Problem Statement:

You work for XYZ Corporation. Your corporation wants to launch a new web-based application and they do not want their servers to be running all the time. It should also be managed by AWS. Implement suitable solutions.

Tasks To Be Performed:

1. Create a sample Python Lambda function.
2. Set the Lambda Trigger as SQS and send a message to test invocations.

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EC2

Amazon S3

Amazon S3 > Buckets

Buckets
Access Grants
Access Points
Object Lambda Access Points
Multi-Region Access Points
Batch Operations
IAM Access Analyzer for S3

Block Public Access settings for this account

▼ Storage Lens
Dashboards
Storage Lens groups
AWS Organizations settings

Feature spotlight **7**

▶ **Account snapshot** · All AWS Regions · **View Storage Lens dashboard**

Storage lens provides visibility into storage usage and activity trends. Learn more

General purpose buckets	Directory buckets

General purpose buckets (4) Info · All AWS Regions

Buckets are containers for data stored in S3.

Copy ARN · Empty · Delete · **Create bucket**

Q Find buckets by name

< 1 >

	Name ▲	AWS Region ▽	IAM Access Analyzer	Creation date ▽
○	cf-templates-15tthmkgl61g-us-east-1	US East (N. Virginia) us-east-1	View analyzer for us-east-1	April 11, 2024, 08:53:16 (UTC+05:30)
○	elasticbeanstalk-us-east-1-602093162468	US East (N. Virginia) us-east-1	View analyzer for us-east-1	December 16, 2023, 09:19:43 (UTC+05:30)
○	intellipaat-bucket-5dec	US East (N. Virginia) us-east-1	View analyzer for us-east-1	December 9, 2023, 13:41:56 (UTC+05:30)
○	sujith-bucket-s3	US East (N. Virginia) us-east-1	View analyzer for us-east-1	March 19, 2024, 16:31:16 (UTC+05:30)

Amazon S3 > Buckets > Create bucket

Create bucket Info

Buckets are containers for data stored in S3.

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 - *New*

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

aws-morning-lambda

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

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Default encryption Info

Server-side encryption is automatically applied to new objects stored in this bucket.

Encryption type Info

◉ Server-side encryption with Amazon S3 managed keys (SSE-S3)

○ Server-side encryption with AWS Key Management Service keys (SSE-KMS)

○ Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)

Secure your objects with two separate layers of encryption. For details on pricing, see **DSSE-KMS pricing** on the **Storage** tab of the
Amazon S3 pricing page. ↗

Bucket Key

Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-
KMS. Learn more ↗

○ Disable

◉ Enable

▶ **Advanced settings**

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

Cancel **Create bucket**

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EC2

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.

Create a function

How it works

Run | Next: Lambda responds to events

.NET | Java | **Node.js** | Python | Ruby | Custom runtime

```
1  exports.handler = async (event) => {
2    console.log(event);
3    return 'Hello from Lambda!';
```

Lambda > Functions > Create function

Create function Info

Choose one of the following options to create your function.

● Author from scratch	○ Use a blueprint	○ Container image
Start with a simple Hello World example.	Build a Lambda application from sample code and configuration presets for common use cases.	Select a container image to deploy for your function.

Basic information

Function name

Enter a name that describes the purpose of your function.

```
mylambdafunction
```

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 3.9                                    ▼
```
[C]

Architecture Info

Choose the instruction set architecture you want for your function code.

● x86_64

○ arm64

Choose the instruction set architecture you want for your function code.

- ● x86_64
- ○ arm64

Permissions Info

By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.

▼ **Change default execution role**

Execution role

Choose a role that defines the permissions of your function. To create a custom role, go to the IAM console ↗.

- ○ Create a new role with basic Lambda permissions
- ● Use an existing role
- ○ Create a new role from AWS policy templates

Existing role

Choose an existing role that you've created to be used with this Lambda function. The role must have permission to upload logs to Amazon CloudWatch Logs.

| service-role/lambda-demo-role-0rzro0a6 ▼ | C |

View the lambda-demo-role-0rzro0a6 role ↗ on the IAM console.

▶ **Advanced settings**

Cancel   **Create function**

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

Lambda > Functions > mylambdafunction

mylambdafunction

Throttle | 🗐 Copy ARN | Actions ▼

▼ **Function overview** Info

Export to Application Composer | Download ▼

| Diagram | Template |

λ **mylambdafunction**

≋ Layers (0)

Description
-

Last modified
7 seconds ago

+ **Add trigger**

+ **Add destination**

Function ARN
🗐 arn:aws:lambda:us-east-1:602093162468:function:my
lambdafunction

Function URL Info
-

Code | Test | Monitor | Configuration | Aliases | Versions

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Lambda > Add trigger

Add trigger

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.

Q s3/aws-morning-lambda   ✕   ↻

Bucket region: us-east-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.

e.g. images/

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EC2

All object create events ✕

Prefix - optional
Enter a single optional prefix to limit the notifications to objects with keys that start with matching characters.

e.g. images/

Suffix - optional
Enter a single optional suffix to limit the notifications to objects with keys that end with matching characters.

e.g. .jpg

Recursive invocation
If your function writes objects to an S3 bucket, ensure that you are using different S3 buckets for input and output. Writing to the same bucket increases the risk of creating a recursive invocation, which can result in increased Lambda usage and increased costs. Learn more 🗗

☑ I acknowledge that using the same S3 bucket for both input and output is not recommended and that this configuration can cause recursive invocations, increased Lambda usage, and increased costs.

Lambda will add the necessary permissions for AWS S3 to invoke your Lambda function from this trigger. Learn more 🗗 about the Lambda permissions model.

⊗ An error occurred when creating the trigger: Please correct the errors above.

Cancel   **Add**

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EC2

✓ Successfully updated the function **mylambdafunction**.   ✕   ⓘ

Code   Test   Monitor   Configuration   Aliases   Versions

Code source   Info   Upload from ▾

▲   File   Edit   Find   View   Go   Tools   Window   **Test** ▼   Deploy   ⤢ ⚙

Q   Go to Anything (⌘ P)   🗐   **lambda_function** ✕   Environment Vari ✕   Execution results ✕   ⊕

▼ 📁 mylambdafunction ⚙▾
    ⟨⟩ lambda_function.py

```python
 5      return {
 6          'statusCode': 200,
 7          'body': json.dumps('Hello from Lambda!')
 8      }
 9  import json
10  import boto3
11
12  def lambda_handler(event, context):
13      # Get the S3 client
14      s3 = boto3.client('s3')
15
16      bucket_name = event['Records'][0]['s3']['bucket']['name']
17      object_key = event['Records'][0]['s3']['object']['key']
18
19      print(f"Bucket: {bucket_name}, Object Key: {object_key}")
20
21      response = s3.get_object(Bucket=bucket_name, Key=object_key)
22      content = response['Body'].read().decode('utf-8')
23
24      print(f"Content of the object:\n{content}")
25
26
```

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EC2

Amazon S3 > Buckets > aws-morning-lambda > Upload

Upload Info

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. Learn more ↗

Drag and drop files and folders you want to upload here, or choose **Add files** or **Add folder**.

Files and folders (0)

All files and folders in this table will be uploaded.

       Remove   **Add files**   **Add folder**

Q Find by name   ‹ 1 ›

	Name	▽	Folder	▽	Type

No files or folders

You have not chosen any files or folders to upload.

Destination Info

Files and folders (1 Total, 846.0 B)

All files and folders in this table will be uploaded.

Remove   **Add files**   **Add folder**

🔍 Find by name   ‹   **1**   ›

☐	Name	▽	Folder	▽	Type
☐	sample data.json		-		application/json

Destination Info

Destination

s3://aws-morning-lambda

▶ **Destination details**
Bucket settings that impact new objects stored in the specified destination.

▶ **Permissions**
Grant public access and access to other AWS accounts.

▶ **Properties**
Specify storage class, encryption settings, tags, and more.

Cancel   Upload

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EC2

⊘ **Upload succeeded**
View details below.

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

Summary

Destination	Succeeded	Failed
s3://aws-morning-lambda	⊘ 1 file, 846.0 B (100.00%)	☺ 0 files, 0 B (0%)

Files and folders | Configuration

Files and folders (1 Total, 846.0 B)

🔍 Find by name

〈 1 〉

Name	Folder ▽	Type ▽	Size ▽	Status ▽	Error	▽
sample data...	-	application/...	846.0 B	⊘ Succeeded	-	

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EC2

Lambda > Functions > mylambdafunction > Add destination

Add destination

Destination configuration   Info

Configure a destination to receive invocation records. Lambda can send records when your function is invoked asynchronously, or when your function processes records from an event source mapping.

Source
Choose the invocation type that Lambda sends records for.

- ● Asynchronous invocation
- ○ Event source mapping invocation

Condition
Choose whether to send invocation records for event processing failures or for successful invocations.

- ● On failure
- ○ On success

Destination type
Choose the destination type that Lambda sends invocation records to.

| SNS topic   ▼ |

Destination
Choose the ARN of the destination, or enter the ARN manually.

| Q *Destination ARN* | ↻ |

EC2

Lambda > Functions > mylambdafunction > Add destination

Add destination

Destination configuration Info

Configure a destination to receive invocation records. Lambda can send records when your function is invoked asynchronously, or when your function processes records from an event source mapping.

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- ○ On success

Destination type
Choose the destination type that Lambda sends invocation records to.

[SNS topic ▼]

Destination
Choose the ARN of the destination, or enter the ARN manually.

[Q Destination ARN]   [C]

Application integration

Amazon SQS
A message queuing service

Amazon SQS provides queues for high-throughput, system-to-system messaging. You can use queues to decouple heavyweight processes and to buffer and batch work. Amazon SQS stores messages until microservices and serverless applications process them.

Get started

Learn how to use Amazon SQS by creating a queue, sending a message to the queue, and receiving and processing the message.

Create queue

Pricing (US)

You can get started with Amazon SQS for free. All customers can make 1 million Amazon SQS requests for free each month. Some applications might be able to operate within this Free Tier limit.

Cost calculator ↗

How it works

Producers
Messages are sent from applications, microservices, and other AWS services

Amazon SQS

SQS Queue

Consumers
Messages are processed by applications, Lambda functions, EC2 Instances, and other

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EC2

Amazon SQS > Queues > Create queue

Create queue

Details

Type
Choose the queue type for your application or cloud infrastructure.

○ **Standard** Info
At-least-once delivery, message ordering isn't preserved

- At-least once delivery
- Best-effort ordering

○ **FIFO** Info
First-in-first-out delivery, message ordering is preserved

- First-in-first-out delivery
- Exactly-once processing

ⓘ You can't change the queue type after you create a queue.

Name

```
myqueue
```

A queue name is case-sensitive and can have up to 80 characters. You can use alphanumeric characters, hyphens (-), and underscores (_).

Configuration Info

aws | Services | Q Search [Option+S]

EC2

Configuration Info
Set the maximum message size, visibility to other consumers, and message retention.

Visibility timeout | Info

| 30 | | Seconds ▼ |

Should be between 0 seconds and 12 hours.

Message retention period | Info

| 4 | | Days ▼ |

Should be between 1 minute and 14 days.

Delivery delay | Info

| 0 | | Seconds ▼ |

Should be between 0 seconds and 15 minutes.

Maximum message size | Info

| 256 | KB |

Should be between 1 KB and 256 KB.

Receive message wait time | Info

| 0 | Seconds |

Should be between 0 and 20 seconds.

Encryption Info
Amazon SQS provides in-transit encryption by default. To add at-rest encryption to your queue, enable server-side encryption.

Server-side encryption
- ● Disabled
- ○ Enabled

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EC2

Access policy Info

Define who can access your queue.

Choose method

◉ **Basic**
Use simple criteria to define a basic access policy.

○ **Advanced**
Use a JSON object to define an advanced access policy.

Define who can send messages to the queue

◉ Only the queue owner
Only the owner of the queue can send messages to the queue.

○ Only the specified AWS accounts, IAM users and roles
Only the specified AWS account IDs, IAM users and roles can send messages to the queue.

Define who can receive messages from the queue

◉ Only the queue owner
Only the owner of the queue can receive messages from the queue.

○ Only the specified AWS accounts, IAM users and roles
Only the specified AWS account IDs, IAM users and roles can receive messages from the queue.

JSON (read-only)

```json
{
  "Version": "2012-10-17",
  "Id": "__default_policy_ID",
  "Statement": [
    {
      "Sid": "__owner_statement",
      "Effect": "Allow",
      "Principal": {
        "AWS": "602093162468"
      },
      "Action": [
        "SQS:*"
      ],
      "Resource": "arn:aws:sqs:us-east-1:602093162468:myqueue"
```

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○ Disabled
○ Enabled

Dead-letter queue - *Optional* Info

Send undeliverable messages to a dead-letter queue.

Set this queue to receive undeliverable messages.
● Disabled
○ Enabled

Tags - *Optional* Info

A tag is a label assigned to an AWS resource. Use tags to search and filter your resources or track your AWS costs.

Key

🔍 Enter key

Value - *optional*

🔍 Enter value

Remove

Add new tag

You can add 49 more tags.

Cancel | Create queue

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EC2

⊘ **Queue myqueue created successfully** ✕
You can now send and receive messages.

Amazon SQS > Queues > myqueue

myqueue

Edit | Delete | Purge | Send and receive messages | Start DLQ redrive

Details Info

Name	Type	ARN
🗗 myqueue	Standard	🗗 arn:aws:sqs:us-east-1:602093162468:myqueue

Encryption	URL	Dead-letter queue
Disabled	🗗 https://sqs.us-east-1.amazonaws.com/602093162468/myqueue	-

▶ **More**

‹ | **SNS subscriptions** | Lambda triggers | EventBridge Pipes | Dead-letter queue | Monitoring | Tagging | Access policy | Encryption | Dead-letter q ›

Lambda > Functions > mylambdafunction > Add destination

Add destination

Destination configuration Info

Configure a destination to receive invocation records. Lambda can send records when your function is invoked asynchronously, or when your function processes records from an event source mapping.

Source
Choose the invocation type that Lambda sends records for.

🔘 Asynchronous invocation
⚪ Event source mapping invocation

Condition
Choose whether to send invocation records for event processing failures or for successful invocations.

🔘 On failure
⚪ On success

Destination type
Choose the destination type that Lambda sends invocation records to.

SQS queue ▼

Destination
Choose the ARN of the destination, or enter the ARN manually.

🔍 arn:aws:sqs:us-east-1:602093162468:myqueue   ✕   ⟳

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EC2

Source
Choose the invocation type that Lambda sends records for.

● Asynchronous invocation
○ Event source mapping invocation

Condition
Choose whether to send invocation records for event processing failures or for successful invocations.

● On failure
○ On success

Destination type
Choose the destination type that Lambda sends invocation records to.

SQS queue　　　　　　　　　　　　　　　　　　　　▾

Destination
Choose the ARN of the destination, or enter the ARN manually.

🔍 arn:aws:sqs:us-east-1:602093162468:myqueue　　　✕	↻

▶ **Permissions**
If your execution role doesn't have the required permissions for the selected destination, then Lambda will attempt to add the permissions to the role.

　　　　　　　　　　　　　　　　　　Cancel　　**Save**

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EC2

Source
Choose the invocation type that Lambda sends records for.

⦿ Asynchronous invocation

○ Event source mapping invocation

Condition
Choose whether to send invocation records for event processing failures or for successful invocations.

○ On failure

⦿ On success

Destination type
Choose the destination type that Lambda sends invocation records to.

SQS queue ▼

Destination
Choose the ARN of the destination, or enter the ARN manually.

Q arn:aws:sqs:us-east-1:602093162468:myqueue ✕ | ↻

▶ **Permissions**

If your execution role doesn't have the required permissions for the selected destination, then Lambda will attempt to add the permissions to the role.

Cancel | **Save**

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EC2

Amazon SQS > Queues > myqueue > Send and receive messages

Send and receive messages

Send messages to and receive messages from a queue.

Send message Info   Clear content   **Send message**

Message body
Enter the message to send to the queue.

Hello from aws made easy!!!

Delivery delay Info

| 0 | Seconds ▼ |

Should be between 0 seconds and 15 minutes.

▶ **Message attributes - *Optional* Info**

Receive messages Info   Edit poll settings   Stop polling   Poll for messages

Messages available   Polling duration   Maximum message count   Polling progress

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EC2

Amazon SQS > Queues > myqueue > Send and receive messages

Send and receive messages

Send messages to and receive messages from a queue.

Send message Info   Clear content   Send message

⊘ **Your message has been sent and is ready to be received.**   View details   ✕

Message body
Enter the message to send to the queue.

```
Hello from aws made easy!!!
```

Delivery delay Info

```
0
```        Seconds        ▼

Should be between 0 seconds and 15 minutes.

▶ **Message attributes - Optional**  Info