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**Class:**D15B

**Roll no.** 15

**Aim:**To create a Lambda function which will log “An Image has been added” once you add an object to a specific bucket in S3

Theory:

**AWS Lambda and S3 Integration:** AWS Lambda allows you to execute code in response to various events, including those triggered by Amazon S3. When an object is added to an S3 bucket, it can trigger a Lambda function to execute, allowing for event-driven processing without managing servers.

**Workflow:**

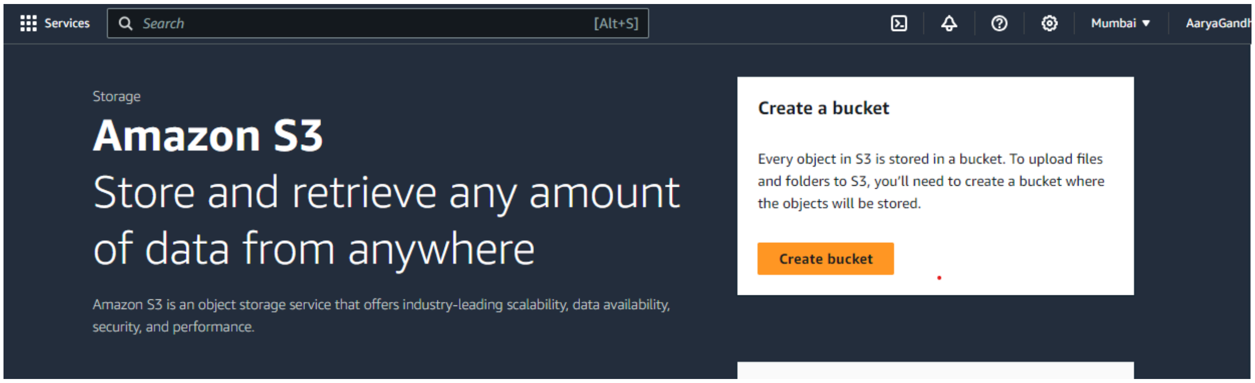
1. **Create an S3 Bucket:**
   - First, create an S3 bucket that will store the objects. This bucket will act as the trigger source for the Lambda function.
2. **Create the Lambda Function:**
   - Set up a new Lambda function using AWS Lambda’s console. You can choose a runtime environment like Python, Node.js, or Java.
   - Write code that logs a message like “An Image has been added” when triggered.
3. **Set Up Permissions:**
   - Ensure that the Lambda function has the necessary permissions to access S3. You can do this by attaching an IAM role with policies that allow reading from the bucket and writing logs to CloudWatch.
4. **Configure S3 Trigger:**
   - Link the S3 bucket to the Lambda function by setting up a trigger. Specify that the function should be triggered when an object is created in the bucket (e.g., when an image is uploaded).
5. **Test the Setup:**
   - Upload an object (e.g., an image) to the S3 bucket to test the trigger. The Lambda function should execute and log the message “An Image has been added” in AWS CloudWatch Logs.

**Steps:**

Here are the steps to create a Lambda function that logs “An Image has been added” once an object is added to a specific S3 bucket in AWS Learner Lab:

## . Create an S3 Bucket

- Go to the AWS Management Console.
- Navigate to the S3 service.
- Click on "Create bucket."



Storage

**Amazon S3**

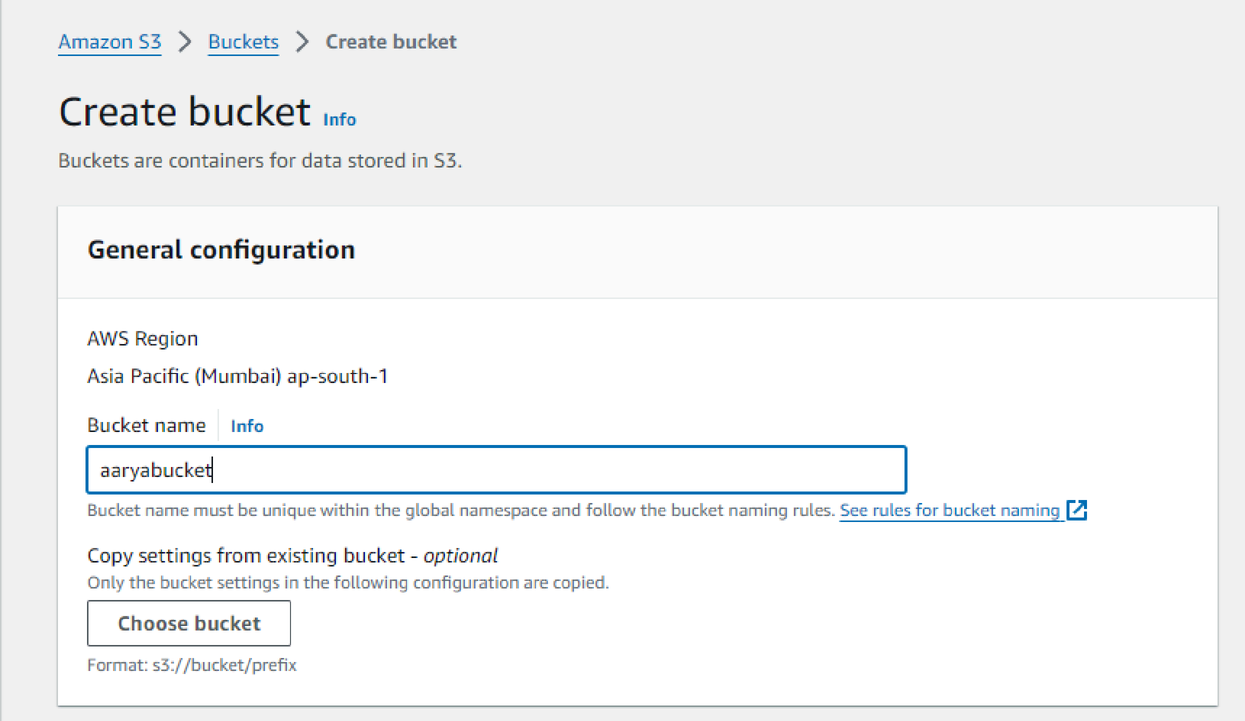
Store and retrieve any amount of data from anywhere

Amazon S3 is an object storage service that offers industry-leading scalability, data availability, security, and performance.

**Create a bucket**

Every object in S3 is stored in a bucket. To upload files and folders to S3, you'll need to create a bucket where the objects will be stored.

- Enter a unique bucket name and choose a region.



Amazon S3 > Buckets > Create bucket

Create bucket Info

Buckets are containers for data stored in S3.

General configuration

AWS Region

Asia Pacific (Mumbai) ap-south-1

Bucket name Info

aaryabucket

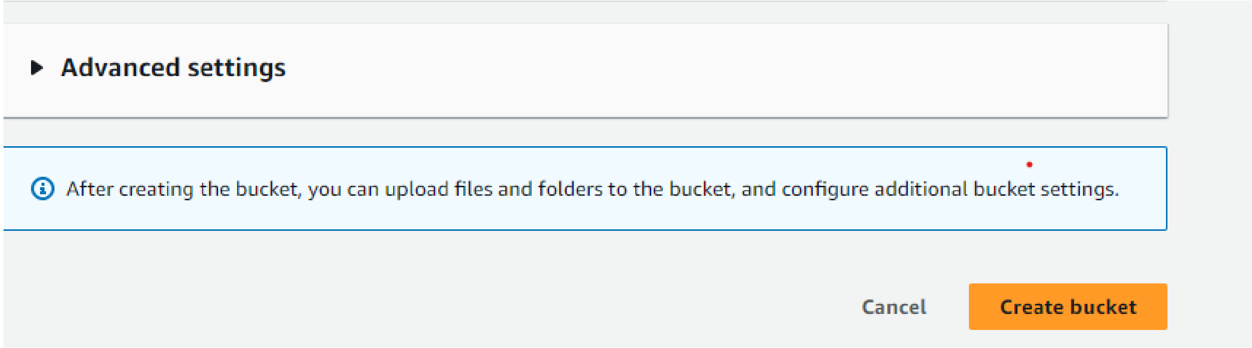
Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming

Copy settings from existing bucket - *optional*

Only the bucket settings in the following configuration are copied.

Format: s3://bucket/prefix

- Configure other settings as needed and click "Create bucket."

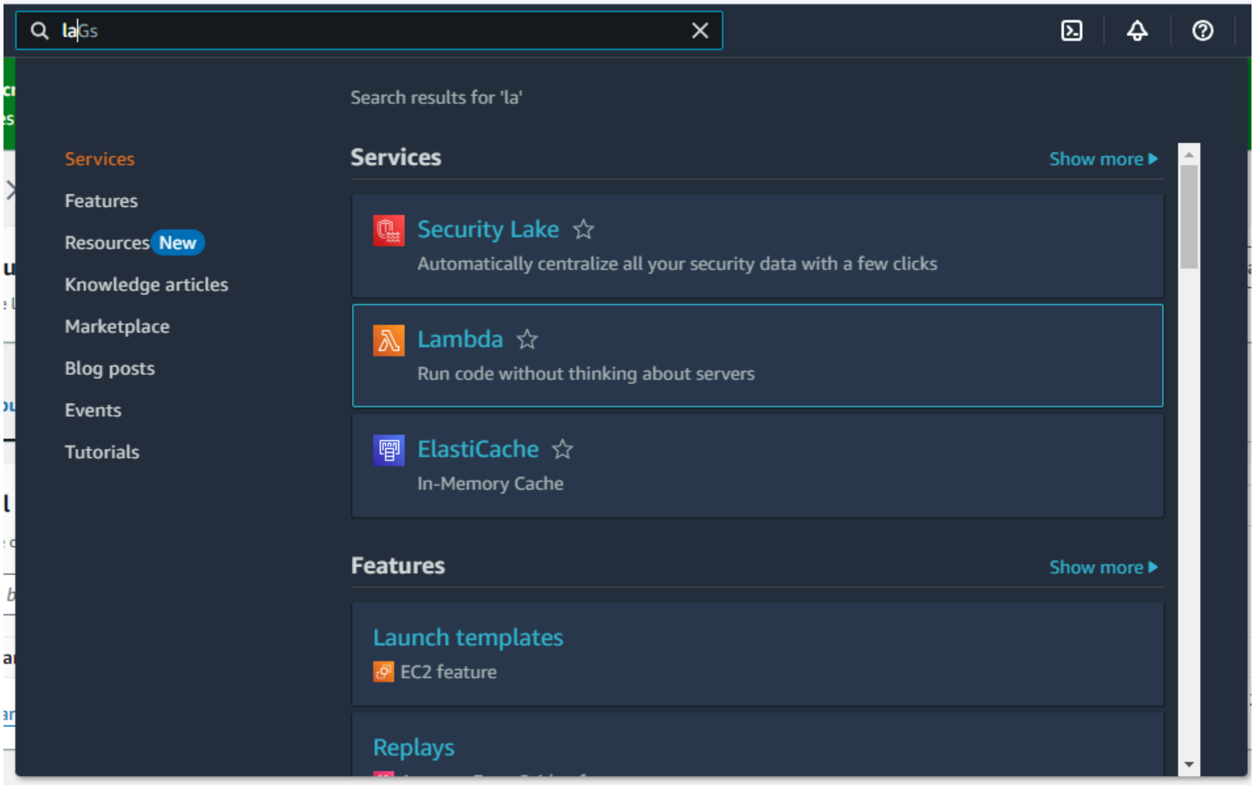


▶ Advanced settings

After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

## . Create a Lambda Function

- Go to the AWS Management Console.
- Navigate to the Lambda service.



Search results for 'la'

Services

Security Lake ☆
Automatically centralize all your security data with a few clicks

Lambda ☆
Run code without thinking about servers

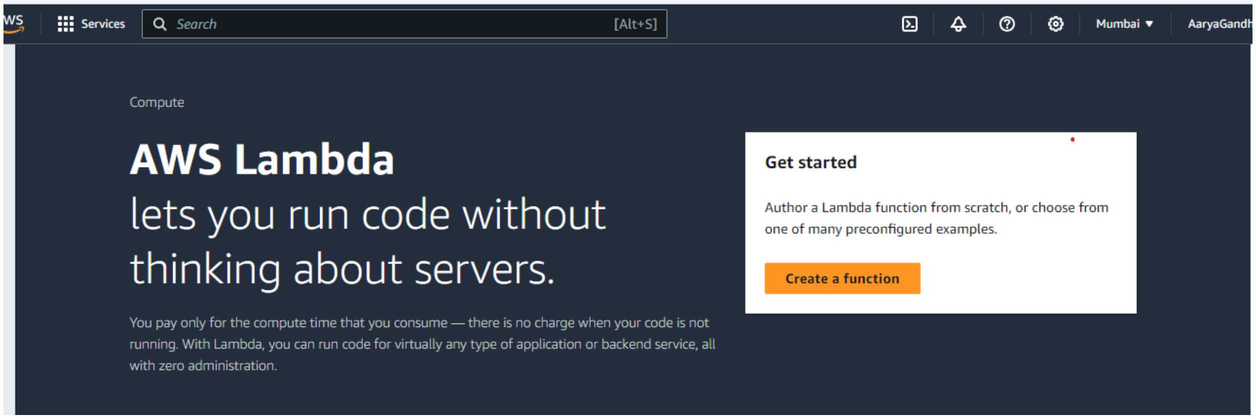
ElastiCache ☆
In-Memory Cache

Features

Launch templates
EC2 feature

Replays

- Click on "Create function."



Compute

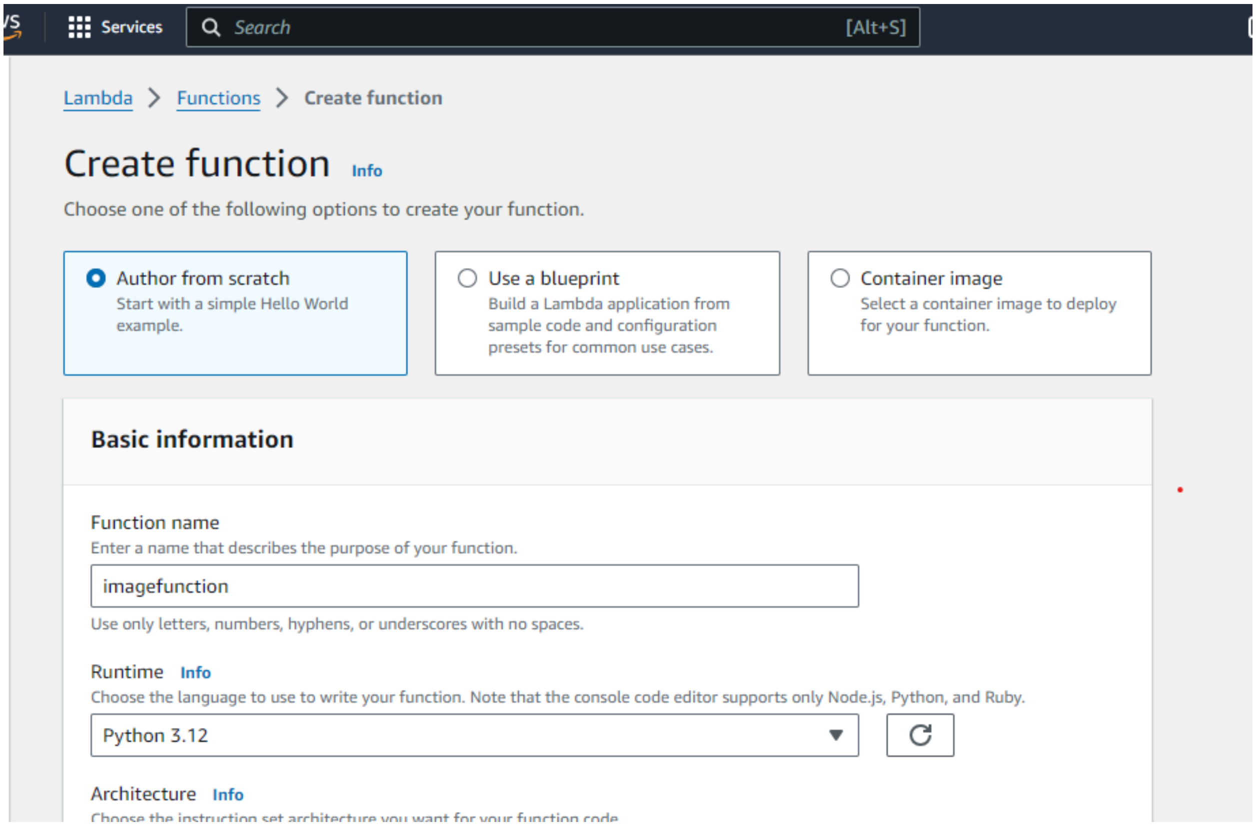
AWS Lambda
lets you run code without thinking about servers.

You pay only for the compute time that you consume — there is no charge when your code is not running. With Lambda, you can run code for virtually any type of application or backend service, all with zero administration.

Get started

Author a Lambda function from scratch, or choose from one of many preconfigured examples.

- Choose "Author from scratch."
- Enter a name for your function, e.g., `S3ImageLogger`.
- Select a runtime (e.g., Python 3.x or Node.js).



Create function

Choose one of the following options to create your function.

● Author from scratch
Start with a simple Hello World example.

○ Use a blueprint
Build a Lambda application from sample code and configuration presets for common use cases.

○ Container image
Select a container image to deploy for your function.

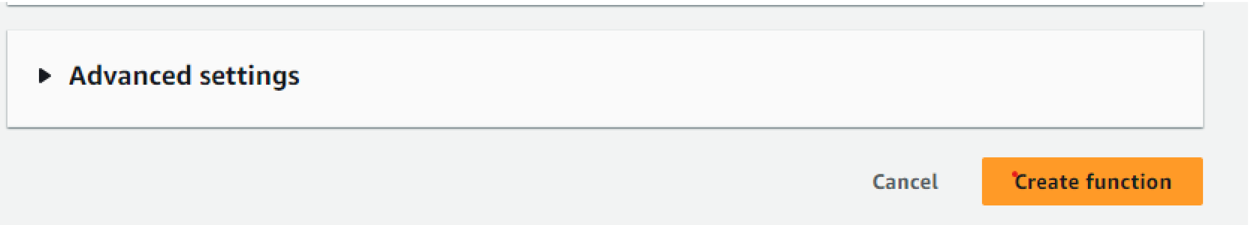
Basic information

Function name
Enter a name that describes the purpose of your function.
imagefunction
Use only letters, numbers, hyphens, or underscores with no spaces.

Runtime Info
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.
Python 3.12

Architecture Info
Choose the instruction set architecture you want for your function code

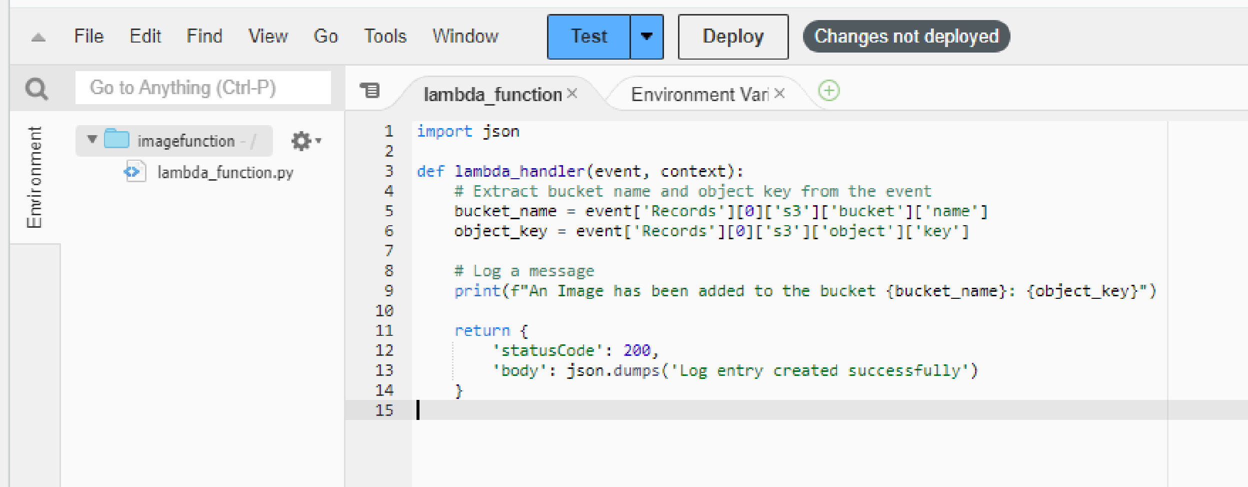
- Click "Create function."



## 3. Write the Lambda Function Code

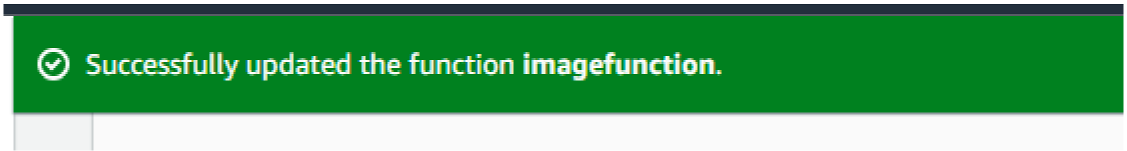
- In the Lambda function console, scroll down to the code editor.

Replace the default code with the following code snippet (assuming you're using Python):



```python
import json

def lambda_handler(event, context):
    # Extract bucket name and object key from the event
    bucket_name = event['Records'][0]['s3']['bucket']['name']
    object_key = event['Records'][0]['s3']['object']['key']

    # Log a message
    print(f"An Image has been added to the bucket {bucket_name}: {object_key}")

    return {
        'statusCode': 200,
        'body': json.dumps('Log entry created successfully')
    }

```

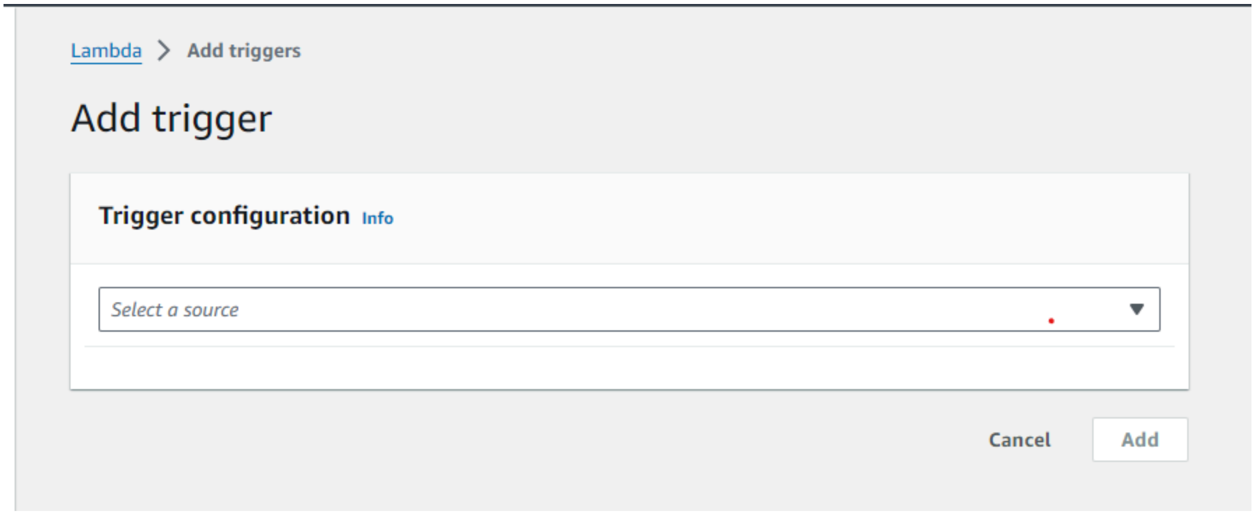
- Click "Deploy" to save your changes.



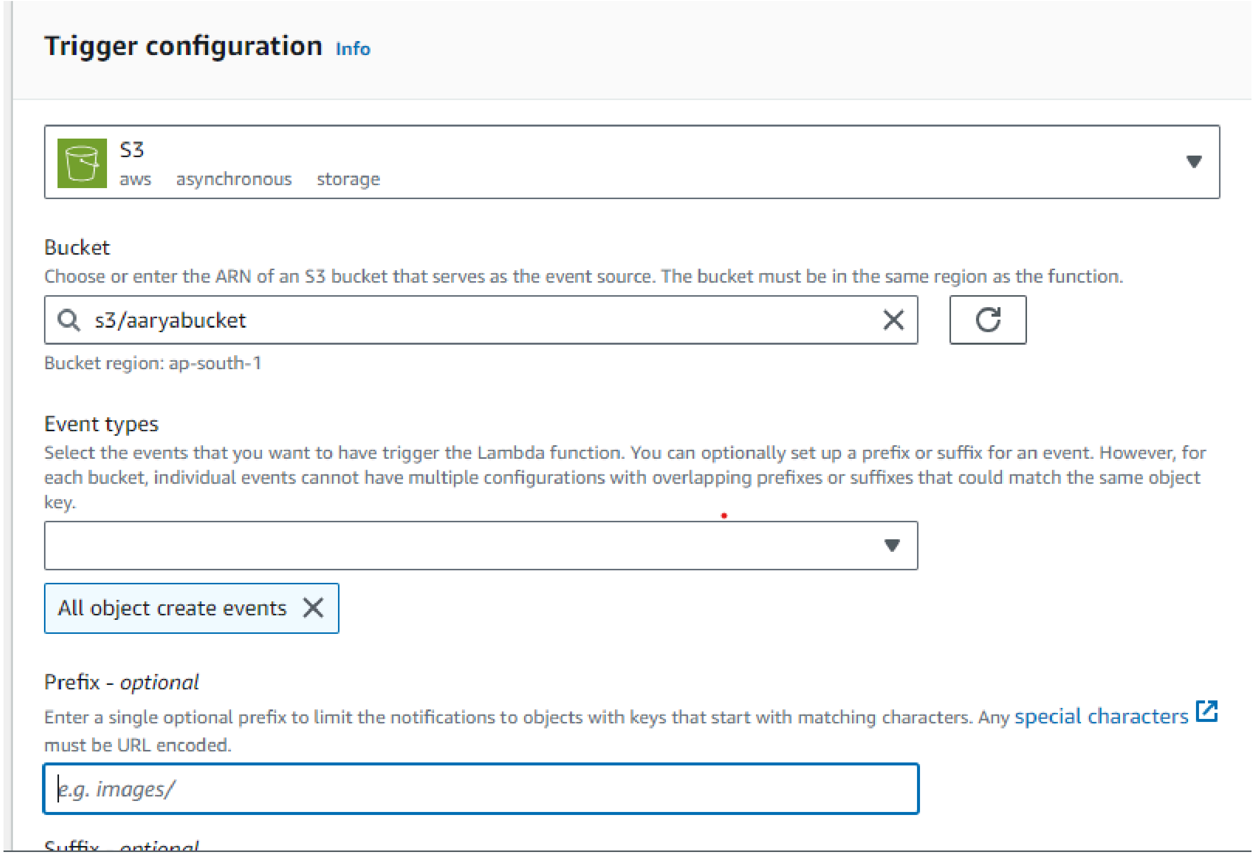
Successfully updated the function **imagefunction**.

## 4. Set Up S3 Trigger for the Lambda Function

- Scroll down to the "Function overview" section in the Lambda console.
- Click on "Add trigger."



- Select "S3" from the list of triggers.
- Choose the S3 bucket you created earlier.
- In the "Event type" dropdown, select "All object create events."
- Optionally, specify a prefix or suffix to filter the events (e.g., for images only, you can use suffix `.jpg`, `.png`).


Trigger configuration Info

S3
aws asynchronous storage

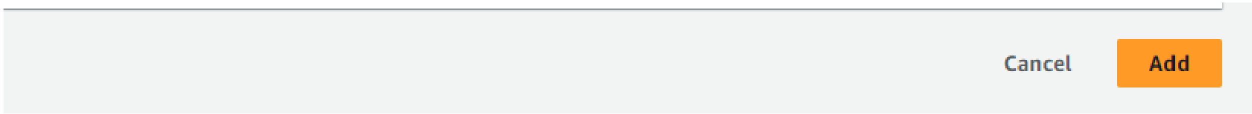
Bucket
Choose or enter the ARN of an S3 bucket that serves as the event source. The bucket must be in the same region as the function.
s3/aaryabucket
Bucket region: ap-south-1

Event types
Select the events that you want to have trigger the Lambda function. You can optionally set up a prefix or suffix for an event. However, for each bucket, individual events cannot have multiple configurations with overlapping prefixes or suffixes that could match the same object key.
All object create events

Prefix - *optional*
Enter a single optional prefix to limit the notifications to objects with keys that start with matching characters. Any special characters must be URL encoded.
*e.g. images/*

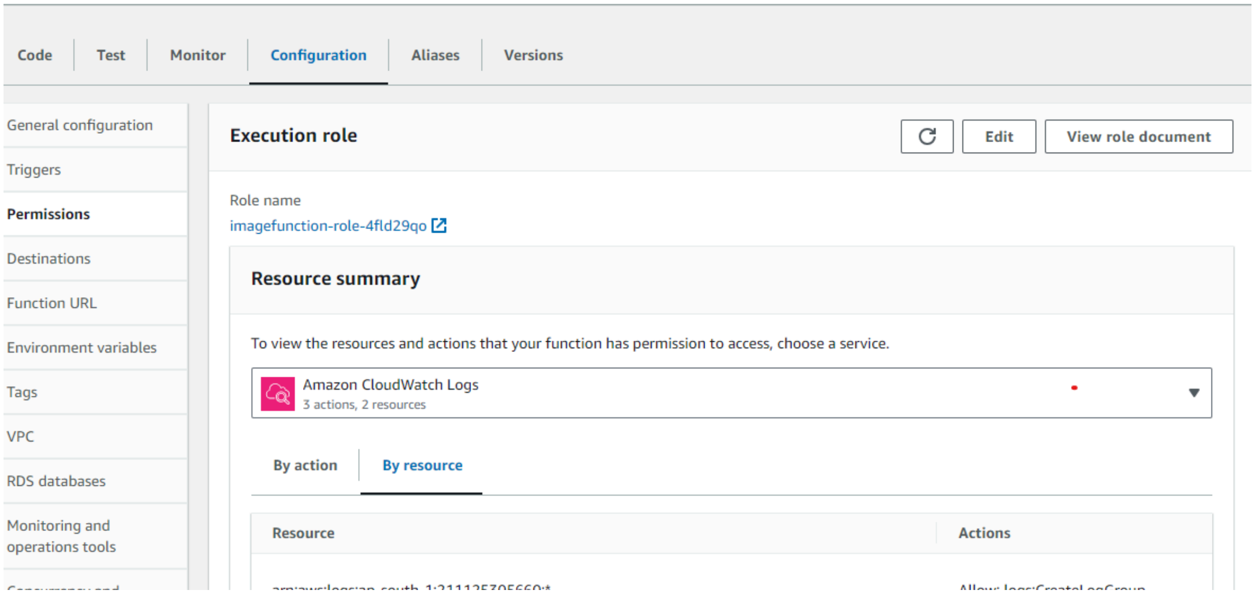
Suffix - *optional*

- Click "Add."



## 5. Grant Permissions to Lambda

- Navigate to the "Permissions" tab of your Lambda function.

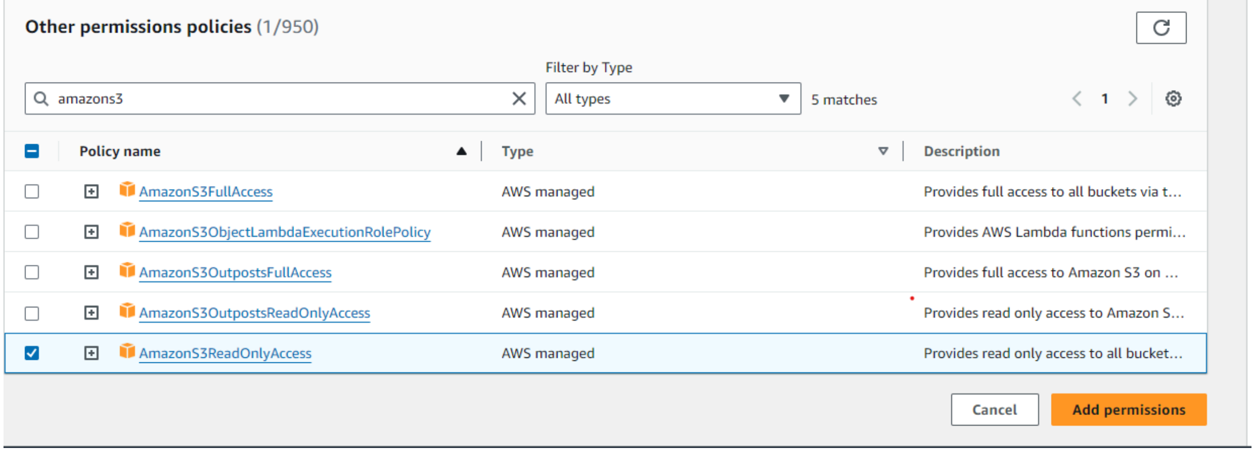


Role name
imagefunction-role-4fld29qo

To view the resources and actions that your function has permission to access, choose a service.

Amazon CloudWatch Logs
3 actions, 2 resources

- Ensure the Lambda function's execution role has the necessary permissions to access the S3 bucket.
- If needed, attach the `AmazonS3ReadOnlyAccess` policy or create a custom policy with the necessary permissions.



**Other permissions policies** (1/950)

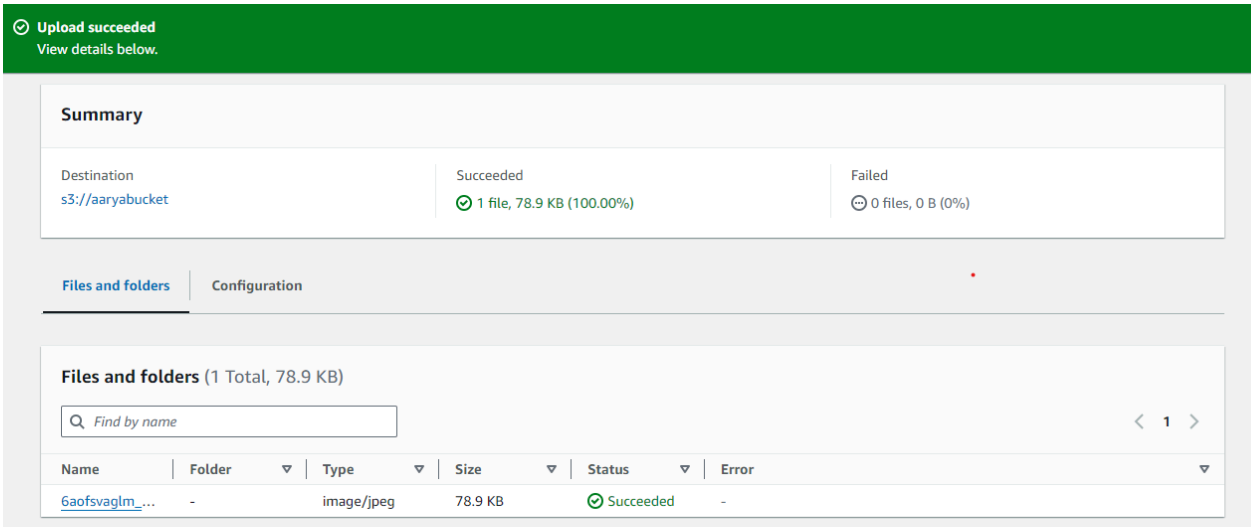
Filter by Type

amazons3 | All types | 5 matches

| ☐ | Policy name | Type | Description |
|---|---|---|---|
| ☐ | AmazonS3FullAccess | AWS managed | Provides full access to all buckets via t… |
| ☐ | AmazonS3ObjectLambdaExecutionRolePolicy | AWS managed | Provides AWS Lambda functions permi… |
| ☐ | AmazonS3OutpostsFullAccess | AWS managed | Provides full access to Amazon S3 on … |
| ☐ | AmazonS3OutpostsReadOnlyAccess | AWS managed | Provides read only access to Amazon S… |
| ☑ | AmazonS3ReadOnlyAccess | AWS managed | Provides read only access to all bucket… |

## . Test the Setup

- Upload an image file to your S3 bucket.



**Upload succeeded**
View details below.

**Summary**

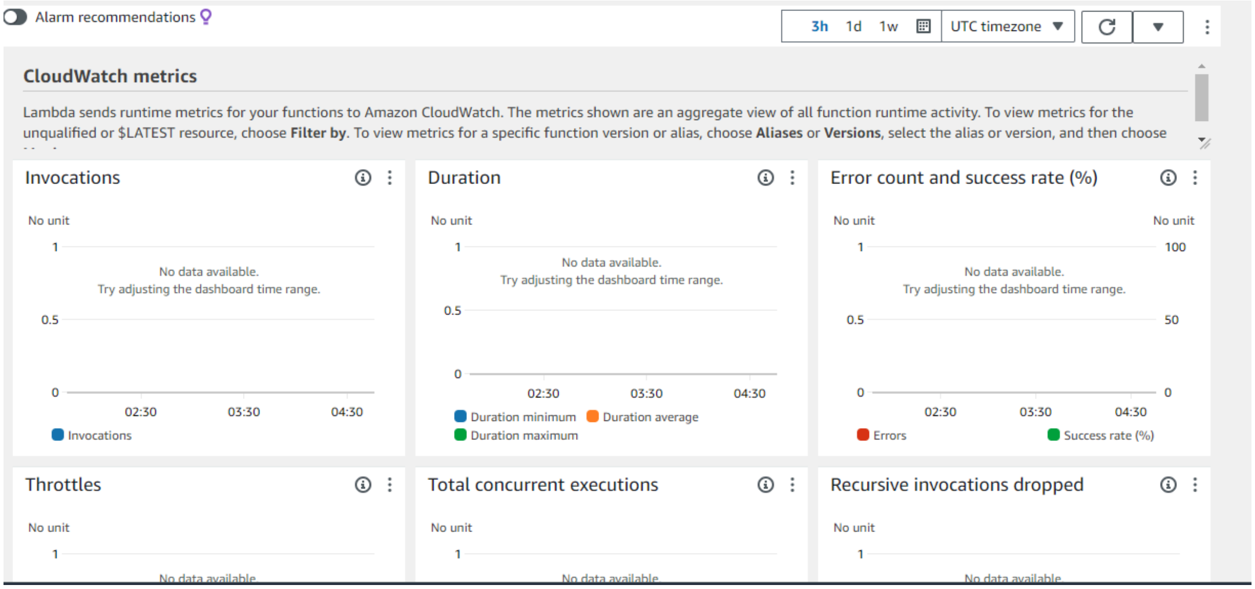
| Destination | Succeeded | Failed |
|---|---|---|
| s3://aaryabucket | 1 file, 78.9 KB (100.00%) | 0 files, 0 B (0%) |

**Files and folders** (1 Total, 78.9 KB)

Find by name

| Name | Folder | Type | Size | Status | Error |
|---|---|---|---|---|---|
| 6aofsvaglm_… | - | image/jpeg | 78.9 KB | Succeeded | - |

- Go to the "Monitoring" tab in your Lambda function to check the logs.



CloudWatch metrics

Lambda sends runtime metrics for your functions to Amazon CloudWatch. The metrics shown are an aggregate view of all function runtime activity. To view metrics for the unqualified or $LATEST resource, choose **Filter by**. To view metrics for a specific function version or alias, choose **Aliases** or **Versions**, select the alias or version, and then choose

- Alternatively, use CloudWatch Logs to view the output and confirm that the message "An Image has been added" has been logged.

### Conclusion:

Integrating AWS Lambda with S3 allows for real-time, automated processing of events such as file uploads. In this example, a Lambda function is configured to log a message whenever an image is added to a specific S3 bucket. This setup demonstrates the power and flexibility of serverless computing by automating tasks without requiring manual intervention or server management. By leveraging AWS Lambda, developers can efficiently handle event-driven workflows, reduce operational overhead, and quickly deploy scalable solutions that respond to specific actions within cloud environments