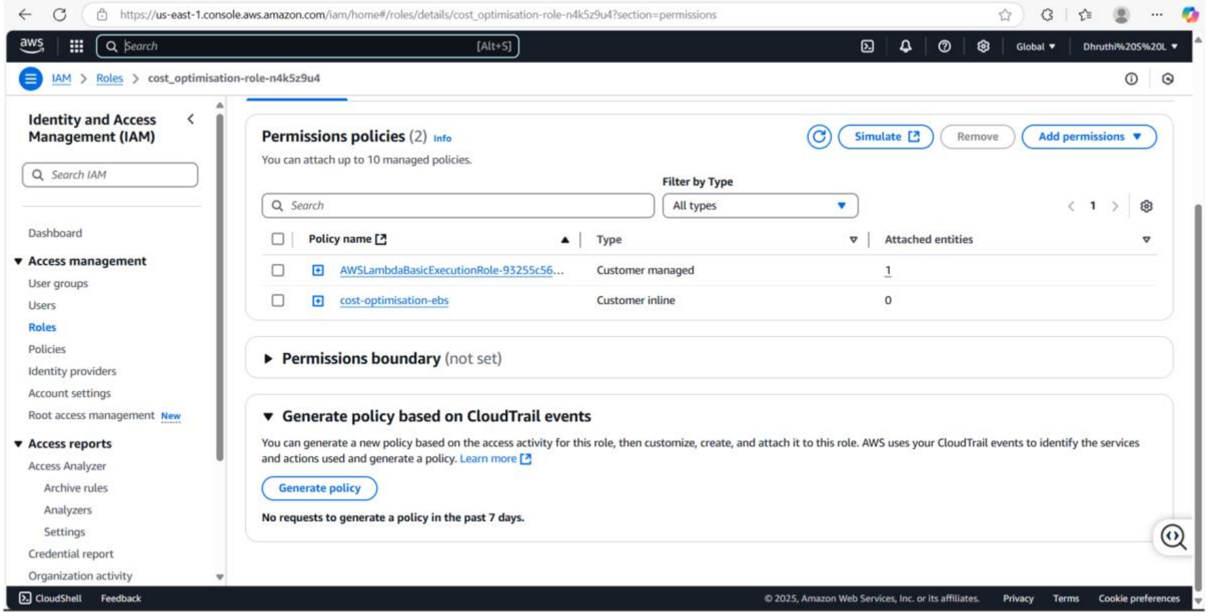
- ☐ DescribeFastSnapshotRestores
- ☐ DescribeImportSnapshotTasks
- ☐ DescribeLockedSnapshots
- ☐ DescribeSnapshotAttribute
- ☑ DescribeSnapshots
- ☐ DescribeSnapshotTierStatus
- ☐ ListSnapshotsInRecycleBin

Read

- ☐ GetSnapshotBlockPublicAccessState

Write

- ☐ CopySnapshot
- ☐ CreateSnapshot
- ☐ CreateSnapshots
- ☑ DeleteSnapshot
- ☐ DisableFastSnapshotRestores
- ☐ DisableSnapshotBlockPublicAccess
- ☐ EnableFastSnapshotRestores
- ☐ EnableSnapshotBlockPublicAccess
- ☐ ImportSnapshot
- ☐ LockSnapshot
- ☐ ModifySnapshotTier
- ☐ RestoreSnapshotFromRecycleBin
- ☐ RestoreSnapshotTier
- ☐ UnlockSnapshot



https://us-east-1.console.aws.amazon.com/iam/home#/roles/details/cost_optimisation-role-n4k5z9u4?section=permissions

IAM > Roles > cost_optimisation-role-n4k5z9u4

Permissions policies (2) Info

You can attach up to 10 managed policies.

Filter by Type: All types

Policy name	Type	Attached entities
AWSLambdaBasicExecutionRole-93255c56...	Customer managed	1
cost-optimisation-ebs	Customer inline	0

Permissions boundary (not set)

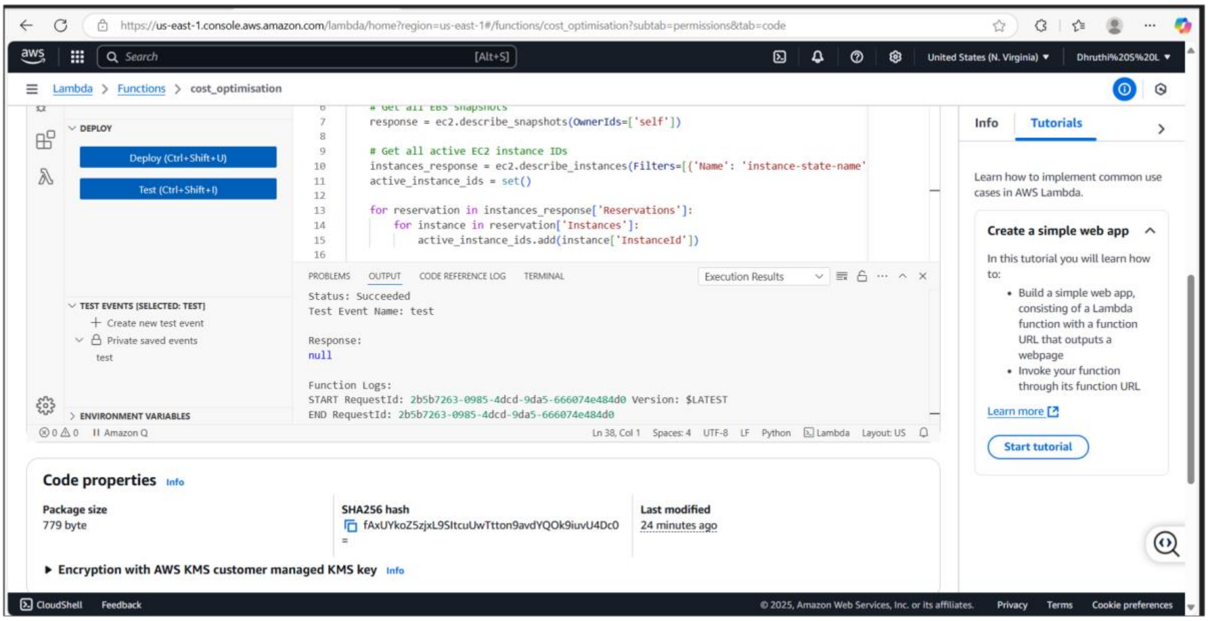
Generate policy based on CloudTrail events

You can generate a new policy based on the access activity for this role, then customize, create, and attach it to this role. AWS uses your CloudTrail events to identify the services and actions used and generate a policy. Learn more

No requests to generate a policy in the past 7 days.

5. **We must give permission to EC2; hence we are forming policy again for it.**
   Describe Volume, Describe instances.

If the instance is active the snapshots are not deleted.



https://us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/cost_optimisation?subtab=permissions&tab=code
Search [Alt+S]
United States (N. Virginia)
Dhruthi%20S%20L
Lambda > Functions > cost_optimisation
DEPLOY
Deploy (Ctrl+Shift+U)
Test (Ctrl+Shift+I)
TEST EVENTS [SELECTED: TEST]
Create new test event
Private saved events
test
ENVIRONMENT VARIABLES
Amazon Q
PROBLEMS
OUTPUT
CODE REFERENCE LOG
TERMINAL
Execution Results
Ln 38, Col 1 Spaces: 4 UTF-8 LF Python Lambda Layout: US
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```
    # Get all EBS snapshots
    response = ec2.describe_snapshots(OwnerIds=['self'])

    # Get all active EC2 instance IDs
    instances_response = ec2.describe_instances(Filters=[{'Name': 'instance-state-name'
    active_instance_ids = set()

    for reservation in instances_response['Reservations']:
        for instance in reservation['Instances']:
            active_instance_ids.add(instance['InstanceId'])
```

```
Status: Succeeded
Test Event Name: test

Response:
null

Function Logs:
START RequestId: 2b5b7263-0985-4dcd-9da5-666074e484d0 Version: $LATEST
END RequestId: 2b5b7263-0985-4dcd-9da5-666074e484d0
```

Learn how to implement common use cases in AWS Lambda.

Create a simple web app

In this tutorial you will learn how to:

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Code properties Info

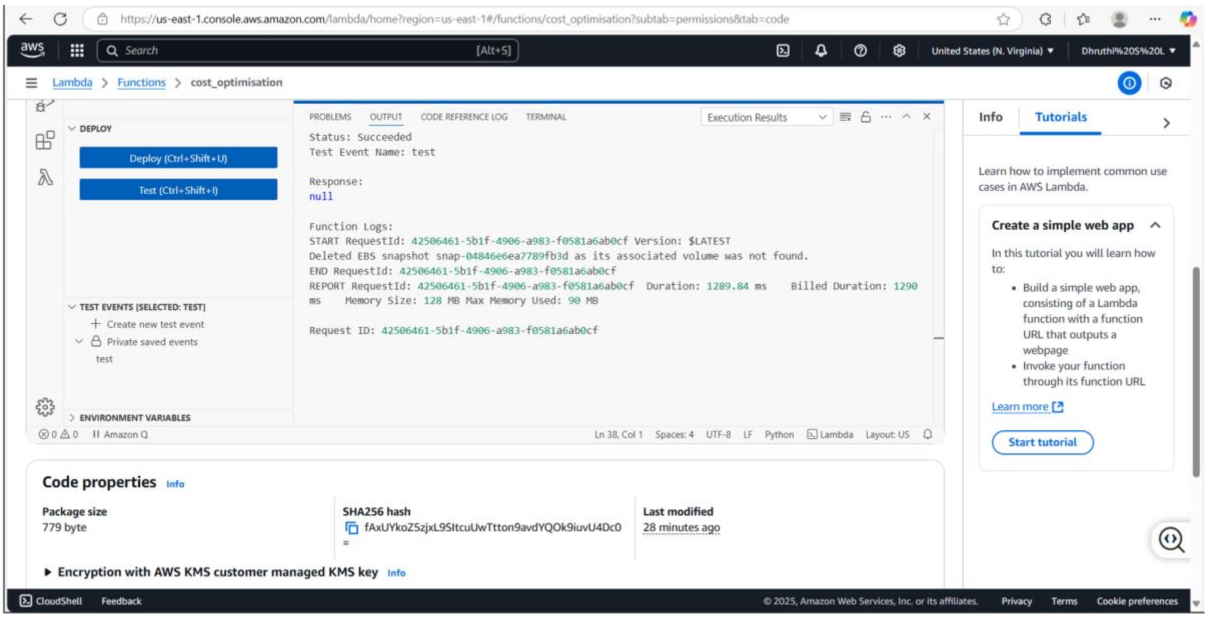
Package size: 779 byte

SHA256 hash: fAxUYkoZ5zjxL9SItcuUwTtton9avdYQOk9iuvU4Dc0=

Last modified: 24 minutes ago

Encryption with AWS KMS customer managed KMS key Info

6. **Deleted the EC2 instance and run the code then we can see that the snapshot is deleted.**



https://us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/cost_optimisation?subtab=permissions&tab=code
Search [Alt+S]
United States (N. Virginia)
Dhruthi%20S%20L
Lambda > Functions > cost_optimisation
DEPLOY
Deploy (Ctrl+Shift+U)
Test (Ctrl+Shift+I)
TEST EVENTS [SELECTED: TEST]
Create new test event
Private saved events
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ENVIRONMENT VARIABLES
Amazon Q
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CODE REFERENCE LOG
TERMINAL
Execution Results
Ln 38, Col 1 Spaces: 4 UTF-8 LF Python Lambda Layout: US
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```
Status: Succeeded
Test Event Name: test

Response:
null

Function Logs:
START RequestId: 42506461-5b1f-4906-a983-f0581a6ab0cf Version: $LATEST
Deleted EBS snapshot snap-04846e6ea7789fb3d as its associated volume was not found.
END RequestId: 42506461-5b1f-4906-a983-f0581a6ab0cf
REPORT RequestId: 42506461-5b1f-4906-a983-f0581a6ab0cf  Duration: 1289.84 ms    Billed Duration: 1290
ms    Memory Size: 128 MB Max Memory Used: 90 MB

Request ID: 42506461-5b1f-4906-a983-f0581a6ab0cf
```

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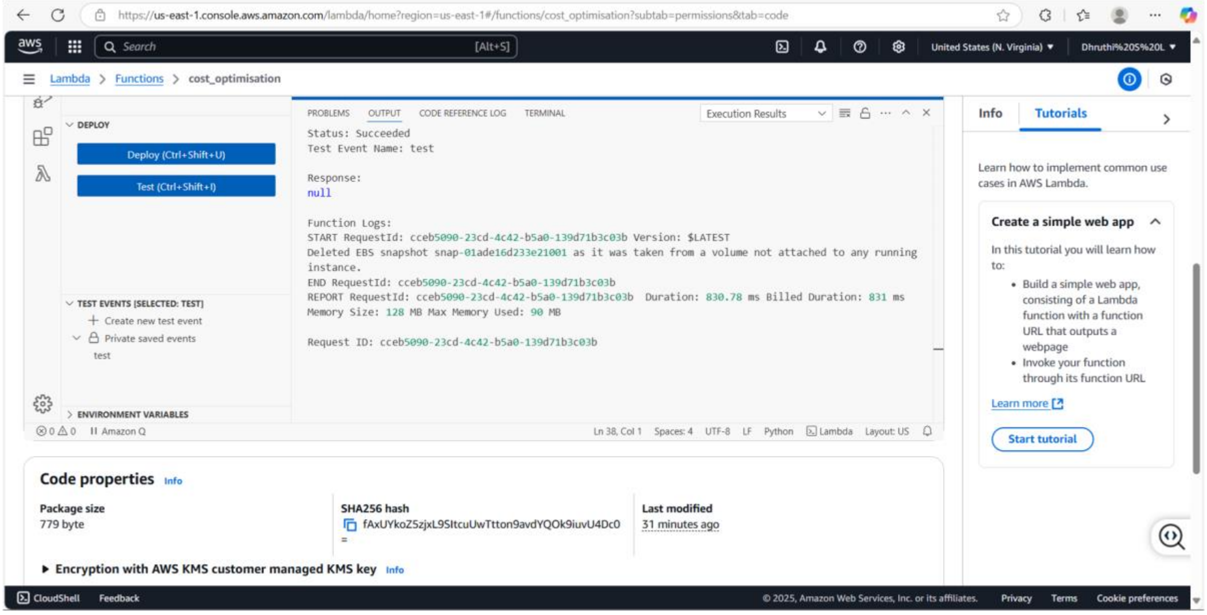
Code properties Info

Package size: 779 byte

SHA256 hash: fAxUYkoZ5zjxL9SItcuUwTtton9avdYQOk9iuvU4Dc0=

Last modified: 28 minutes ago

Encryption with AWS KMS customer managed KMS key Info



https://us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/cost_optimisation?subtab=permissions&tab=code
aws
Search
[Alt+S]
United States (N. Virginia) ▼
Dhruthi%20S%20L ▼
Lambda > Functions > cost_optimisation
DEPLOY
Deploy (Ctrl+Shift+U)
Test (Ctrl+Shift+I)
TEST EVENTS [SELECTED: TEST]
+ Create new test event
Private saved events
test
ENVIRONMENT VARIABLES
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Amazon Q
Ln 38, Col 1
Spaces: 4
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```
Status: Succeeded
Test Event Name: test

Response:
null

Function Logs:
START RequestId: cceb5090-23cd-4c42-b5a0-139d71b3c03b Version: $LATEST
Deleted EBS snapshot snap-01ade16d233e21001 as it was taken from a volume not attached to any running
instance.
END RequestId: cceb5090-23cd-4c42-b5a0-139d71b3c03b
REPORT RequestId: cceb5090-23cd-4c42-b5a0-139d71b3c03b  Duration: 830.78 ms Billed Duration: 831 ms
Memory Size: 128 MB Max Memory Used: 90 MB

Request ID: cceb5090-23cd-4c42-b5a0-139d71b3c03b
```

Code properties Info

Package size	SHA256 hash	Last modified
779 byte	fAxUYkoZ5zjxL9SItcuUwTtton9avdYQOk9iuvU4Dc0 =	31 minutes ago

▸ Encryption with AWS KMS customer managed KMS key Info