Automated EBS Snapshots Scheduling

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1. Introduction

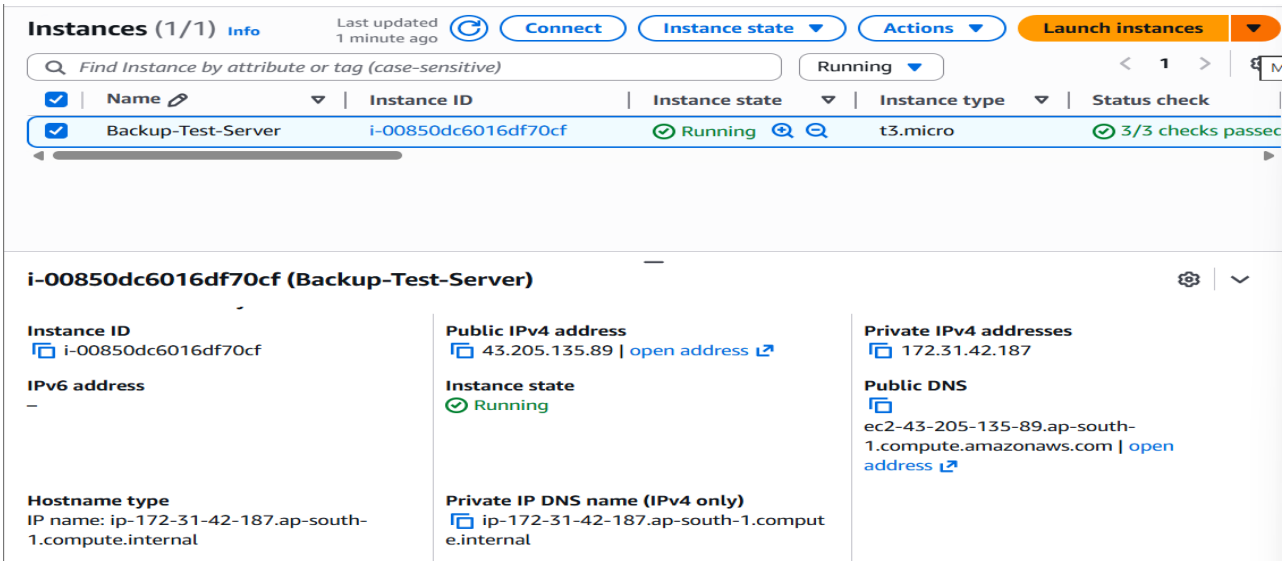
In cloud infrastructure management, data availability and disaster recovery are critical components. This project demonstrates the implementation of an **automated backup strategy** for Amazon EBS (Elastic Block Store) volumes using **AWS Lambda**.

Unlike manual snapshots, this solution leverages a serverless architecture to identify specific resources based on metadata tags and trigger point-in-time backups. By using **IAM Roles**, the system operates securely without the need for manual key pair management or SSH access. This integration highlights how administrative tasks can be automated to ensure consistency, reduce human error, and maintain data durability across an AWS environment.

2. Implementation

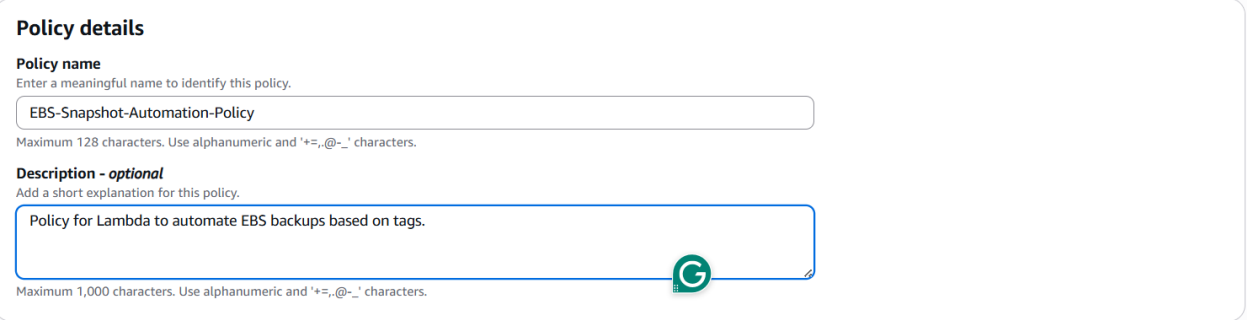
Step 1: Launch EC2 Instance (Target Resource)

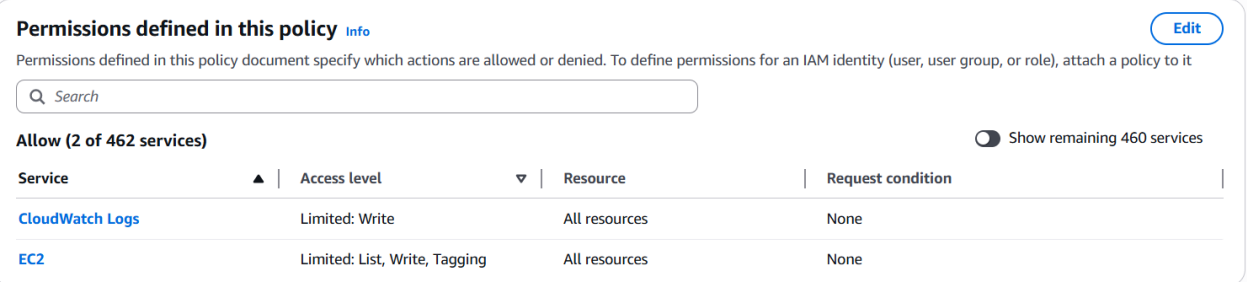
- Logged in to the AWS Management Console and navigated to **EC2**.
- Launched a new instance using **Amazon Linux 2023 AMI**.
- **Key Pair:** Selected **"Proceed without a key pair"** as the automation interacts via AWS APIs rather than terminal access.
- **Resource Tagging:** Assigned a custom tag to the instance to allow the Lambda function to identify it.
    - **Key:** `Backup`
    - **Value:** `True`
- **Instance ID obtained:** `i-00850dc6016df70cf`

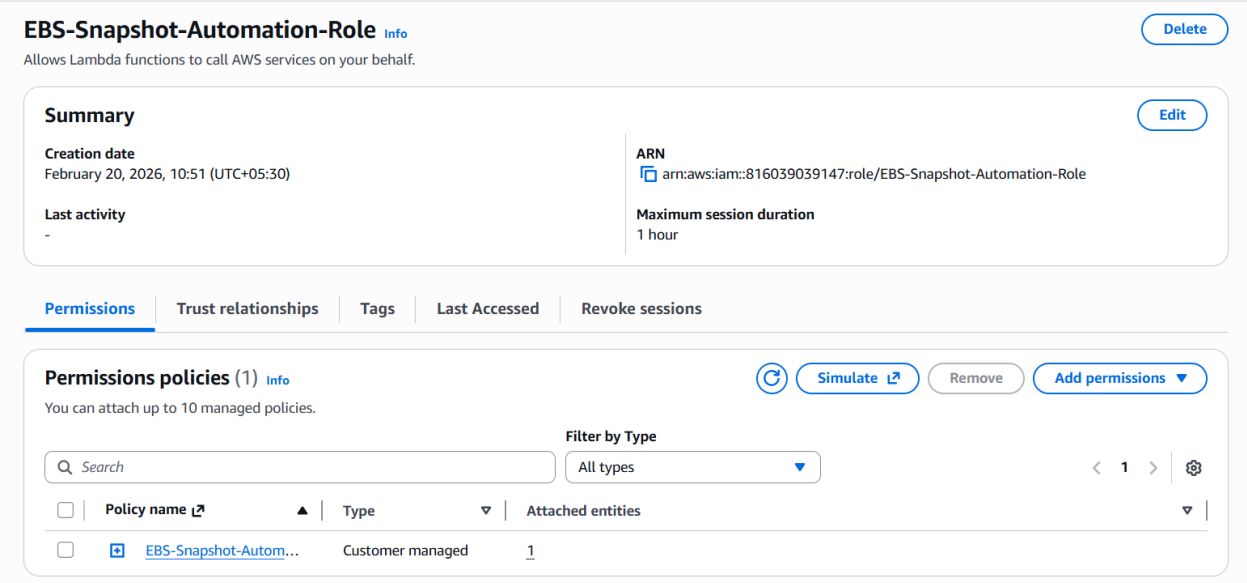


Step 2: Create IAM Policy and Role

- Navigated to **IAM** and used the **Visual Editor** to create a least-privilege policy.
- **Service (EC2):** Granted `DescribeInstances`, `DescribeVolumes`, `CreateSnapshot`, and `CreateTags` permissions.
- **Service (CloudWatch Logs):** Granted permission to create log groups and streams for troubleshooting.
- **Role Creation:** Created a service role named `EBS-Snapshot-Automation-Role` and attached the policy, allowing **Lambda** to assume this identity.







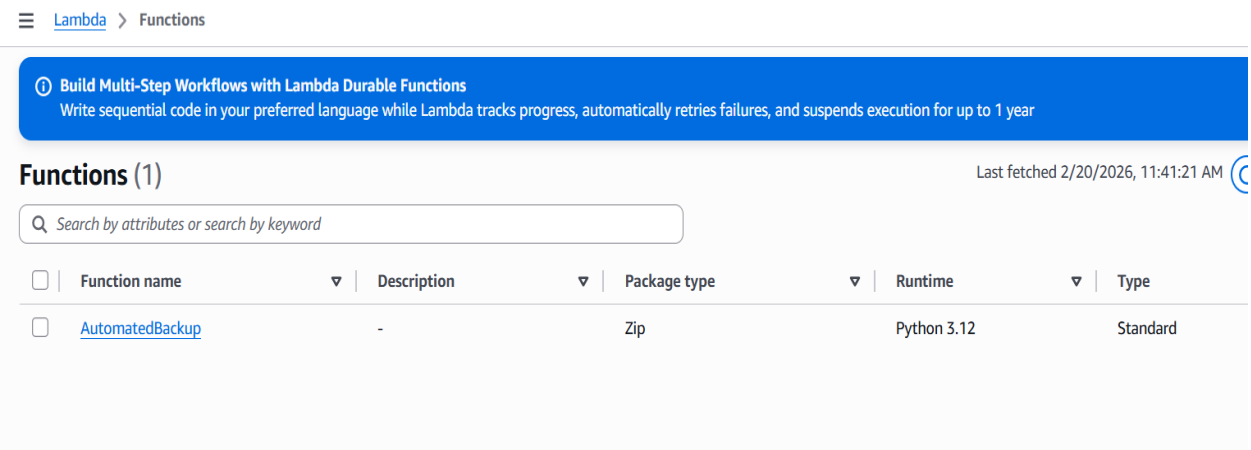
Step 3: Lambda Function Configuration

- Navigated to the **AWS Lambda** console and created a new function named `AutomatedBackup`.
- **Runtime:** Selected **Python 3.12** for its stability and native support for the Boto3 SDK.
- **Execution Role:** Assigned the existing `EBS-Snapshot-Automation-Role`.
- **Logic:** Implemented a Python script that:
    1. Filters instances by the `Backup: True` tag.
    2. Identifies all attached EBS Volume IDs.
    3. Executes the `create_snapshot` command with a dynamic timestamp.

Python code:

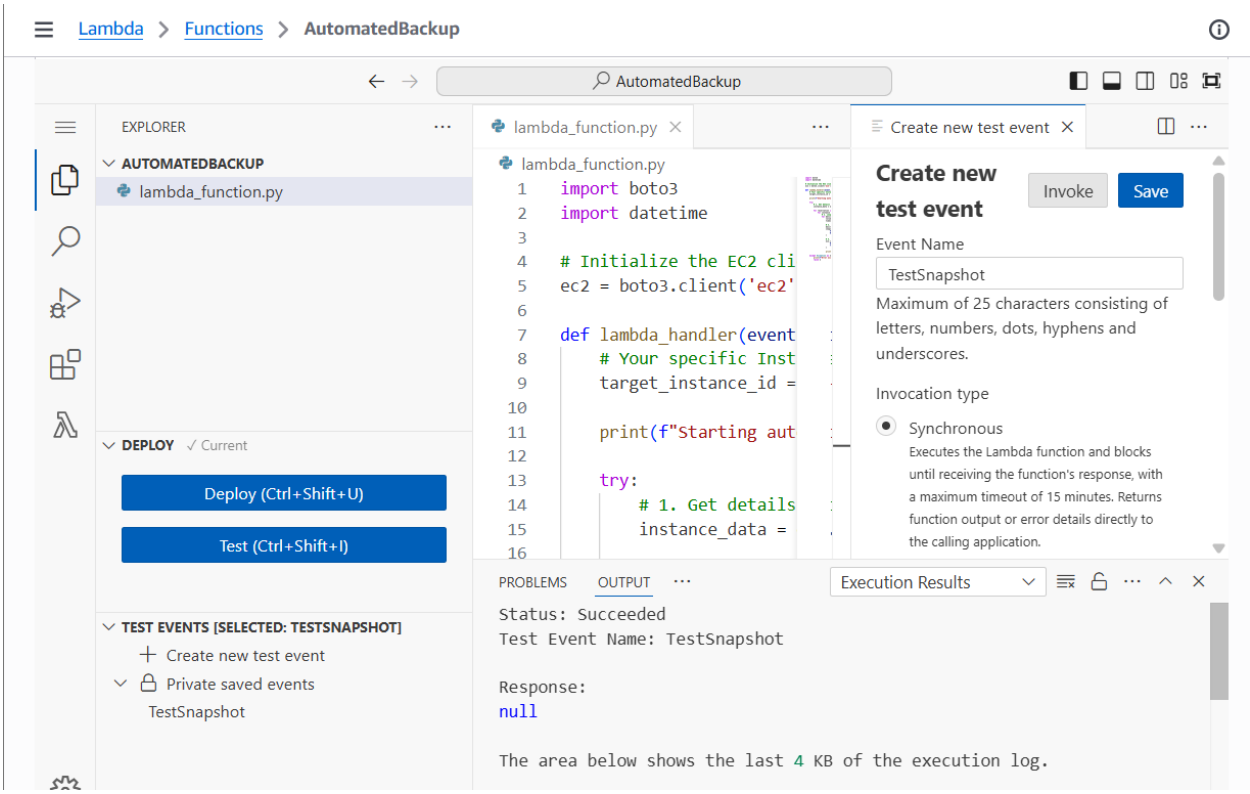
```
import boto3
import datetime

# Initialize the EC2 client
ec2 = boto3.client('ec2')

def lambda_handler(event, context):
    # Your specific Instance ID
    target_instance_id = 'i-00850dc6016df70cf'

    print(f"Starting automated backup for instance: {target_instance_id}")

    try:
        # 1. Get details about the instance and its volumes
        instance_data = ec2.describe_instances(InstanceIds=[target_instance_id])

        for reservation in instance_data['Reservations']:
            for instance in reservation['Instances']:
                # 2. Loop through all volumes (EBS) attached to this instance
                for device in instance['BlockDeviceMappings']:
                    volume_id = device['Ebs']['VolumeId']
                    timestamp = datetime.datetime.now().strftime("%Y-%m-%d
%H:%M:%S")

                    # 3. Create the actual Snapshot
                    description = f"Automated Backup of {target_instance_id} -
{timestamp}"
                    snapshot = ec2.create_snapshot(
                        VolumeId=volume_id,
                        Description=description
                    )
```

```
                    # 4. Add a Name tag to the snapshot for your report
                    ec2.create_tags(
                        Resources=[snapshot['SnapshotId']],
                        Tags=[{'Key': 'Name', 'Value': f"Backup-
{target_instance_id}"}]
                    )

                    print(f"Success! Created Snapshot ID:
{snapshot['SnapshotId']} for Volume: {volume_id}")

    except Exception as e:
        print(f"Error occurred: {str(e)}")
        raise e
```



Step 4: Deployment and Execution

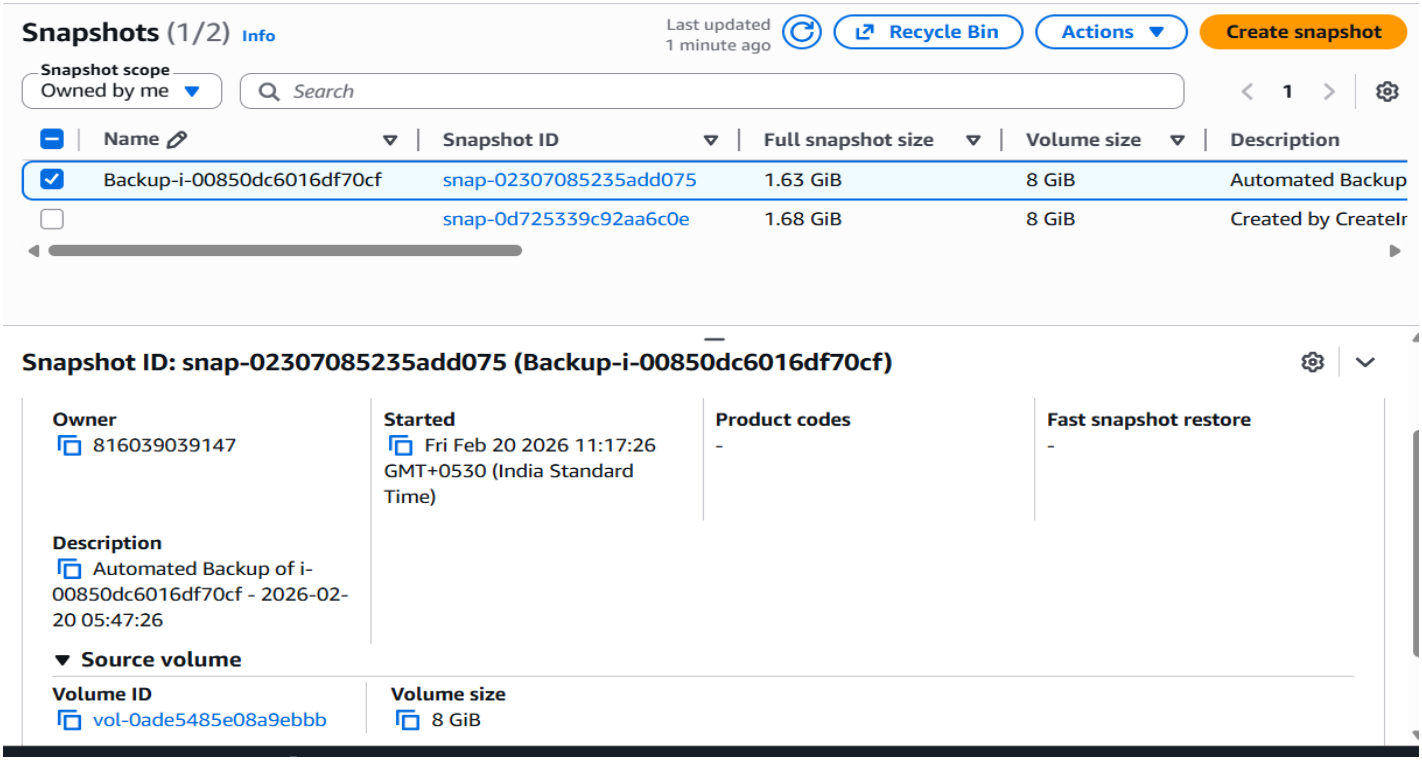
- Deployed the Python code to the AWS Lambda environment.
- **Manual Trigger:** Configured a test event and invoked the function manually to verify the initial setup.
- **Automated Trigger Logic:** Discussed the use of **Amazon EventBridge** to schedule this function (e.g., daily at 10:00 AM) to fulfill the automated scheduling requirement.

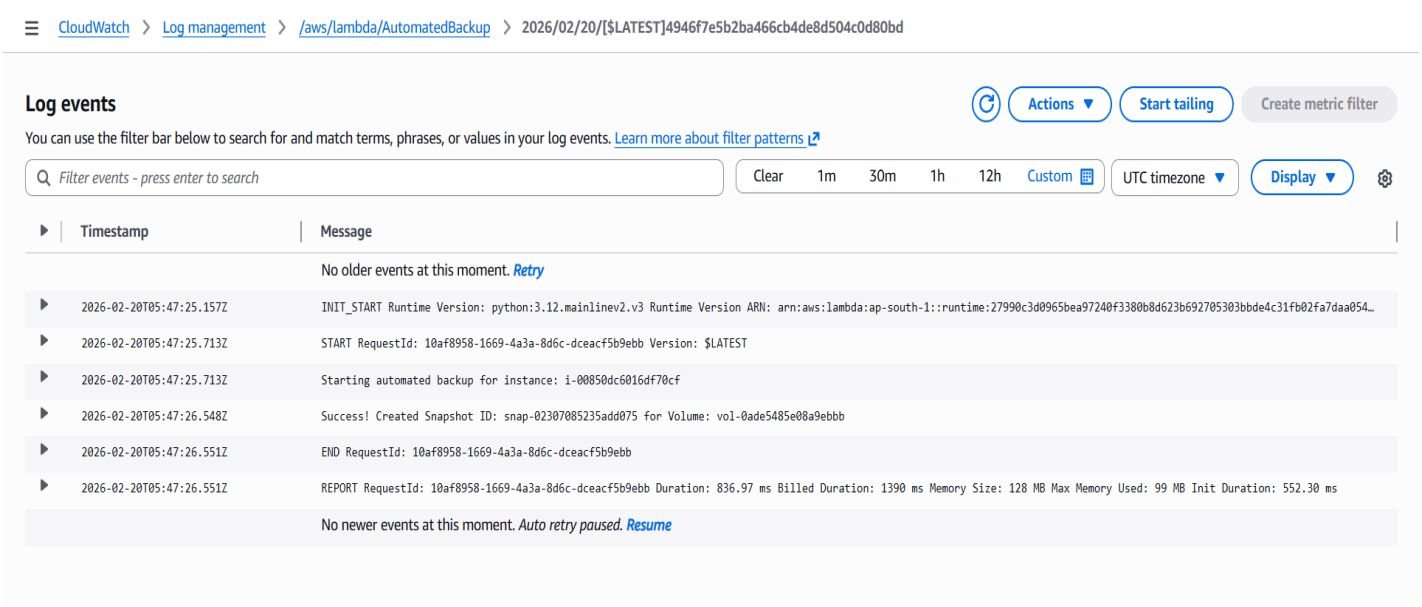


Step 5: Multi-Tier Verification (Logs & EC2 Console)

To confirm the successful execution of the automation, verification was performed at both the process level (Logs) and the resource level (Console).

- **Log Verification (CloudWatch):** Navigated to **CloudWatch Logs** under the `/aws/lambda/AutomatedBackup` log group. The logs confirmed that the function successfully identified the target instance `i-00850dc6016df70cf` and executed the `create_snapshot` command.
    - **Result:** `Success! Success! Created Snapshot ID: snap-02307085235add075 for Volume: vol-0ade5485e08a9ebbb`
- **Resource Verification (EC2 Snapshots):** Navigated to the **EC2 Console** under the **Snapshots** section. Verified that a new snapshot exists.
- **Metadata Confirmation:** Confirmed that the snapshot contains the custom description: *"Automated Backup of i-00850dc6016df70cf"*, proving it was generated by the specific Lambda function.


Snapshots (1/2) Info
Last updated 1 minute ago
Recycle Bin
Actions
Create snapshot
Snapshot scope
Owned by me
Search
1
Name
Snapshot ID
Full snapshot size
Volume size
Description
Backup-i-00850dc6016df70cf
snap-02307085235add075
1.63 GiB
8 GiB
Automated Backup
snap-0d725339c92aa6c0e
1.68 GiB
8 GiB
Created by CreateIr
Snapshot ID: snap-02307085235add075 (Backup-i-00850dc6016df70cf)
Owner
816039039147
Started
Fri Feb 20 2026 11:17:26 GMT+0530 (India Standard Time)
Product codes
-
Fast snapshot restore
-
Description
Automated Backup of i-00850dc6016df70cf - 2026-02-20 05:47:26
Source volume
Volume ID
vol-0ade5485e08a9ebbb
Volume size
8 GiB


CloudWatch
Log management
/aws/lambda/AutomatedBackup
2026/02/20/[$LATEST]4946f7e5b2ba466cb4de8d504c0d80bd
Log events
Actions
Start tailing
Create metric filter
You can use the filter bar below to search for and match terms, phrases, or values in your log events. Learn more about filter patterns
Filter events - press enter to search
Clear
1m
30m
1h
12h
Custom
UTC timezone
Display
Timestamp
Message
No older events at this moment. Retry
2026-02-20T05:47:25.157Z
INIT_START Runtime Version: python:3.12.mainlinev2.v3 Runtime Version ARN: arn:aws:lambda:ap-south-1::runtime:27990c3d0965bea97240f3380b8d623b692705303bbde4c31fb02fa7daa054…
2026-02-20T05:47:25.713Z
START RequestId: 10af8958-1669-4a3a-8d6c-dceacf5b9ebb Version: $LATEST
2026-02-20T05:47:25.713Z
Starting automated backup for instance: i-00850dc6016df70cf
2026-02-20T05:47:26.548Z
Success! Created Snapshot ID: snap-02307085235add075 for Volume: vol-0ade5485e08a9ebbb
2026-02-20T05:47:26.551Z
END RequestId: 10af8958-1669-4a3a-8d6c-dceacf5b9ebb
2026-02-20T05:47:26.551Z
REPORT RequestId: 10af8958-1669-4a3a-8d6c-dceacf5b9ebb Duration: 836.97 ms Billed Duration: 1390 ms Memory Size: 128 MB Max Memory Used: 99 MB Init Duration: 552.30 ms
No newer events at this moment. Auto retry paused. Resume

3. Conclusion

This lab successfully demonstrated a serverless approach to infrastructure automation. By integrating **AWS Lambda** with **Amazon EBS**, we moved from manual backup operations to an automated, tag-based system. The use of **IAM Roles** instead of key pairs ensured a higher security posture by adhering to the principle of least privilege and eliminating the need for long-term credentials.

The successful verification of snapshots in the EC2 console and the corresponding logs in CloudWatch proved the reliability of the script. This project provides foundational knowledge in **event-driven administration** and **cloud-native security**, essential for managing large-scale, resilient environments where manual intervention must be minimized.