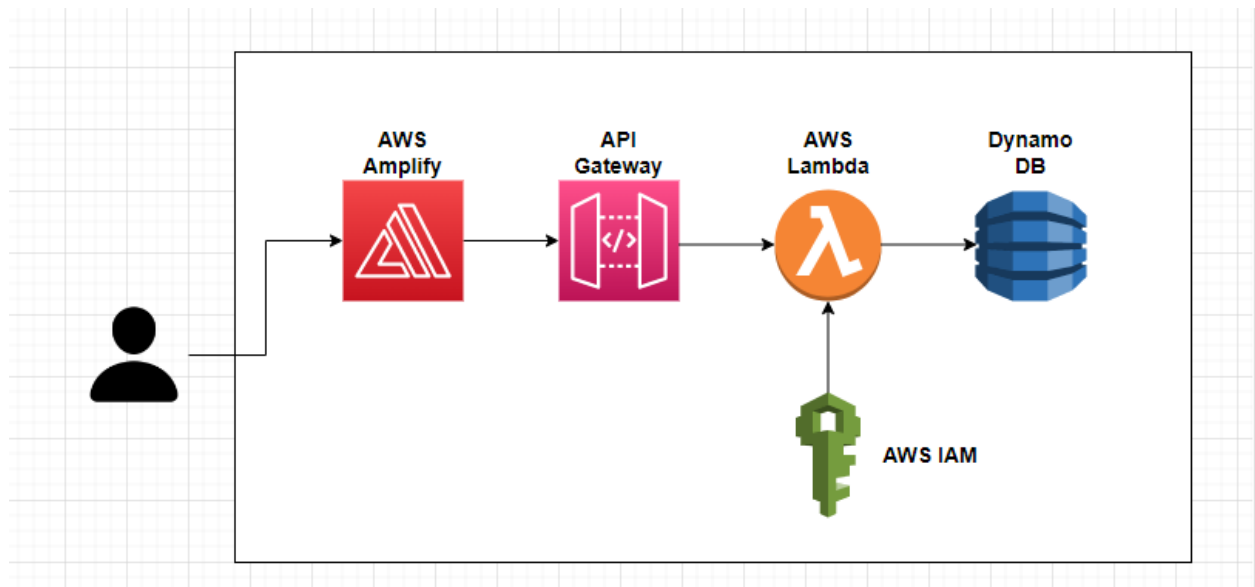


ARCHITECT AND BUILD END TO END WEB APPLICATION

Services used



Architecture



Steps to be done

1. Create a web/host page
2. Invoke the math functionality
3. Do the math calculation
4. Store/Return the result

STEPS

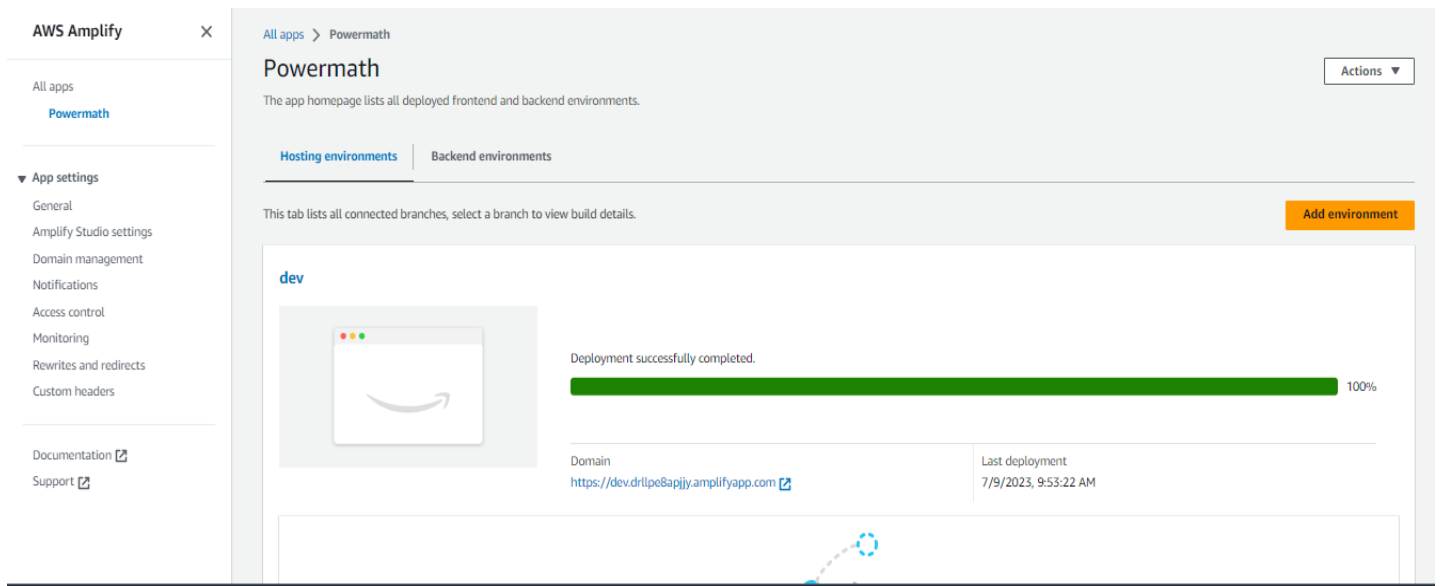
1. Creating a Web Page using AWS Amplify

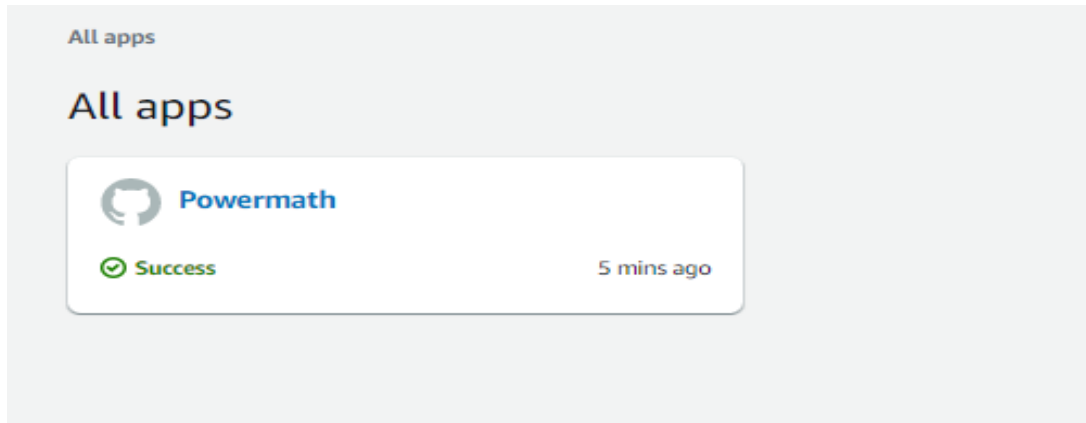
AWS Amplify: Used to build and host the websites

AWS Amplify is a set of products and tools that enable mobile and front-end web developers to build and deploy secure, scalable full-stack applications, powered by AWS.

Open amplify in AWS console → New app → Host your web app → Deploy without Git provider → Give the app name ---- Drag and drop the zip of index.html file → Save and deploy

Use the domain link to see the result

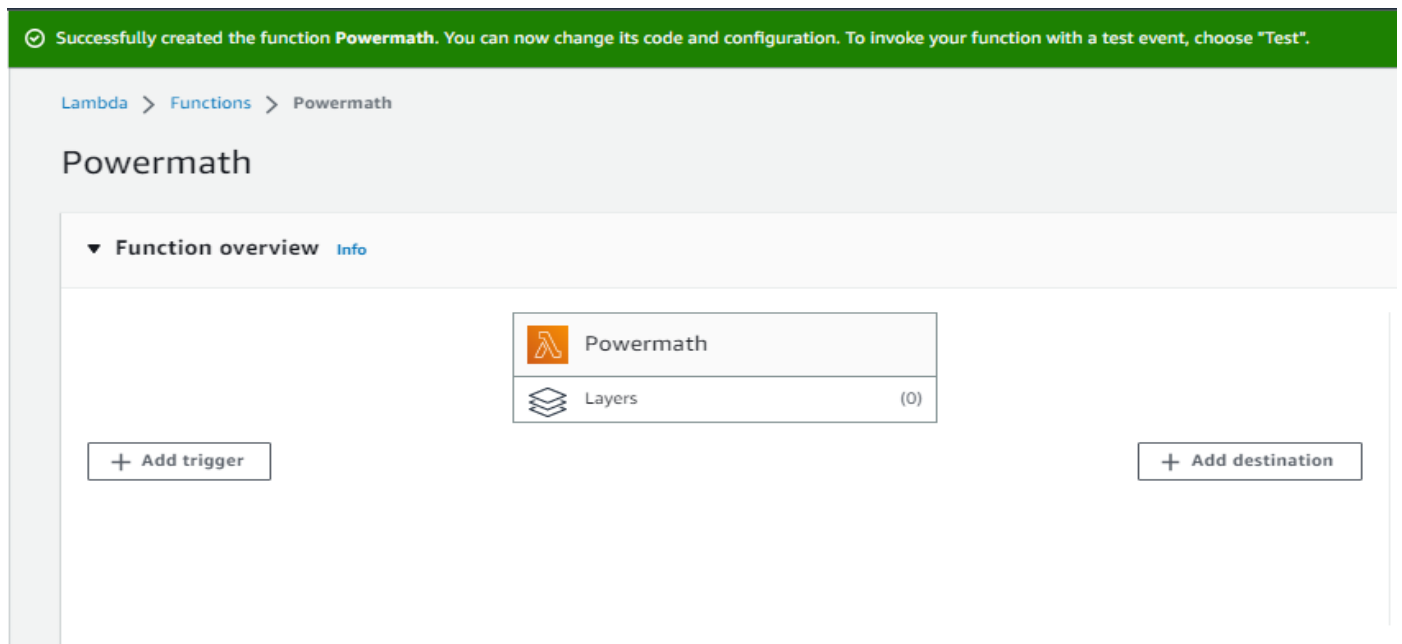




2. Creating a Math Functionality using AWS Lambda

AWS Lambda: Code that runs (serverlessly) upon some trigger

Open AWS lambda in AWS console → Create function → Author from scratch → Select Python 3.10 in Runtime → Create function



Copy the python code → Save (ctrl+S) → deploy → Test drop down menu (Configure test event) → Give the event name ---- In event JSON give the Base and event value ---- Save → Test

Code source Info

File Edit Find View Go Tools Window Test Deploy Changes not deployed

Go to Anything (Ctrl-P)

Powermath - /
lambda_function.py

```
1 # import the JSON utility package
2 import json
3 # import the Python math library
4 import math
5
6 # import the AWS SDK (for Python the package name is boto3)
7 import boto3
8 # import two packages to help us with dates and date formatting
9 from time import gmtime, strftime
10
11 # create a DynamoDB object using the AWS SDK
12 dynamodb = boto3.resource('dynamodb')
13 # use the DynamoDB object to select our table
14 table = dynamodb.Table('PowermathDB')
15 # store the current time in a human readable format in a variable
16 now = strftime("%a, %d %b %Y %H:%M:%S +0000", gmtime())
17
18 # define the handler function that the Lambda service will use as an entry point
19 def lambda_handler(event, context):
20
21     # extract the two numbers from the Lambda service's event object
22     mathResult = math.pow(int(event['base']), int(event['exponent']))
23
24     # write result and time to the DynamoDB table using the object we instantiated and save response in a variable
25     response = table.put_item(
26         Item={
27             'ID': str(mathResult),
28             'LatestGreetingTime': now
29         })
30
31     # return a properly formatted JSON object
32     return {
33         'statusCode': 200,
34         'body': json.dumps('Your result is ' + str(mathResult))
35     }
```

Test event action

Create new event

Edit saved event

Event name

Testevent

Maximum of 25 characters consisting of letters, numbers, dots, hyphens and underscores.

Event sharing settings

Private

This event is only available in the Lambda console and to the event creator. You can configure a total of 10. [Learn more](#)

Shareable

This event is available to IAM users within the same account who have permissions to access and use shareable events. [Learn more](#)

Template - optional

hello-world

Event JSON

Format JSON

```
1 {
2   "base": 3,
3   "exponent": 5
4 }
```

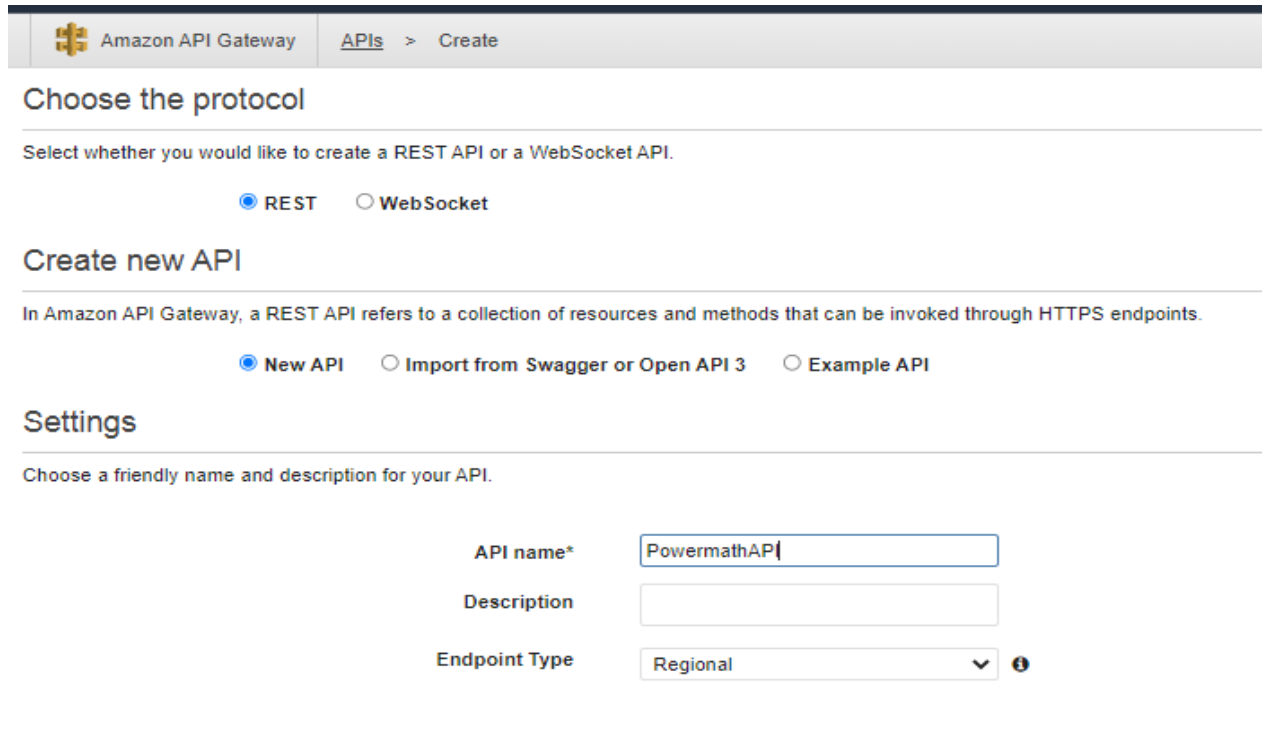
Cancel

Save

3. Invoking the Math functionality using API Gateway

API Gateway: Used to build HTTP, REST and WebSocket API's

Open API Gateway in AWS console → Create API → Build Rest API → Under Choose protocol select **Rest** → Under create new API select **New API** → Create API



Amazon API Gateway APIs > Create

Choose the protocol

Select whether you would like to create a REST API or a WebSocket API.

☒ REST ☐ WebSocket

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

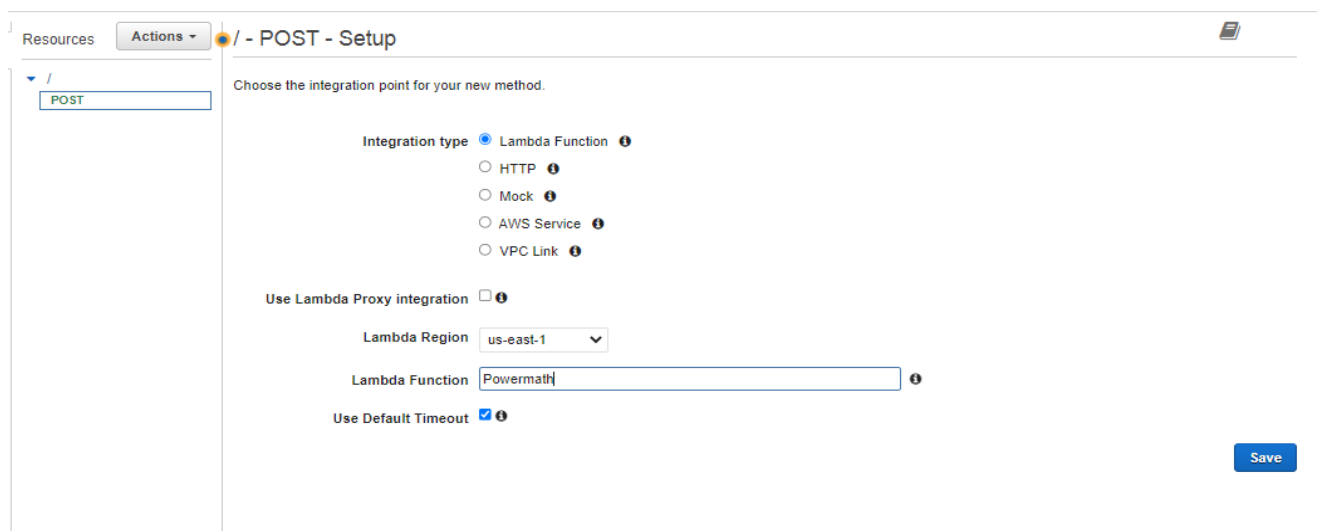
Choose a friendly name and description for your API.

API name*

Description

Endpoint Type ⓘ

Select resources in side menu → Select “/” → Actions → Create method → Type of method as **POST** → Select the “Right symbol” (Its near POST) → Under Integration type select Lambda Function ----- Under Lambda function select the Lambda function which has to be invoked → Save



Resources Actions ▾ / - POST - Setup ⓘ

POST

Choose the integration point for your new method.

Integration type ☒ Lambda Function ⓘ
☐ HTTP ⓘ
☐ Mock ⓘ
☐ AWS Service ⓘ
☐ VPC Link ⓘ

Use Lambda Proxy integration ☐ ⓘ

Lambda Region

Lambda Function ⓘ

Use Default Timeout ☒ ⓘ

Save

Select Post → Actions → Enable CORS → Enable CORS and replace existing CORS headers

CORS --- Cross origin Resource Sharing

By enabling this, this allows the web application running in one origin or domain to be able to access resources on a different origin or domain.

Our application is running on AWS Amplify domain and Lambda function is running in another domain, we need to be able to work across those domains.

Resources

Actions

Enable CORS

POST

Gateway Responses for PowermathAPI API

☐ DEFAULT 4XX ☐ DEFAULT 5XX

Methods ☒ POST ☐ OPTIONS

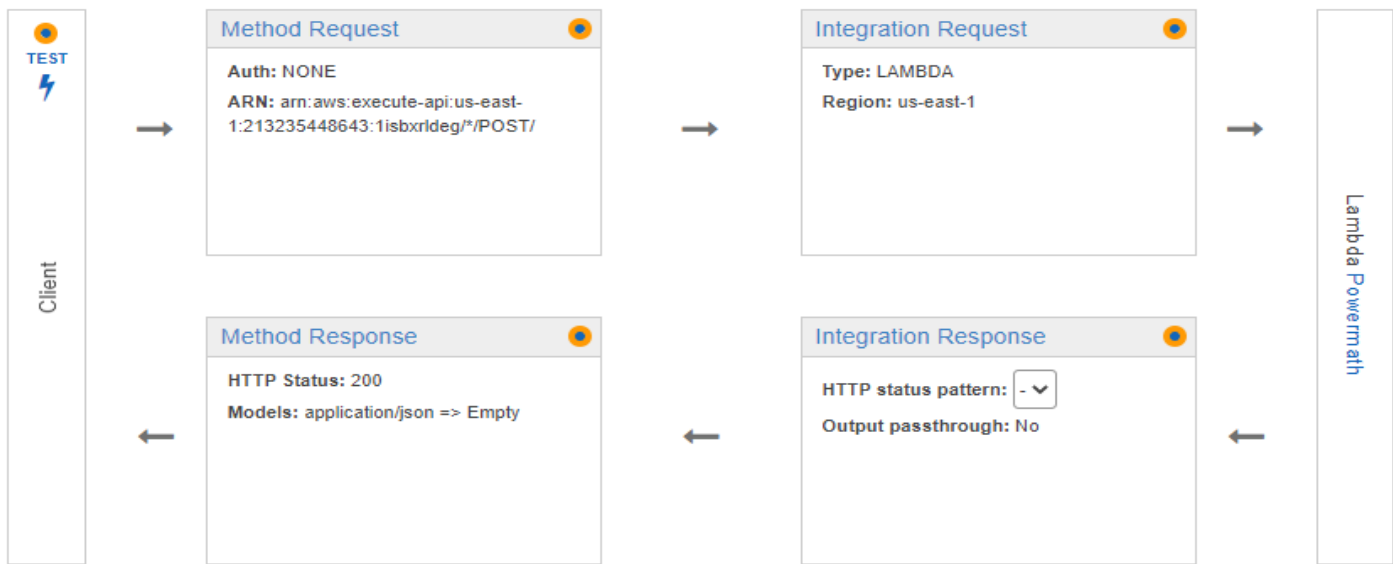
Access-Control-Allow-Methods OPTIONS, POST

Access-Control-Allow-Headers Content-Type,X-Amz-Date,Authorization

Access-Control-Allow-Origin* *

Advanced

Enable CORS and replace existing CORS headers



Select POST → Actions → Deploy API → Select Deployment stage and give Deployment Name → Deploy → Copy and Keep the **invoke URL** for future use

Select Resources in side menu → POST → Click on lightning symbol below the TEST → In request body give the base and exponent values → TEST

Resources Actions

Method Execution / - 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

No query string parameters exist for this method. You can add them via Method Request.

Headers

No header parameters exist for this method. You can add them via Method Request.

Stage Variables

No stage variables exist for this method.

Request Body

```
1 {
2   "base": 3,
3   "exponent": 2
4 }
```

Request: /

Status: 200

Latency: 240 ms

Response Body

```
{ "statusCode": 200, "body": "\\Your result is 9.0\\" }
```

Response Headers

```
{ "Access-Control-Allow-Origin": ["*"], "Content-Type": ["application/json"], "X-Amzn-Trace-Id": ["Root=1-64aa418b-f45a46121229cf91f14852;Sampled=0;lineage=dbba64d3:0"] }
```

Logs

```
Execution log for request 3a2ca007-6f67-48b8-a3b4-62b6f21f702f
Sun Jul 09 05:11:39 UTC 2023 : Starting execution for request: 3a2ca007-6f67-48b8-a3b4-62b6f21f702f
Sun Jul 09 05:11:39 UTC 2023 : HTTP Method: POST, Resource Path: /
Sun Jul 09 05:11:39 UTC 2023 : Method request path: {}
Sun Jul 09 05:11:39 UTC 2023 : Method request query string: {}
Sun Jul 09 05:11:39 UTC 2023 : Method request headers: {}
Sun Jul 09 05:11:39 UTC 2023 : Method request body before transformations:
{
  "base": 3,
  "exponent": 2
}
```

5. Storing the Results in the DynamoDb table

Dynamo DB: Used to store the results

Open Dynamo DB in AWS console → Create a Table → Give Name and type ID in partition key → Create table

Copy the ARN number of DynamoDB created and keep it safe for future use

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.

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.

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.

String ▼

1 to 255 characters and case sensitive.

5. Giving permissions to AWS Lambda to edit in Dynamo DB table

Create a role in IAM so that Lambda function gets the permission to edit the table dynamo DB

Open Powermath function in Lambda which is created earlier → Configuration → Permission → Select the Powermath-Role → IAM console opens in new Tab → Add permissions → Create inline policy → JSON → Paste the Policy → Paste the ARN of the Dynamo DB → Next → Give the policy name → Create policy

Open the html code and Update the API gateway invoke URL here and create a zipo file drag and drop inside the APP created in AWS Amplify


```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Power of Math!!!</title>
  <!-- Styling for the client UI -->
  <style>
  </style>
  <script>
    // callAPI function that takes the base and exponent numbers as parameters
    var callAPI = (base, exponent) => {
      // instantiate a headers object
      var myHeaders = new Headers();
      // add content type header to object
      myHeaders.append("Content-Type", "application/json");
      // using built in JSON utility package turn object to string and store in a variable
      var raw = JSON.stringify({ "base": base, "exponent": exponent });
      // create a JSON object with parameters for API call and store in a variable
      var requestOptions = {
        method: 'POST',
        headers: myHeaders,
        body: raw,
        redirect: 'follow'
      };
      // make API call with parameters and use promises to get response
      fetch("YOUR API GATEWAY ENDPOINT", requestOptions)
        .then(response => response.text())
        .then(result => alert(JSON.parse(result).body))
        .catch(error => console.log('error', error));
    };
  </script>
</head>
<body>
  <h1>POWER OF MATH!!</h1>
  <form>
    <label>Base number:</label>
    <input type="text" id="base">
    <label>...to the power of:</label>
  </form>
</body>
</html>
```

dev



Deployment successfully completed.



Domain
<https://dev.drlpe8apjjy.amplifyapp.com>

Last deployment
7/9/2023, 11:12:47 AM

Results

AWS Amplify

Power of Math

Powermath -

View table | A

Domain Over

GIT

Yogish1235/P

dev.drllpe8apjyy.amplifyapp.com

WhatsApp

BBNL-Payurbills

LinkedIn

The Web Developer...

POWER OF MATH!!

Base number: 5...to the power of: 2

CALCULATE

—Hosted by Yogish R Patkar—

dev.drllpe8apjyy.amplifyapp.com says

"Your result is 25.0"

OK

AWS Amplify

Power of Math

Powermath -

View table | A

Domain Over

GIT

Yogish1235/P

dev.drllpe8apjyy.amplifyapp.com

WhatsApp

BBNL-Payurbills

LinkedIn

The Web Developer...

POWER OF MATH!!

Base number: 10...to the power of: 3

CALCULATE

—Hosted by Yogish R Patkar—

dev.drllpe8apjyy.amplifyapp.com says

"Your result is 1000.0"

OK

Results updated in table

DynamoDB

Dashboard

Tables

Update settings

Explore items

PartiQL editor

Backups

Exports to S3

Imports from S3

Reserved capacity

Settings

DAX

Clusters

Subnet groups

Parameter groups

Events

PowermathDB

Table - PowermathDB

All attributes

Filters

RunReset

Completed. Read capacity units consumed: 0.5

Items returned (5)

ActionsCreate item

IDLatestGreetingTime

1000.0Sun, 09 Jul 2023 05:45:01 +0000

27.0Sun, 09 Jul 2023 05:34:04 +0000

25.0Sun, 09 Jul 2023 05:45:01 +0000

4.0Sun, 09 Jul 2023 05:45:01 +0000

243.0Sun, 09 Jul 2023 05:34:04 +0000

Reference

https://youtu.be/7m_q1ldzw0U