Automation of EC2 Instance Start/Stop using AWS Lambda and EventBridge

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Course Code: P-48 AWS_project_Lambda

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1. Introduction

In cloud environments, running resources continuously can lead to unnecessary costs. Amazon EC2 instances, if not stopped when idle, increase billing charges. To optimize costs and improve efficiency, automation is essential.

This project demonstrates how to use AWS Lambda and Amazon EventBridge to automatically start and stop EC2 instances at scheduled times. By leveraging serverless architecture, this solution reduces manual effort and ensures resources are only active during required hours.

2. Objectives

- Automate EC2 instance lifecycle (start and stop)
- Save AWS costs by running EC2 only during business hours
- Demonstrate integration of Lambda (serverless compute) with EventBridge (scheduling)
- Gain practical knowledge of IAM, Lambda, VPC, and EventBridge

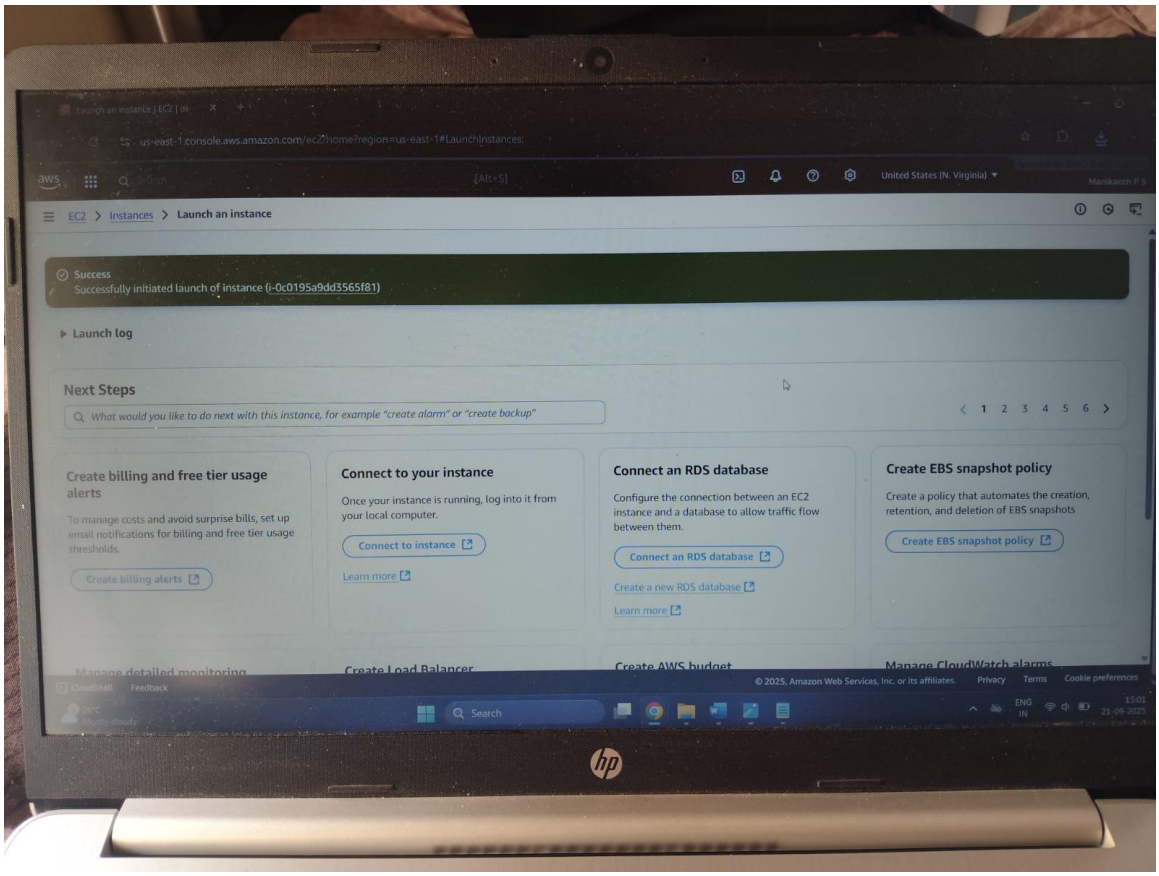
3. Workflow Diagram

Workflow: EventBridge → Lambda → EC2

4. Implementation Steps

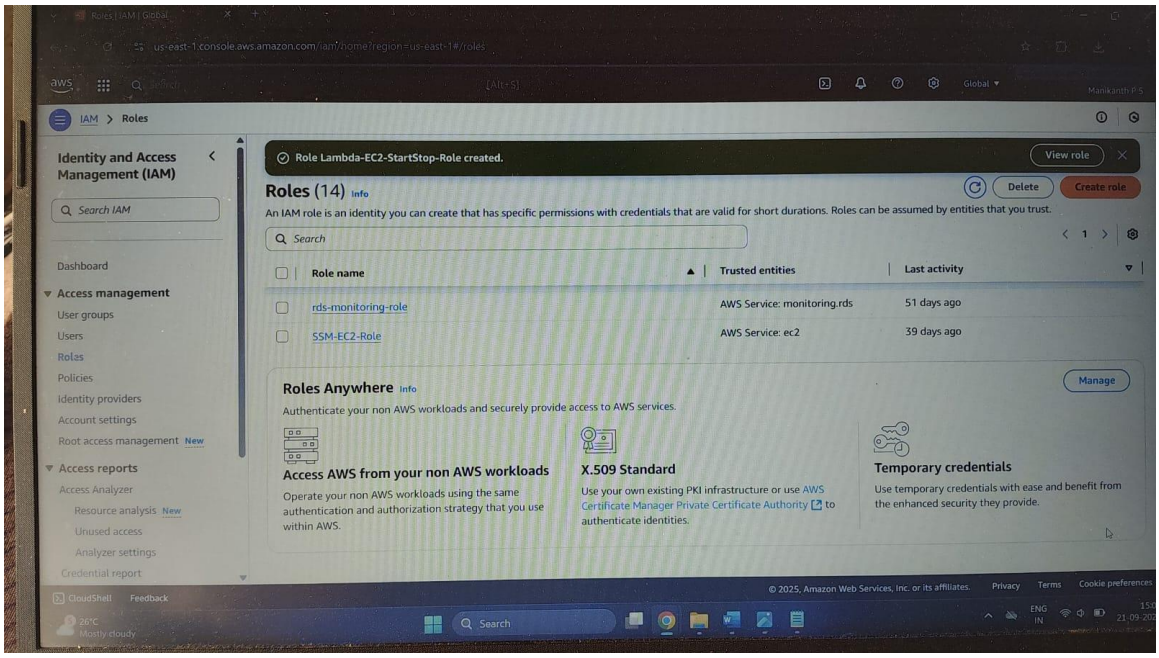
4.1 Launch EC2 Instance

Created Amazon Linux 2023 free-tier instance (t2.micro).



4.2 Create IAM Role & Policy

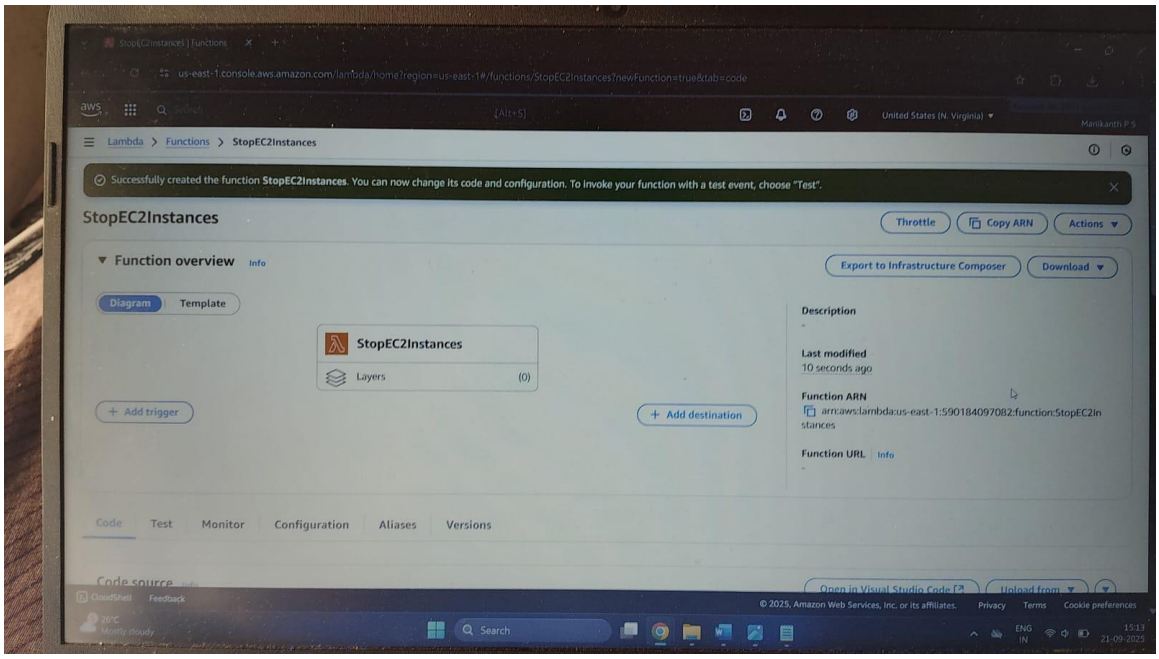
Configured IAM role with permissions for Lambda to manage EC2 instances.



Screenshot: 4.2 Create IAM Role & Policy

4.3 Create Lambda Functions

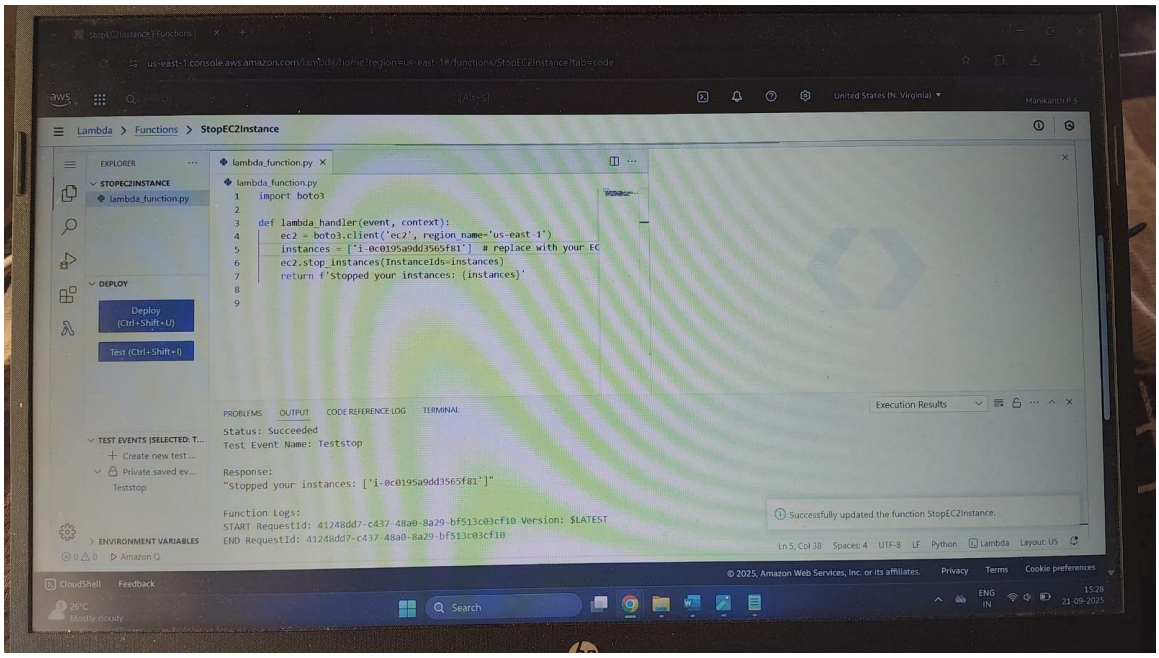
Developed Python Lambda functions to start and stop EC2 instances using boto3.



Screenshot: 4.3 Create Lambda Functions

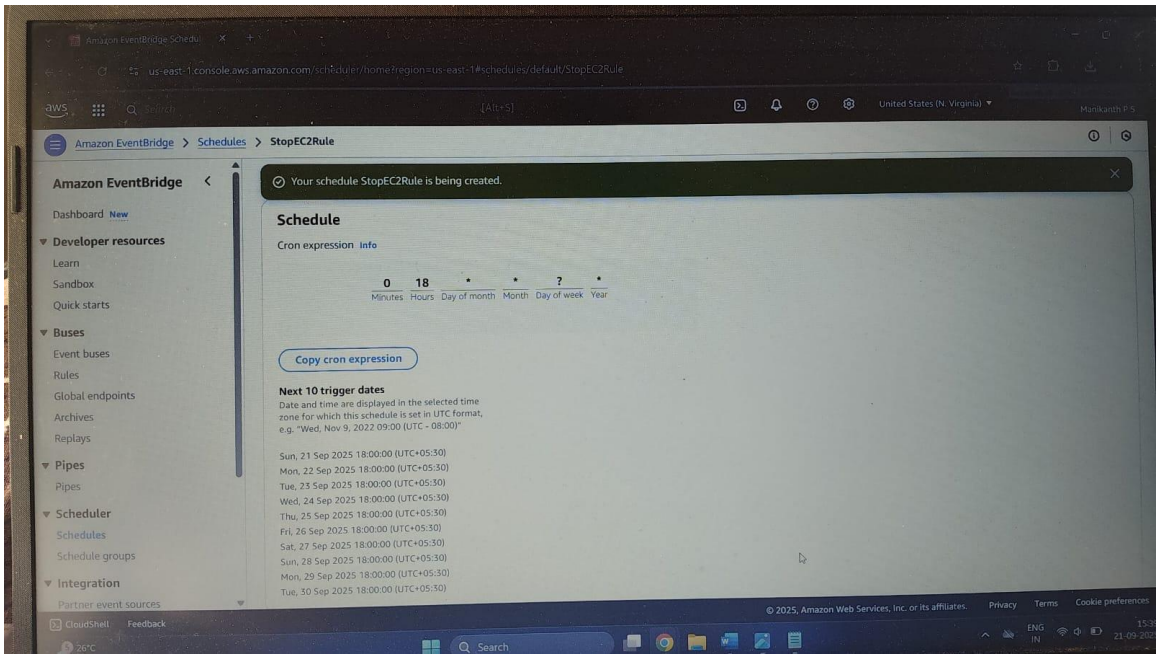
4.4 Test Lambda Functions

Verified that Lambda successfully starts and stops the EC2 instance.



4.5 Create EventBridge Schedules

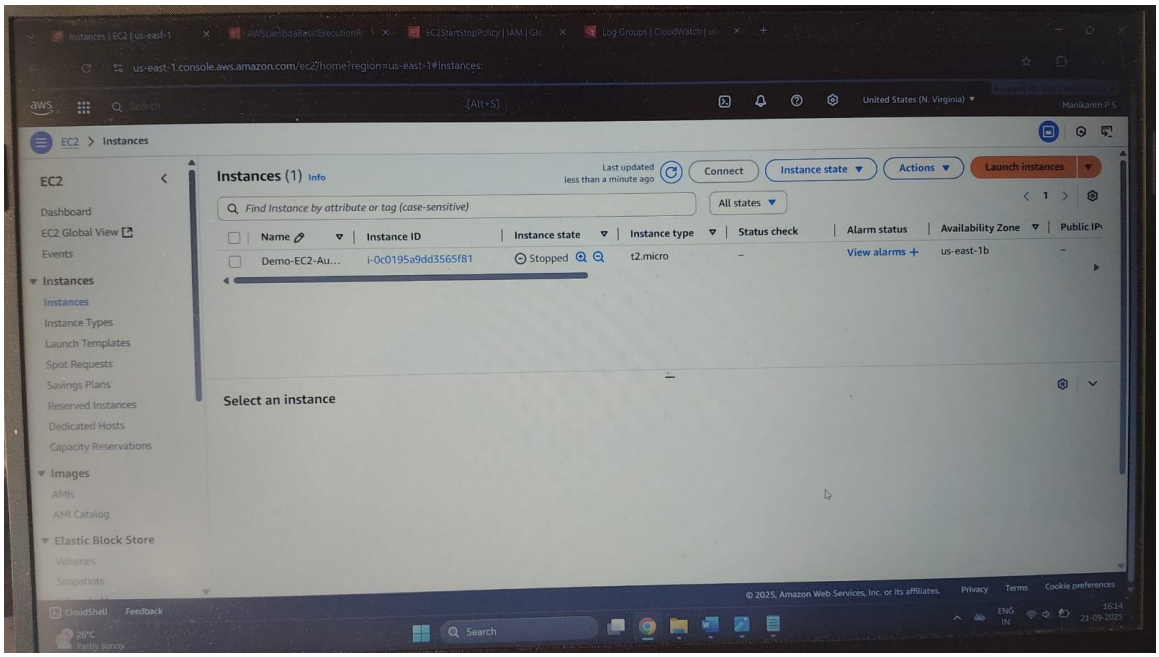
Set up schedules to start EC2 at 9 AM IST and stop EC2 at 9 PM IST.



Screenshot: 4.5 Create EventBridge Schedules

4.6 Verify Automation

Confirmed EC2 instance state changes automatically as per the schedule.


us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:
EC2 > Instances
Instances (1) Info
Last updated less than a minute ago
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Demo-EC2-Au...
i-0c0195a9dd3565f81
Stopped
t2.micro
View alarms
us-east-1b
Select an instance
Dashboard
EC2 Global View
Events
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
CloudShell
Feedback
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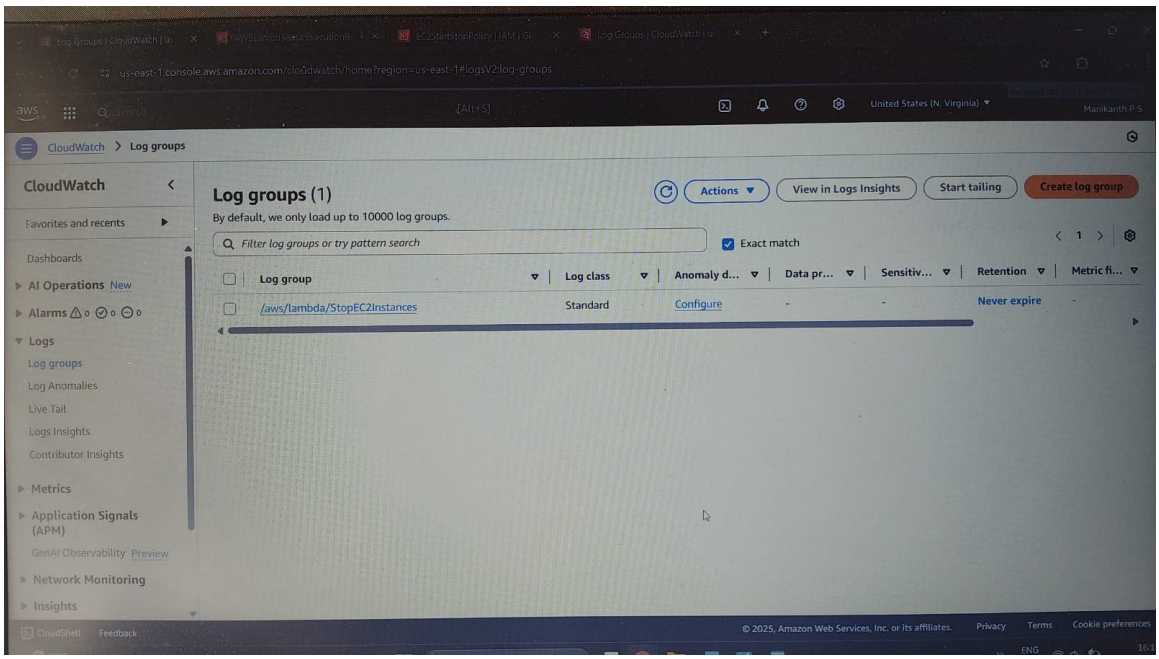
us-east-1.console.aws.amazon.com/cloudwatch/home?region=us-east-1#logsV2:log-groups
CloudWatch > Log groups
Log groups (1)
By default, we only load up to 10000 log groups.
Actions
View in Logs Insights
Start tailing
Create log group
Filter log groups or try pattern search
Exact match
Log group
Log class
Anomaly d...
Data pr...
Sensitiv...
Retention
Metric fi...
/aws/lambda/StopEC2Instances
Standard
Configure
Never expire
Favorites and recents
Dashboards
AI Operations New
Alarms
Logs
Log groups
Log Anomalies
Live Tail
Logs Insights
Contributor Insights
Metrics
Application Signals (APM)
GenAI Observability Preview
Network Monitoring
Insights
CloudShell
Feedback
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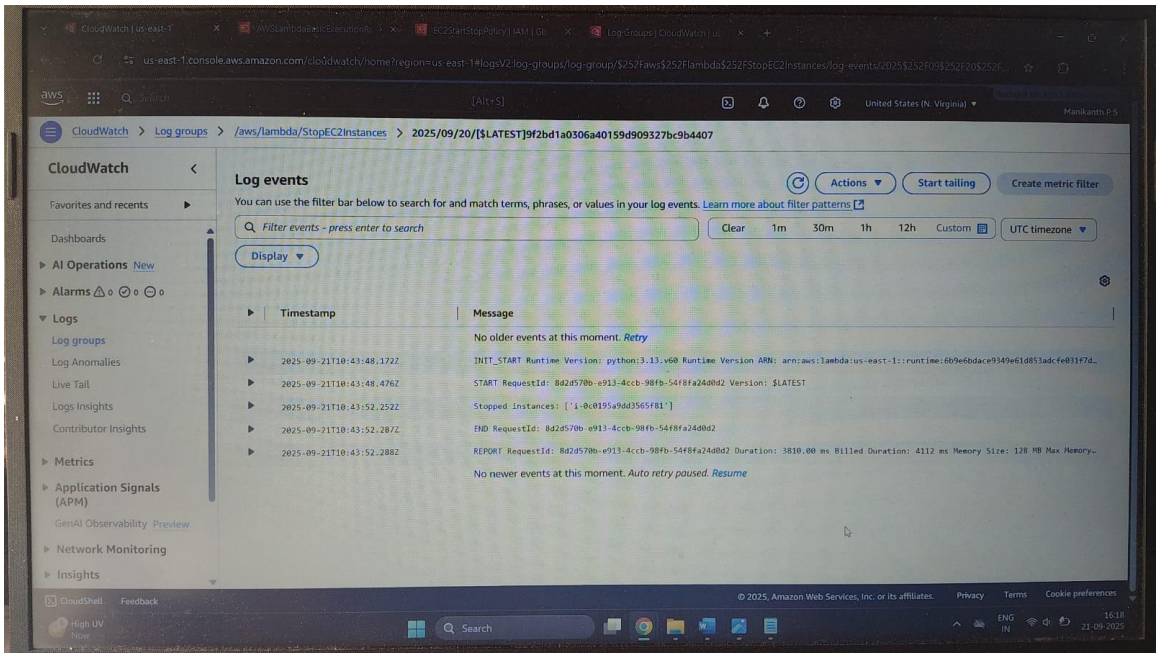

5. Results

The automation worked successfully. The EC2 instance started and stopped at scheduled times without manual effort. Logs confirmed successful Lambda execution.

6. Conclusion

This project demonstrates a cost-saving automation solution using AWS serverless architecture. By integrating EventBridge schedules with Lambda functions, EC2 instances are managed efficiently.

Key takeaways:
- Manual monitoring is eliminated
- Costs are optimized by shutting down idle resources
- The architecture is scalable and can manage multiple EC2 instances with minimal changes

This automation can be extended by adding SNS notifications, tag-based instance selection, or integration with CloudWatch alarms for more flexibility.

7. References

1. AWS Documentation: EC2, Lambda, EventBridge
2. ExcelR Cloud Module Notes