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Subject: Advanced DevOps

Practical Exam Case Study

Case Study No. 20: Automated Notifications using SNS

Concepts Used: AWS Lambda, S3, SNS.

Problem Statement : Develop a Lambda function that triggers when a new file is uploaded to an S3 bucket, and sends an email notification using SNS with details of the uploaded file."

Tasks:

- **Python Lambda Function**: Write a Python-based Lambda function that is triggered by S3 upload events.
- **Extract File Information**: Capture the file name and file size from the S3 event and format this information into a notification.
- **Send Notifications via SNS**: Use SNS to deliver the notification to a configured email address.
- **Test**: Upload a file to the S3 bucket and verify the receipt of the email notification.

Introduction:

Overview:
In this case study, we focus on implementing a system that leverages AWS services to automate email notifications whenever a file is uploaded to an Amazon S3 bucket. This system uses AWS Lambda, Amazon S3, and Amazon SNS to provide real-time updates, which are essential in scenarios like data processing, monitoring, and other environments that require instant feedback.

Key AWS Components:

- **AWS Lambda**: A serverless compute service that runs code in response to specific events, such as file uploads to S3. It eliminates the need to manage infrastructure, providing a scalable and cost-effective solution.
- **Amazon S3**: A highly reliable and secure object storage service. In this system, S3 triggers an event each time a new file is uploaded to a specified bucket.
- **Amazon SNS**: SNS (Simple Notification Service) is used to send notifications. In this use case, we employ the email protocol to keep users informed about file uploads in real-time.

Key Feature and Application-

Key Feature:

The primary feature of this system is the automated email notifications powered by the integration of AWS Lambda and SNS. As soon as a file is uploaded to the S3 bucket, a notification is triggered automatically, reducing manual intervention and ensuring timely alerts..

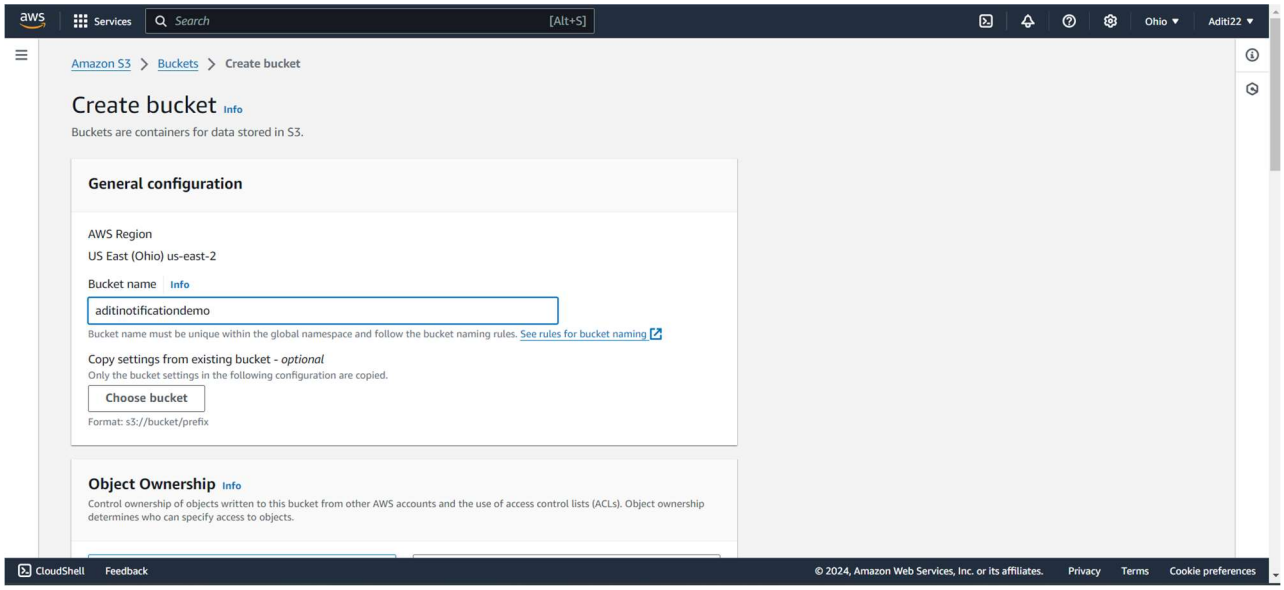
Application:
This system is highly useful in scenarios where real-time notifications are critical. For example, in a data processing workflow, when a new file is uploaded, relevant team members are instantly notified, allowing processes to start promptly without human intervention. This improves operational efficiency and reduces delays.

Advantages:
Instant Notifications: Users receive immediate alerts for new uploads, ensuring that actions can be taken in a timely manner.
Seamless Scalability: The system scales automatically with the demand, thanks to the elasticity and scalability of AWS infrastructure.

Implementation:

Step 1:

Creation of **S3 Bucket** -



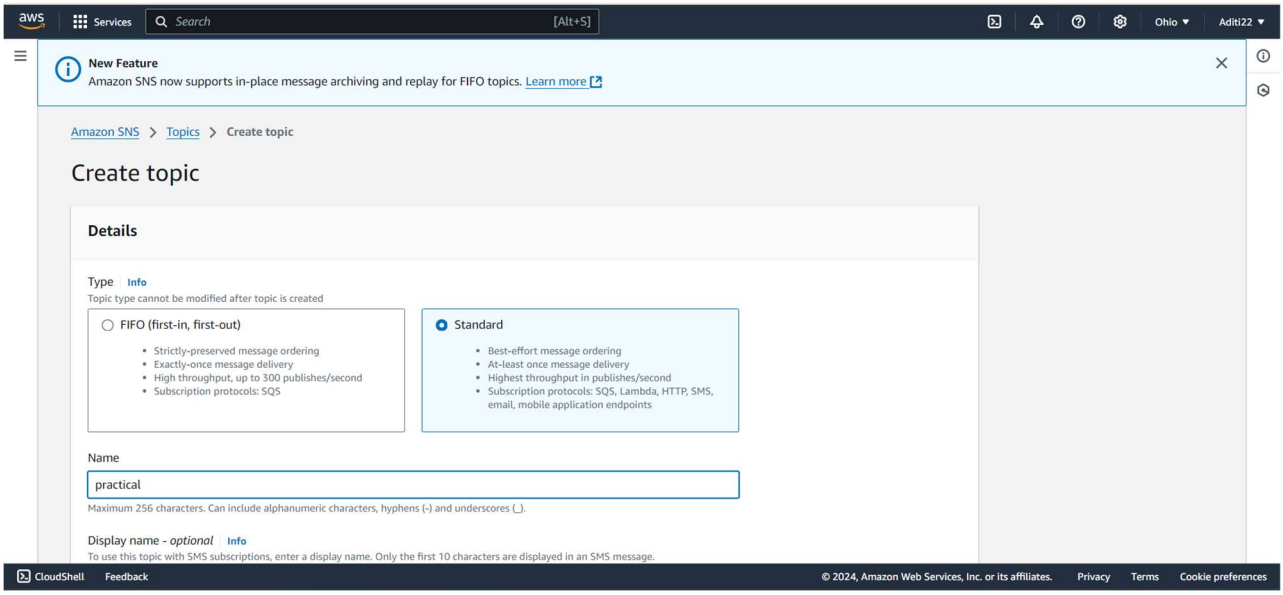
Specify the unique name to the bucket and keep all other default settings as it is.

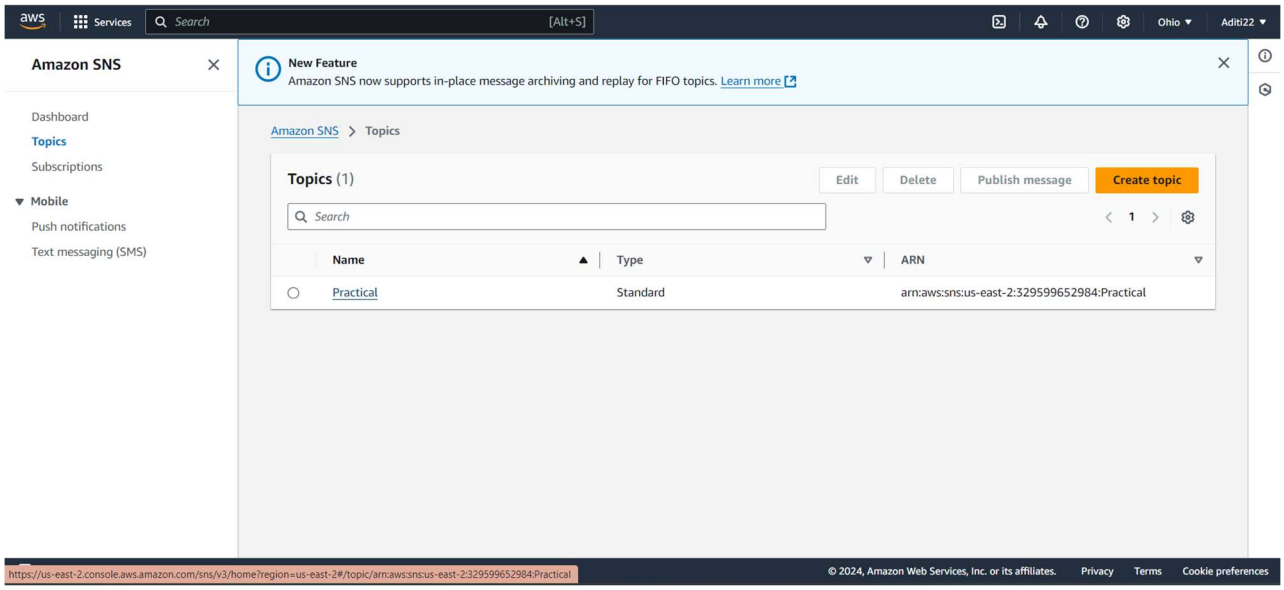
Successfully created S3 Bucket.

Step 2:

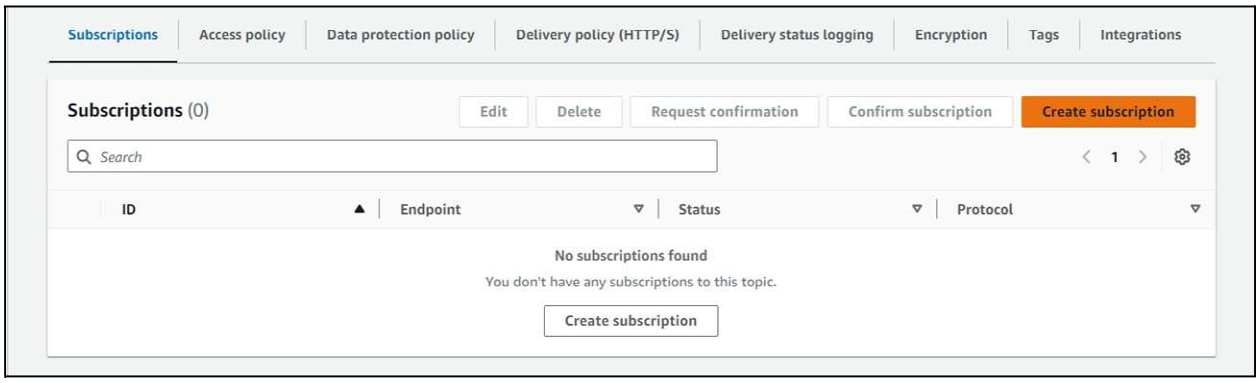
Set Up **SNS** Service-

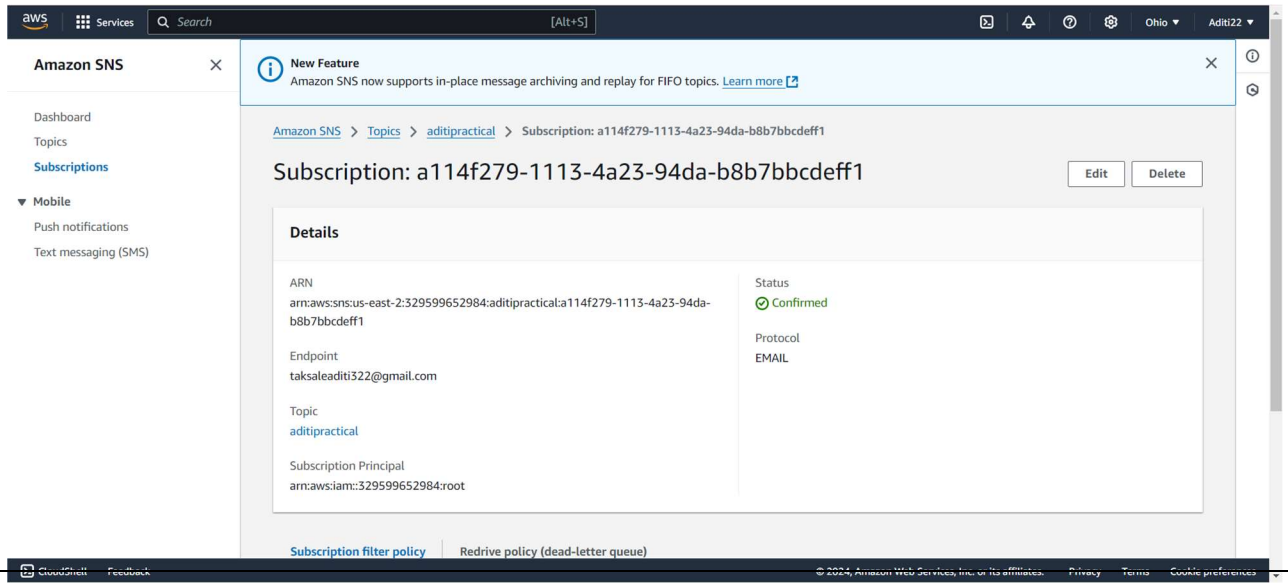
- Create a **new topic**:
    - Click "Create topic."
    - Select "Standard" as the type.
    - Enter a name for the topic and click "Create topic."



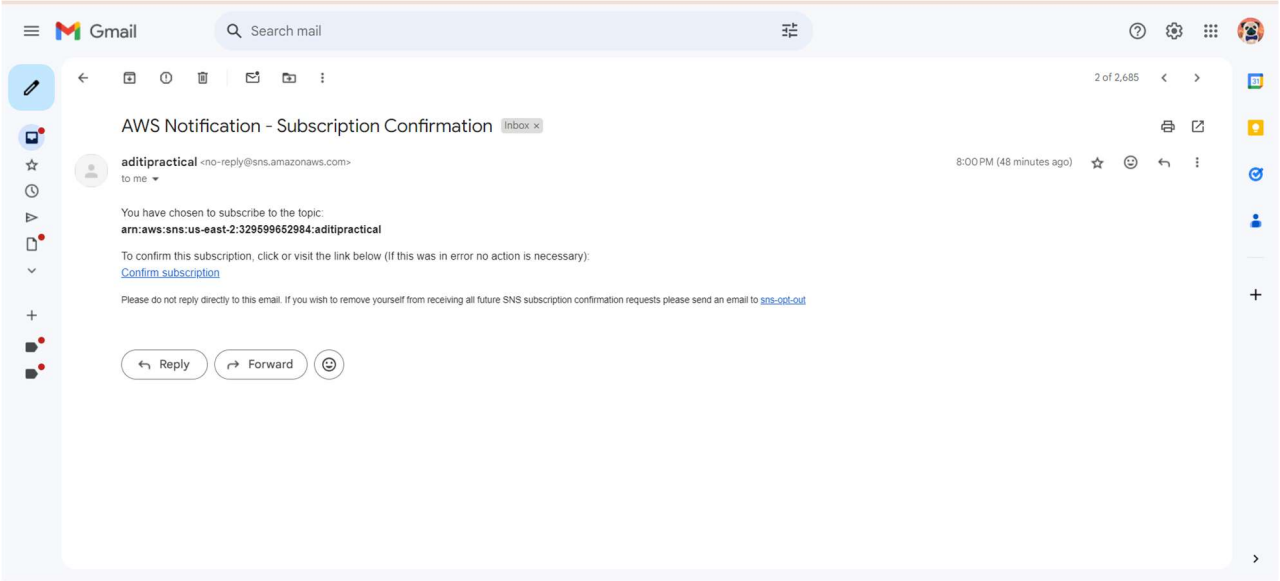


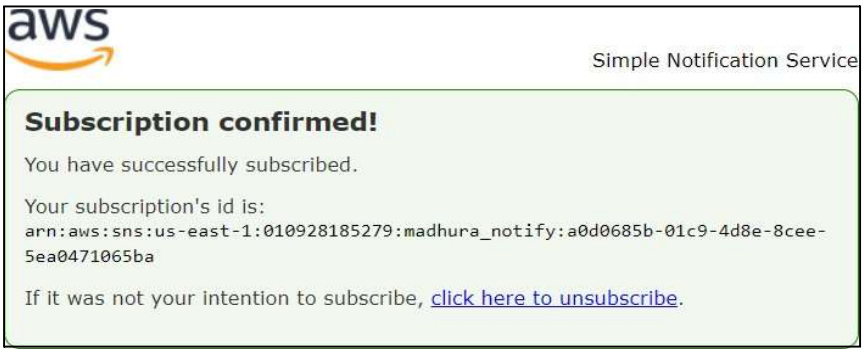
- Create a **subscription**:
  - Go to the topic's details page.
  - Click "Create subscription."
  - Choose "**Email**" as the **protocol**.
  - Enter the email address to receive notifications and click "Create subscription."

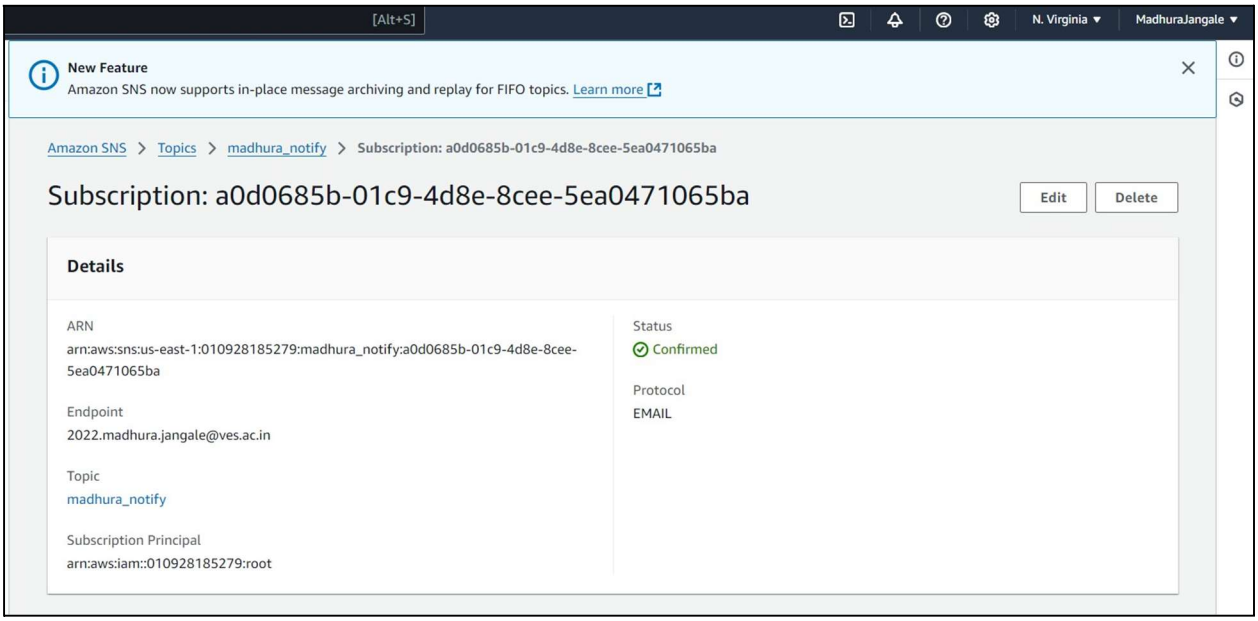




- **Confirm** subscription: Check your email for a confirmation message and click on the link to confirm the subscription.



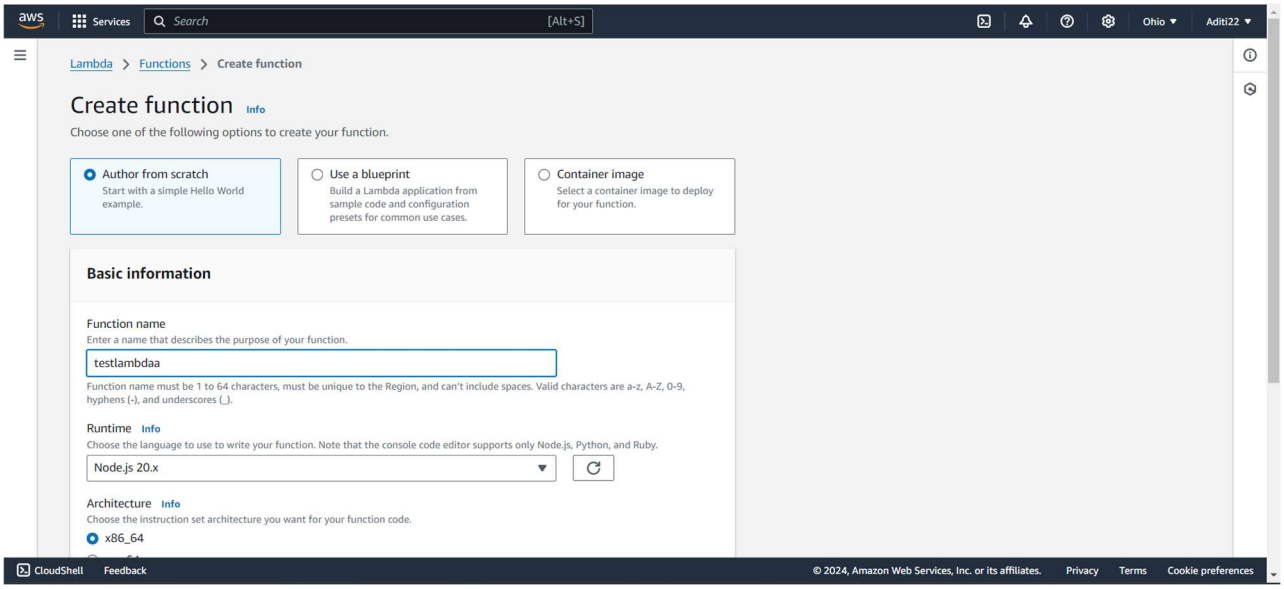




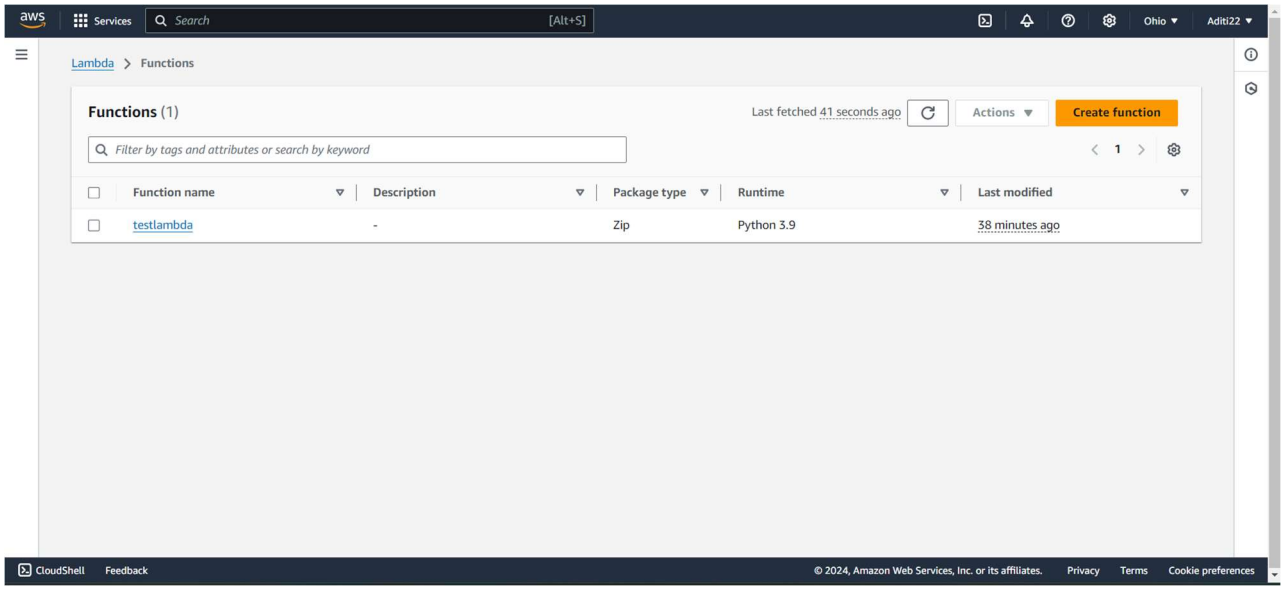
Email Confirmed.

Step 3:

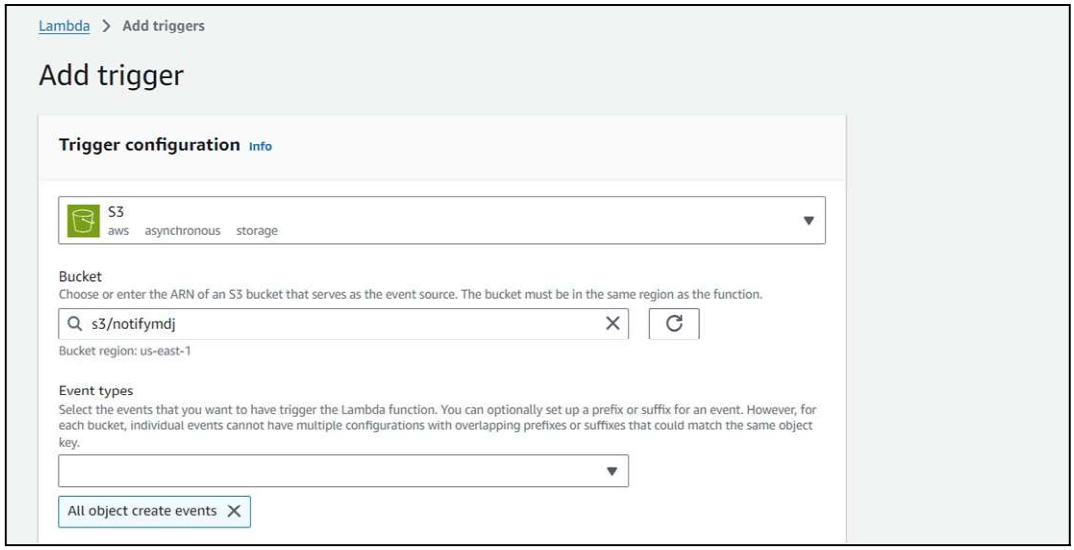
Create a **Lambda Function -**

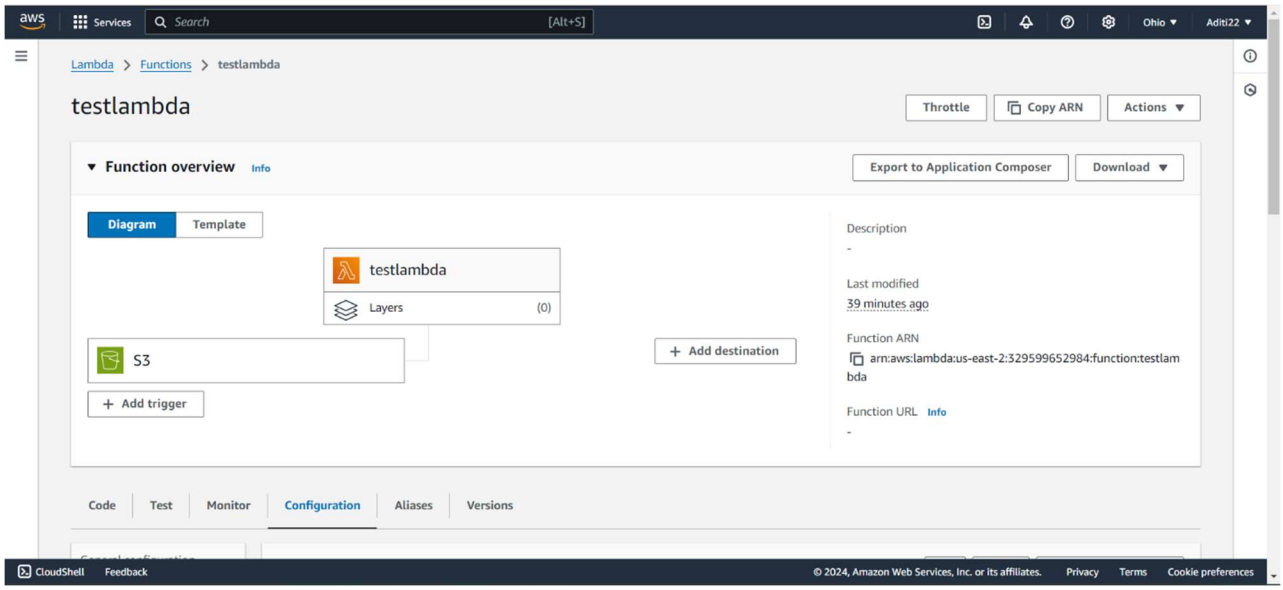


Function created.



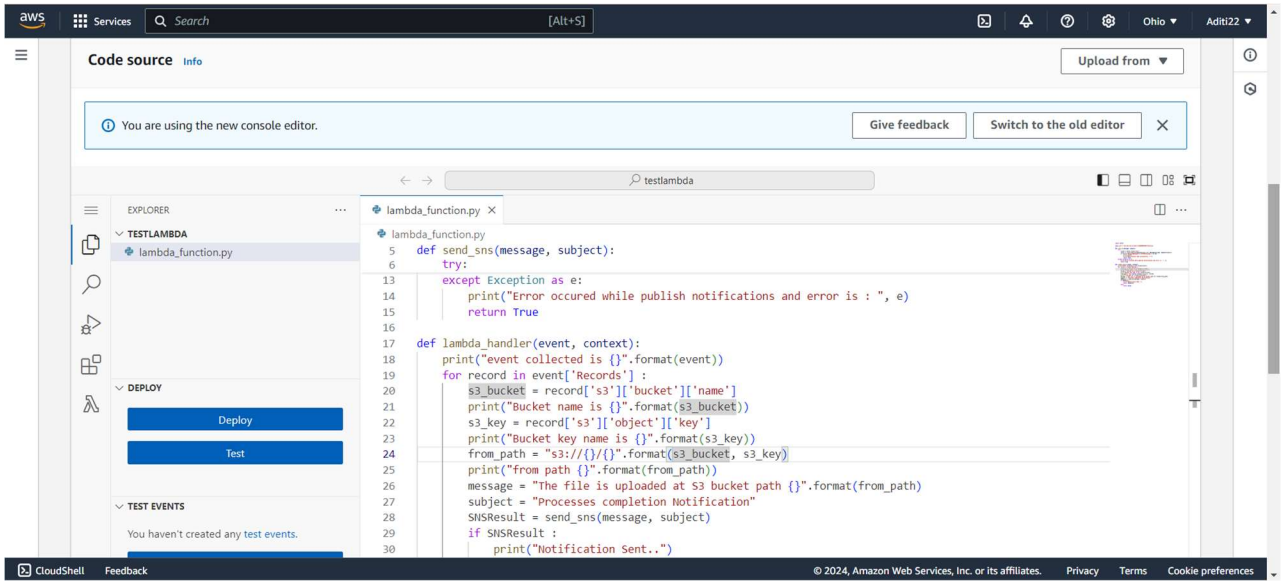
Now add **triggers** to it-





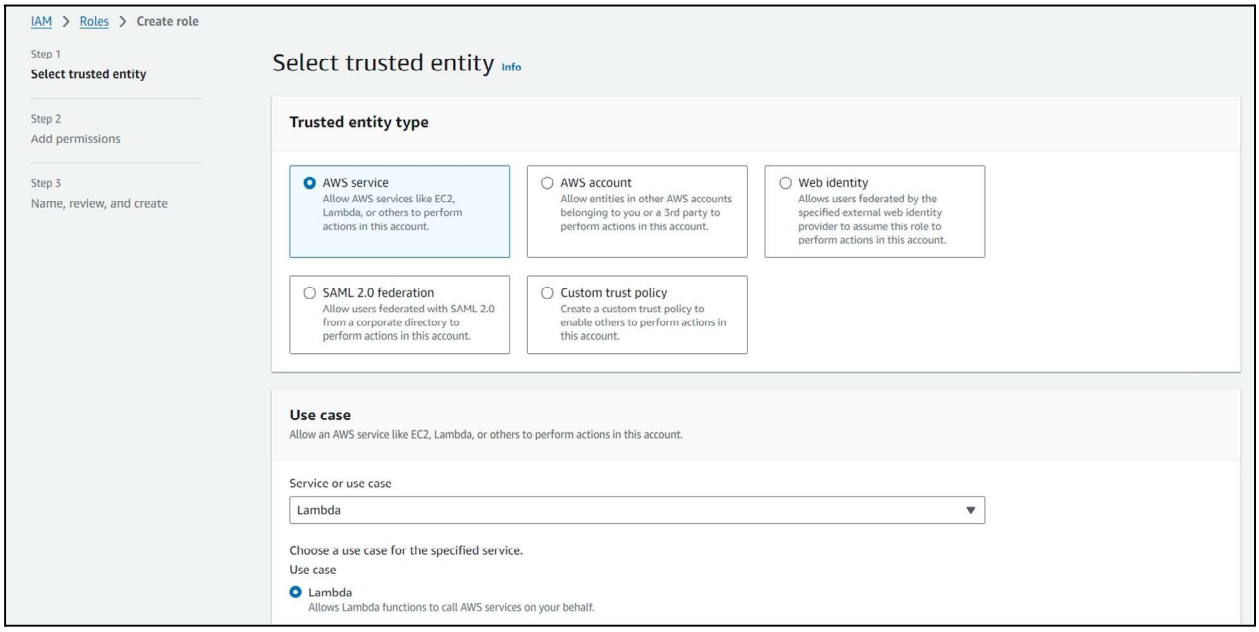
Now write the following code in the lambda function created-

- Replace the **TopicArn** with the ARN of your SNS Topic.
- Then Click on Deploy.

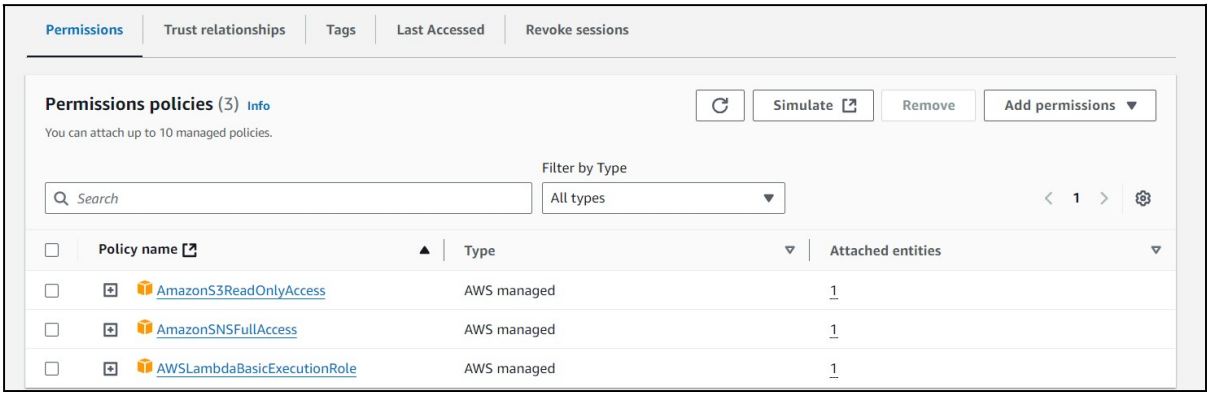


Step 4:
Configure **IAM role** for Lambda-

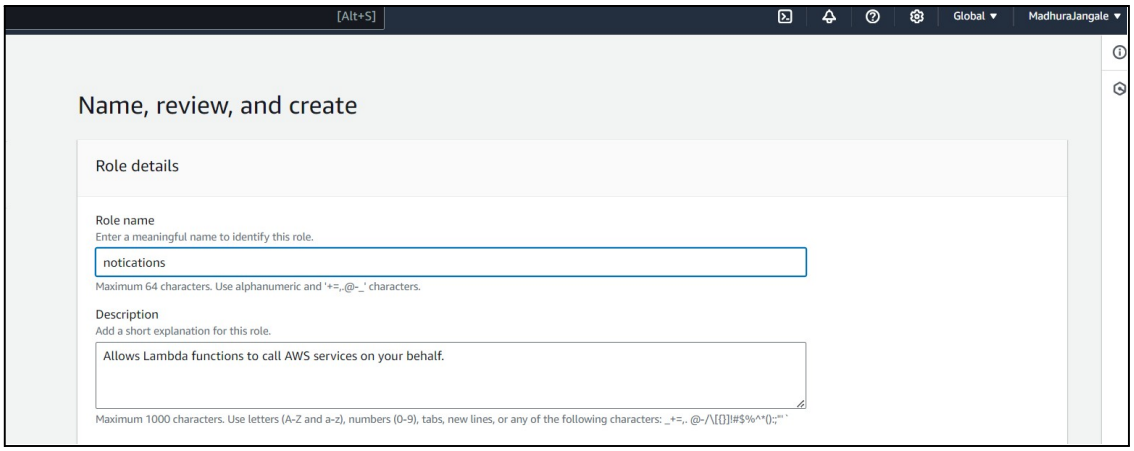
Navigate to IAM>Roles>Create role



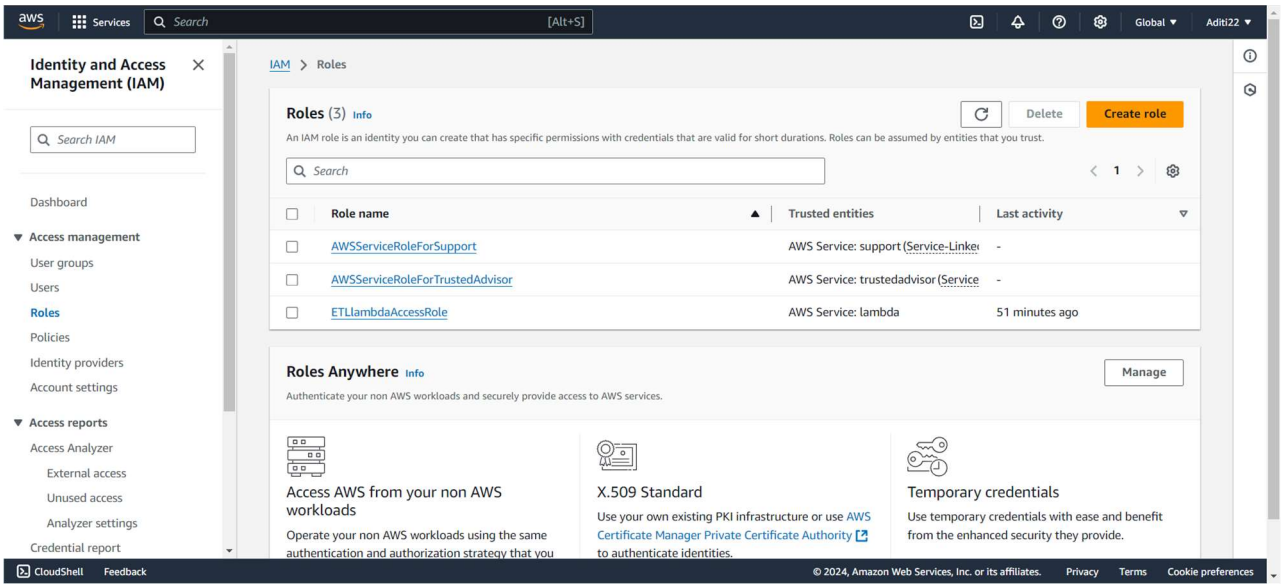
Attach the "**AmazonS3ReadOnlyAccess**", "**AmazonSNSFullAccess**" and "**AWSLambdaBasicExecutionRole**" policies.



Give name to the role.



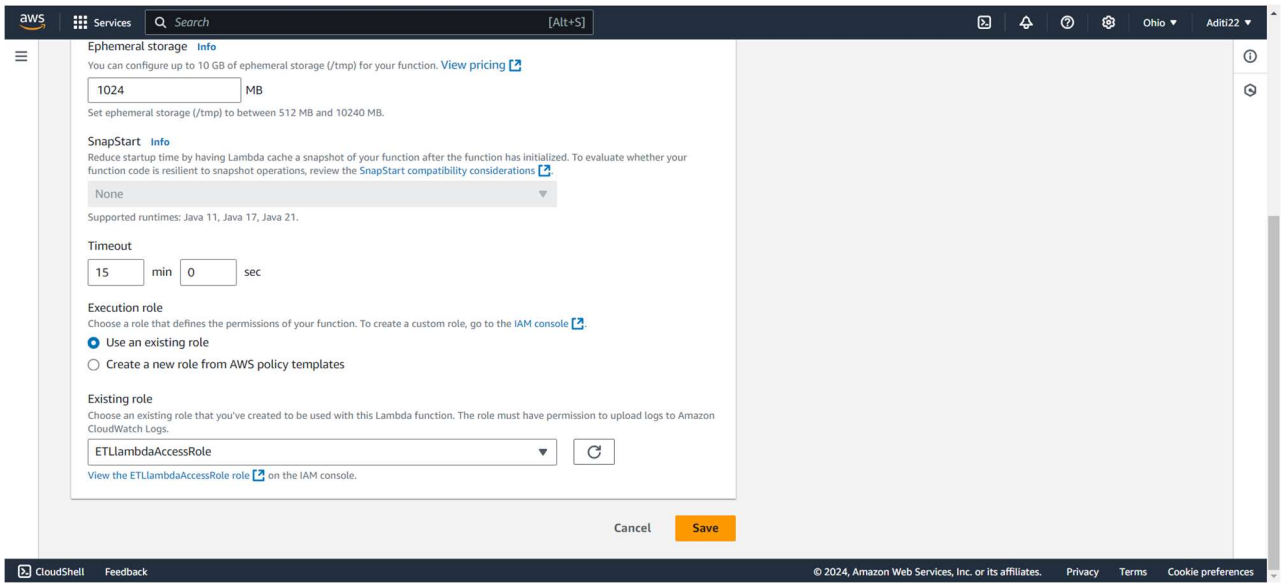
Role created.



Step 5:

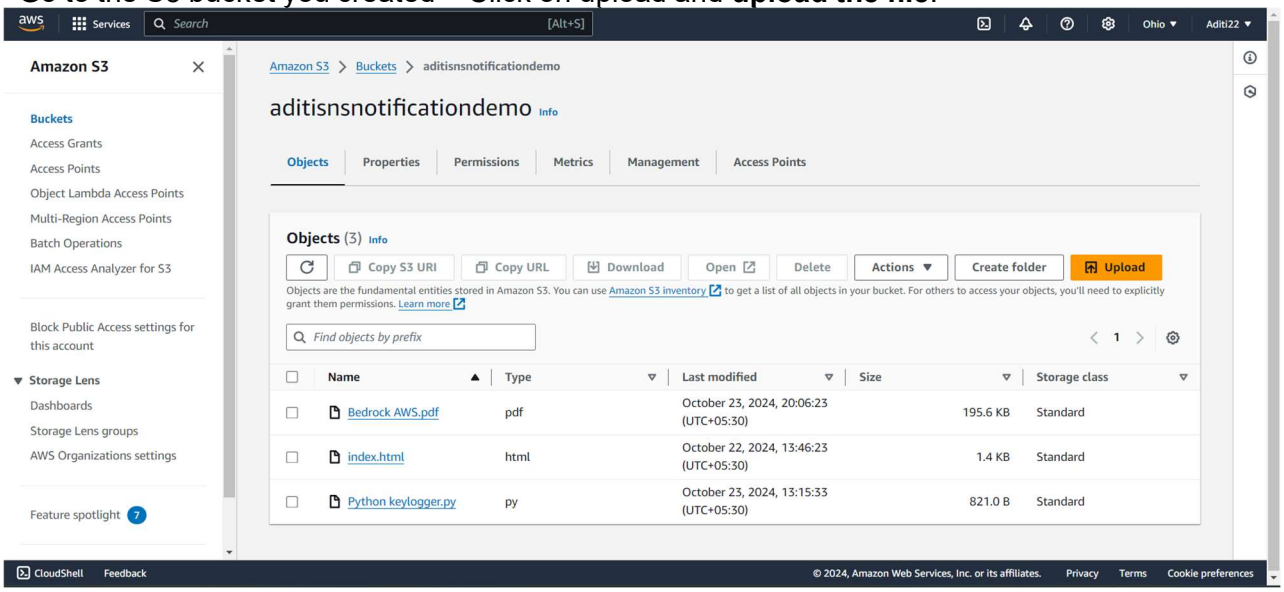
Attach the role to your lambda function-

- Navigate to the lambda functions details page > under “execution role” > click “edit” > Select “**use an existing role**” > choose the role created.
- Keep the **timeout of 15 min**.

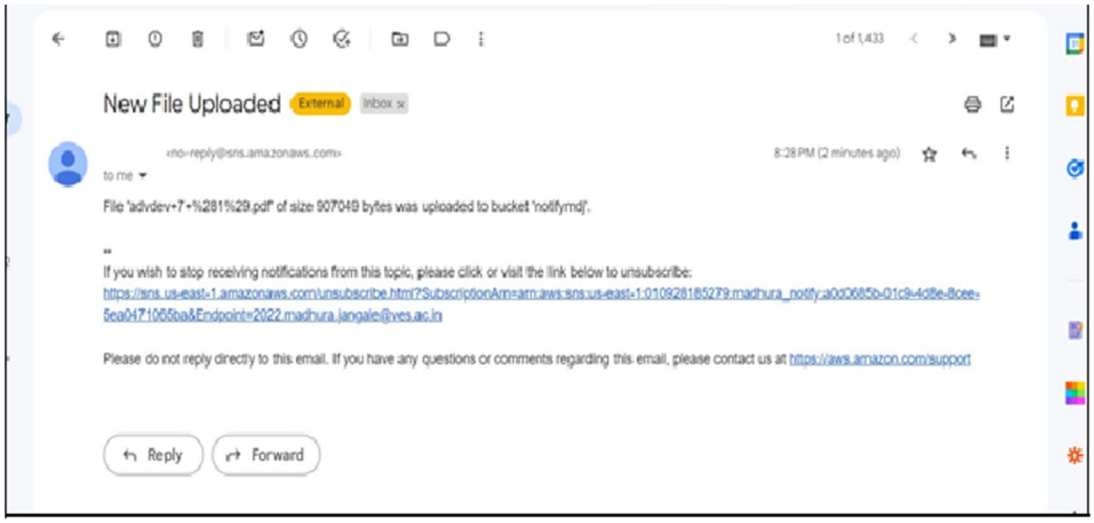


Step 6:
Check the setup-

Go to the S3 bucket you created > Click on upload and **upload the file**.



Check your inbox of the email used in sns you will see the mail of file upload as below.



Execution completed successfully.