AWS S3 → Lambda → SNS Notification System

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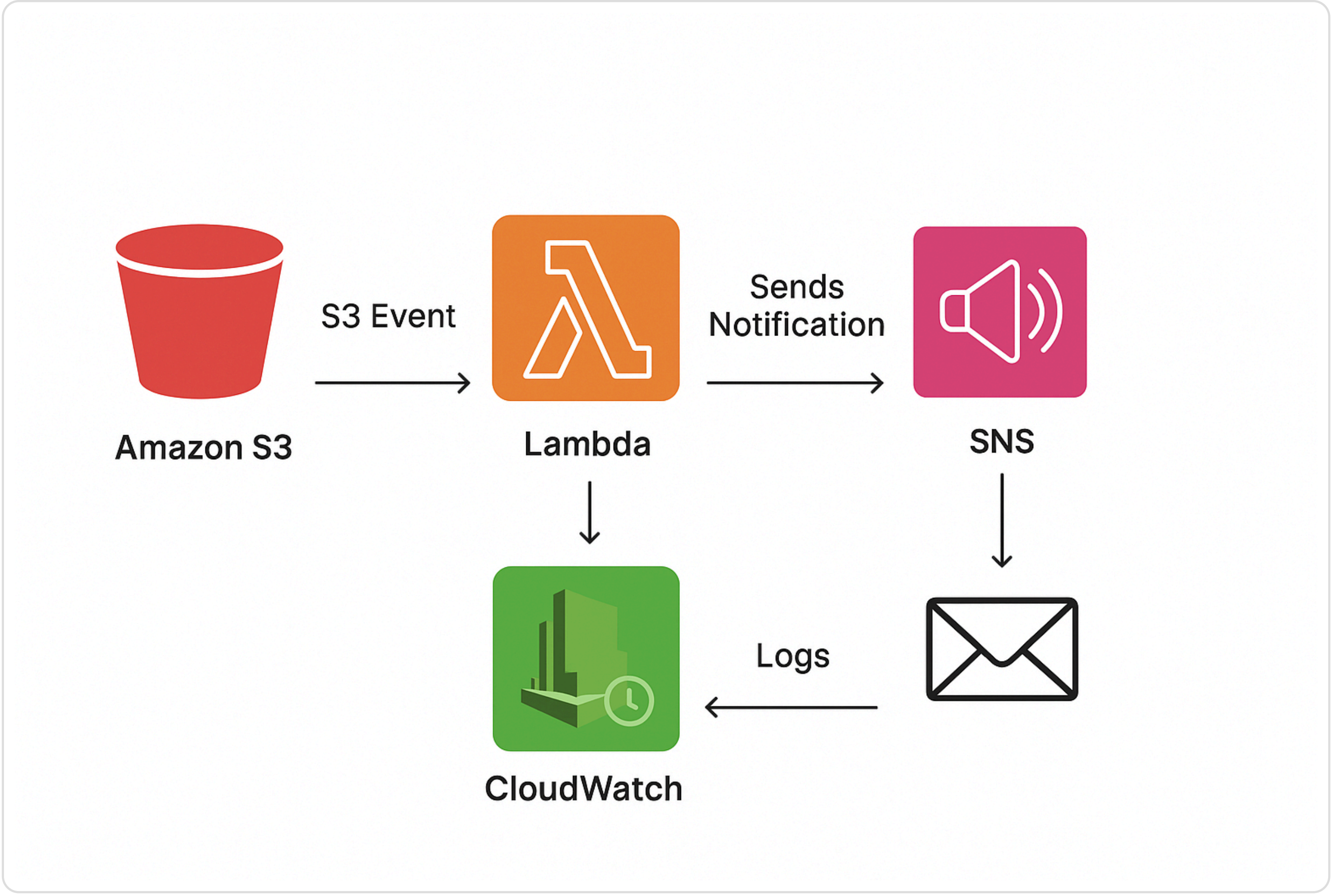
Note: Amazon SES is not available in the Stockholm (eu-north-1) region, which is why Amazon SNS was used for notifications in this architecture.

1. Architecture Overview

The solution integrates **Amazon S3**, **AWS Lambda**, **Amazon SNS**, and **CloudWatch**:

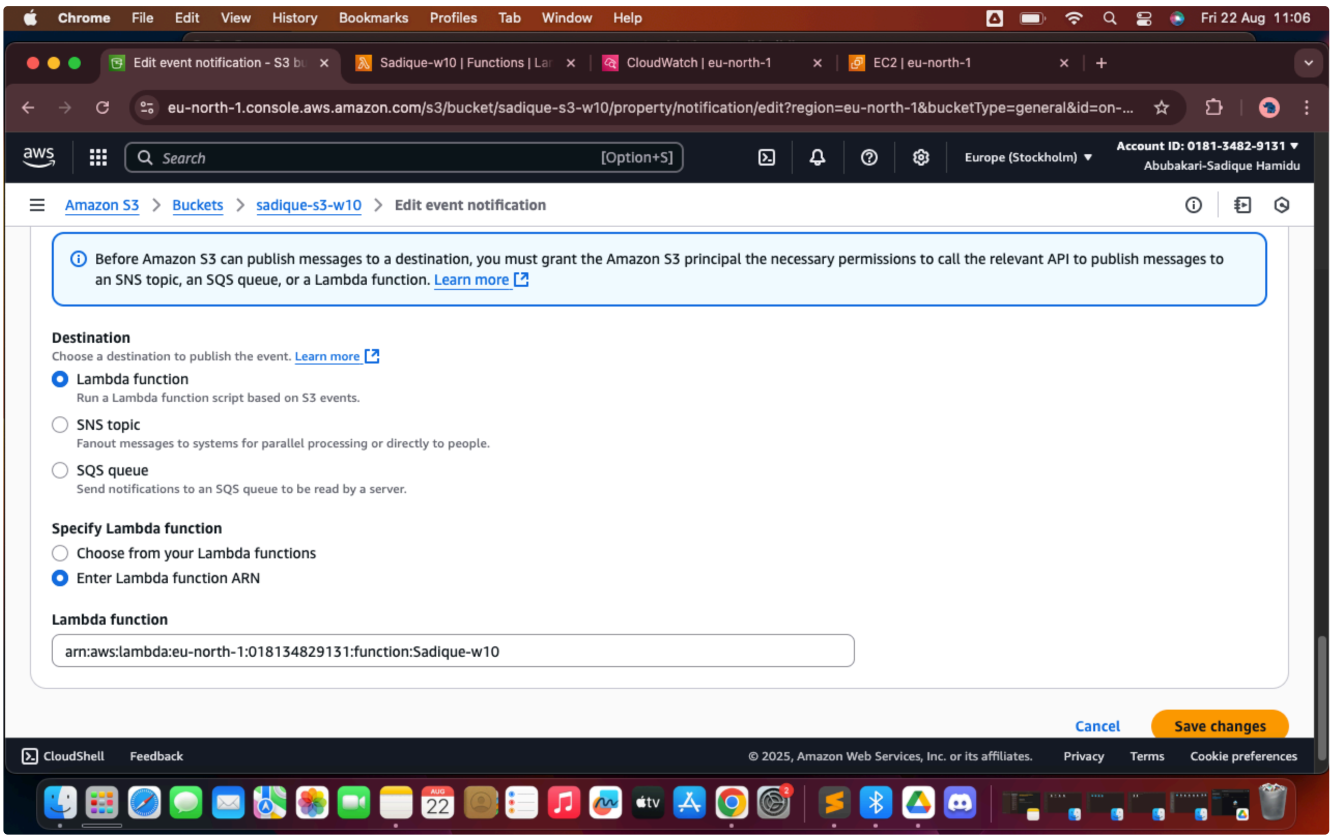
- **Amazon S3** stores uploaded files. An event notification is triggered when a new object is uploaded.
- **AWS Lambda** is triggered by S3. It processes the event and publishes a message to SNS.
- **Amazon SNS** sends email notifications to subscribed users.
- **CloudWatch** captures logs for troubleshooting and monitoring.



2. Implementation Steps

Step 1: Create S3 Bucket & Enable Event Notification

A bucket was created in the `eu-north-1 (Stockholm)` region. Event notifications were configured to trigger the Lambda function on **ObjectCreated**.


Amazon S3 > Buckets > sadique-s3-w10 > Edit event notification

Before Amazon S3 can publish messages to a destination, you must grant the Amazon S3 principal the necessary permissions to call the relevant API to publish messages to an SNS topic, an SQS queue, or a Lambda function. Learn more

Destination
Choose a destination to publish the event. Learn more

- [✓ Lambda function] — Run a Lambda function script based on S3 events.
- SNS topic — Fanout messages to systems for parallel processing or directly to people.
- SQS queue — Send notifications to an SQS queue to be read by a server.

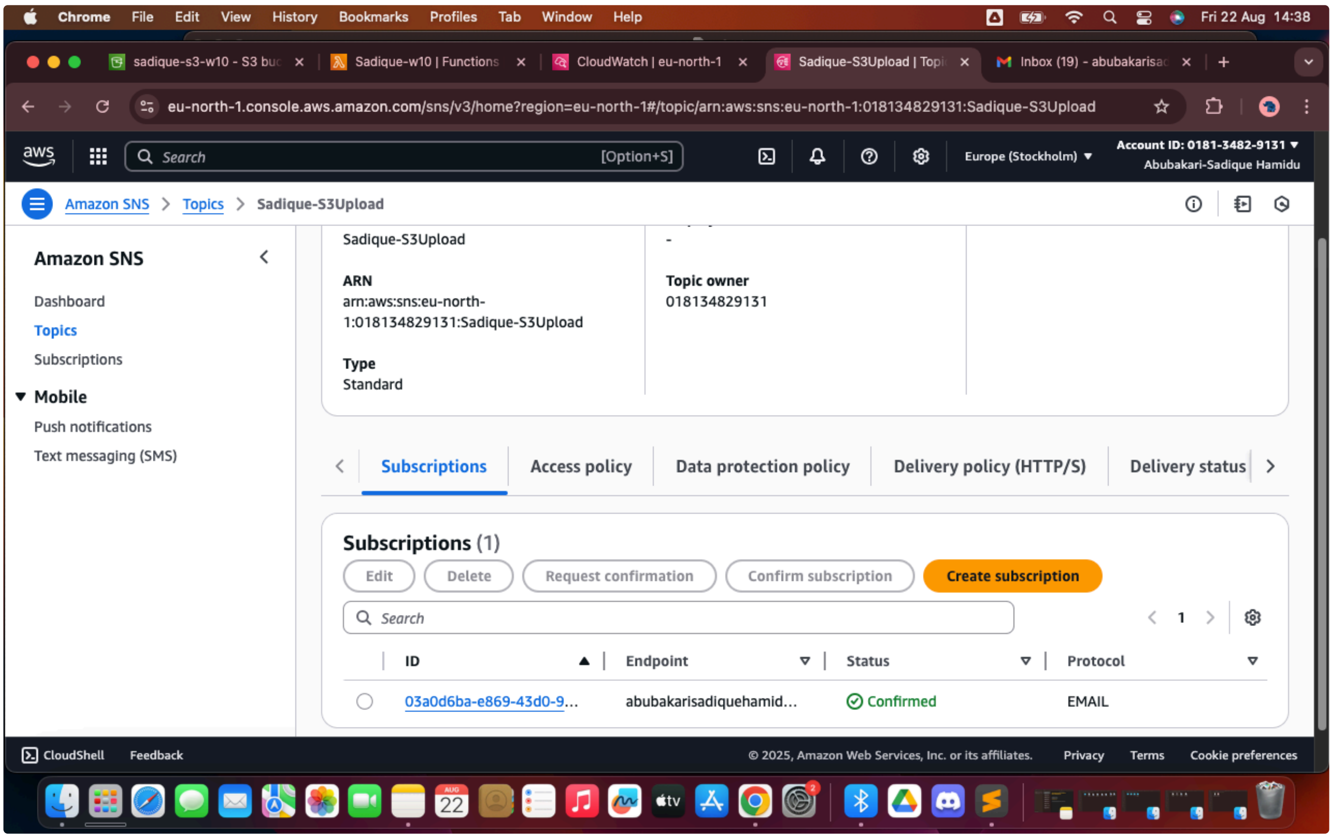
Specify Lambda function
- Choose from your Lambda functions
- [✓ Enter Lambda function ARN]

Lambda function
arn:aws:lambda:eu-north-1:018134829131:function:Sadique-w10

Cancel | Save changes

Step 2: Create SNS Topic & Subscribe Email

An SNS topic named **sadique-s3-upload** was created. An email subscription was added and confirmed.


Amazon SNS > Topics > Sadique-S3Upload

Sadique-S3Upload

ARN
arn:aws:sns:eu-north-1:018134829131:Sadique-S3Upload

Topic owner
018134829131

Type
Standard

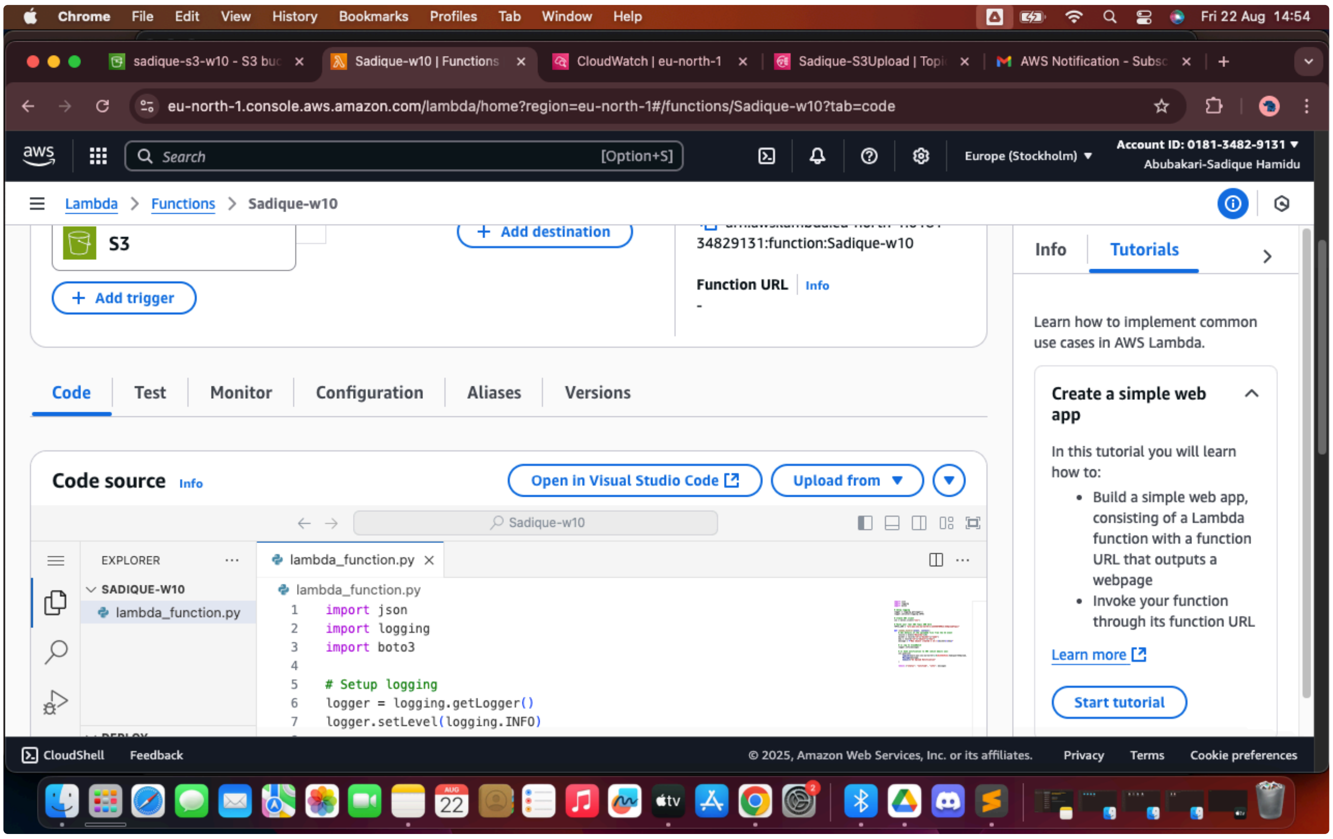
Subscriptions (1)

ID	Endpoint	Status	Protocol
03a0d6ba-e869-43d0-9...	abubakarisadiquehamid...	Confirmed	EMAIL

Step 3: Create Lambda Function

The Lambda function was created with Python code. It logs to CloudWatch and publishes to SNS. The SNS Topic ARN was inserted into the code:

```
TopicArn = "arn:aws:sns:eu-north-1:XXXXXXXXXXXX:Sadique-S3Upload"
```



Chrome File Edit View History Bookmarks Profiles Tab Window Help
Fri 22 Aug 14:54
sadique-s3-w10 - S3 buc
Sadique-w10 | Functions
CloudWatch | eu-north-1
Sadique-S3Upload | Topi
AWS Notification - Subsc
eu-north-1.console.aws.amazon.com/lambda/home?region=eu-north-1#/functions/Sadique-w10?tab=code
Search [Option+S]
Europe (Stockholm)
Account ID: 0181-3482-9131
Abubakari-Sadique Hamidu
Lambda > Functions > Sadique-w10
S3
+ Add destination
+ Add trigger
34829131:function:Sadique-w10
Function URL Info
-
Code Test Monitor Configuration Aliases Versions
Code source Info
Open in Visual Studio Code
Upload from
Sadique-w10
EXPLORER
SADIQUE-W10
lambda_function.py
Info Tutorials
CloudShell Feedback
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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

Learn more

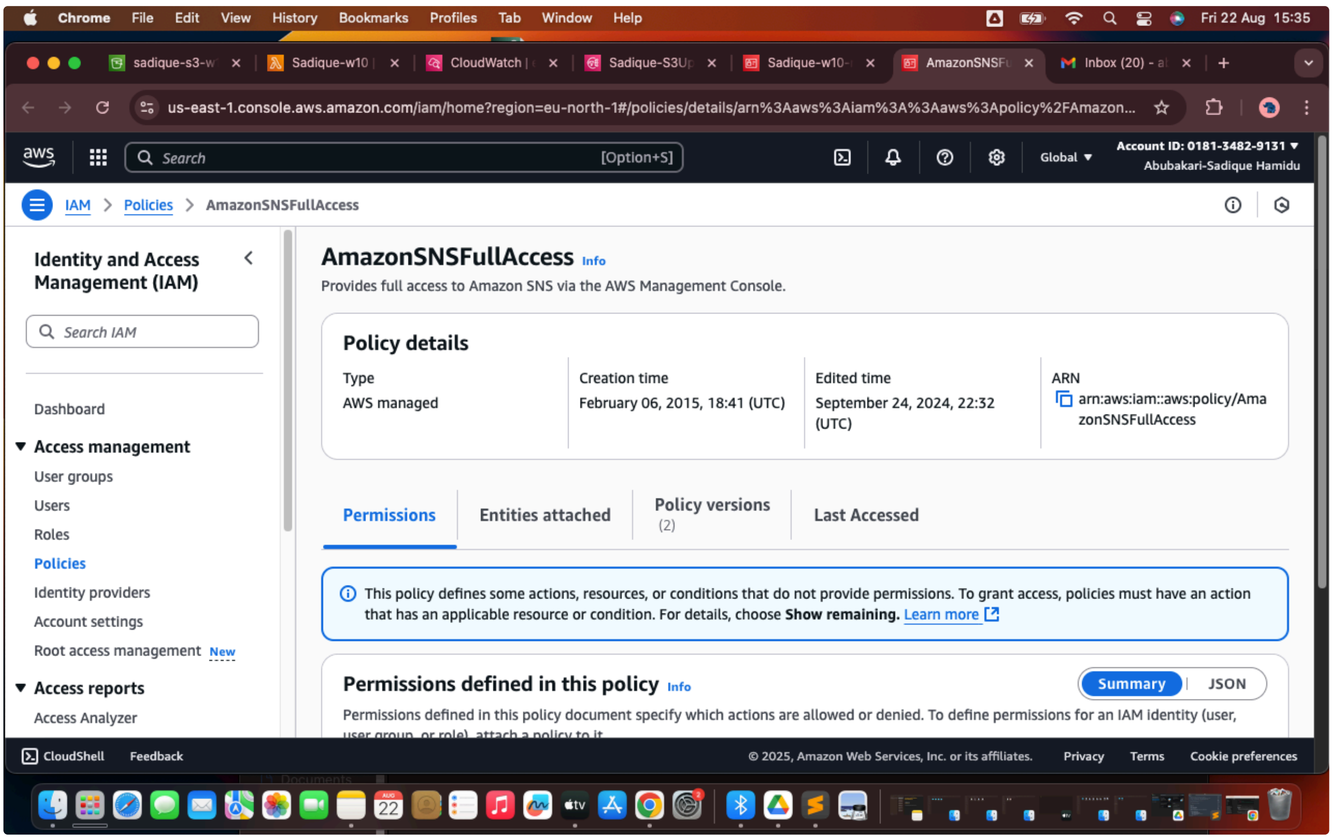
Start tutorial

```python
import json
import logging
import boto3

# Setup logging
logger = logging.getLogger()
logger.setLevel(logging.INFO)
```

Step 4: IAM Role Permission Fix

Initially, the Lambda failed due to `AuthorizationError`. The role **Sadique-w10-role-ls4ib5pd** was missing `SNS:Publish` permission. The issue was fixed by attaching the **AmazonSNSFullAccess** policy.


Chrome File Edit View History Bookmarks Profiles Tab Window Help
Fri 22 Aug 15:35
sadique-s3-w
Sadique-w10
CloudWatch
Sadique-S3U
Sadique-w10-
AmazonSNSF
Inbox (20) - a
us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/policies/details/arn%3Aaws%3Aiam%3A%3Aaws%3Apolicy%2FAmazon...
Search
[Option+S]
Global
Account ID: 0181-3482-9131
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IAM > Policies > AmazonSNSFullAccess
Identity and Access Management (IAM)
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
Identity providers
Account settings
Root access management New
Access reports
Access Analyzer
CloudShell
Feedback
© 2025, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

AmazonSNSFullAccess Info

Provides full access to Amazon SNS via the AWS Management Console.

Policy details

Type	Creation time	Edited time	ARN
AWS managed	February 06, 2015, 18:41 (UTC)	September 24, 2024, 22:32 (UTC)	arn:aws:iam::aws:policy/AmazonSNSFullAccess

Permissions | Entities attached | Policy versions (2) | Last Accessed

This policy defines some actions, resources, or conditions that do not provide permissions. To grant access, policies must have an action that has an applicable resource or condition. For details, choose **Show remaining.** Learn more

Permissions defined in this policy Info

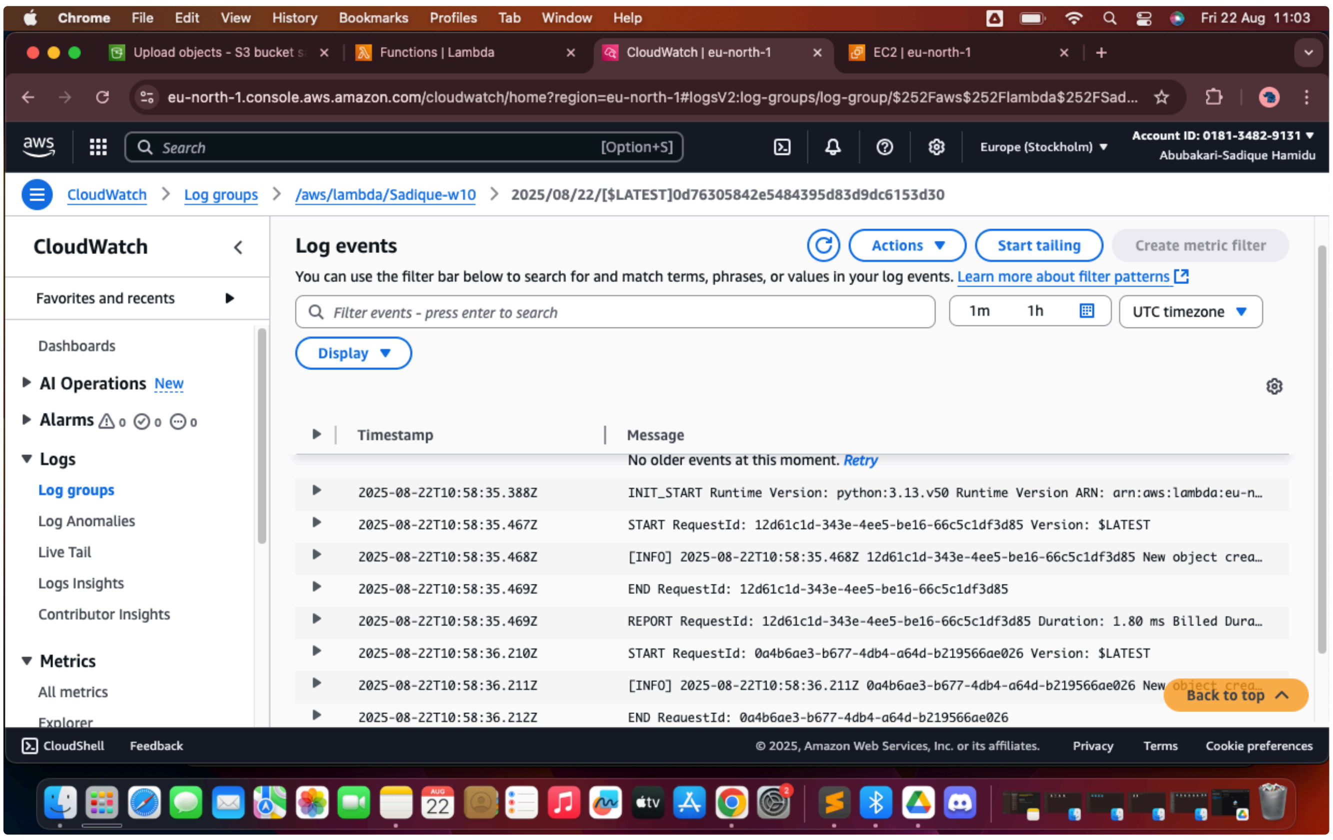
Summary | JSON

Permissions defined in this policy document specify which actions are allowed or denied. To define permissions for an IAM identity (user, user group, or role), attach a policy to it.

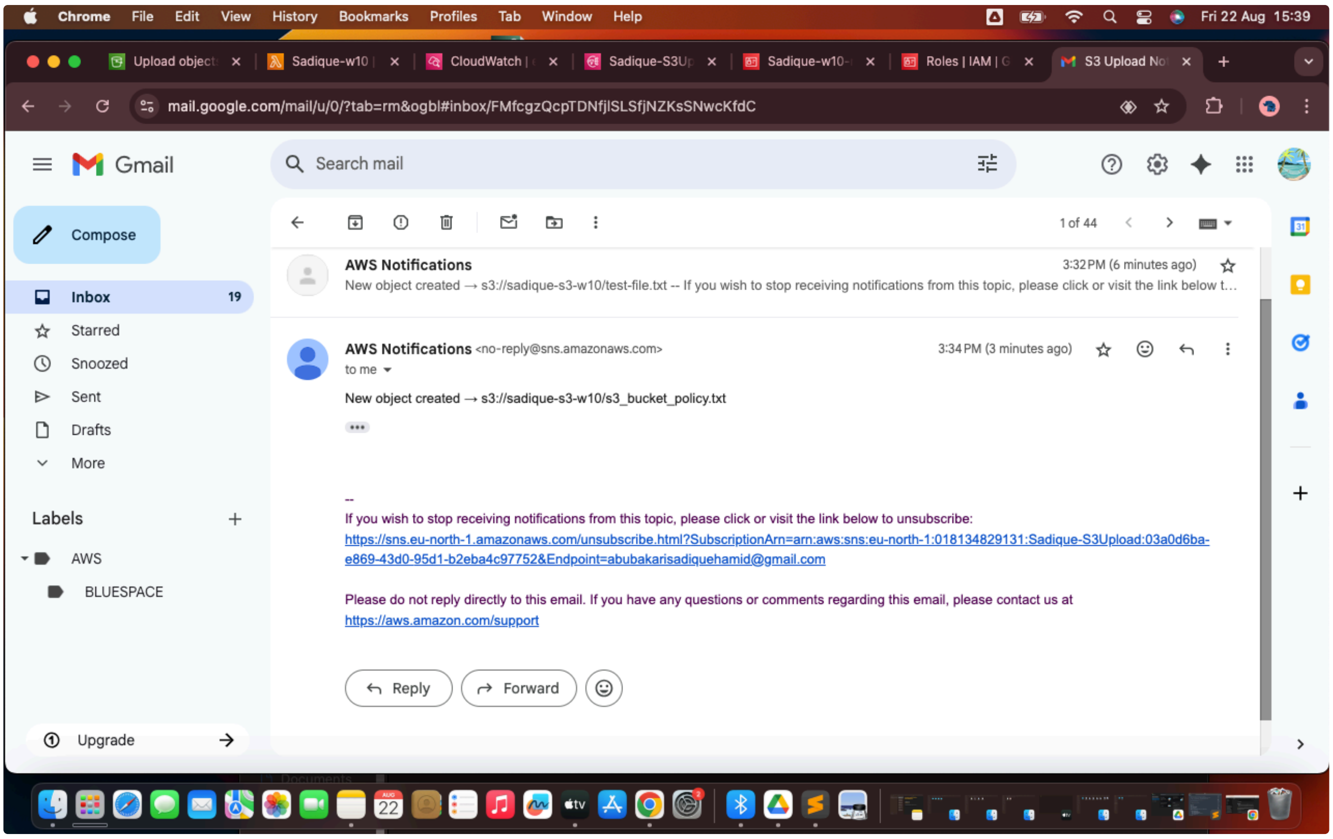
3. Testing & Results

A test file was uploaded to the S3 bucket. The Lambda executed successfully:

- Logs were recorded in **CloudWatch**.
- An email notification was received via **SNS**.


CloudWatch > Log groups > /aws/lambda/Sadique-w10 > 2025/08/22/[$LATEST]0d76305842e5484395d83d9dc6153d30
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
1m
1h
UTC timezone
Display

```
Timestamp                    Message
                             No older events at this moment. Retry
2025-08-22T10:58:35.388Z     INIT_START Runtime Version: python:3.13.v50 Runtime Version ARN: arn:aws:lambda:eu-n…
2025-08-22T10:58:35.467Z     START RequestId: 12d61c1d-343e-4ee5-be16-66c5c1df3d85 Version: $LATEST
2025-08-22T10:58:35.468Z     [INFO] 2025-08-22T10:58:35.468Z 12d61c1d-343e-4ee5-be16-66c5c1df3d85 New object crea…
2025-08-22T10:58:35.469Z     END RequestId: 12d61c1d-343e-4ee5-be16-66c5c1df3d85
2025-08-22T10:58:35.469Z     REPORT RequestId: 12d61c1d-343e-4ee5-be16-66c5c1df3d85 Duration: 1.80 ms Billed Dura…
2025-08-22T10:58:36.210Z     START RequestId: 0a4b6ae3-b677-4db4-a64d-b219566ae026 Version: $LATEST
2025-08-22T10:58:36.211Z     [INFO] 2025-08-22T10:58:36.211Z 0a4b6ae3-b677-4db4-a64d-b219566ae026 New object crea…
2025-08-22T10:58:36.212Z     END RequestId: 0a4b6ae3-b677-4db4-a64d-b219566ae026
```



AWS Notifications 3:32 PM (6 minutes ago)
New object created → s3://sadique-s3-w10/test-file.txt -- If you wish to stop receiving notifications from this topic, please click or visit the link below t…

AWS Notifications <no-reply@sns.amazonaws.com> 3:34 PM (3 minutes ago)
to me

New object created → s3://sadique-s3-w10/s3_bucket_policy.txt

--
If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:
https://sns.eu-north-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:eu-north-1:018134829131:Sadique-S3Upload:03a0d6ba-e869-43d0-95d1-b2eba4c97752&Endpoint=abubakarisadiquehamid@gmail.com

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at https://aws.amazon.com/support

4. Troubleshooting

- **No Email Received:** Subscription not confirmed or wrong region selected.
- **AuthorizationError:** Fixed by attaching **AmazonSNSFullAccess** policy.

- **S3 Event Not Triggering:** Ensure event notification is pointing to Lambda correctly.

5. Conclusion

The integration successfully ensures that every file uploaded to S3 triggers a Lambda function which logs the event and sends an email notification via SNS.

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