EXPERIMENT-5

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BRANCH: T.E. INFORMATION TECHNOLOGY (SEM 5)

1. What is AWS Lambda?

➔Lambda is a compute service that lets you run code without provisioning or managing servers. Lambda runs your code on a high-availability compute infrastructure and performs all of the administration of the compute resources, including server and operating system maintenance, capacity provisioning and automatic scaling, and logging. With Lambda, you can run code for virtually any type of application or backend service. All you need to do is supply your code in one of the languages that Lambda supports.

2. What is serverless computing?

- ✓ **Serverless computing** is a cloud architecture that allows organizations to get on-demand access to the resources they need. Customers only pay for the resources they use. Resources are not allocated to an application when it is not in use.
- ✓ In a serverless computing architecture, a server's code execution is fully managed by the cloud provider. Therefore, the provider's customers do not need to develop and deploy the underlying infrastructure that would traditionally be required to run applications and programs. The primary objective of serverless computing is to make it easier for software developers to create code that is intended to run on cloud platforms and perform a clearly defined role.

3. What languages does AWS Lambda support?

- C#
- Go
- Java
- Node.js
- PowerShell
- Python
- Ruby

4. What is AWS DynamoDB Table

➔Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability. DynamoDB lets you offload the administrative burdens of operating and scaling a distributed database so that you don't have to worry about hardware provisioning, setup and configuration, replication, software patching, or cluster scaling. DynamoDB also offers encryption at rest, which eliminates the operational burden and complexity involved in protecting sensitive data.

5. Explain AWS IAM service

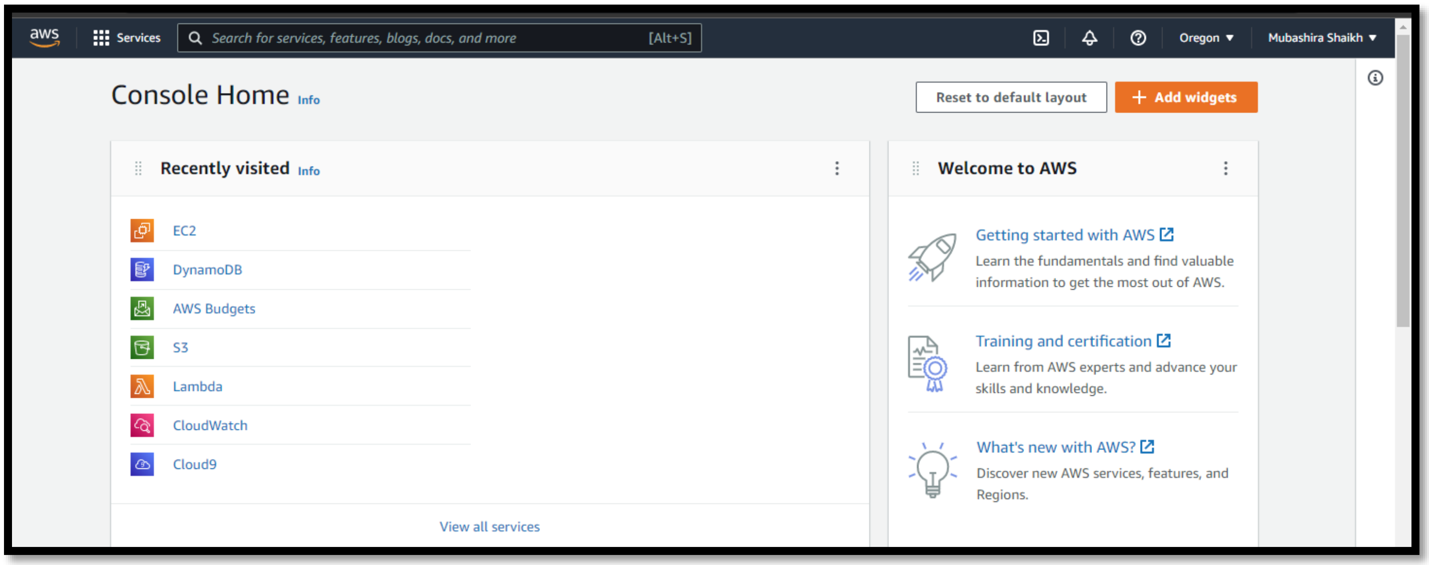
→AWS Identity and Access Management (IAM) is a web service that helps you securely control access to AWS resources. You use IAM to control who is authenticated (signed in) and authorized (has permissions) to use resources.

→When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account *root user* and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you do not use the root user for your everyday tasks, even the administrative ones. Instead, adhere to the best practice of using the root user only to create your first IAM user. Then securely lock away the root user credentials and use them to perform only a few account and service management tasks.

6. To understand AWS Lambda, create your first Lambda functions using Python / Java / Nodejs.

Create AWs Lambda function and configure a trigger for Amazon Simple Storage Service (Amazon S3). The trigger invokes your Lambda function every time that you add an object to your Amazon S3 bucket. Allow AWS Lambda to access Amazon DynamoDB Table .Create IAM role that allows full access to DynamoDB Table.

Step 1: AWS Management Console Dashboard.

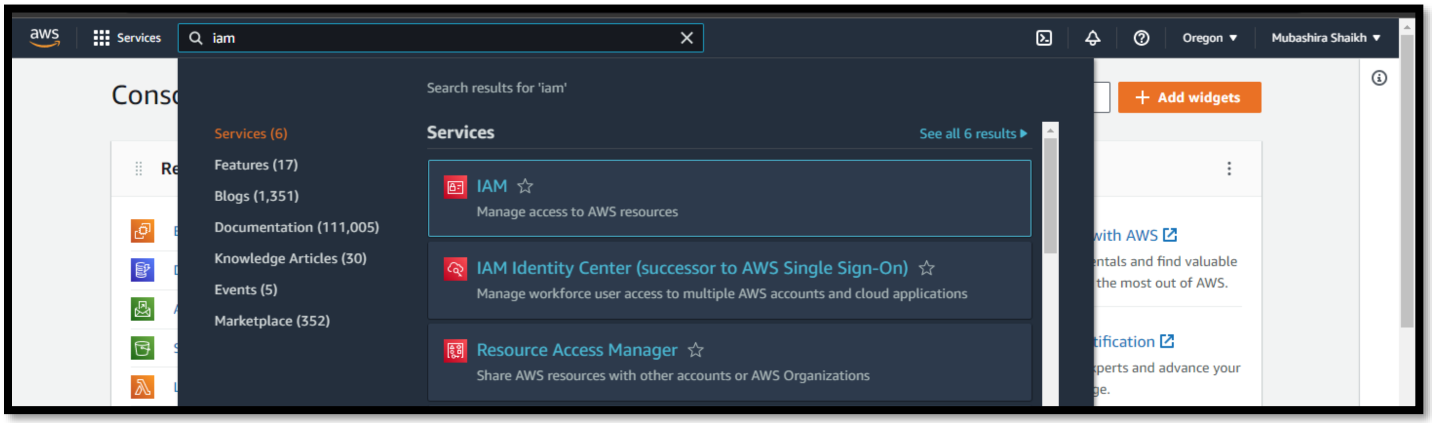


Getting started with AWS
Learn the fundamentals and find valuable information to get the most out of AWS.

Training and certification
Learn from AWS experts and advance your skills and knowledge.

What's new with AWS?
Discover new AWS services, features, and Regions.

Step 2: Search for "IAM" and select it.

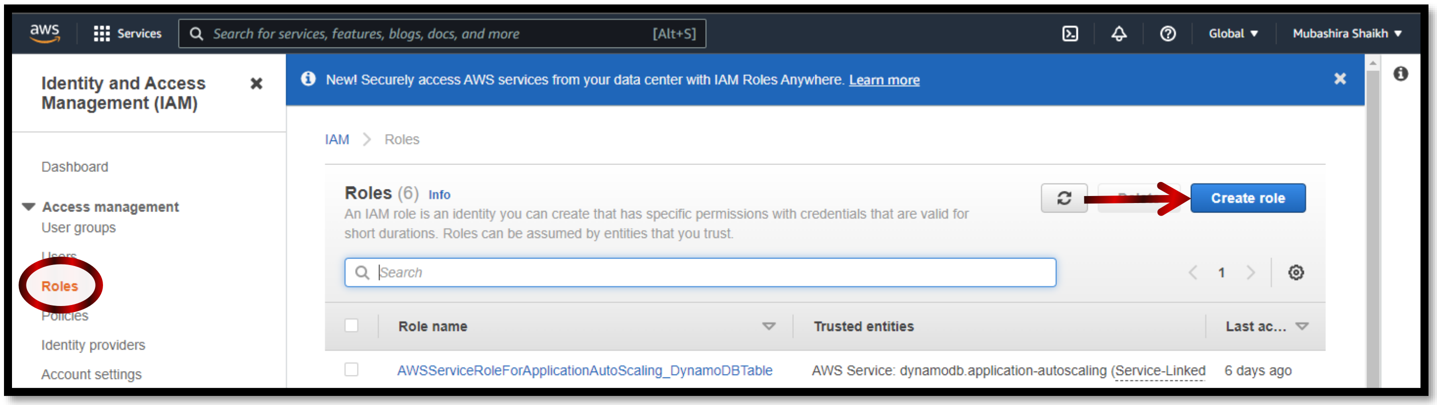


IAM
Manage access to AWS resources

IAM Identity Center (successor to AWS Single Sign-On)
Manage workforce user access to multiple AWS accounts and cloud applications

Resource Access Manager
Share AWS resources with other accounts or AWS Organizations

Step 3: Go to role and click on "Create role".

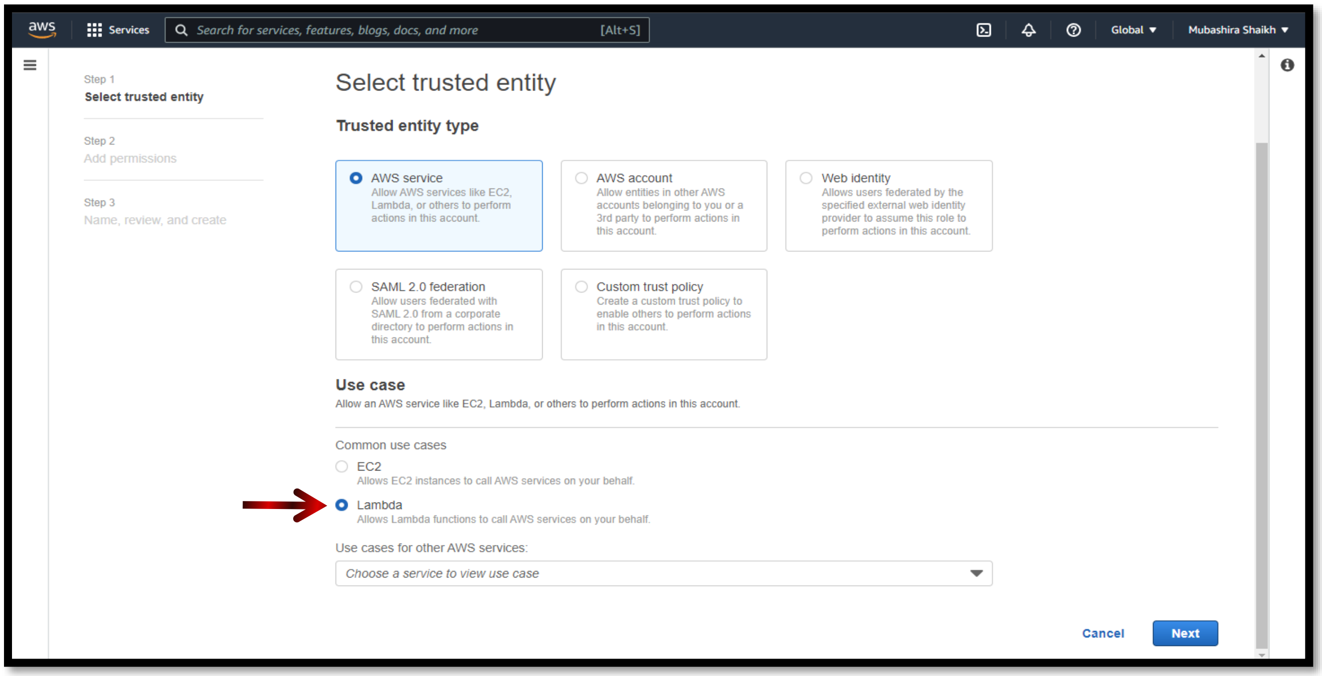


New! Securely access AWS services from your data center with IAM Roles Anywhere. Learn more

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.

Role name	Trusted entities	Last ac...
AWSServiceRoleForApplicationAutoScaling_DynamoDBTable	AWS Service: dynamodb.application-autoscaling (Service-Linked	6 days ago

Step 4: Select lambda usecase→Click on next.



Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Select trusted entity

Trusted entity type

- (●) AWS service — Allow AWS services like EC2, Lambda, or others to perform actions in this account.
- ( ) AWS account — Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
- ( ) Web identity — Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
- ( ) SAML 2.0 federation — Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
- ( ) Custom trust policy — Create a custom trust policy to enable others to perform actions in this account.

Use case
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Common use cases
- ( ) EC2 — Allows EC2 instances to call AWS services on your behalf.
- (●) Lambda — Allows Lambda functions to call AWS services on your behalf.

Use cases for other AWS services:
Choose a service to view use case

Services
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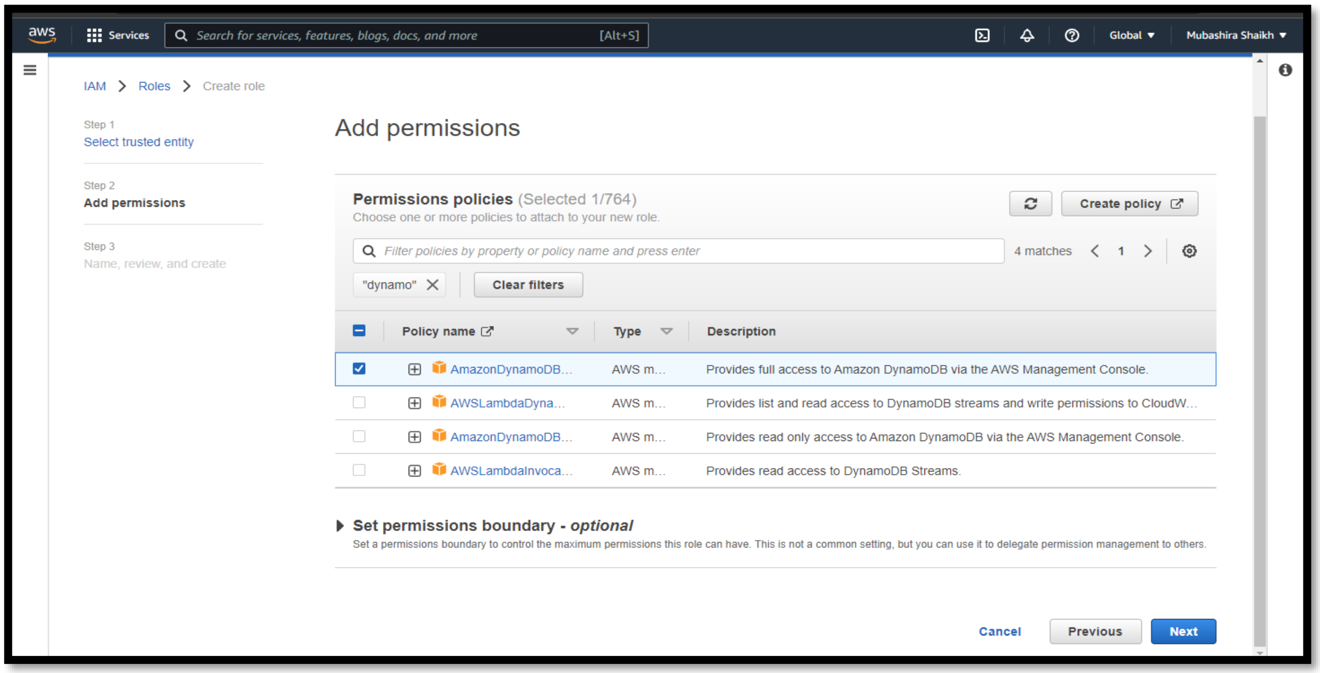
Global
Mubashira Shaikh
Cancel
Next

Step 5: Search Amazon DynamoDB in permission policies→Select policy which provides "full access to DynamoDB"→Click on next.



IAM > Roles > Create role

Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Add permissions

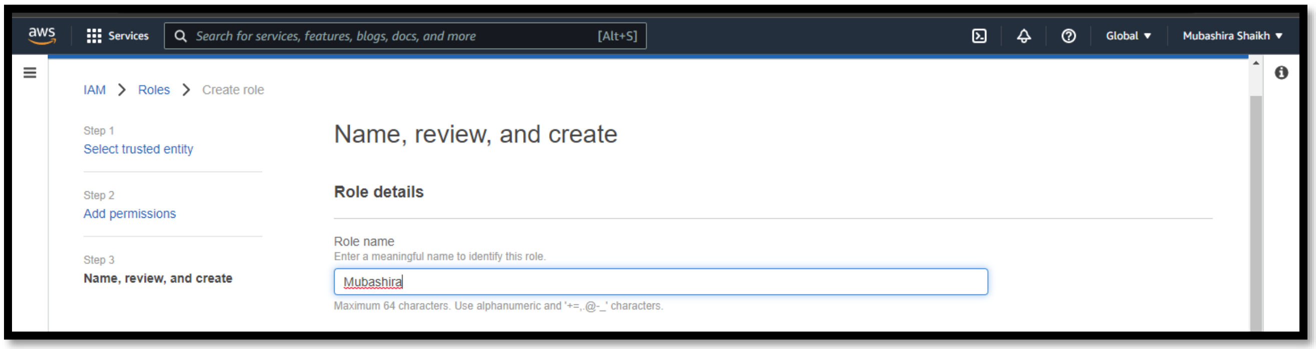
Permissions policies (Selected 1/764)
Choose one or more policies to attach to your new role.

Filter policies by property or policy name and press enter — 4 matches
"dynamo" ✕ Clear filters

	Policy name	Type	Description
✓	AmazonDynamoDB...	AWS m...	Provides full access to Amazon DynamoDB via the AWS Management Console.
	AWSLambdaDyna...	AWS m...	Provides list and read access to DynamoDB streams and write permissions to CloudW...
	AmazonDynamoDB...	AWS m...	Provides read only access to Amazon DynamoDB via the AWS Management Console.
	AWSLambdaInvoca...	AWS m...	Provides read access to DynamoDB Streams.

Set permissions boundary - *optional*
Set a permissions boundary to control the maximum permissions this role can have. This is not a common setting, but you can use it to delegate permission management to others.

Step 6: Give name to your role→Click on Create role.



IAM > Roles > Create role

Step 1
Select trusted entity

Step 2
Add permissions

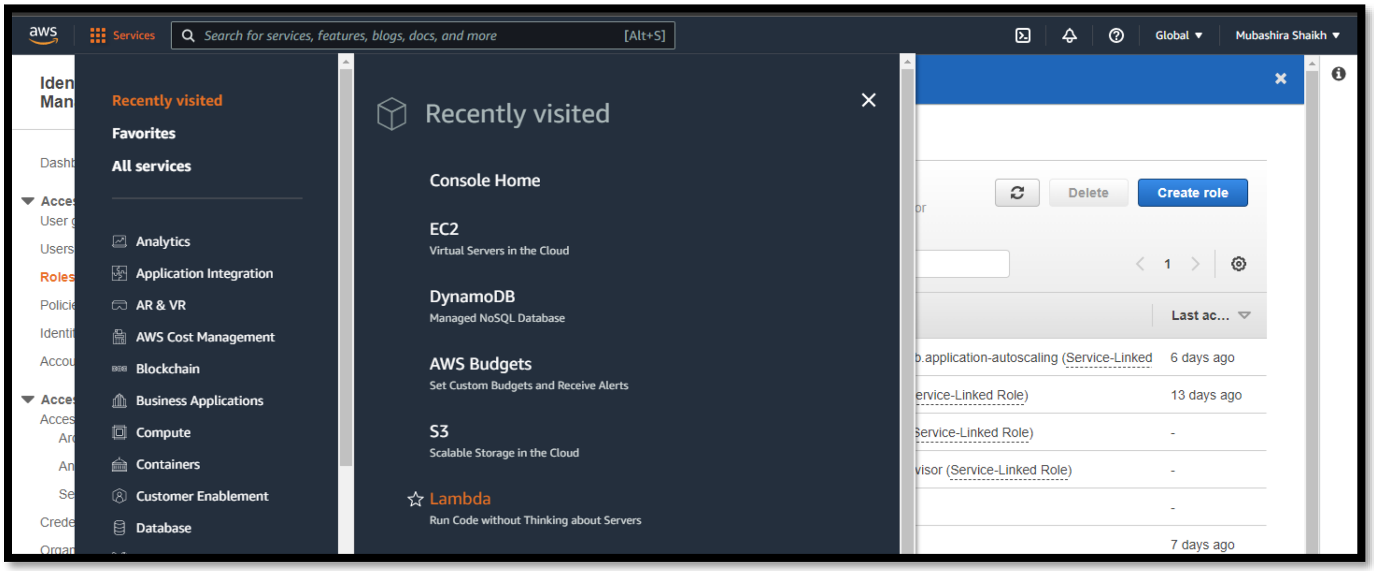
Step 3
Name, review, and create

Name, review, and create

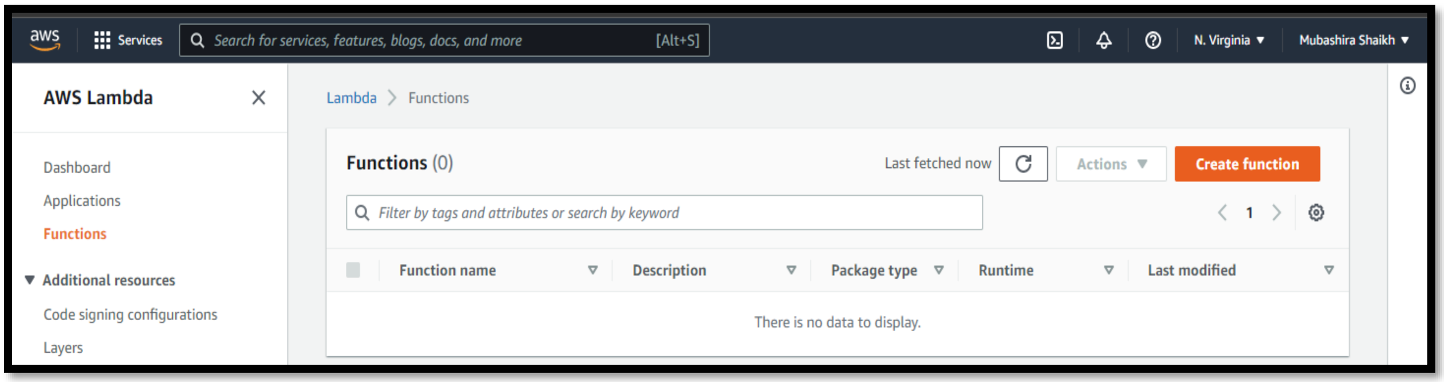
Role details

Role name
Enter a meaningful name to identify this role.
Mubashira
Maximum 64 characters. Use alphanumeric and '+=,.@-_' characters.

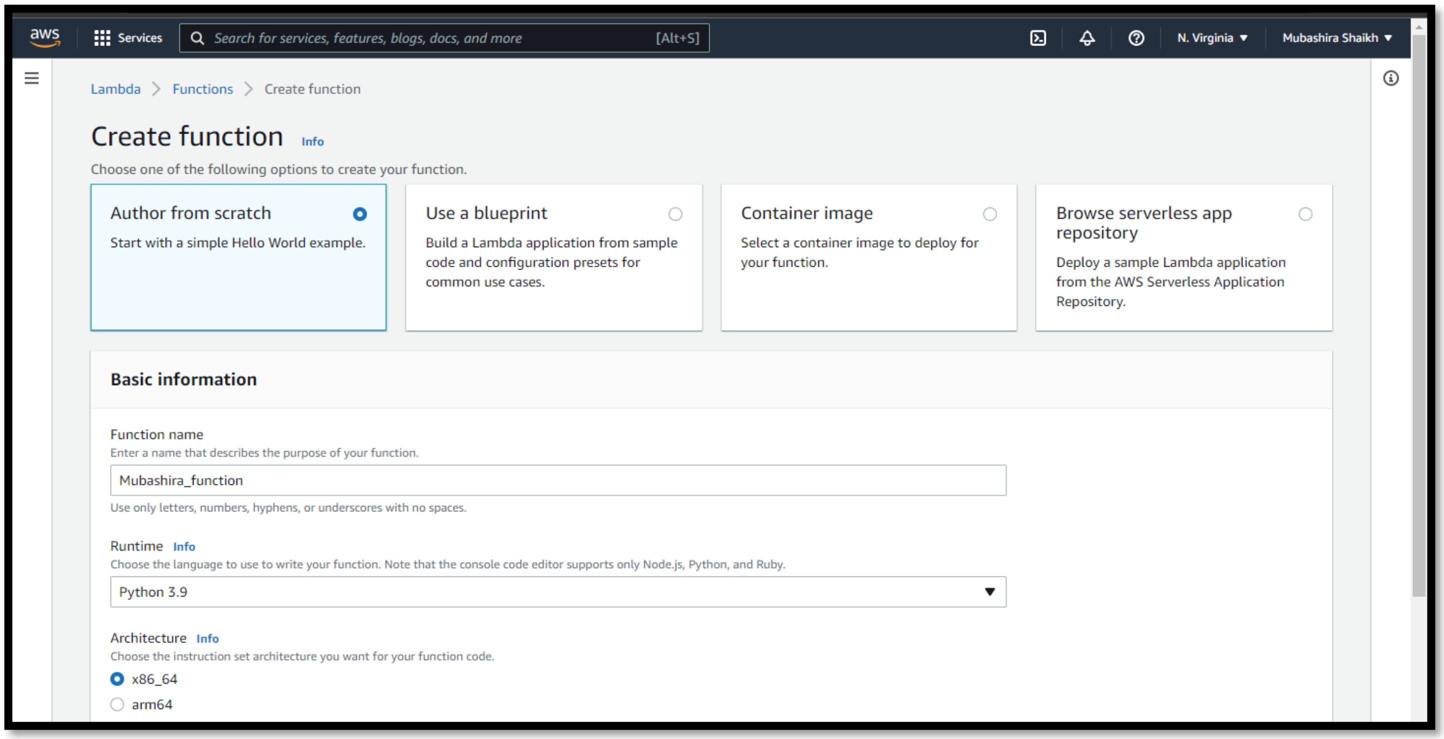
Step 7: Go to services→click on “Lambda”.



Step 8: Click on Create function.



Step 9: Choose “Author from Scratch”→Give name to your function→Choose “Python” language in runtime.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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.

Browse serverless app repository — Deploy a sample Lambda application from the AWS Serverless Application Repository.

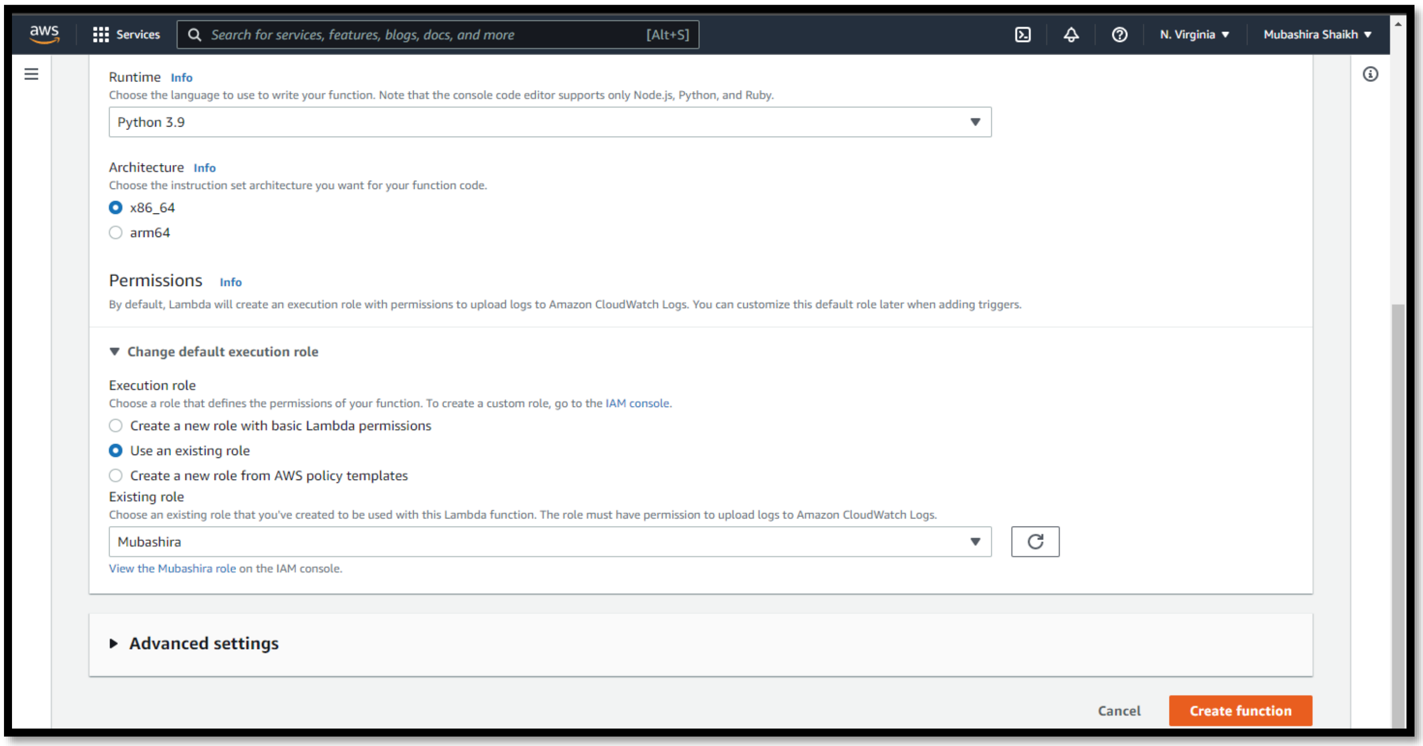
Basic information

Function name
Enter a name that describes the purpose of your function.
Mubashira_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 3.9

Architecture Info
Choose the instruction set architecture you want for your function code.
[✓ x86_64]
arm64

Step 10: Permissions→Change execution role→Choose "Use an existing role"→Click on Create function.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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

Architecture Info
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.

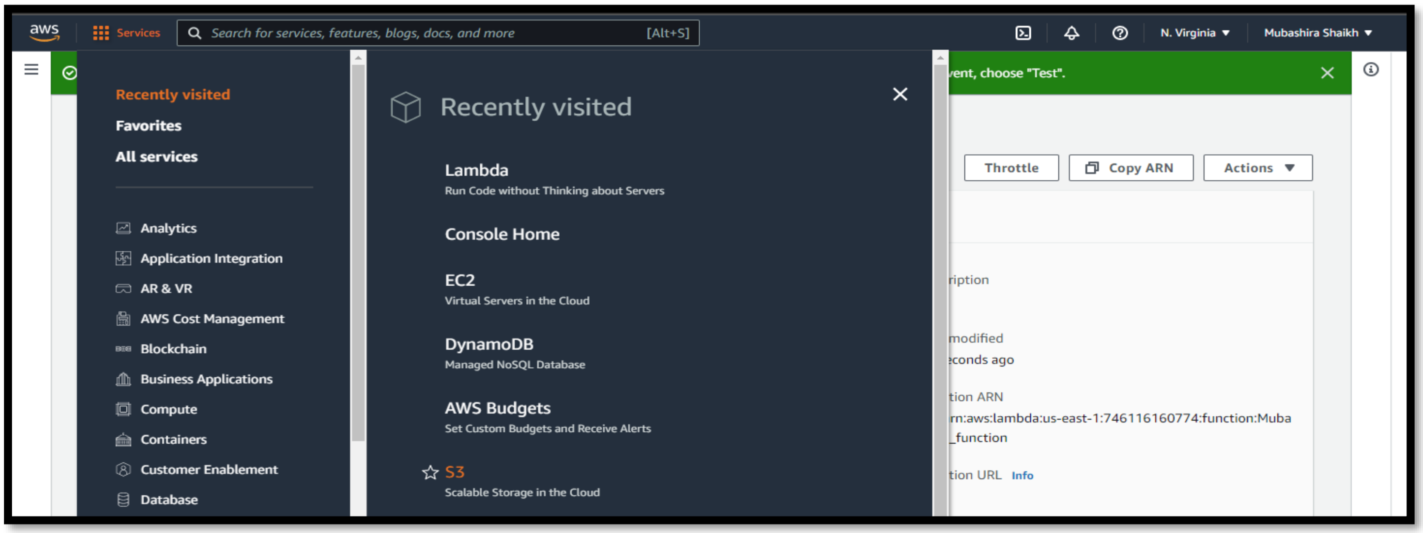
▼ Change default execution role

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

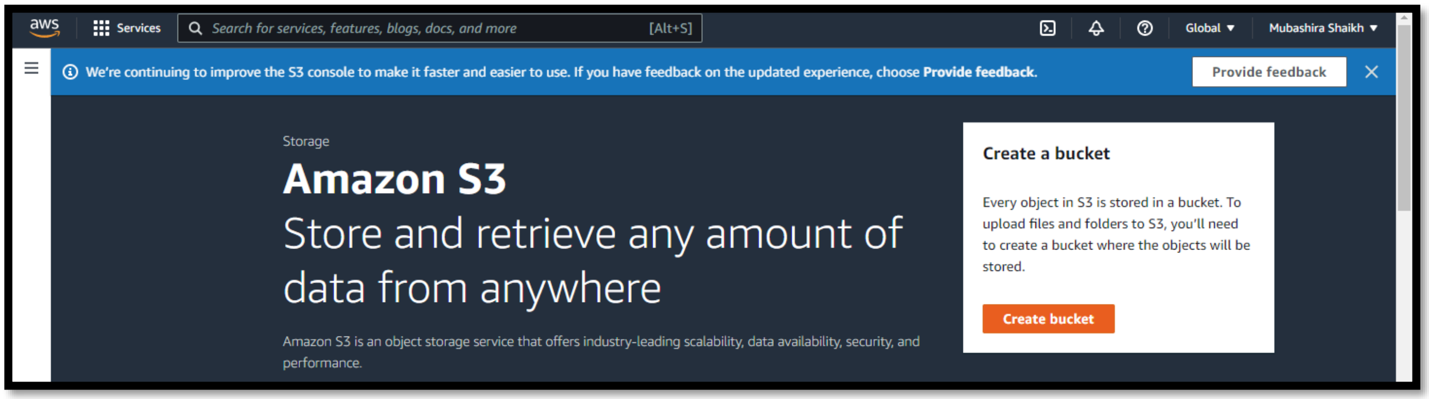
Existing role
Choose an existing role that you've created to be used with this Lambda function. The role must have permission to upload logs to Amazon CloudWatch Logs.
Mubashira
View the Mubashira role on the IAM console.

▶ Advanced settings

Step 11: Go to Services→Select S3.



Step 12: Click on "Create bucket".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Provide feedback

We're continuing to improve the S3 console to make it faster and easier to use. If you have feedback on the updated experience, choose **Provide feedback**.

Storage

Amazon S3

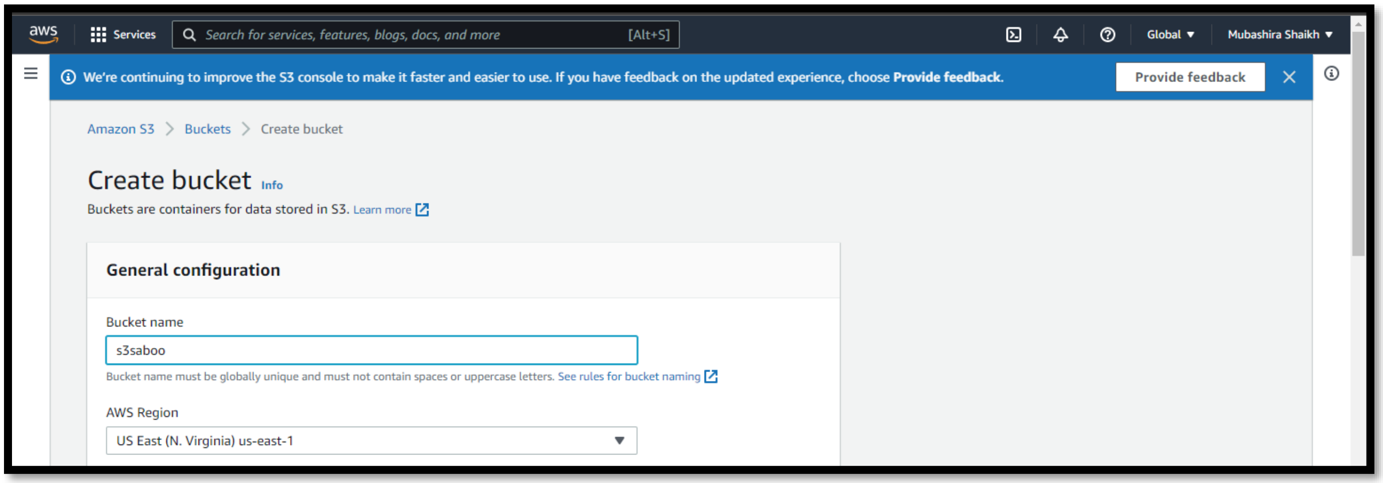
Store and retrieve any amount of data from anywhere

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.

Step 13: Give name to your bucket.



We're continuing to improve the S3 console to make it faster and easier to use. If you have feedback on the updated experience, choose **Provide feedback**.

Amazon S3 > Buckets > Create bucket

Create bucket Info

Buckets are containers for data stored in S3. Learn more

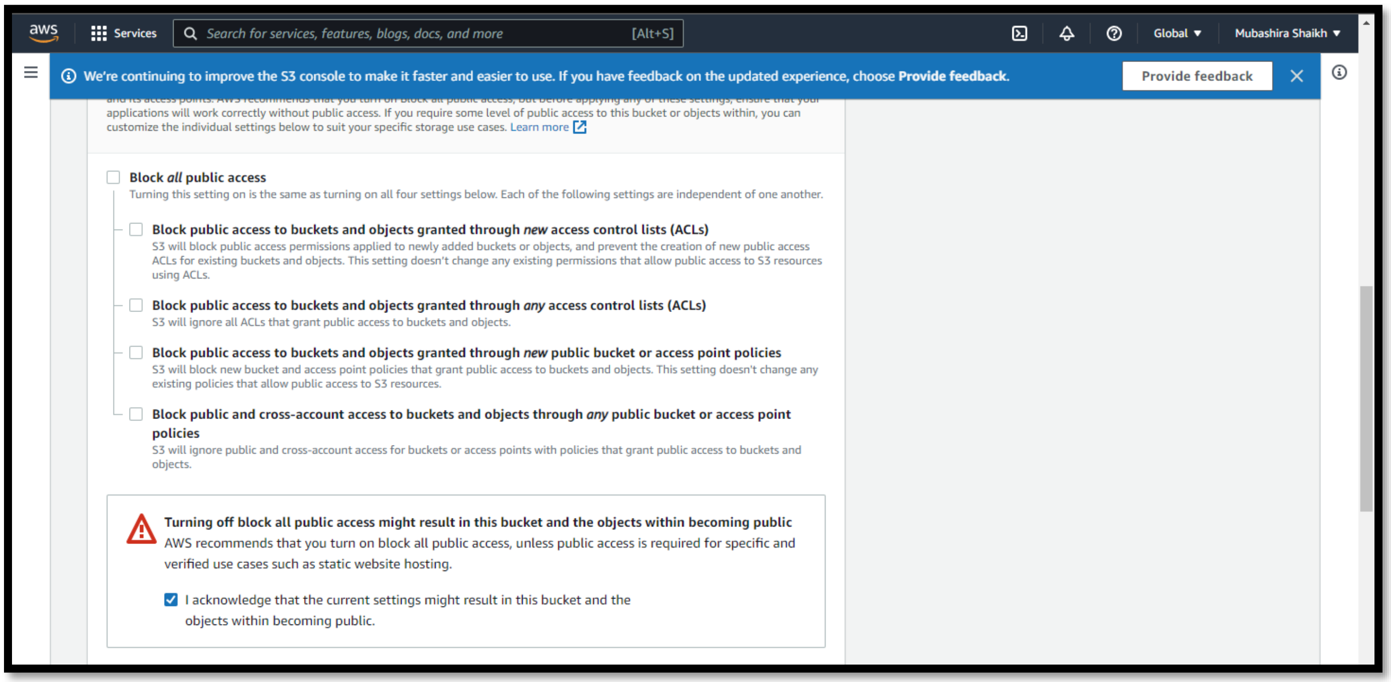
General configuration

Bucket name: s3saboo

Bucket name must be globally unique and must not contain spaces or uppercase letters. See rules for bucket naming

AWS Region: US East (N. Virginia) us-east-1

Step 14: Unblock all public access.



applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. Learn more

☐ **Block *all* public access**
Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

☐ **Block public access to buckets and objects granted through *new* access control lists (ACLs)**
S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.

☐ **Block public access to buckets and objects granted through *any* access control lists (ACLs)**
S3 will ignore all ACLs that grant public access to buckets and objects.

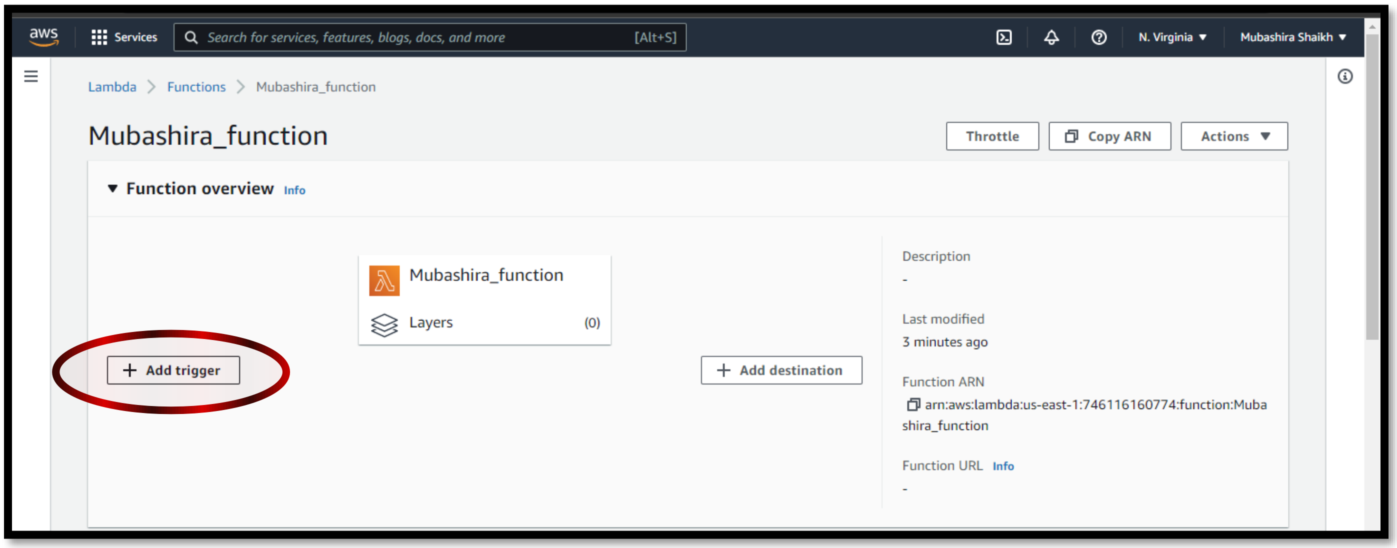
☐ **Block public access to buckets and objects granted through *new* public bucket or access point policies**
S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.

☐ **Block public and cross-account access to buckets and objects through *any* public bucket or access point policies**
S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Turning off block all public access might result in this bucket and the objects within becoming public
AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.

☑ I acknowledge that the current settings might result in this bucket and the objects within becoming public.

Step 15: Click on Add trigger.



Lambda > Functions > Mubashira_function

Mubashira_function

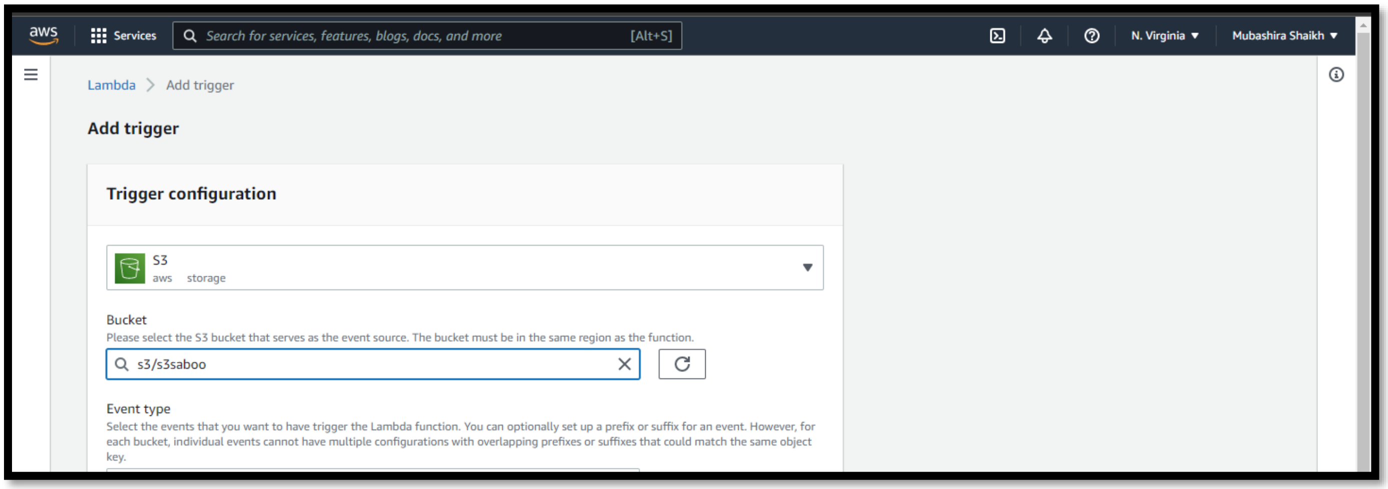
Description: -

Last modified: 3 minutes ago

Function ARN: arn:aws:lambda:us-east-1:746116160774:function:Mubashira_function

Function URL Info: -

Step 16: Select your S3 bucket.


aws
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Lambda > Add trigger

Add trigger

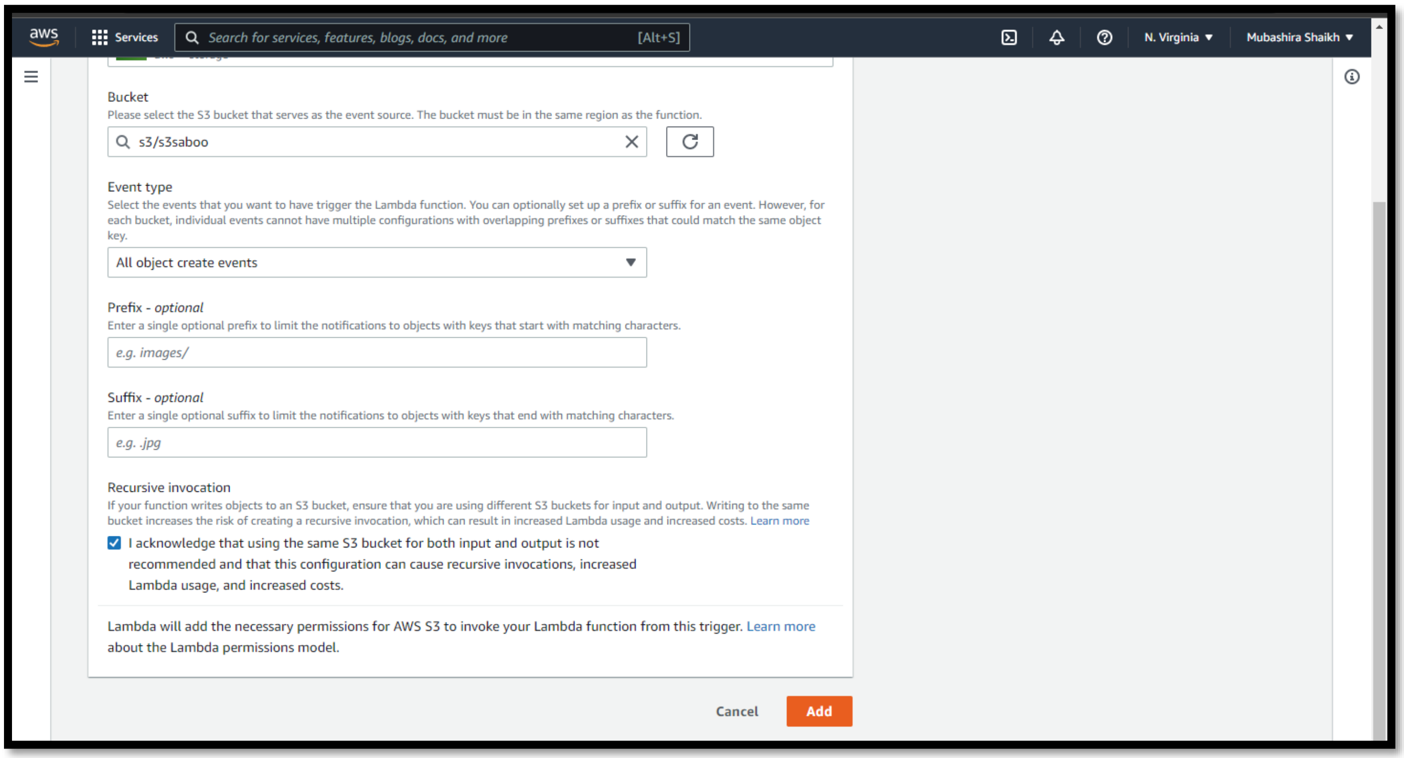
Trigger configuration

S3
aws storage

Bucket
Please select the S3 bucket that serves as the event source. The bucket must be in the same region as the function.
s3/s3saboo

Event type
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.

Step 17: Acknowledge Recursive invocation.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Bucket
Please select the S3 bucket that serves as the event source. The bucket must be in the same region as the function.
s3/s3saboo

Event type
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

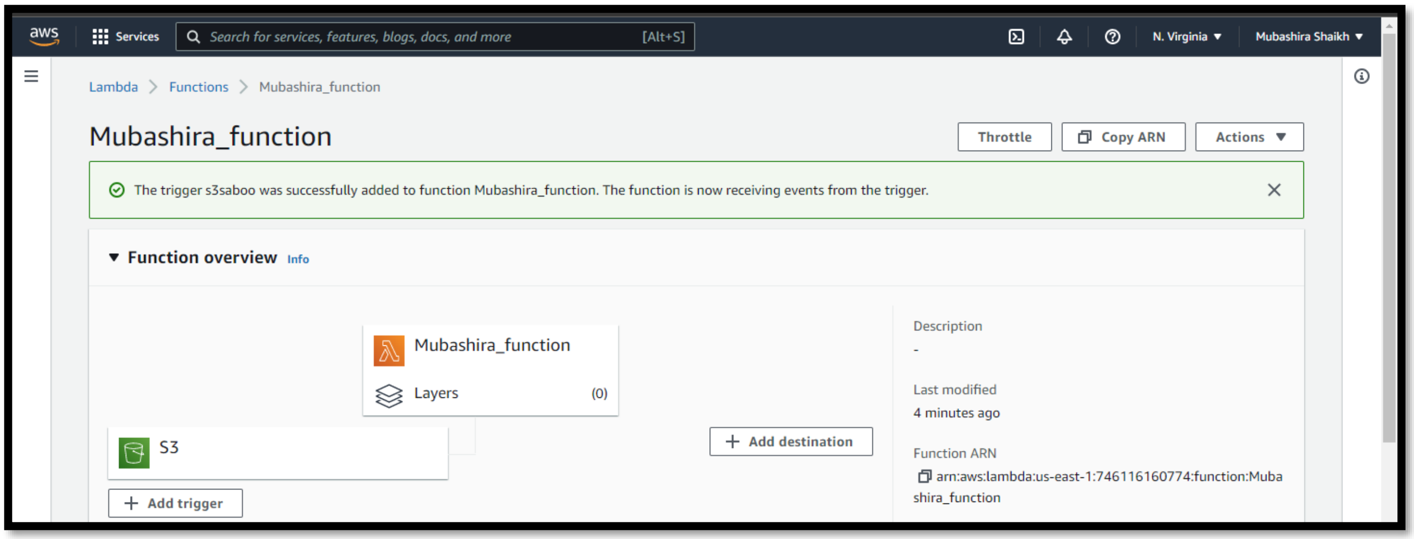
Prefix - *optional*
Enter a single optional prefix to limit the notifications to objects with keys that start with matching characters.
e.g. images/

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.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Lambda > Functions > Mubashira_function

Mubashira_function

The trigger s3saboo was successfully added to function Mubashira_function. The function is now receiving events from the trigger.

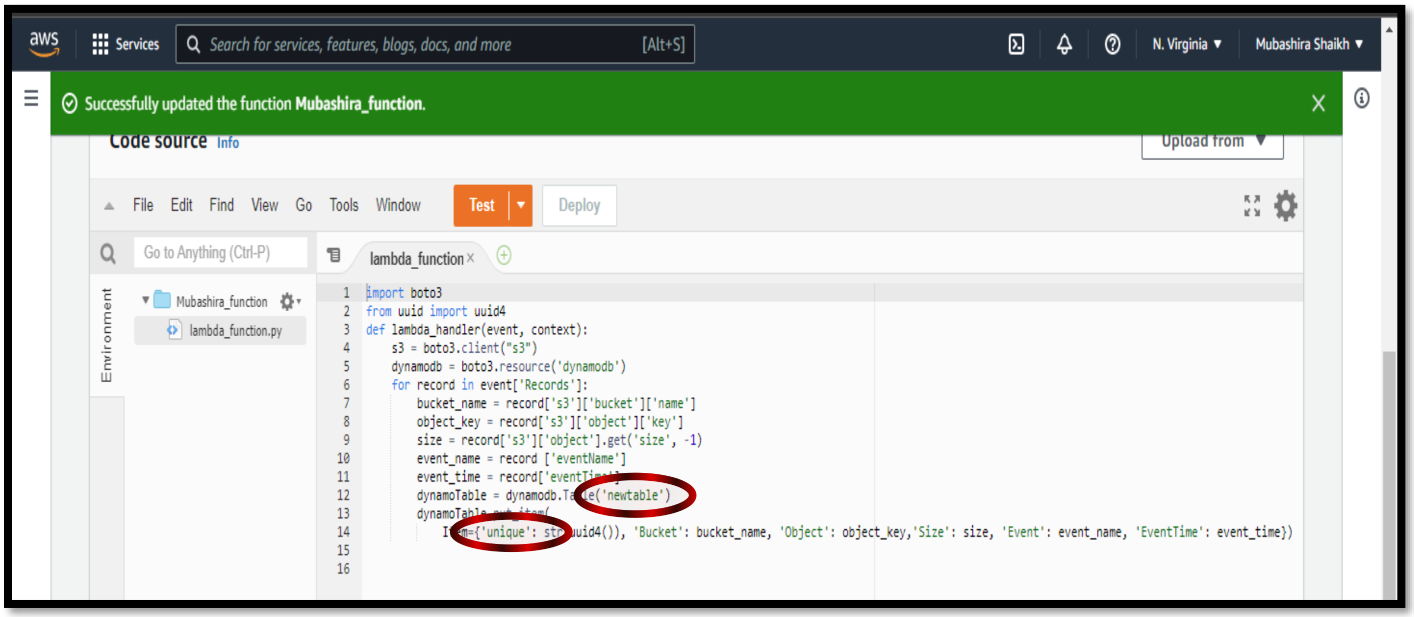
Function overview Info

Description
-

Last modified
4 minutes ago

Function ARN
arn:aws:lambda:us-east-1:746116160774:function:Mubashira_function

Step 18: Write the python code for S3 trigger→Save the code→Deploy it.

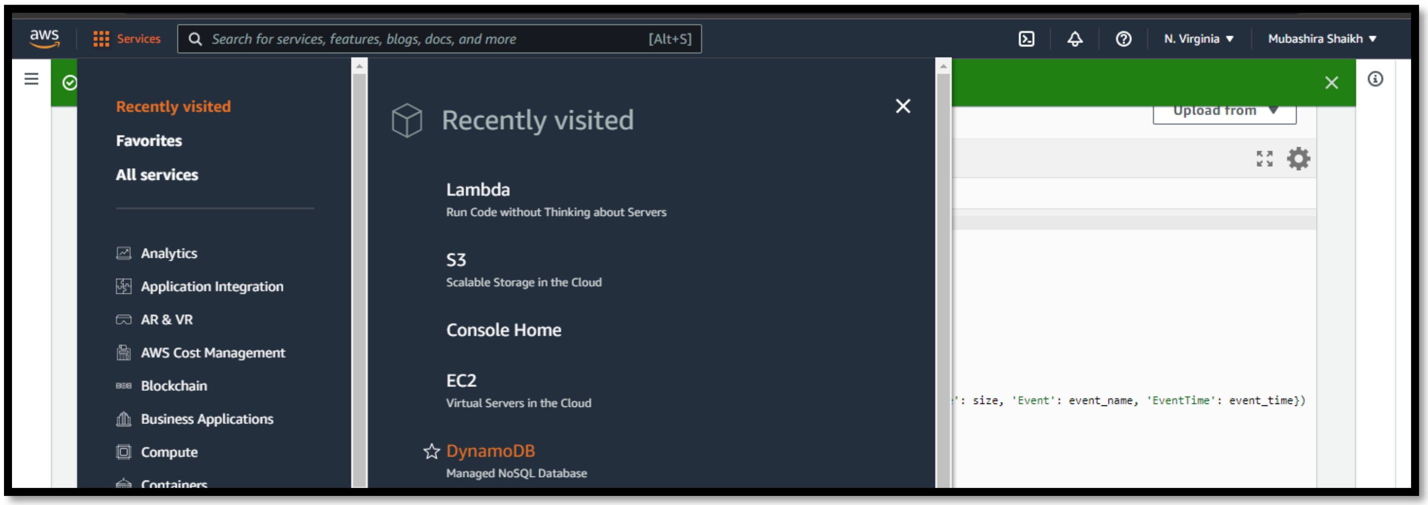


Successfully updated the function Mubashira_function.

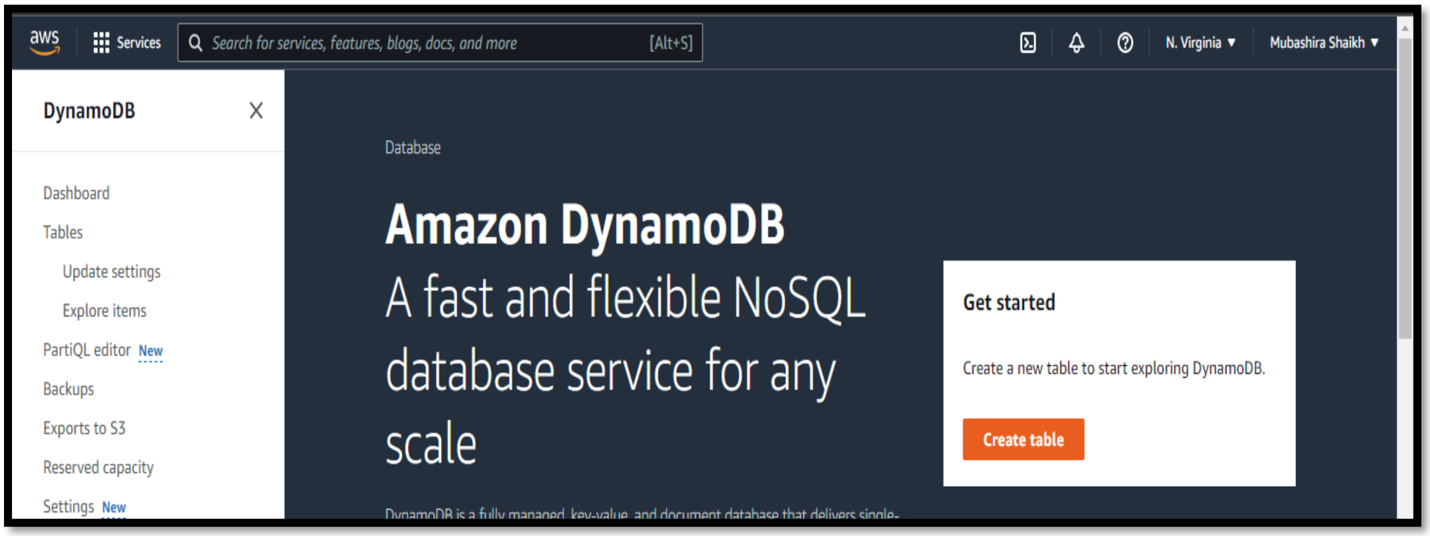
```python
import boto3
from uuid import uuid4
def lambda_handler(event, context):
    s3 = boto3.client("s3")
    dynamodb = boto3.resource('dynamodb')
    for record in event['Records']:
        bucket_name = record['s3']['bucket']['name']
        object_key = record['s3']['object']['key']
        size = record['s3']['object'].get('size', -1)
        event_name = record ['eventName']
        event_time = record['eventTime']
        dynamoTable = dynamodb.Table('newtable')
        dynamoTable.put_item(
            Item={'unique': str(uuid4()), 'Bucket': bucket_name, 'Object': object_key,'Size': size, 'Event': event_name, 'EventTime': event_time})


```

Step 19: Go to services→Select DynamoDB.



Step 20: Create the table.



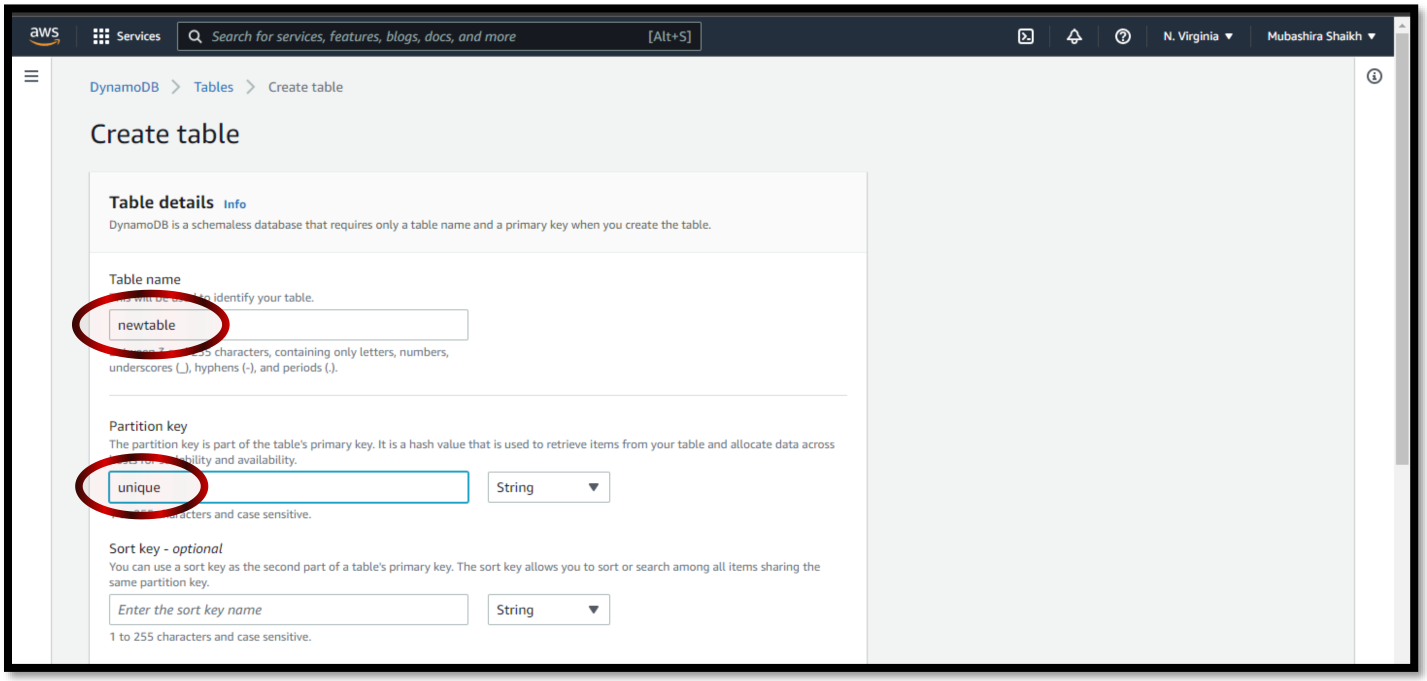
Amazon DynamoDB

A fast and flexible NoSQL database service for any scale

Create a new table to start exploring DynamoDB.

DynamoDB is a fully managed, key-value, and document database that delivers single-

Step 21: Give name and partition key same as mentioned in the code→Click create table.



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DynamoDB > Tables > Create table

Create table

Table details Info

DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.

Table name

This will be used to identify your table.

newtable

Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).

Partition key

The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.

unique | String

1 to 255 characters and case sensitive.

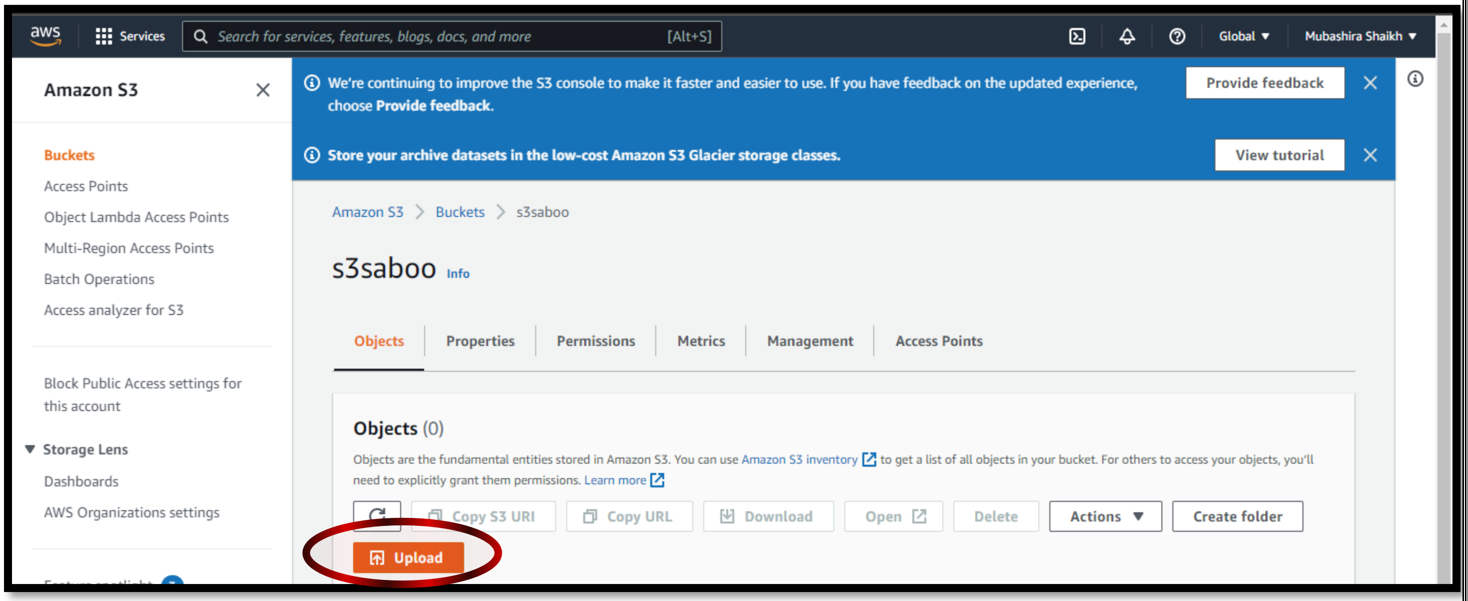
Sort key - *optional*

You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

Enter the sort key name | String

1 to 255 characters and case sensitive.

Step 22: Go to your bucket and upload an object by clicking on add files.



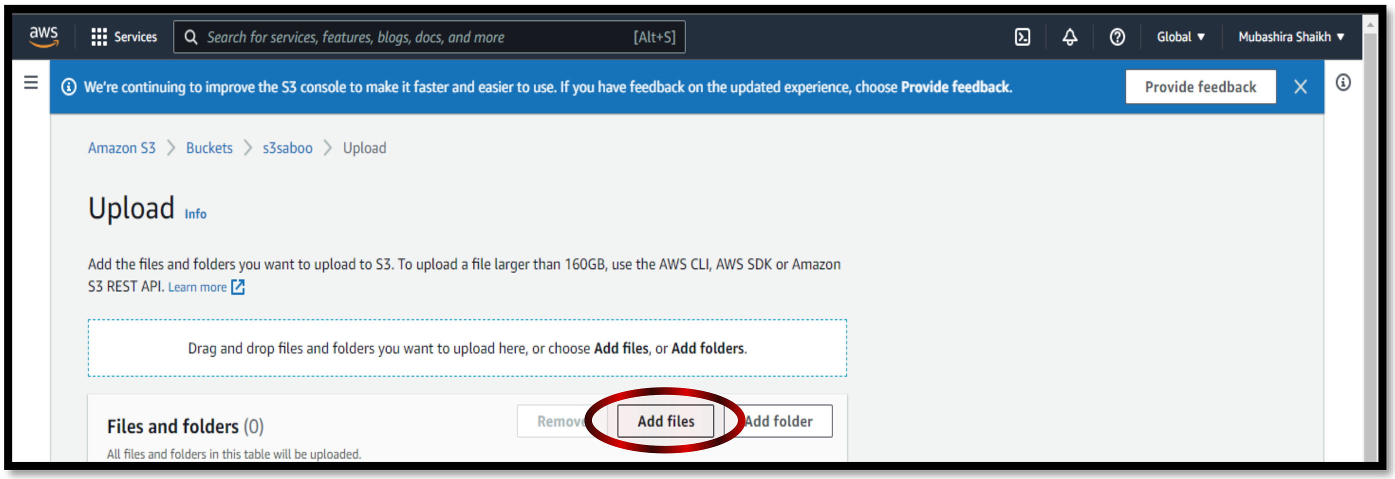
We're continuing to improve the S3 console to make it faster and easier to use. If you have feedback on the updated experience, choose **Provide feedback**.

Store your archive datasets in the low-cost Amazon S3 Glacier storage classes.

s3saboo Info

Objects (0)

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



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Amazon S3 > Buckets > s3saboo > Upload
Remove
Add files
Add folder

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Upload Info

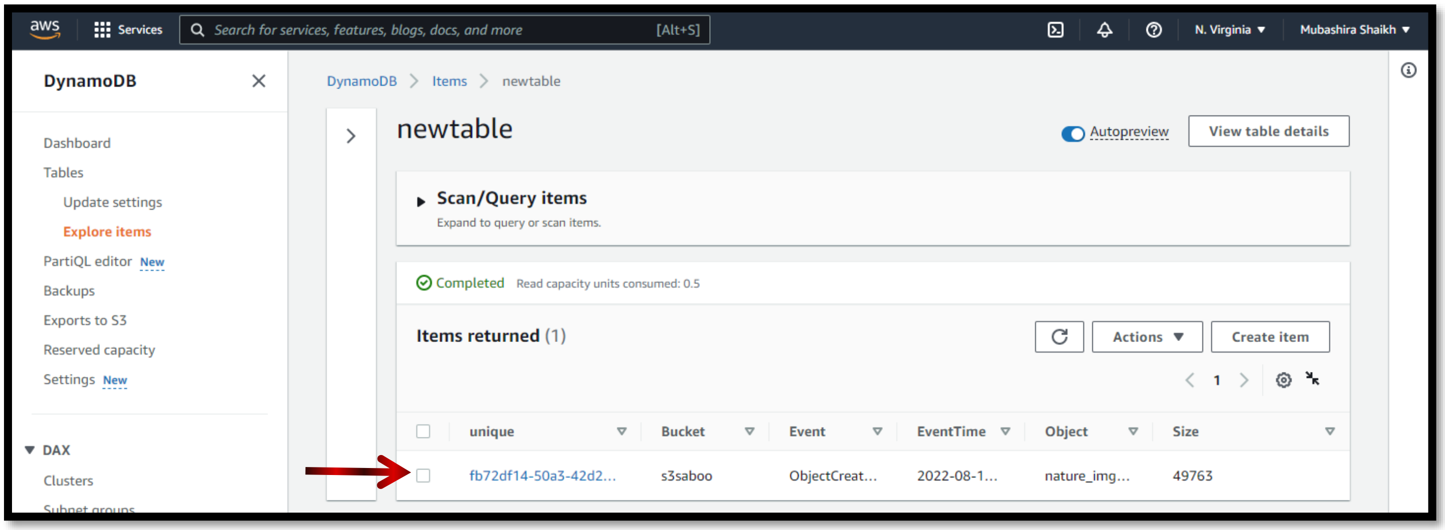
Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. Learn more

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

Files and folders (0)

All files and folders in this table will be uploaded.

Step 23: Go to your table and check the details of the uploaded file.



DynamoDB > Items > newtable

newtable

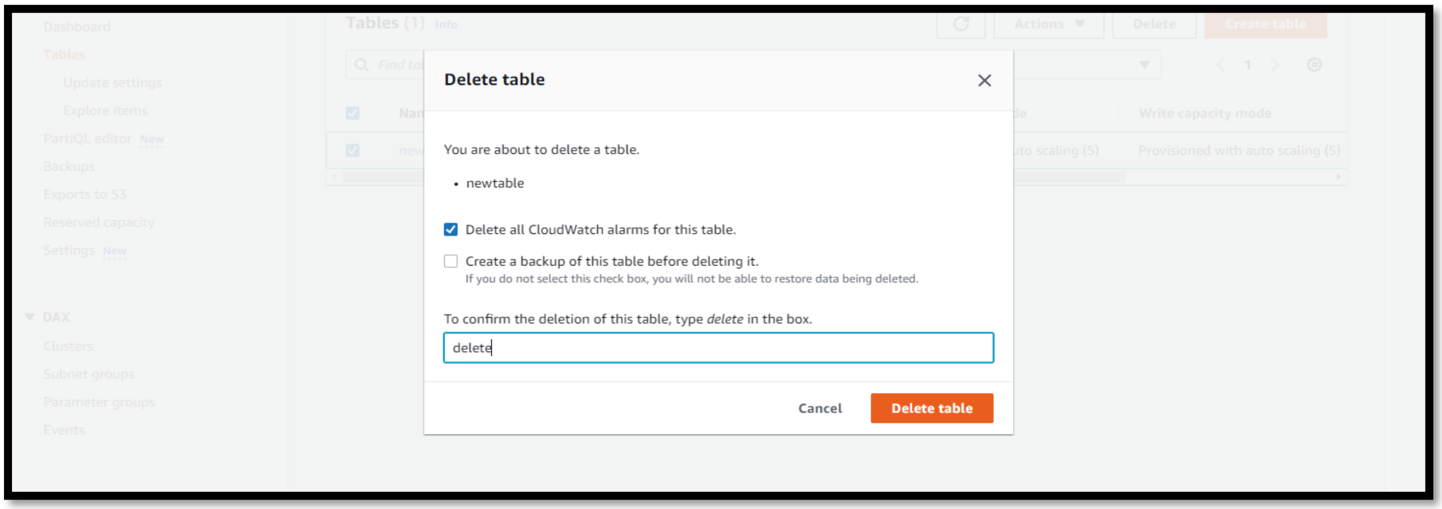
Scan/Query items
Expand to query or scan items.

Completed Read capacity units consumed: 0.5

Items returned (1)

unique	Bucket	Event	EventTime	Object	Size
fb72df14-50a3-42d2...	s3saboo	ObjectCreat...	2022-08-1...	nature_img...	49763

Step 24: Delete the table



Delete table

You are about to delete a table.

- newtable

☑ Delete all CloudWatch alarms for this table.

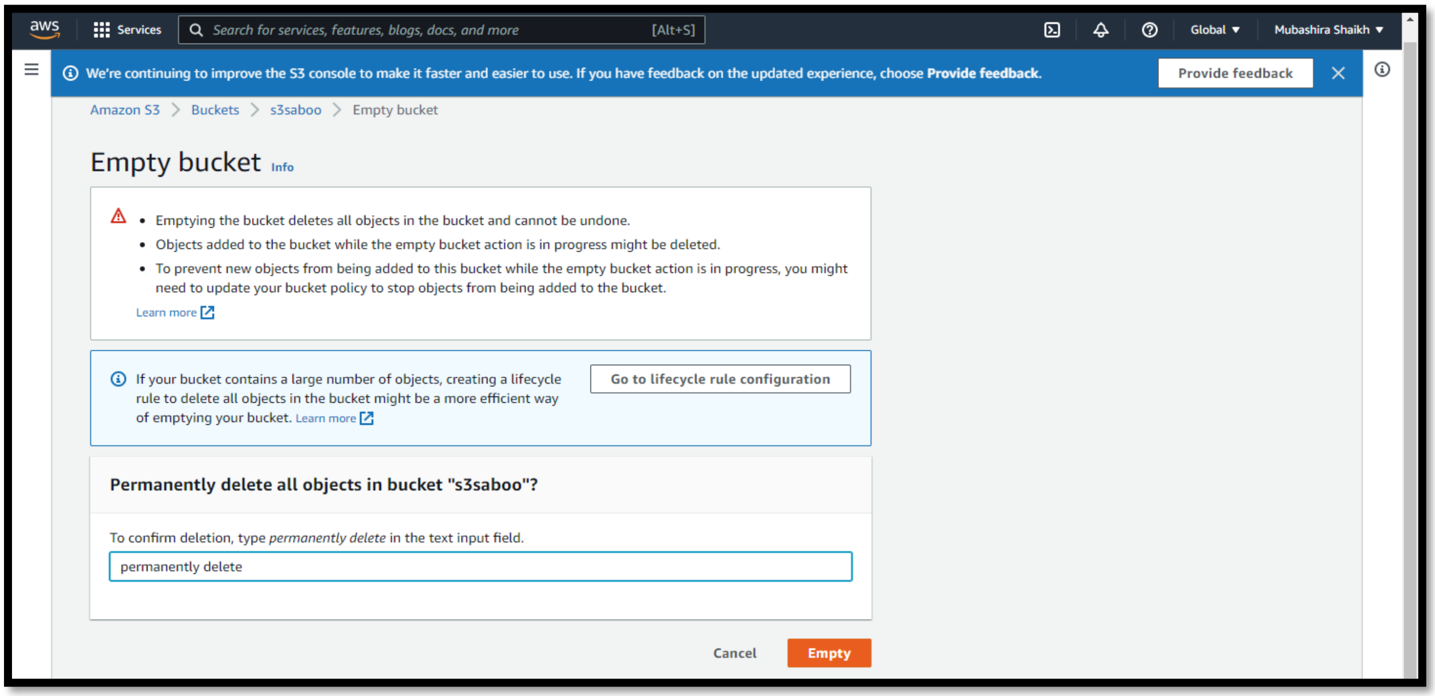
☐ Create a backup of this table before deleting it.
If you do not select this check box, you will not be able to restore data being deleted.

To confirm the deletion of this table, type *delete* in the box.

delete

Cancel | Delete table

Step 25: Empty your bucket→then delete it.



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Amazon S3 > Buckets > s3saboo > Empty bucket

Empty bucket Info

- Emptying the bucket deletes all objects in the bucket and cannot be undone.
- Objects added to the bucket while the empty bucket action is in progress might be deleted.
- To prevent new objects from being added to this bucket while the empty bucket action is in progress, you might need to update your bucket policy to stop objects from being added to the bucket.

Learn more

If your bucket contains a large number of objects, creating a lifecycle rule to delete all objects in the bucket might be a more efficient way of emptying your bucket. Learn more

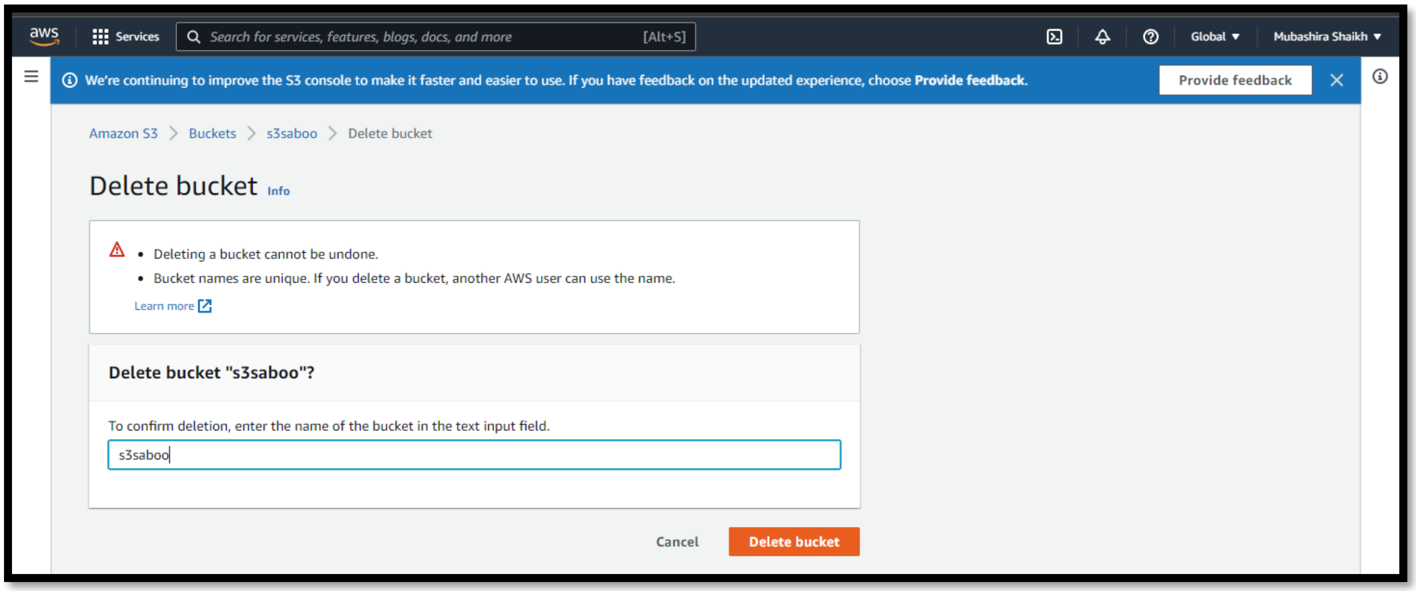
Go to lifecycle rule configuration

Permanently delete all objects in bucket "s3saboo"?

To confirm deletion, type *permanently delete* in the text input field.

permanently delete

Cancel | Empty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Global
Mubashira Shaikh
Provide feedback
Amazon S3 > Buckets > s3saboo > Delete bucket
Info
Learn more
Cancel
Delete bucket

We're continuing to improve the S3 console to make it faster and easier to use. If you have feedback on the updated experience, choose **Provide feedback**.

Delete bucket

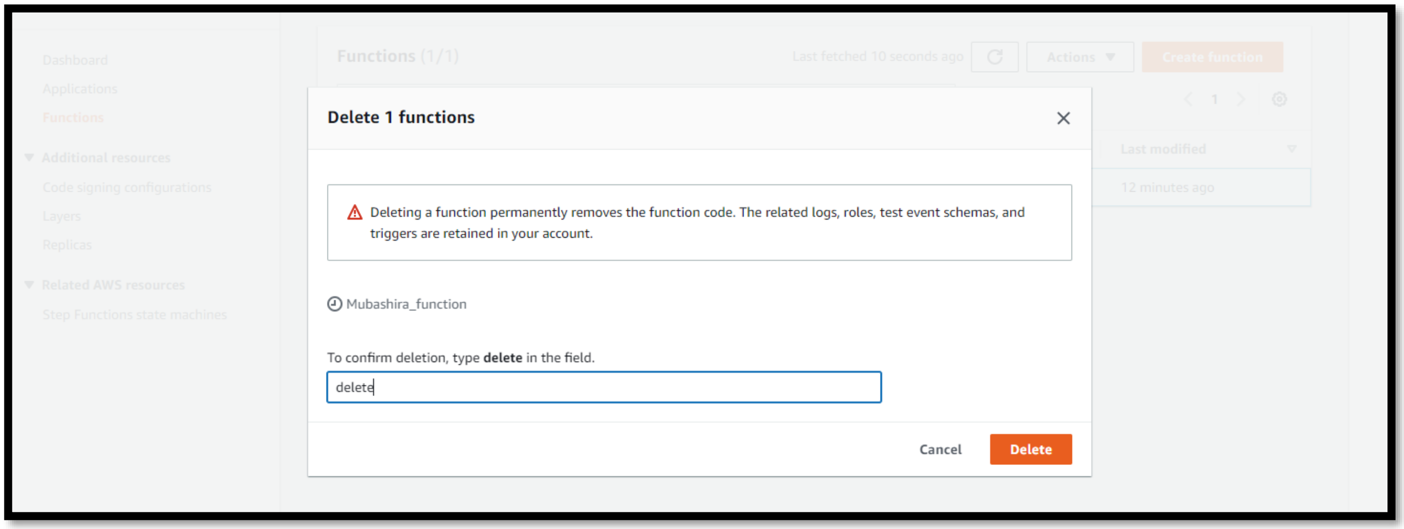
- Deleting a bucket cannot be undone.
- Bucket names are unique. If you delete a bucket, another AWS user can use the name.

Delete bucket "s3saboo"?

To confirm deletion, enter the name of the bucket in the text input field.

s3saboo

Step 26: Delete your lambda function



Delete 1 functions

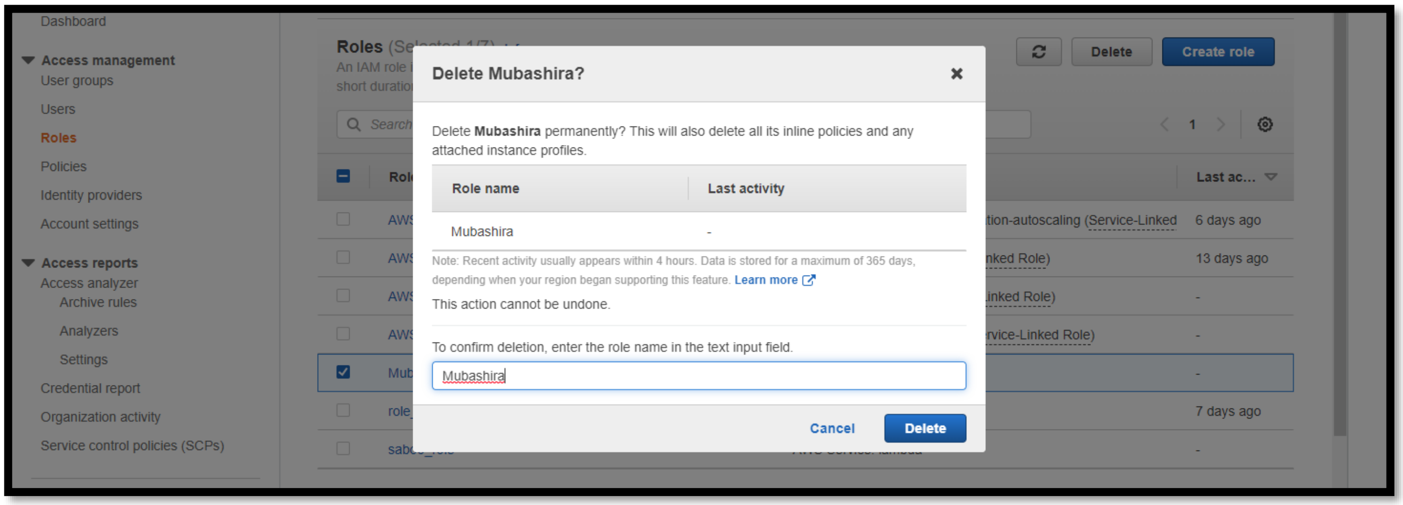
Deleting a function permanently removes the function code. The related logs, roles, test event schemas, and triggers are retained in your account.

Mubashira_function

To confirm deletion, type **delete** in the field.

delete

Delete the role



Delete Mubashira?

Delete **Mubashira** permanently? This will also delete all its inline policies and any attached instance profiles.

Role name	Last activity
Mubashira	-

Note: Recent activity usually appears within 4 hours. Data is stored for a maximum of 365 days, depending when your region began supporting this feature. Learn more

This action cannot be undone.

To confirm deletion, enter the role name in the text input field.

Mubashira