

AWS Cost Monitoring & Budget Alerts

Services: AWS Budgets, Cost Explorer, Lambda, SES
Goal: Automatically notify when budget thresholds are met.

Skills: Billing alerts, email notifications, tagging strategies.

Automatically monitor AWS cloud spending and send email alerts when the cost crosses defined thresholds (e.g., 50%, 80%, 100% of the budget).

Architecture Overview

1. **AWS Budgets** → Tracks spending vs. budget
2. **AWS CloudWatch Events** → Triggers Lambda when budget crosses threshold
3. **AWS Lambda** → Processes alert and sends email using SES
4. **AWS SES** → Sends email notifications to the user

STEP 1: Enable Billing & Cost Management Tools

Before creating budgets or alerts:

Enable Billing Alerts

1. Go to **AWS Billing Console**
2. Select **Billing Preferences**
3. Enable:
 - Receive Billing Alerts
 - Cost Explorer
 - Budgets Reports

STEP 2: Create a Budget in AWS Budgets

Create a Cost Budget

1. Open **AWS Budgets** from console
2. Click **Create budget**
3. Select **Cost Budget**
4. Choose type:
 - **Recurring monthly** (most common)
 - Enter **amount** (example: ₹1,000 or \$10)
5. Set thresholds:
 - 50% (Alert)
 - 80% (Warning)
 - 100% (Critical)

Add Notification

- **Email alerts**
 - **SNS topic**
 - **Lambda automation**
 - **SNS Notification → Lambda trigger**
(if SNS not used, CloudWatch event triggers Lambda directly)
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STEP 3: Create an SES Email Identity

SES is used to send alert emails.

Steps:

1. Go to **Amazon SES**
2. Choose **Verified Identities**
3. Add your email (example: kavyakavyanajali@gmail.com)
4. Click **Verify**
5. Check your inbox → click confirm link

The screenshot shows the Amazon SNS Topics page. The topic 'budget-alert-topic' is selected. The 'Details' section shows the following information:

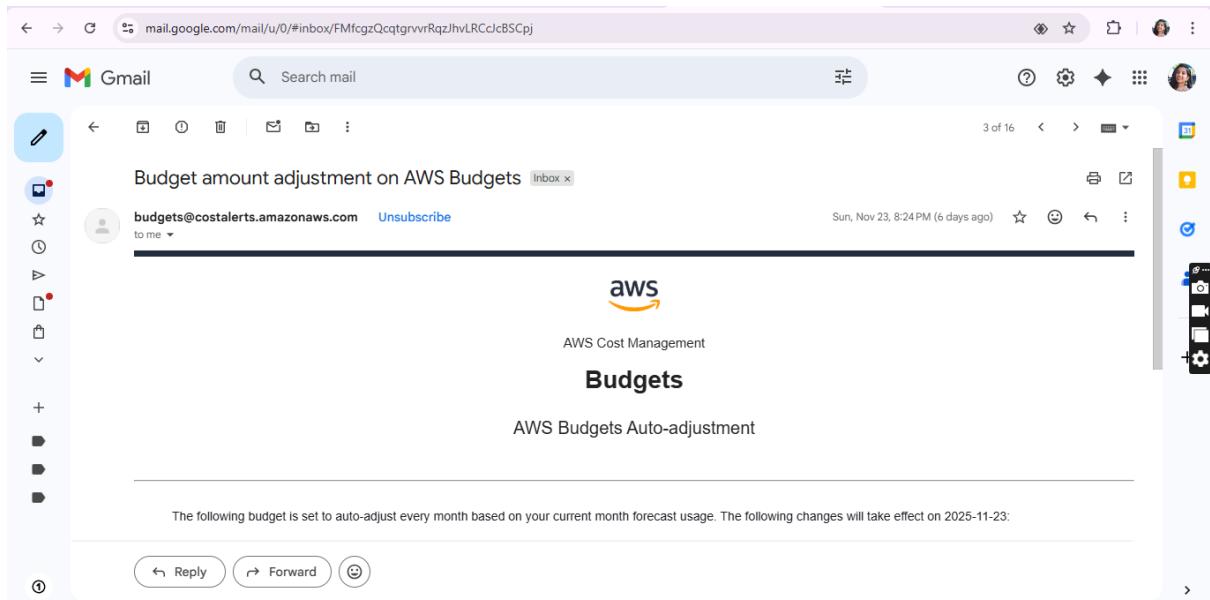
Name	budget-alert-topic	ARN	arn:aws:sns:us-east-1:162308490504:budget-alert-topic
Topic owner	162308490504	Display name	budget-alert-topic
		Type	Standard

Below the details, there are tabs for Subscriptions, Access policy, Data protection policy, Delivery policy (HTTP/S), and Delivery status logging. The Subscriptions tab shows 0 subscriptions. There is a 'Create subscription' button. The page footer includes links for CloudShell, Feedback, and Console Mobile App, along with standard copyright and privacy information.

The screenshot shows the AWS Cost Management Budgets page. A blue banner at the top indicates an upcoming budget adjustment. The 'Budgets (1)' table lists the following information:

Name	Thresholds	Health status	Billing View	Budget	Amount
budget-alert	OK	Healthy	Primary View	\$20.01	\$0.00

The left sidebar contains navigation links for Billing and Cost Management, including Home, Getting Started, Dashboards, Billing and Payments, Cost and Usage Analysis, and Cost Explorer.



STEP 4: Create Alert Lambda Function

This Lambda sends email through SES when cost crosses threshold.

Python Lambda Code

```
import boto3

ses = boto3.client('ses')
def lambda_handler(event, context):
    budget_name = event['detail']['budgetName']
    cost = event['detail']['newBudgetAmount']
    status = event['detail']['budgetLimit']

    email_body = f"""
    AWS Budget Alert

    Budget Name: {budget_name}
    Current Cost: {cost}
    Threshold Reached: {status}
    """

    ses.send_email(
        Source='your_verified_email@example.com',
        Destination={'ToAddresses': ['recipient@example.com']},
        Message={
            'Subject': {'Data': 'AWS Budget Alert'},
            'Body': {'Text': {'Data': email_body}}
        }
    )

    return "Alert Sent"
```

IAM Permissions

AmazonSESFullAccess, AWSEventsActionsRWD, CloudWatchEventsFullAccess

The screenshot shows the AWS Lambda console interface. At the top, the URL is `us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/budget-notifier?tab=configure`. The top bar includes the AWS logo, search bar, and account information (Account ID: 1623-0849-0504, United States (N. Virginia)). Below the header, the navigation path is `Lambda > Functions > budget-notifier`. The main section is titled "Function overview" with tabs for "Diagram" (selected) and "Template". The "Diagram" view shows a box labeled "budget-notifier" with a "Layers" section showing "(0)". Below it is a box labeled "SNS" with a "budget-alert-topic" entry. Buttons for "+ Add destination" and "+ Add trigger" are visible. To the right, there's a "Description" field (empty), "Last modified" (1 minute ago), "Function ARN" (arn:aws:lambda:us-east-1:162308490504:function:budget-notifier), and a "Function URL" link. Buttons for "Export to Infrastructure Composer" and "Download" are at the top right. The bottom of the screen shows standard AWS footer links: CloudShell, Feedback, Console Mobile App, Privacy, Terms, and Cookie preferences.

Create the Lambda function Console

steps: 1. Lambda → Create function → Author from scratch → Name: budget-notifier → Runtime: Python 3.11 (or 3.10/3.9) → Execution role: choose the role created earlier.

2. After creation, add an SNS trigger: Add trigger → SNS → choose aws-cost-budgets-topic.

The screenshot shows the AWS SNS console. The URL is `us-east-1.console.aws.amazon.com/sns/v3/home?region=us-east-1#/topic/arn:aws:sns:us-east-1:162308490504:budget-alert-topic`. The top bar includes the AWS logo, search bar, and account information (Account ID: 1623-0849-0504, United States (N. Virginia)). The navigation path is `Amazon SNS > Topics > budget-alert-topic`. On the left, there's a sidebar with "Amazon SNS" and sections for Dashboard, Topics (selected), Subscriptions, and Mobile (Push notifications, Text messaging (SMS)). The main area is titled "Details" for the topic "budget-alert-topic". It shows the ARN (arn:aws:sns:us-east-1:162308490504:budget-alert-topic), Display name (budget-alert-topic), and Type (Standard). Below this, the "Topic owner" is listed as 162308490504. A "Subscriptions" tab is selected, showing a table with one row: "db3f89f2-9400-4d0f-85ca..." with an Endpoint of "arn:aws:lambda:us-east-1:162308490504:function:budget-notifier" and a Status of "Confirmed". Other tabs include "Access policy", "Data protection policy", "Delivery policy (HTTP/S)", and "Delivery status logging". A "Create subscription" button is at the top right of the subscriptions table.

Attach the Lambda function as an SNS subscription

If you added the SNS trigger during function creation it's attached; otherwise:

1. SNS → Topics → open aws-cost-budgets-topic → Subscriptions → Create subscription:
2. Protocol: AWS Lambda
3. Endpoint: Choose your Lambda function
4. Confirm the subscription.

STEP 5: Create an EventBridge Rule to Trigger Lambda

A rule is needed so AWS triggers Lambda when budget threshold is crossed.

Steps:

1. Go to **Amazon EventBridge**
2. Click **Create Rule**
3. Name: BudgetAlertRule
4. Event Pattern:
 - o Prefill with **AWS Budgets → Threshold Breached**
5. Target:
 - o **Lambda Function**

The screenshot shows the 'Rules' section of the Amazon EventBridge console. A specific rule named 'budgetalerrule' is selected. The 'Targets' tab is active, displaying one target: 'budget-notifier' (Lambda function) with ARN: arn:aws:lambda:us-east-1:162308490504:funcion:budget-notifier. The rule is enabled and has a standard type. The event bus name is 'default' and the event bus ARN is arn:aws:events:us-east-1:162308490504:event-bus/default.

STEP 6: Testing

Test Case

- Lower the budget temporarily (e.g., set ₹10)
- Use AWS for 1 hour—your cost exceeds ₹10 → threshold triggers
- Lambda executes → SES sends an email

Conclusion

This project provides a **robust and automated solution** for AWS cost management using serverless architecture. It enhances visibility, prevents overspending, and supports cost optimization initiatives while requiring almost **zero maintenance**.