

ID No: 2000031256

AWS-Solution Architect Associate Project

Sec-14

Assigned Project-1:

To build complete end-to-end serverless web application in AWS cloud using API gateway, Lambda function, DynamoDB

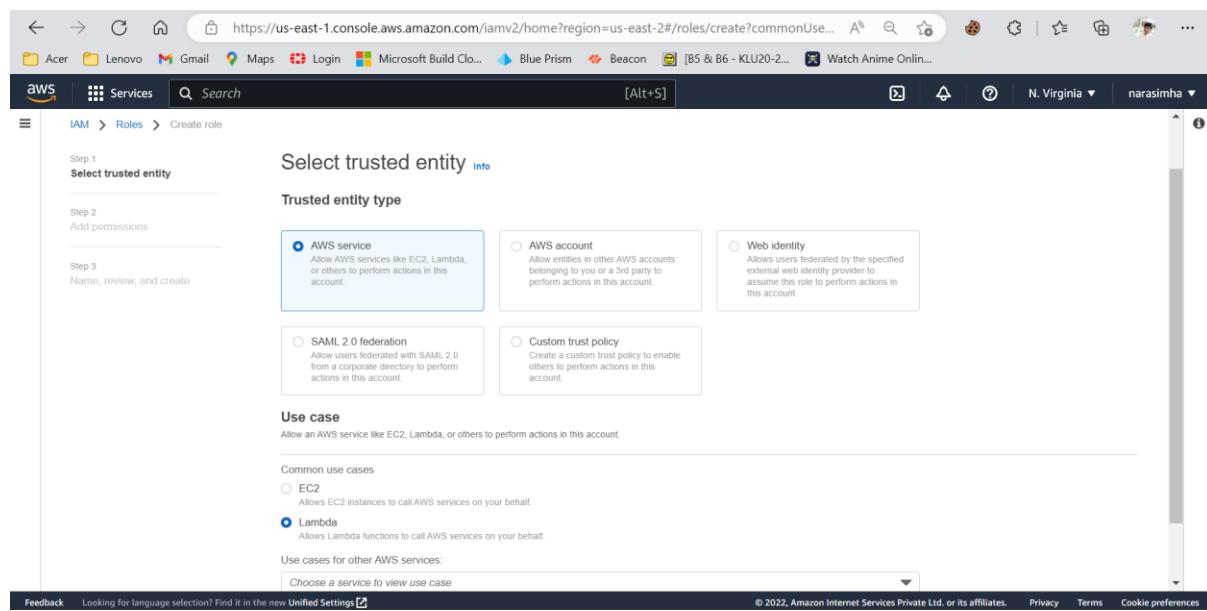
Get and Post employee details : API Gateway

Test REST Api : Postman api platform(free login)

Employee Business Logic : AWS Lambda service

Store employee details : AWS DynamoDB service

Create an IAM Role With Lambda as Use case and Policy:DynamoDB Full access



Add permissions

Permissions policies (Selected 1/785) [Info](#)
Choose one or more policies to attach to your new role.

Policy name	Type	Description
<input checked="" type="checkbox"/>  AmazonDynamoDB ...	AWS managed policy	Provides full access to Amazon DynamoDB via the AWS Management Console.
<input type="checkbox"/>  AWSLambdaDyna...	AWS managed policy	Provides list and read access to DynamoDB streams and write permissions to CloudWatch logs.
<input type="checkbox"/>  AmazonDynamoDB ...	AWS managed policy	Provides read only access to Amazon DynamoDB via the AWS Management Console.
<input type="checkbox"/>  AWSLambdaInvo...	AWS managed policy	Provides read access to DynamoDB Streams.

Set permissions boundary - optional [Info](#)
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.

[Cancel](#) [Previous](#) [Next](#)

Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
lambda_dynamodb_role_nov24
Maximum 64 characters. Use alphanumeric and '+', '_', '@', '-' characters.

Description
Add a short explanation for this role.
Allows Lambda functions to call AWS services on your behalf.
Maximum 1000 characters. Use alphanumeric and '+', '_', '@', '-' characters.

Step 1: Select trusted entities [Edit](#)

```

1 - [
2 -   "Version": "2012-10-17",
3 -   "Statement": [
4 -     {
5 -       "Effect": "Allow",
6 -       "Action": [
7 -         "sts:AssumeRole"
8 -       ],
9 -       "Principal": [
10 -         "arn:aws:iam::123456789012:root"
11 -       ]
12 -     }
13 -   ]
14 - ]

```

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Identity and Access Management (IAM)

New! Securely access AWS services from your data center with IAM Roles Anywhere. [Learn more](#)

Role lambda_dynamodb_role_nov24 created. [View role](#)

IAM > Roles

Roles (8) [Info](#)
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 acti...
AWSServiceRoleForAmazonElasticFileSystem	AWS Service: elasticfilesystem (Service-Linked Role)	80 days ago
AWSServiceRoleForApplicationAutoScaling_DynamoDBTable	AWS Service: dynamodb.application-autoscaling (Service-Linked Role)	73 days ago
AWSServiceRoleForBackup	AWS Service: backup (Service-Linked Role)	9 hours ago
AWSServiceRoleForSupport	AWS Service: support (Service-Linked Role)	-
AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service-Linked Role)	-
lambda_dynamodb_role_nov24	AWS Service: lambda	-
lambda_dynamodb_sep12	AWS Service: lambda	73 days ago

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DYNAMODB:

The screenshot shows the main Amazon DynamoDB landing page. It features a large banner with the text "Amazon DynamoDB" and "A fast and flexible NoSQL database service for any scale". Below the banner, a sub-banner states: "DynamoDB is a fully managed, key-value, and document database that delivers single-digit-millisecond performance at any scale." To the right, there's a "Get started" section with a "Create table" button, a "Pricing" section with a detailed description of pricing models, and a "Documentation" section. On the left, a sidebar lists various management options like Dashboard, Tables, Update settings, Explore items, PartiQL editor, Backups, Exports to S3, Imports from S3, Reserved capacity, and Settings.

This screenshot shows the "Create table" step in the DynamoDB wizard. It includes fields for "Table name" (set to "kluniversity"), "Partition key" (set to "EmpID" of type "Number"), and "Sort key - optional" (set to "EmpName" of type "String"). A note indicates that the sort key allows sorting or searching among items with the same partition key. The wizard also provides a "Copy link" button and a summary message: "DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table."

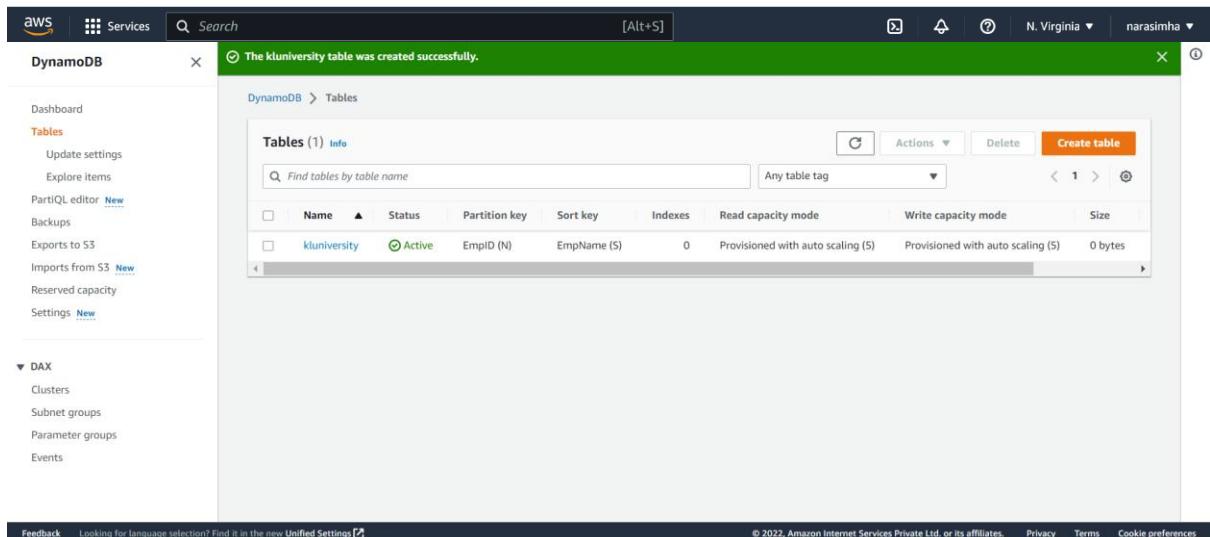
This screenshot shows the "Tables" list in the DynamoDB console. It displays a single table named "kluniversity" with the status "Creating". The table has a partition key "EmpID (N)" and a sort key "EmpName (S)". Provisioned capacity mode is set for both read and write operations. The table size is listed as "0 bytes". The interface includes a search bar, filter dropdown, and standard table navigation controls.

The kluniversity table was created successfully.

DynamoDB Tables (1) Info

Name	Status	Partition key	Sort key	Indexes	Read capacity mode	Write capacity mode	Size
kluniversity	Active	EmpID (N)	EmpName (S)	0	Provisioned with auto scaling (5)	Provisioned with auto scaling (5)	0 bytes

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LAMBDA:

Lambda > Functions > Create function > Configure blueprint hello-world-python

Basic information

Function name: lambda_nov24

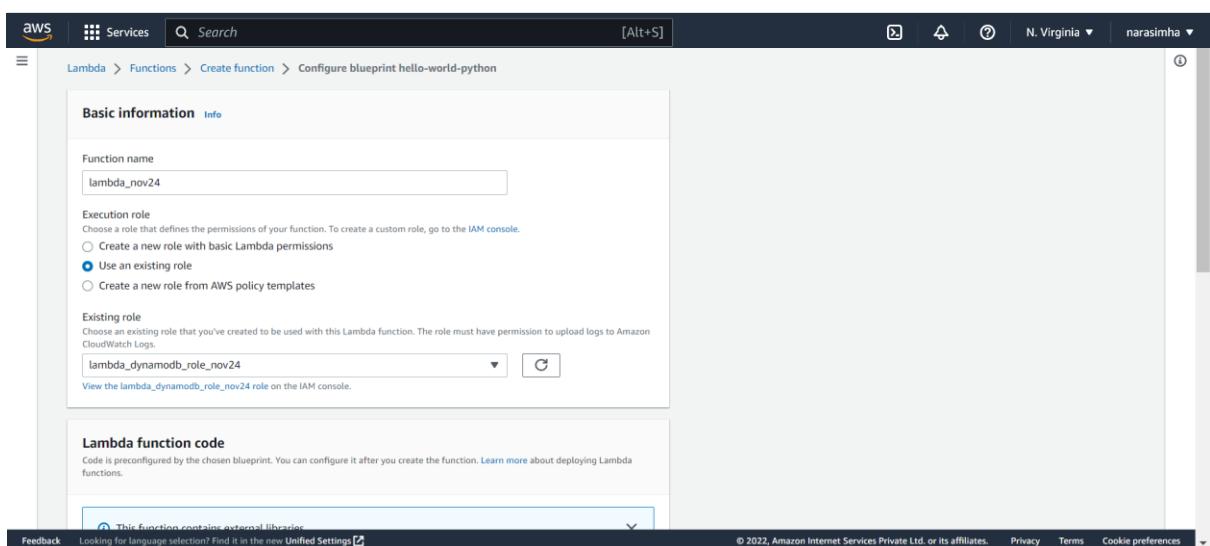
Execution role: Use an existing role (lambda_dynamodb_role_nov24)

Existing role: lambda_dynamodb_role_nov24

Lambda function code

This function contains external libraries.

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Successfully created the function lambda_nov24. You can now change its code and configuration. To invoke your function with a test event, choose "Test".

Lambda > Functions > lambda_nov24

lambda_nov24

Function overview

Code (selected), Test, Monitor, Configuration, Aliases, Versions

Description: A starter AWS Lambda function.

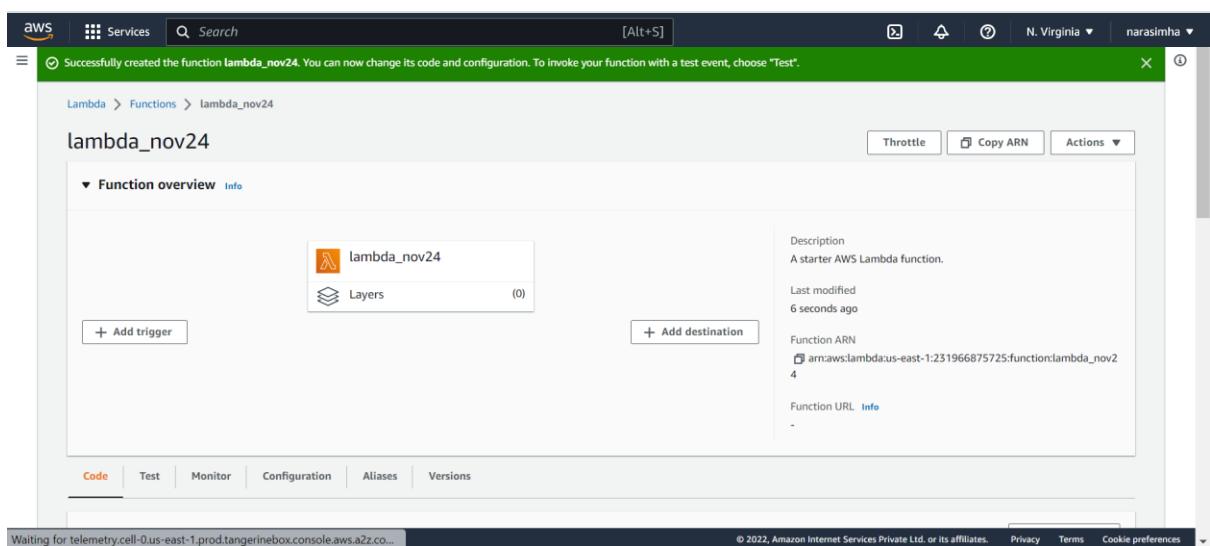
Last modified: 6 seconds ago

Function ARN: arnaws:lambda:us-east-1:231966875725:function:lambda_nov24

Function URL: [Info](#)

+ Add trigger, + Add destination

Waiting for telemetry cell-0.us-east-1.prod.tangerinebox.console.aws.a2z.co... © 2022, Amazon Internet Services Private Ltd. or its affiliates. Privacy Terms Cookie preferences



Screenshot of the AWS Lambda function configuration page showing a successful creation message and the Test tab selected.

To invoke your function without saving an event, configure the JSON event, then choose Test.

Test event action: Create new event

Event name: demo

Event sharing settings: Private

Template - optional

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Event name: demo

Event JSON:

```
1 < {
2   "EmpID": 31629,
3   "EmpName": "Rekha"
4 }
```

Format JSON

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Updating the function lambda_nov24.

Code source: Info

File Edit Find View Go Tools Window Test Deploy

Upload from

Environment

```
lambda_function.x
lambda_nov24/
lambda_function.py

1 import json
2 import boto3
3
4 database=boto3.resource('dynamodb')
5 table=database.Table("kluniversity")
6
7 def lambda_handler(event,context):
8     table.put_item(Item=event)
9     response={
10         'statusCode':200,
11         'body':'created an item successfully'
12     }
```

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The test event demo was successfully saved.

Code source Info

File Edit Find View Go Tools Window Test Deploy

Execution results

Test Event Name demo

Response

```
{
  "statusCode": 200,
  "body": "created an item successfully"
}
```

Function Logs

```
START RequestId: 3dfeacd-a7cd-4d9a-9458-0b80dbb1240a Version: $LATEST
END RequestId: 3dfeacd-a7cd-4d9a-9458-0b80dbb1240a
REPORT RequestId: 3dfeacd-a7cd-4d9a-9458-0b80dbb1240a Duration: 153.43 ms Billed Duration: 154 ms Memory Size: 128 MB Max Memory Used: 73 MB
Request ID
3dfeacd-a7cd-4d9a-9458-0b80dbb1240a
```

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DynamoDB

Dashboard Tables Update settings Explore items PartQL editor Backups Exports to S3 Imports from S3 Reserved capacity Settings

Tables (1)

Any table tag Find tables by table name

kluniversity

Scan/Query items

Scan/Query a table or index Scan Query kluniversity

Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (1)

Actions Create item

EmpID EmpName

3162 Rekha

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25°C Partly cloudy Search

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10:13 PM 11/24/2022

REST API:

API Gateway

Build a WebSocket API using persistent connections for real-time use cases such as chat applications or dashboards.

Works with the following:
Lambda, HTTP, AWS Services

Build

REST API

Develop a REST API where you gain complete control over the request and response along with API management capabilities.

Works with the following:
Lambda, HTTP, AWS Services

Import Build

REST API Private

Create a REST API that is only accessible from within a VPC.

Works with the following:
Lambda, HTTP, AWS Services

Import Build

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The screenshot shows the 'Create' page for a new API. At the top, there's a navigation bar with the AWS logo, 'Services', a search bar, and account information for 'N. Virginia' and 'narasimha'. Below the navigation is a section titled 'Choose the protocol' with two radio buttons: 'REST' (selected) and 'WebSocket'. A note below says 'In Amazon API Gateway, a REST API refers to a collection of resources and methods that can be invoked through HTTPS endpoints.' There are three options for creating the API: 'New API' (selected), 'Import from Swagger or Open API 3', and 'Example API'.

Create new API

In Amazon API Gateway, a REST API refers to a collection of resources and methods that can be invoked through HTTPS endpoints.

New API Import from Swagger or Open API 3 Example API

Settings

Choose a friendly name and description for your API.

API name* RESTAPI_31629
Description
Endpoint Type Regional

* Required Create API

The screenshot shows the 'Actions' dropdown menu for a specific resource. The menu is divided into 'RESOURCE ACTIONS' and 'API ACTIONS'. Under 'RESOURCE ACTIONS', the options are 'Create Method', 'Create Resource', 'Enable CORS', and 'Edit Resource Documentation'. Under 'API ACTIONS', the options are 'Deploy API', 'Import API', 'Edit API Documentation', and 'Delete API'. The 'Delete API' option is highlighted with a red border.

The screenshot shows the 'New Child Resource' dialog. It has a heading 'New Child Resource' and a sub-instruction 'Use this page to create a new child resource for your resource.' Below this, there's a checkbox 'Configure as proxy resource' which is unchecked. The 'Resource Name*' field contains 'kluniversity' and the 'Resource Path*' field contains '/kluniversity'. A note explains that you can add path parameters using brackets. Below these fields is a checkbox 'Enable API Gateway CORS' which is also unchecked. At the bottom of the dialog are 'Required' and 'Cancel' buttons, and a large 'Create Resource' button.

Screenshot of the AWS API Gateway console showing the 'Actions' menu for a resource. The 'Delete Resource' option is highlighted.

API: RESTAPI_31629

Resources

No methods defined for the resource.

API ACTIONS

- Deploy API
- Import API
- Edit API Documentation
- Delete API

Screenshot of the AWS API Gateway console showing the 'POST - Setup' configuration page.

Choose the integration point for your new method.

Integration type: Lambda Function ⓘ

HTTP ⓘ

Mock ⓘ

AWS Service ⓘ

VPC Link ⓘ

Use Lambda Proxy integration ⓘ

Lambda Region: us-east-1

Lambda Function: lambda_nov24

Use Default Timeout ⓘ

Save

Screenshot of the AWS API Gateway console showing the 'Add Permission to Lambda Function' dialog.

You are about to give API Gateway permission to invoke your Lambda function:
arn:aws:lambda:us-east-1:231966875725:function:lambda_nov24

Cancel OK

Mock ⓘ

AWS Service ⓘ

VPC Link ⓘ

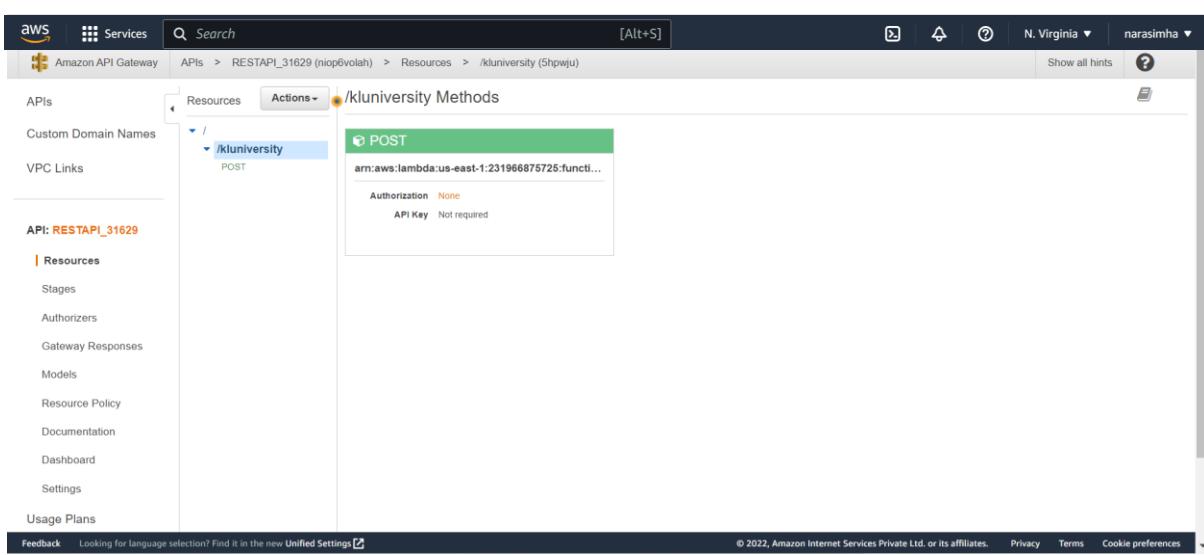
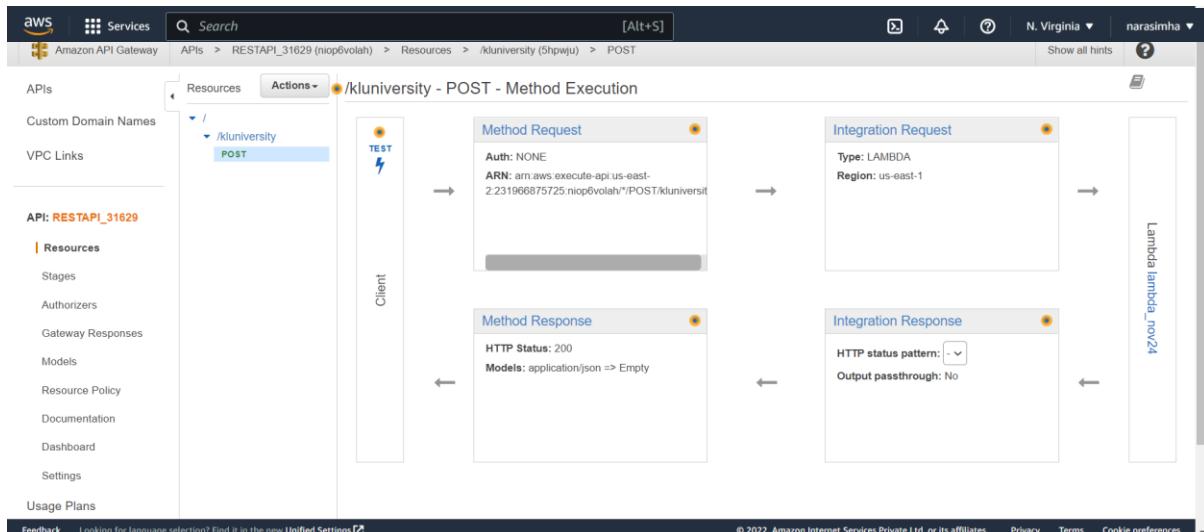
Use Lambda Proxy Integration ⓘ

Lambda Region: us-east-1

Lambda Function: lambda_nov24

Use Default Timeout ⓘ

Save



Method Test:

Make a test call to your method. When you make a test call, API Gateway skips authorization and directly invokes your method.

Path:

No path parameters exist for this resource. You can define path parameters by using the syntax **(myPathParam)** in a resource path.

Query Strings:

{kluniversity}
param1=value1¶m2=value2

Headers:

{kluniversity}
Use a colon (:) to separate header name and value, and new lines to declare multiple headers. e.g.
Accept:application/json

Stage Variables:

No stage variables exist for this method.

AWS Services Search [Alt+S]

Amazon API Gateway APIs > RESTAPI_31629 (niop6volah) > Resources > /kluniversity (5hpwu) > POST

APIs Resources Actions Method Execution /kluniversity - POST - Method Test

Make a test call to your method. When you make a test call, API Gateway skips authorization and directly invokes your method

Path

No path parameters exist for this resource. You can define path parameters by using the syntax `(myPathParam)` in a resource path.

Query Strings

param1=value1¶m2=value2

Headers

(kluniversity)
Use a colon (:) to separate header name and value, and new lines to declare multiple headers. e.g.
Accept:application/json

Response Body

{"statusCode": 200, "body": "created an item successfully"}

Response Headers

{"Content-Type":["application/json"], "X-Amzn-Trace-Id": ["Root=1-637fa1d3-ab956f661bc6df441112038; Sampled=0"]}

Logs

Execution log for request 37f61dda-18cd-4fca-a99d-8d36f540982f
Thu Nov 24 16:54:43 UTC 2022 : Starting execution for request: 37f61dda-18cd-4fca-a99d-8d36f540982f
Thu Nov 24 16:54:43 UTC 2022 : HTTP Method: POST, Resource Path: /kluniversity
Thu Nov 24 16:54:43 UTC 2022 : Method request path: {}
Thu Nov 24 16:54:43 UTC 2022 : Method request query string: {}
Thu Nov 24 16:54:43 UTC 2022 : Method request headers: {}

Stage Variables

No stage variables exist for this method.

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AWS Services Search [Alt+S]

DynamoDB Dashboard Tables Update settings Explore items PartQL editor Backups Exports to S3 Imports from S3 Reserved capacity Settings

Scan/Query items Scan/Query a table or index Scan Query kluniversity

Filters Run Reset

Completed Read capacity units consumed: 0.5

Items returned (2)

	EmpID	EmpName	EmpGender
<input type="checkbox"/>	3162	Rekha	
<input type="checkbox"/>	31629	Rekha Sri Durga	Female

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AWS Services Search [Alt+S]

Amazon API Gateway APIs > RESTAPI_31629 (niop6volah) > Resources > /kluniversity (5hpwu)

APIs Resources Actions /kluniversity Methods

POST arn:aws:lambda:us-east-1:231966875725:function... Authorization None API Key Not required

ANY DELETE GET HEAD OPTIONS PATCH PUT

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Amazon API Gateway

APIs > RESTAPI_31629 (niop6volah) > Resources > /kluniversity (5hpwju) > GET

/kluniversity - GET - Setup

Choose the integration point for your new method.

Integration type: Lambda Function ⓘ
 HTTP ⓘ
 Mock ⓘ
 AWS Service ⓘ
 VPC Link ⓘ

Use Lambda Proxy Integration: ⓘ

Lambda Region: us-east-1
Lambda Function: lambda_nov24

Use Default Timeout ⓘ

Save

Amazon API Gateway

APIs > RESTAPI_31629 (niop6volah) > Resources > /kluniversity (5hpwju) > GET

Add Permission to Lambda Function

You are about to give API Gateway permission to invoke your Lambda function:
arn:aws:lambda:us-east-1:231966875725:function:lambda_nov24

Cancel **OK**

Integration type: Mock ⓘ
 AWS Service ⓘ
 VPC Link ⓘ

Use Lambda Proxy Integration: ⓘ

Lambda Region: us-east-1
Lambda Function: lambda_nov24

Use Default Timeout ⓘ

Save

Amazon API Gateway

APIs > RESTAPI_31629 (niop6volah) > Resources > /kluniversity (5hpwju) > GET

/kluniversity - GET - Method Execution

Client → Method Request → Integration Request → Method Response → Integration Response → Lambda Function

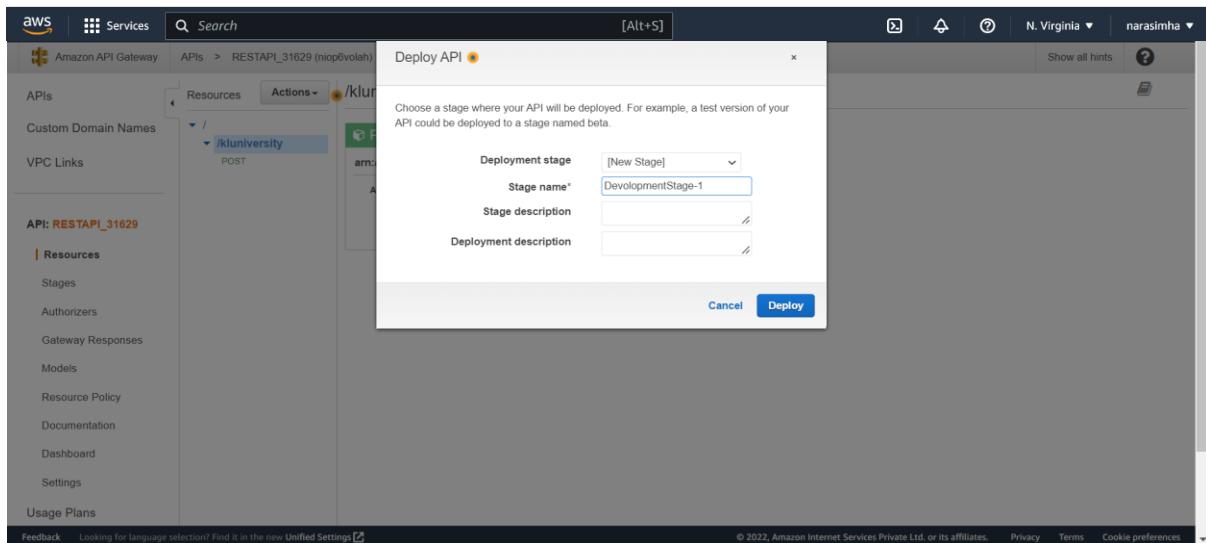
Method Request:
Auth: NONE
ARN: arn:aws:execute-api:us-east-1:231966875725:niop6volah/*:GET/kluniversity

Integration Request:
Type: LAMBDA
Region: us-east-1

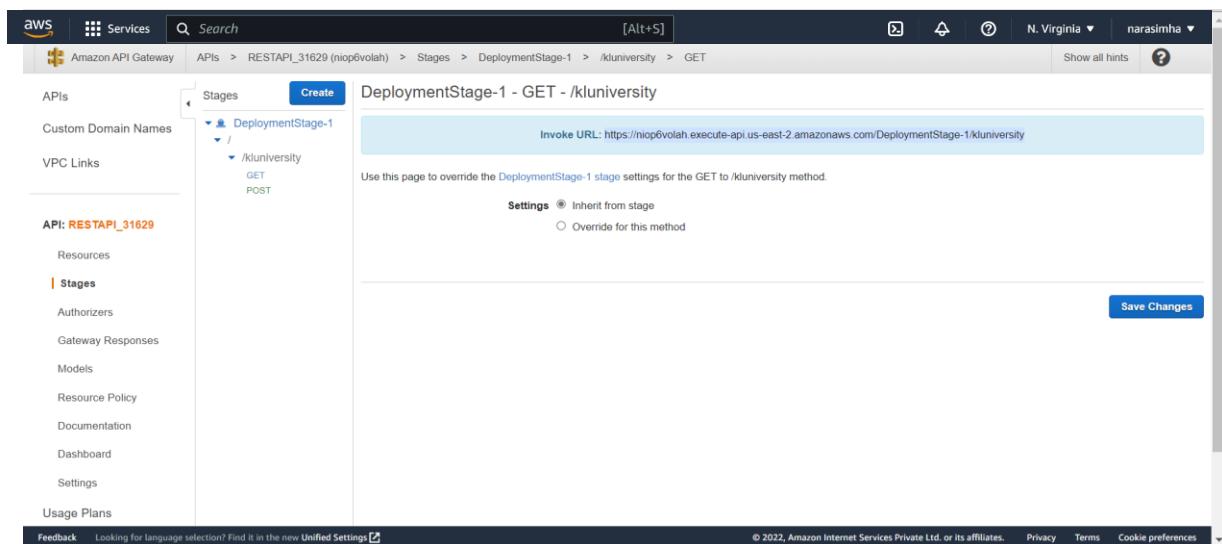
Method Response:
HTTP Status: 200
Models: application/json => Empty

Integration Response:
HTTP status pattern: -
Output passthrough: No

Lambda Function: lambda_nov24



In above pic, we have created only one method POST, same as before create a method GET and select that and create the DeploymentStage-1



Copy the Invoke URL and open POSTMAN app

Screenshot of the Postman application interface showing a collection named "ADC_AWSProject33". The left sidebar lists various sections: Collections, APIs, Environments (selected), Mock Servers, Monitors, Flows, and History. The main workspace displays a GET request to "https://niop6volah.execute-api.us-east-2.amazonaws.com/DeploymentStage-1/kluniversity". The "Body" tab is selected, showing a JSON payload:

```
1
2
3
4
```

The response area contains a placeholder message: "Click Send to get a response".

Screenshot of the Postman application interface showing the same collection "ADC_AWSProject33". The "Body" tab is selected, showing a different JSON payload:

```
1
2
3
4
```

The response area contains a placeholder message: "Click Send to get a response".

You don't have any environments.

An environment is a set of variables that allows you to switch the context of your requests.

Create Environment

Body Cookies Headers (7) Test Results

Pretty Raw Preview Visualize JSON

1 "statusCode": 200,
2 "body": "created an item successfully"

You don't have any environments.

An environment is a set of variables that allows you to switch the context of your requests.

Create Environment

Body Cookies Headers (7) Test Results

Pretty Raw Preview Visualize JSON

1 "statusCode": 200,
2 "body": "created an item successfully"

DynamoDB

Dashboard Tables Update settings Explore items PartiQL editor Backups Exports to S3 Imports from S3 Reserved capacity Settings

Find tables by table name

Scan/Query a table or index Scan Query kluniversity

Completed Read capacity units consumed: 0.5

Items returned (3)

EmpID	EmpName	EmpGender
80043	Akhil	Male
3162	Rekha	
31629	Rekha Sri Durga	Female

The Above Image Incidates created an Item Successfully due to the code in the Lambda Function is only creating an item....

For GET method to work ,in lambda function table.get_item(Key=event) is used in the code

The screenshots show the AWS Lambda console interface across three different stages of function configuration:

- Screenshot 1 (Top):** Shows the "Test event" configuration screen. The "Event name" is set to "demo". The "Event JSON" field contains the following JSON:

```
1 - [ { 2 "EmpID": 3162, 3 "EmpName": "Rekha" 4 } ]
```

- Screenshot 2 (Middle):** Shows the "Code source" tab with the "lambda_function.py" file open. The code is:

```
1 import json 2 import boto3 3 4 database=boto3.resource('dynamodb') 5 table=database.Table('kluniversity') 6 7 def lambda_handler(event,context): 8     response=table.get_item(Key=event) 9     return response
```

A message at the top says "Updating the function lambda_no24."

- Screenshot 3 (Bottom):** Shows the "Code source" tab with the same code as Screenshot 2. A message at the top says "Successfully updated the function lambda_no24."

```

{
    "Item": {
        "EmpName": "Rekha",
        "EmpID": 3162
    },
    "ResponseMetadata": {
        "RequestId": "0AEKX6ILTS94HQOKSDU999HISBVV4KQNS05AEMVJF66Q9ASUAAJG",
        "HTTPStatusCode": 200,
        "HTTPHeaders": {
            "Content-Type": "application/x-amz-json-1.0",
            "Content-Length": "100",
            "Connection": "keep-alive",
            "x-amzn-requestid": "0AEKX6ILTS94HQOKSDU999HISBVV4KQNS05AEMVJF66Q9ASUAAJG",
            "x-amz-crc32": "708334321"
        },
        "RetryAttempts": 0
    }
}

```

Function Logs
START RequestId: dc384464-3c67-4738-8b36-36787e1a8856 Version: \$LATEST
END RequestId: dc384464-3c67-4738-8b36-36787e1a8856
REPORT RequestId: dc384464-3c67-4738-8b36-36787e1a8856 Duration: 39.35 ms Billed Duration: 40 ms Memory Size: 128 MB Max Memory Used: 72 MB

Now this code has been executed, So go to Postman and execute it

Output of GET Function in Postman:

```

{
    "Item": {
        "EmpName": "Rekha",
        "EmpID": 3162
    },
    "ResponseMetadata": {
        "RequestId": "0AEKX6ILTS94HQOKSDU999HISBVV4KQNS05AEMVJF66Q9ASUAAJG",
        "HTTPStatusCode": 200,
        "HTTPHeaders": {
            "Content-Type": "application/x-amz-json-1.0",
            "Content-Length": "100",
            "Connection": "keep-alive",
            "x-amzn-requestid": "0AEKX6ILTS94HQOKSDU999HISBVV4KQNS05AEMVJF66Q9ASUAAJG",
            "x-amz-crc32": "708334321"
        },
        "RetryAttempts": 0
    }
}

```