

## Advanced DevOps Lab

### Experiment 12

**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.

AWS Lambda is a serverless compute service that lets you run code without provisioning or managing servers. It automatically scales your application by running code in response to events. One of the most common use cases for Lambda is integrating it with Amazon S3, a scalable object storage service.

When an object is added to or modified in an S3 bucket, you can configure an S3 event notification to trigger a Lambda function. This event-driven architecture simplifies processing data in real time and reduces the need for manual intervention.

#### Key Benefits

1. **Serverless Architecture:**
  - No need to manage servers or infrastructure. You focus solely on writing code.
  - AWS handles scaling automatically based on the number of events.
2. **Cost Efficiency:**
  - Pay only for the compute time you consume. You are charged based on the number of requests and the duration of execution.
3. **Real-time Processing:**
  - Automatically process files as they are uploaded, allowing for instant reactions to events (e.g., generating thumbnails, analyzing data).
4. **Ease of Integration:**
  - Lambda integrates easily with other AWS services, enabling seamless workflows and data processing pipelines.
5. **Event-Driven Processing:**
  - Respond to changes in data, such as new uploads, deletions, or updates, without the need for polling or scheduled tasks.

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.

### General configuration

AWS Region

US East (N. Virginia) us-east-1

Bucket type

Info

☒ General purpose

Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

☐ Directory

Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name

Info

slamdbabucket

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.

Choose bucket

Format: s3://bucket/prefix

### Object Ownership

Info

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

Successfully created bucket "slamdbabucket"

To upload files and folders, or to configure additional bucket settings, choose [View details](#).

Amazon S3

>

Buckets

Account snapshot - updated every 24 hours

All AWS Regions

Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

View Storage Lens dashboard

General purpose buckets

Directory buckets

General purpose buckets (2)

Info

All AWS Regions

Refresh

Copy ARN

Empty

Delete

Create bucket

Find buckets by name

Name	AWS Region	IAM Access Analyzer	Creation date
<input type="radio"/> <a href="#">slamdbabucket</a>	US East (N. Virginia) us-east-1	<a href="#">View analyzer for us-east-1</a>	October 3, 2024, 15:13:18 (UTC+05:30)
<input type="radio"/> <a href="#">test-2468-shravani</a>	US East (N. Virginia) us-east-1	<a href="#">View analyzer for us-east-1</a>	August 22, 2024, 20:13:56 (UTC+05:30)

## 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.

[Lambda](#) > [Functions](#) > Create function

## Create function [Info](#)

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.

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.

☒ x86\_64

☐ arm64

☑ Successfully created the function **shraimageloader**. You can now change its code and configuration. To invoke your function with a test event, choose "Test".

[Lambda](#) > [Functions](#) > shraimageloader

shraimageloader

Throttle

Copy ARN

Actions ▼

▼ **Function overview** [Info](#)

Diagram

Template

shraimageloader

Layers (0)

+ Add trigger

+ Add destination

Description

-

Last modified

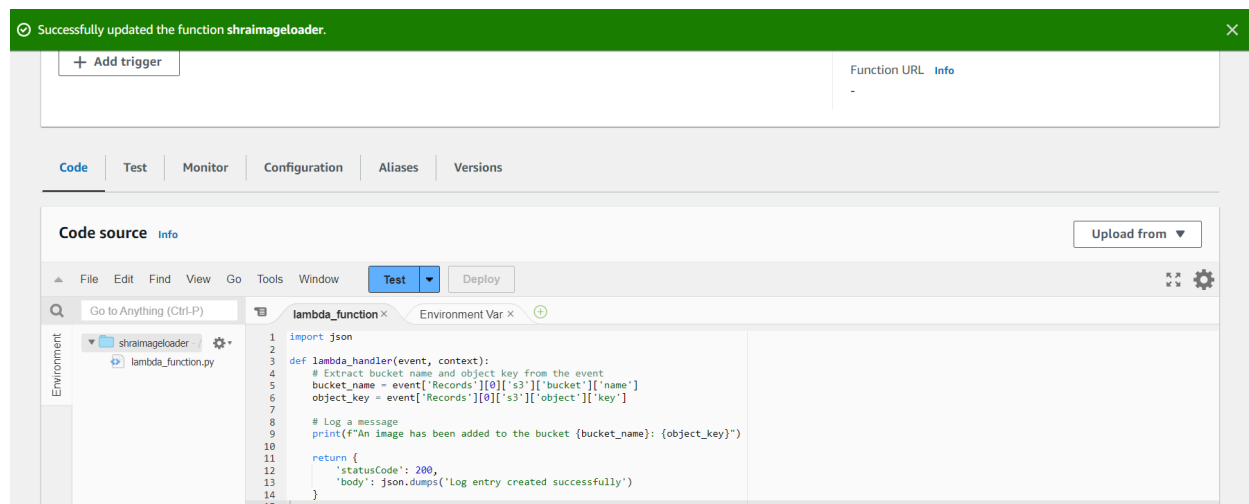
1 minute ago

Function ARN

arn:aws:lambda:us-east-1:533162464157:function:shraimageloader

Function URL [Info](#)

- Write code that logs a message like “An Image has been added” when triggered.

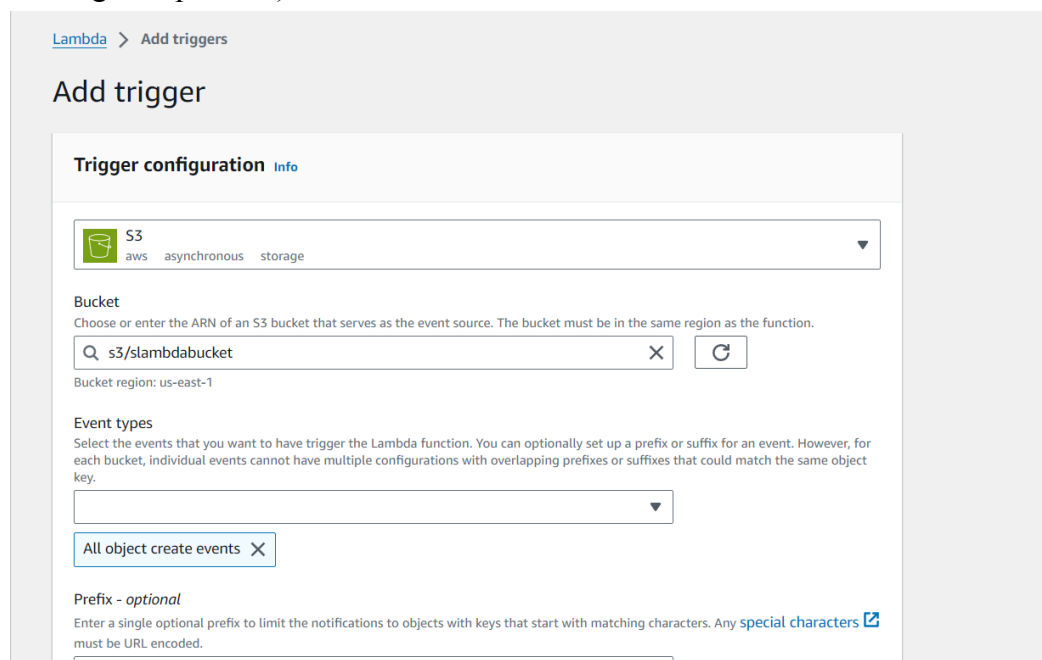


### 3. Set Up Permissions:

- 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).



Lambda > Functions > shraimageloader

## shraimageloader

Throttle Copy ARN Actions

✓ The trigger slambdabucket was successfully added to function shraimageloader. The function is now receiving events from the trigger.

Function overview Info

Export to Application Composer Download

Diagram Template

shraimageloader

Layers (0)

S3

+ Add trigger

+ Add destination

Description

-

Last modified

3 minutes ago

Function ARN

arn:aws:lambda:us-east-1:533162464157:function:shraimageloader

Function URL Info

-

## 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.

Amazon S3 > Buckets > slambdabucket

## slambdabucket Info

Objects Properties Permissions Metrics Management Access Points

Objects (0) Info

Refresh Copy S3 URI Copy URL Download Open Delete Actions Create folder Upload

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

Find objects by prefix

Name	Type	Last modified	Size	Storage class
No objects				
You don't have any objects in this bucket.				

Upload

Outcomes:

Upload succeeded  
View details below.

The information below will no longer be available after you navigate away from this page.

Summary

Destination  
s3://slambdabucket

Succeeded  
1 file, 203.3 KB (100.00%)

Failed  
0 files, 0 B (0%)

Files and folders

Configuration

Files and folders (1 Total, 203.3 KB)

Find by name

< 1 >

Name	Folder	Type	Size	Status	Error
autocad iso...	-	image/png	203.3 KB	Succeeded	-

[Alt+S]

N. Virginia

voclabs/user3402813=PATIL\_SHRAVANI\_ANIL @ 5331-6246-4157

CloudWatch > Log groups

Log groups (5)

By default, we only load up to 10000 log groups.

Filter log groups or try prefix search

Exact match

< 1 >

Log group	Log class	Anomaly d...	Data p...	Sensiti...	Retenti...	Metric
/aws/lambda/RedshiftEventSubscription	Standard	Configure	-	-	Never expire	-
/aws/lambda/RedshiftOverwatch	Standard	Configure	-	-	Never expire	-
/aws/lambda/RoleCreationFunction	Standard	Configure	-	-	Never expire	-
/aws/lambda/lambdas	Standard	Configure	-	-	Never expire	-
/aws/lambda/shraimageloder	Standard	Configure	-	-	Never expire	-

CloudWatch > Log groups > /aws/lambda/shraimageloder > 2024/10/09/[\$LATEST]63b47d46440a4e3bb3068f8e582dca42

Log events

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

Clear 1m 30m 1h 12h Custom UTC timezone Display

Timestamp	Message
	No older events at this moment. <a href="#">Retry</a>
2024-10-09T11:47:45.726Z	INIT_START Runtime Version: python:3.12.v36 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:188d9ca2e2714ff5637bd2bbe06c...
2024-10-09T11:47:45.819Z	START RequestId: f525ecc3-bf13-409b-aeb7-92738df864da Version: \$LATEST
2024-10-09T11:47:45.820Z	An image has been added to the bucket slambdabucket: autocad+iso+pb+1.png
2024-10-09T11:47:45.821Z	END RequestId: f525ecc3-bf13-409b-aeb7-92738df864da
2024-10-09T11:47:45.821Z	REPORT RequestId: f525ecc3-bf13-409b-aeb7-92738df864da Duration: 1.92 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory U...
	No newer events at this moment. <a href="#">Auto retry paused.</a> <a href="#">Resume</a>

**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.