

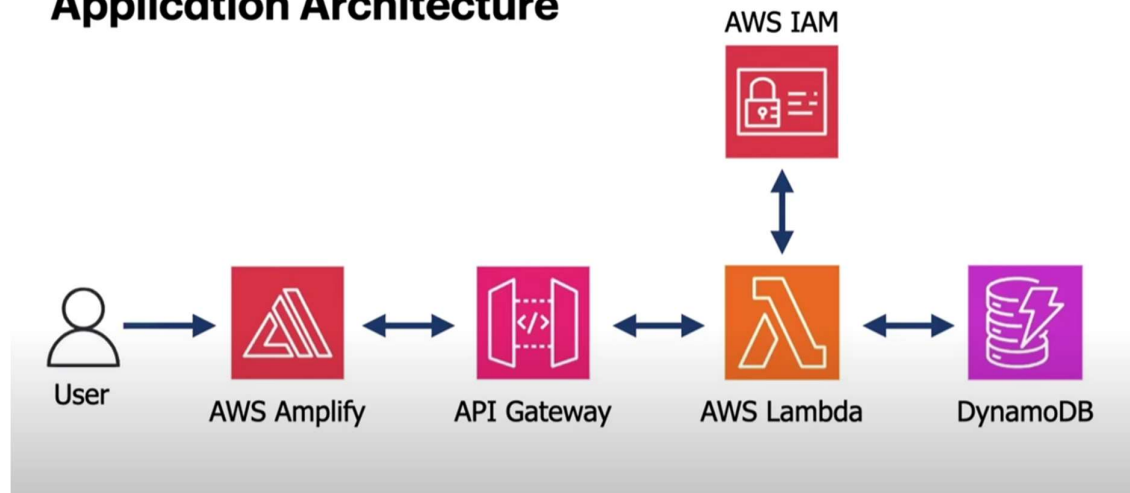
Sai Saranya Mulukutla

22BAI1471

AWS LAB-05

Serverless APP using DynamoDB (CRUD operations)

Application Architecture



1. DynamoDB (Database):

- **Purpose:** Stores medicine data (e.g., MedicineID, Name, Price, Use, Expiry Date, etc.).
- **Link:** The table is accessed by the Lambda function for reading (Scan) and writing (PutItem) operations.

2. Lambda (Serverless Backend):

- **Purpose:** Contains the logic to interact with DynamoDB (add medicines, fetch medicine details).
- **Link:** Lambda reads from and writes to the DynamoDB table. It is invoked by API Gateway to perform these operations when triggered by HTTP requests.

3. API Gateway (REST API):

- **Purpose:** Provides a REST API to access Lambda functions through HTTP methods (POST, GET).
- **Link:** Acts as an interface between the front-end (HTML/JavaScript) and the Lambda function, sending user requests to Lambda.

4. IAM (Access Control):

- **Purpose:** Manages permissions and access control for AWS resources.
- **Link:** IAM roles and policies grant the Lambda function permissions to read and write data in DynamoDB.

5. AWS Amplify (Web Hosting):

- **Purpose:** Hosts and deploys the front-end (HTML/JavaScript) of the PharmaPlus application.
- **Link:** Amplify serves the front-end, which interacts with API Gateway to make requests that trigger the Lambda function.

These services work together to create a full-stack application where users can interact with the frontend (Amplify), make requests via API Gateway, which trigger Lambda functions to interact with DynamoDB, all controlled by IAM permissions.

1) Create a table in DynamoDB

The screenshot displays the AWS Management Console interface for Amazon DynamoDB. The top section, titled 'Amazon DynamoDB', describes it as a fast and flexible NoSQL database service. It includes a 'Get started' button to create a new table. Below this, there's a 'How it works' section with a video thumbnail. The bottom section, 'Create table', is the main focus. It contains a 'Table details' section where the 'Table name' is set to 'PharmaPlus' and the 'Partition key' is 'medicineId'. The 'Sort key - optional' section is also visible. The 'Table settings' section at the bottom shows 'Default settings' selected, indicating the fastest way to create the 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.

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.

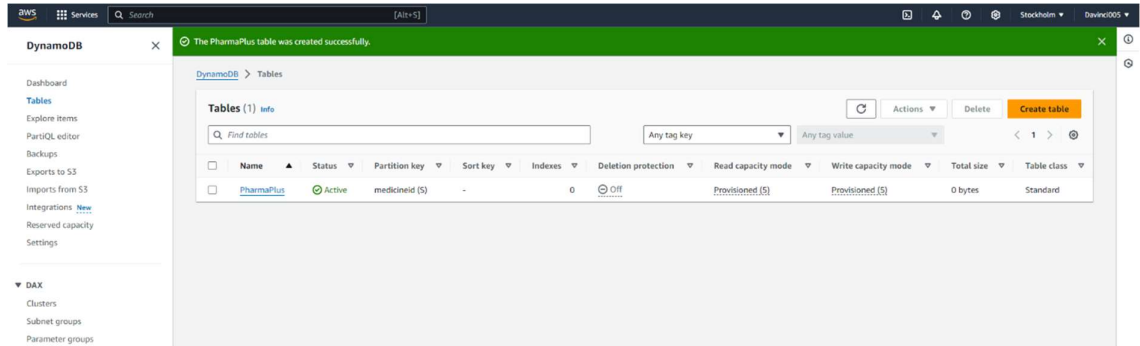
1 to 255 characters and case sensitive.

Table settings

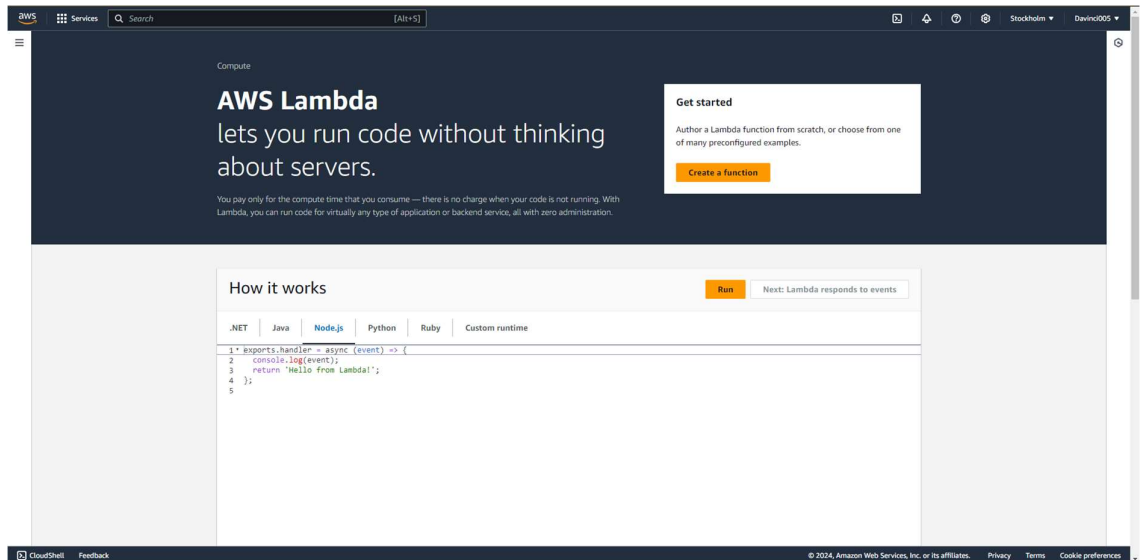
☒ **Default settings**
The fastest way to create your table. You can modify these settings now or after your table has been created.

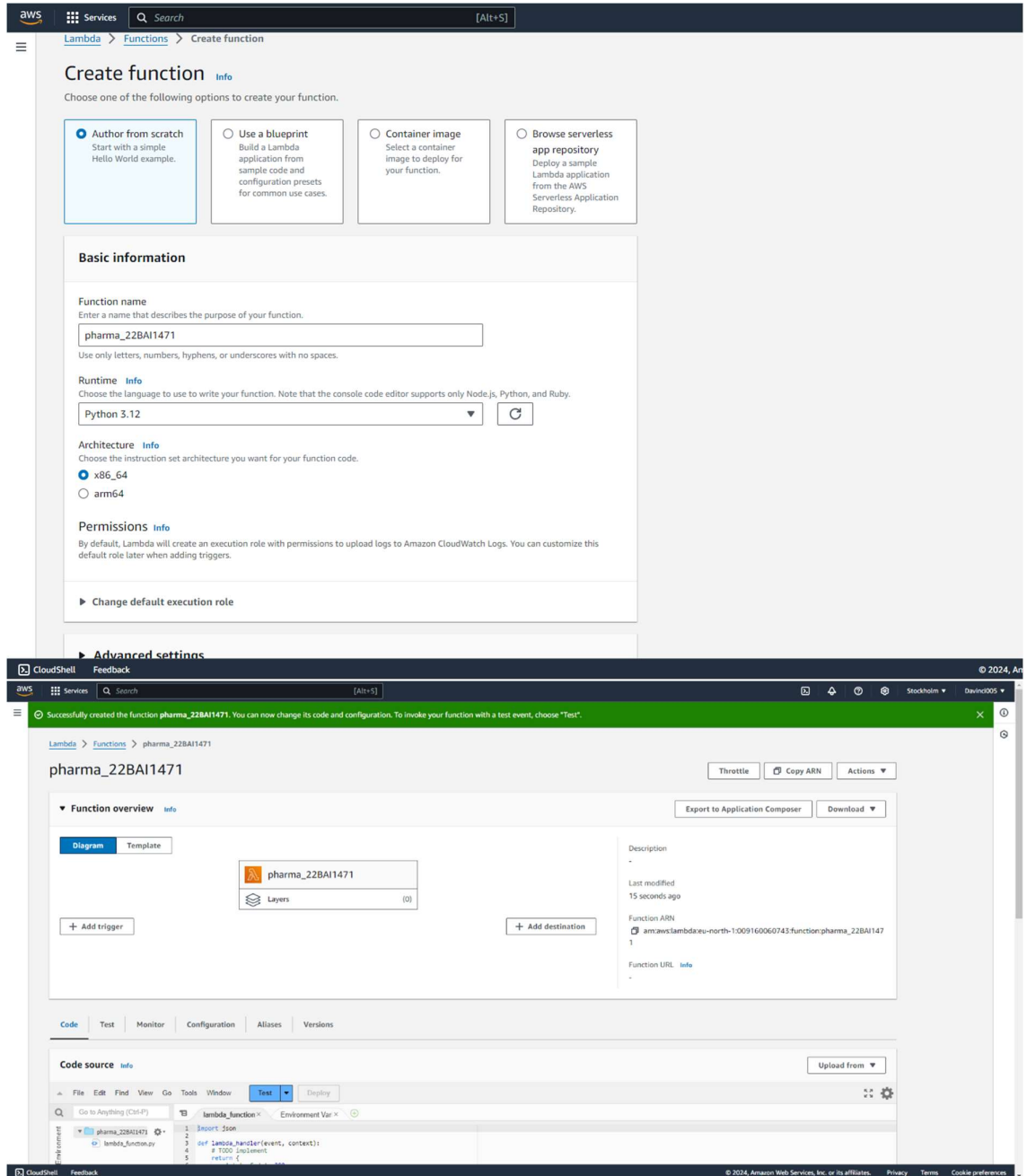
☐ **Customize settings**
Use these advanced features to make DynamoDB work better for your needs.

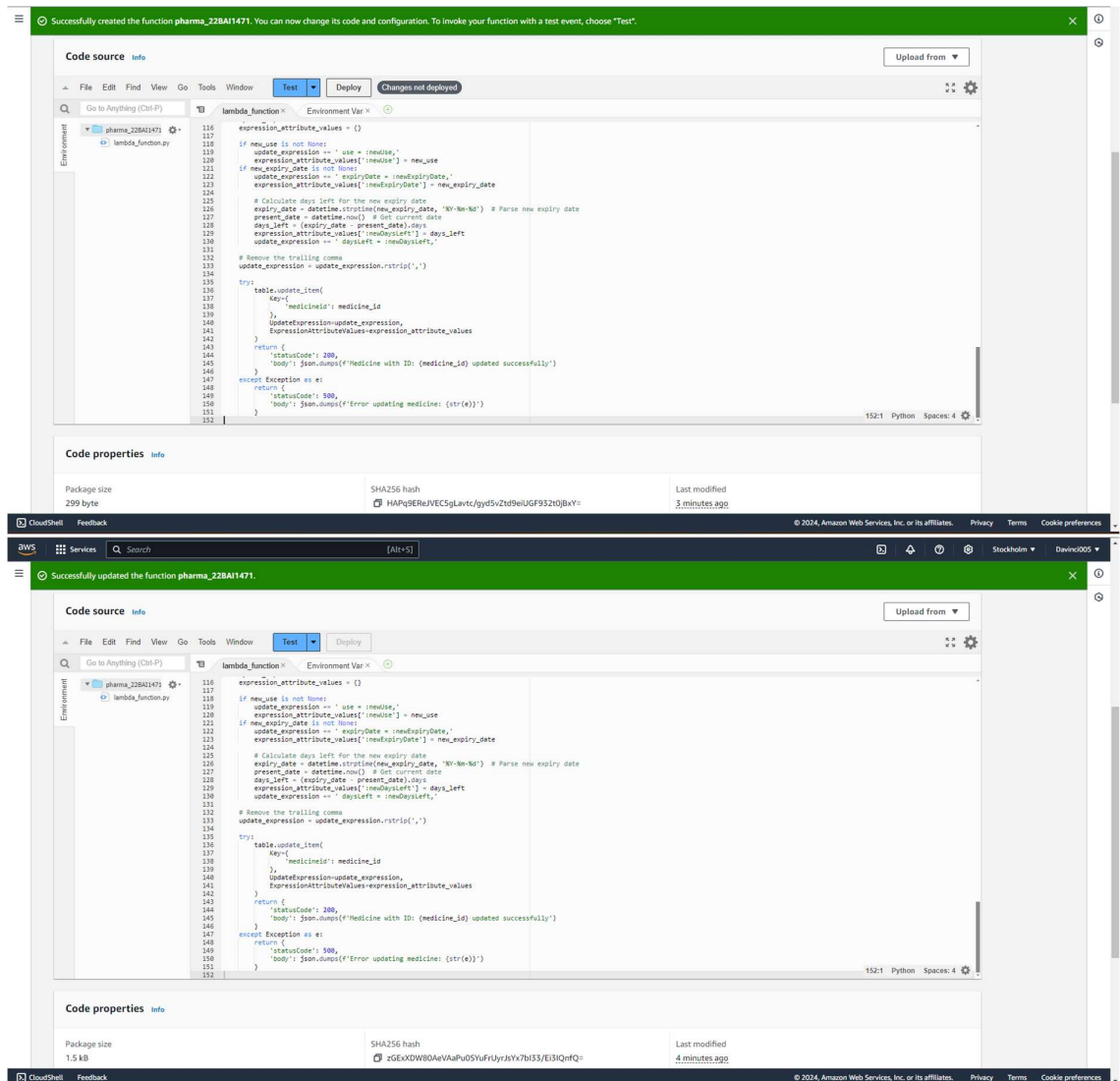
Default table settings



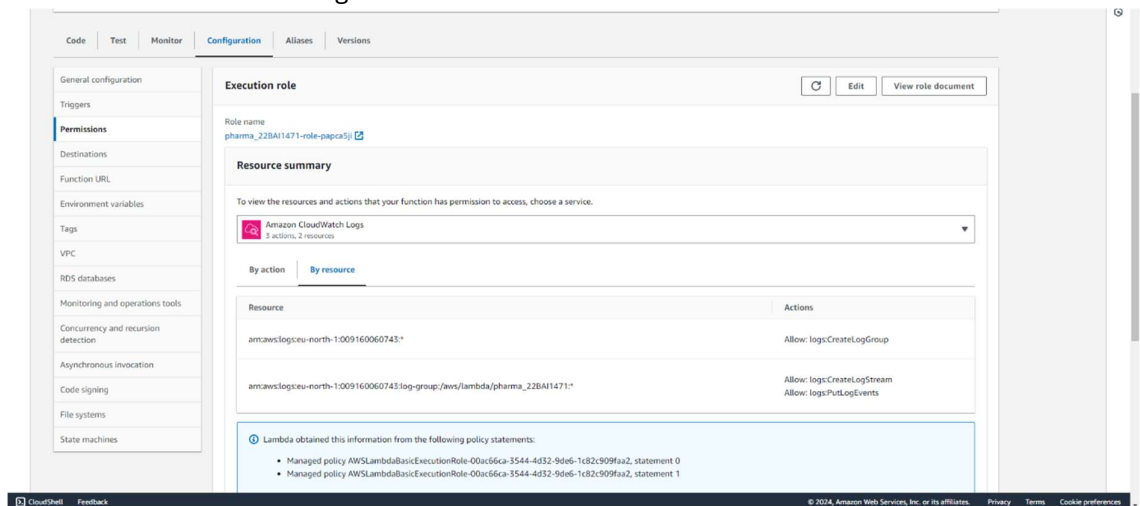
2) Create a lambda function

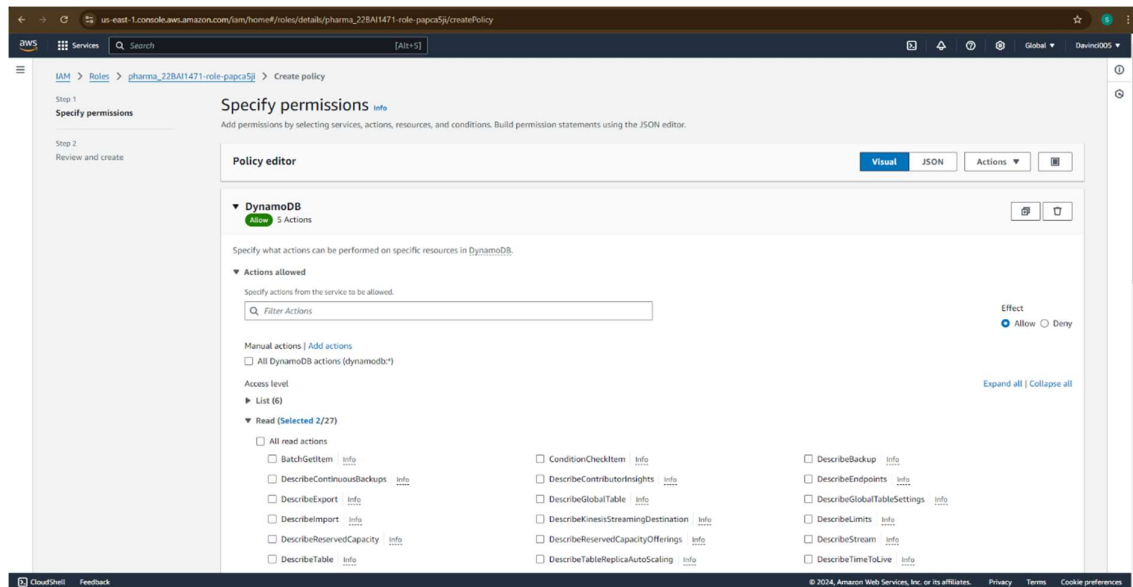




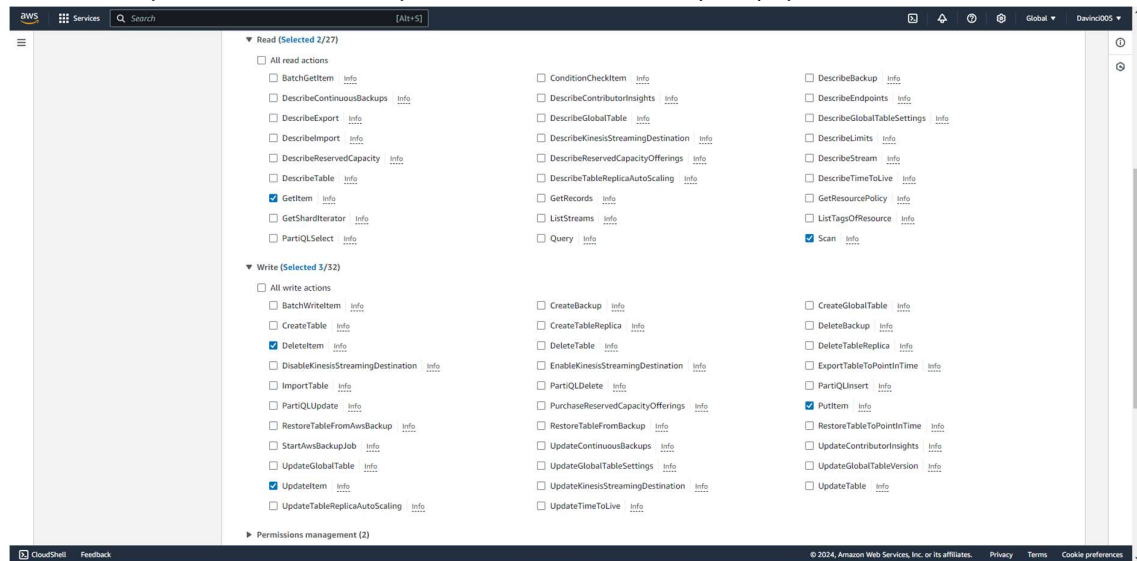


- Configure the permissions in the role associated with the lambda function to allow lambda function to do changes in the table





4) Select the operations like read, update, delete and create (crud) operations



DynamoDB

Dashboard

Tables

Explore items

PartiQL editor

Backups

Exports to S3

Imports from S3

Integrations New

Reserved capacity

Settings

DAX

Clusters

Subnet groups

Parameter groups

Events

Find tables

PharmaPlus

Protect your DynamoDB table from accidental writes and deletes

When you turn on point-in-time recovery (PITR), DynamoDB backs up your table data automatically so that you can restore to any given second in the preceding 35 days. Additional charges apply. [Learn more](#)

Edit PITR

General information info

Partition key

medicined (String)

Sort key

-

Capacity mode

Provisioned

Table status

Active

Alarms

No active alarms

Point-in-time recovery (PITR) info

Off

Resource-based policy info

Not active

Additional info

Table class

DynamoDB Standard

Indexes

0 global, 0 local

DynamoDB stream

Off

Time to Live (TTL) info

Off

Replication Regions

0 Regions

Encryption

Owned by Amazon

Date created

October 6, 2024, 20:23:18 (UTC+05:30)

Deletion protection

Off

Integrations info

Items summary

DynamoDB updates the following information approximately every six hours.

Item count

0

Table size

0 bytes

Average item size

0 bytes

Get live item count

CloudShell

Feedback

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StartAwsBackupJob info

UpdateGlobalTable info

UpdateContinuousBackups info

UpdateGlobalTableSettings info

UpdateGlobalTableVersion info

UpdateTable info

UpdateTableItem info

Permissions manager

Tagging (2)

Resources

Specify resource ARNs, here

All

Specific

index info

table info

Request conditions

Actions on resources are allowed or denied only when these conditions are met.

Add more permissions

History: 0

Known: 0

Warnings: 0

Suggestions: 2

Specify ARN(s)

Visual

Text

Resource in

This account

Any account

Other account

Resource region

eu-north-1

Any region

Resource table name

PharmaPlus

Any table name

Resource ARN

am:aws:dynamodb:eu-north-1:009160060743:table/PharmaPlus

Any in this account

Any in this account

Cancel

Add ARNs

IAM

Roles

pharma_22BA11471-role-papca5j

Create policy

Step 1

Specify permissions

Step 2

Review and create

Review and create info

Review the permissions, specify details, and tags.

Policy details

Policy name

Enter a meaningful name to identify this policy.

policy_pharma

Maximum 128 characters. Use alphanumeric and "-", "_", ".", characters.

Permissions defined in this policy info

Permissions defined in this policy document specify which actions are allowed or denied. To define permissions for an IAM identity (user, user group, or role), attach a policy to it.

Search

Allow (1 of 421 services)

Show remaining 420 services

Service

Access level

Resource

Request condition

DynamoDB

Limited: Read, Write

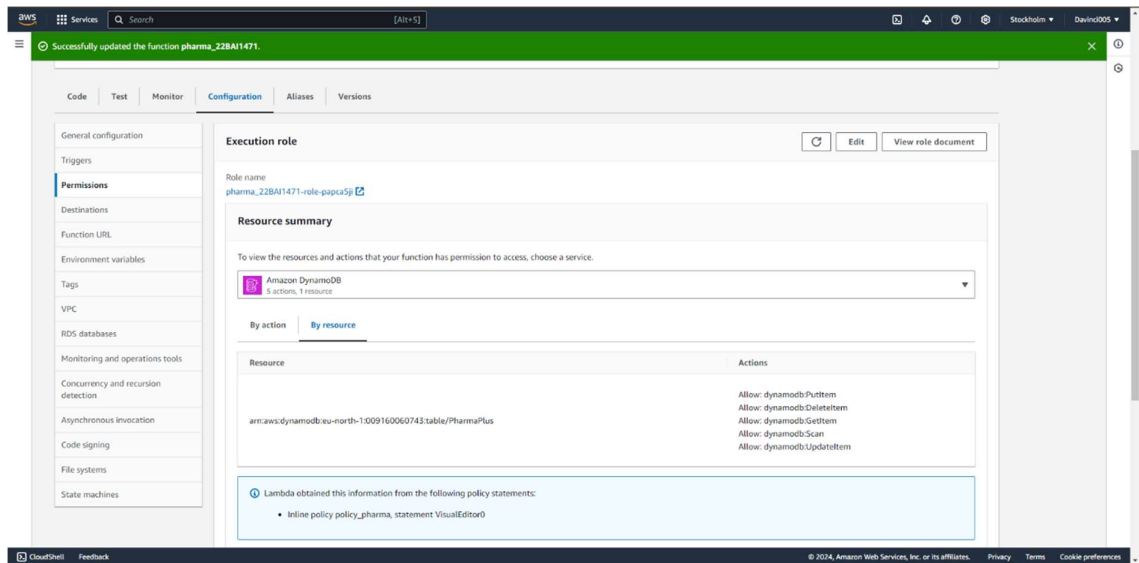
region| string like [eu-north-1, TableName] string like [PharmaPlus]

None

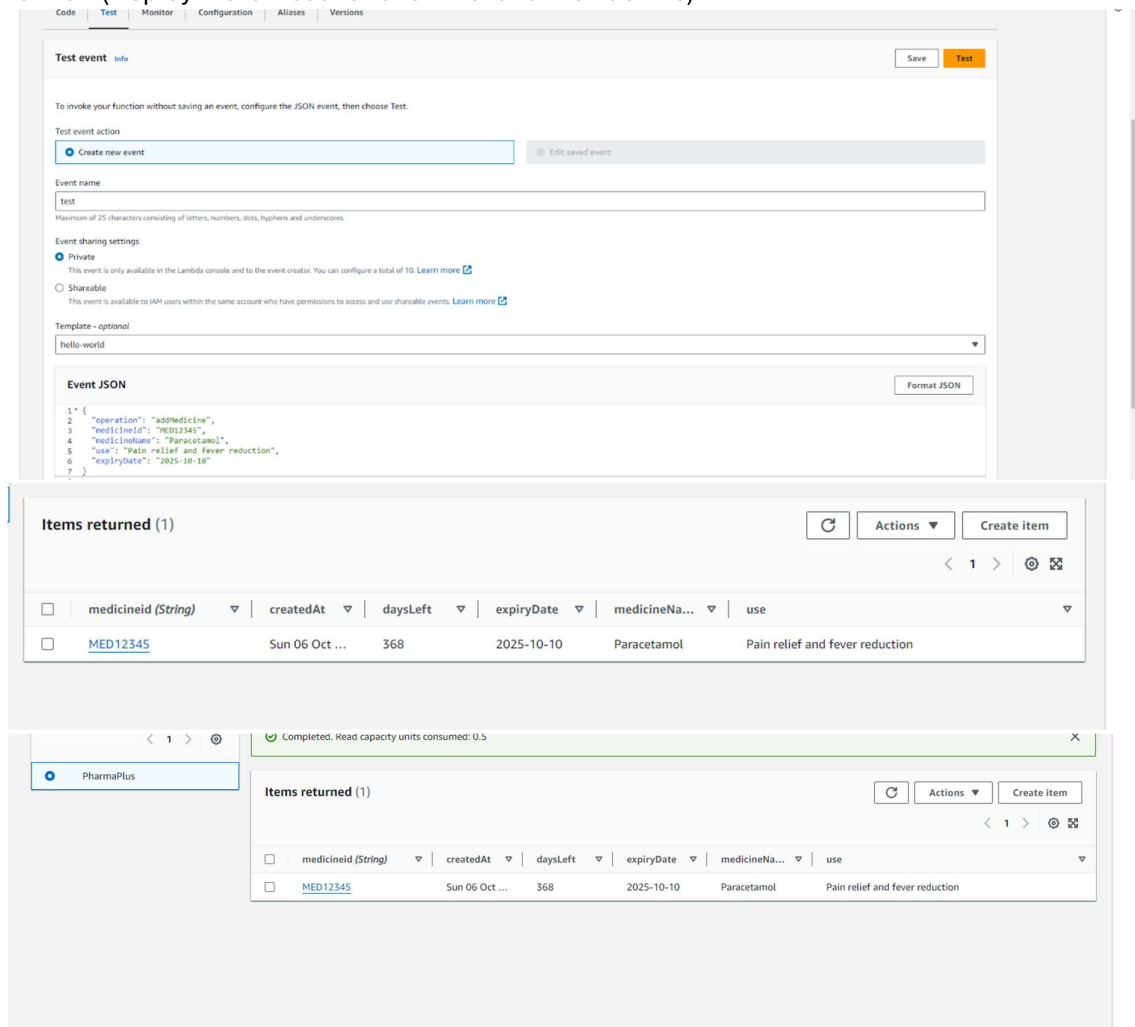
Cancel

Previous

Create policy



- 5) Create a test event to test if the lambda function is working or not using a sample JSON format. (Deploy the lambda function first and then do this)



- 6) Now we need to create a REST API to access the table via lambda function

Items | Amazon Dyrpharma_228AI1471ChatGPAPI Gateway - Cre

eu-north-1.console.aws.amazon.com/apigateway/main/apis?region=eu-north-1

awsServicesSearch[Alt+S]

StockholmDavinci005

WebSocket API

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

ImportBuild

REST API Private

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

Works with the following:

Lambda, HTTP, AWS Services

ImportBuild

CloudShellFeedback

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aws

Services

Search

[Alt+S]

Stockholm

Davinci005

API Gateway > APIs > Create API > Create REST API

Create REST API

API details

☒ New API
Create a new REST API.

☐ Clone existing API
Create a copy of an API in this AWS account.

☐ Import API
Import an API from an OpenAPI definition.

☐ Example API
Learn about API Gateway with an example API.

API name
pharma_API

Description - optional

API endpoint type
Regional APIs are deployed in the current AWS Region. Edge-optimized APIs route requests to the nearest CloudFront Point of Presence. Private APIs are only accessible from VPCs.
Regional

Cancel>Create API

CloudShell

Feedback

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Privacy

Terms

Cookie preferences

API Gateway > APIs > Resources - pharma_API (939hhalpg) > Create resource

Create resource

Resource details

☒ Proxy resource Info
Proxy resources handle requests to all sub-resources. To create a proxy resource use a path parameter that ends with a plus sign, for example {proxy+}.

Resource path
/Resource name
getData

☒ CORS (Cross Origin Resource Sharing) Info
Create an OPTIONS method that allows all origins, all methods, and several common headers.

Cancel>Create resource

- 7) Create resources with appropriate methods to do CRUD operations like get, post, put, patch, delete, update, etc.



Use: Removes a resource from the server, such as deleting a specific medicine from the database.

API Gateway > APIs > Resources - pharma_API (939h4afpg) > Enable CORS

Enable CORS

CORS settings

To allow requests from scripts running in the browser, configure cross-origin resource sharing (CORS) for your API. When you save your configuration, API Gateway replaces any existing CORS settings with your new configuration.

Gateway responses

API Gateway will configure CORS for the selected gateway responses.

☒ Default 4XX

☒ Default 5XX

Access-Control-Allow-Methods

☒ OPTIONS

☒ POST

Access-Control-Allow-Headers

API Gateway will configure CORS for the selected gateway responses.

Content-Type,X-Amz-Date,Authorization,X-Api-Key,X-Amz-Security-Token

Access-Control-Allow-Origin

Enter an origin that can access the resource. Use a wildcard "*" to allow any origin to access the resource.

*

Additional settings

Cancel

Save

CloudShellFeedback

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API actionsDeploy API

Create resource

/

/getData

OPTIONS

POST

Resource details

DeleteUpdate documentationEnable CORS

Path

Resource ID

/getData

zb96qc

Methods (2)

DeleteCreate method

Method type	Integration type	Authorization	API key
<input type="radio"/> OPTIONS	Mock	None	Not required
<input type="radio"/> POST	Lambda	None	Not required

Request body

1 {

2 "operation": "getMedicines"

3 }

4

Test

/getData - POST method test results

Request

Latency ms

Status

/getData

1180

200

Response body

{ "statusCode": 200, "body": "[{"medicineName": "Paracetamol", "createdAt": "Sun 06 Oct 2024 15:11:16", "expiryDate": "2025-10-10", "use": "Pain relief and fever reduction", "daysLeft": 368.0, "medicineid": "MED12345"}]", "headers": {"Content-Type": "application/json"}}

Response headers

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API Gateway > APIs > Resources - pharma_API (939hhaifpg) > Create resource

Create resource

Resource details

☐ Proxy resource [Info](#)

Proxy resources handle requests to all sub-resources. To create a proxy resource use a path parameter that ends with a plus sign, for example {proxy*}.

Resource path

/

Resource name

deleteData

☒ CORS (Cross Origin Resource Sharing) [Info](#)

Create an OPTIONS method that allows all origins, all methods, and several common headers.

Cancel

Create resource

API Gateway > APIs > Resources - pharma_API (939hhaifpg) > Create method

Create method

Method details

Method type

DELETE

Integration type

☒ Lambda function

Integrate your API with a Lambda function.



☐ HTTP

Integrate with an existing HTTP endpoint.



☐ Mock

Generate a response based on API Gateway mappings and transformations.



☐ AWS service

Integrate with an AWS Service.



☐ VPC link

Integrate with a resource that isn't accessible over the public internet.



☐ Lambda proxy integration

Send the request to your Lambda function as a structured event.

Lambda function

Provide the Lambda function name or alias. You can also provide an ARN from another account.

eu-north-1

Q arn:aws:lambda:eu-north-1:009160060743:function:ph X

API Gateway > APIs > Resources - pharma_API (939hhaifpg) > Create resource

Create resource

Resource details

☐ Proxy resource [Info](#)

Proxy resources handle requests to all sub-resources. To create a proxy resource use a path parameter that ends with a plus sign, for example {proxy*}.

Resource path

/

Resource name

updateData

☒ CORS (Cross Origin Resource Sharing) [Info](#)

Create an OPTIONS method that allows all origins, all methods, and several common headers.

Cancel

Create resource

Create resource

/

/deleteData

DELETE

OPTIONS

/getData

GET

OPTIONS

POST

/updateData

OPTIONS

PATCH

PUT

Resource details

Delete

Update documentation

Enable CORS

Path

/updateData

Resource ID

3m2qbb

Methods (3)

Delete

Create method

	Method type	Integration type	Authorization	API key
<input type="radio"/>	OPTIONS	Mock	None	Not required
<input type="radio"/>	PATCH	Lambda	None	Not required
<input type="radio"/>	PUT	Lambda	None	Not required

Resources

Create resource

/deleteData - t

DELETE

OPTIONS

/getData

GET

OPTIONS

POST

/updateData

OPTIONS

PATCH

PUT

Deploy API

Create or select a stage where your API will be deployed. You can use the deployment history to revert or change the active deployment for a stage. [Learn more](#)

Stage

"New stage"

Stage name

stage1

A new stage will be created with the default settings. Edit your stage settings on the [Stage](#) page.

Deployment description

Cancel

Deploy

API actions

Deploy API

Update documentation

Delete

Medicine ID:

Enter Medicine ID

Medicine Name:

Enter Medicine Name

Use:

Enter Use

Expiry Date:

dd-mm-yyyy

Image Placeholder

Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
1	Paracetmol	Fever	2024-10-11	4	Sun 06 Oct 2024 16:36:23	<div>UpdateDelete</div>

Our Collections

This page says
Enter new use for Medicine ID: 1

Fever, mild body pains

OKCancel

Enter Medicine ID

Enter Medicine Name

Use:

Enter Use

Expiry Date:

dd-mm-yyyy

Image Placeholder

Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
1	Paracetmol	Fever	2024-10-11	4	Sun 06 Oct 2024 16:36:23	Update Delete

Our Collections

"Your health, our priority"

Medicine ID:

Enter Medicine ID

Medicine Name:

Enter Medicine Name

Use:

Enter Use

Expiry Date:

dd-mm-yyyy

Image Placeholder

Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
1	Paracetmol	Fever, mild body pains	2024-11-11	35	Sun 06 Oct 2024 16:36:23	Update Delete

Our Collections

This page says
"Medicine with ID: 1 deleted successfully"

OK

Enter Medicine ID

Medicine Name:

Enter Medicine Name

Use:

Enter Use

Expiry Date:

dd-mm-yyyy

Image Placeholder

Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
1	Paracetmol	Fever, mild body pains	2024-11-11	35	Sun 06 Oct 2024 16:36:23	Update Delete

Our Collections

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
Our Collections						

Medicine ID:

Enter Medicine ID

Medicine Name:

Enter Medicine Name

Use:

Enter Use

Expiry Date:

dd-mm-yyyy

Image Placeholder

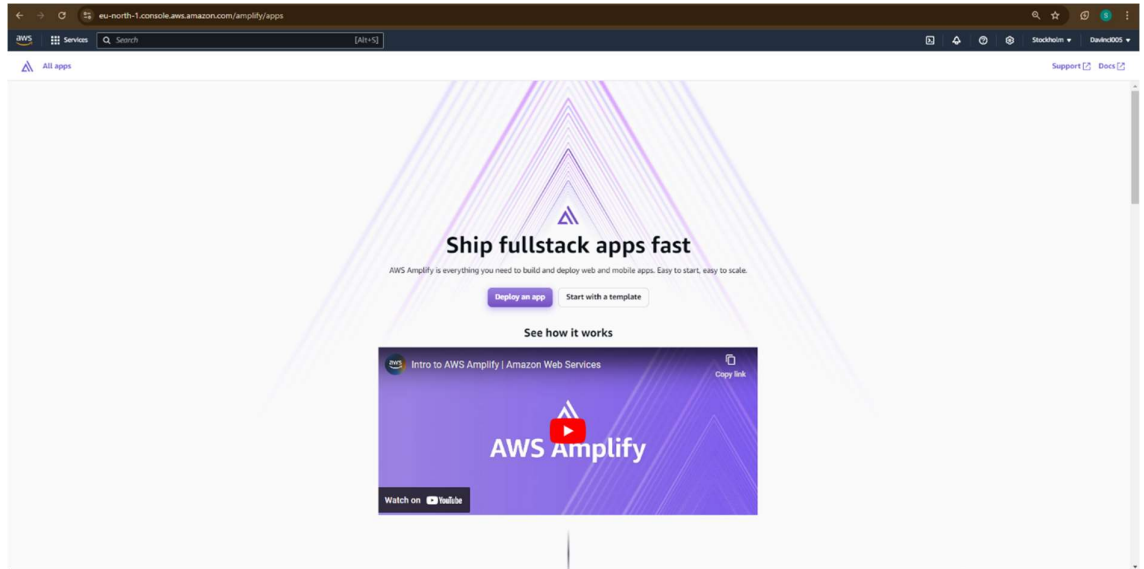
Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
2	Sabol	Cream all-in one not for inner use	2024-10-09	2	Sun 06 Oct 2024 16:38:51	<div>Update</div> <div>Delete</div>
1	Paracetamol	Fever	2024-10-17	10	Sun 06 Oct 2024 16:38:20	<div>Update</div> <div>Delete</div>

Our Collections

- 8) Deploy using amplify. Upload the index.html of the website which has the logic with the API created.



Start building with Amplify

Amplify provides a fully-managed web hosting experience and a backend building service to build fullstack apps. If you need a starter project, please visit the [docs](#).

Deploy your app

To deploy an app from a Git provider, select one of the options below:

☐ GitHub ☐ Bitbucket ☐ CodeCommit ☐ GitLab

Amplify requires read-only access to your repository.

To deploy an app manually, select "Deploy without Git"

☒ Deploy without Git

► Start with a template

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

[Looking to build an app with our Gen 1 tools \(Amplify Studio/Amplify CLI\)? Create an app with Gen 1](#)

Start a manual deployment

Manually upload objects to deploy your app. You can choose to drag and drop the artifacts directly, pull a zip from an existing S3 bucket or any other URL.

App name: PharmaPlus Branch name: staging

Zip the contents of your build output, not the top level folder

Make sure you zip the contents of your build output and not the top level folder. For example, if your build output generates a folder named "build" or "public", first navigate into that folder, select all of the contents, and zip it from there. [Read more](#)

Method

☒ Drag and drop ☐ Amazon S3 ☐ Any URL

index.zip
Uploaded ✓ [Remove](#)

[Cancel](#) [Previous](#) [Save and deploy](#)

PharmaPlus

"Your health, our priority."

Enter Medicine ID

Medicine ID:

Enter Medicine Name

Medicine Name:


Enter Use

Please fill in this field.

Use:


dd-mm-yyyy

Expiry Date:



Add Medicine

Medicine List:







Add Medicine

Medicine List:

Medicine ID	Medicine Name	Use	Expiry Date	Days Left	Created At	Actions
2	Saibol	Cream all-in one not for inner use	2024-10-09	2	Sun 06 Oct 2024 16:38:51	<div>UpdateDelete</div>
1	Paracetmol	Fever	2024-10-17	10	Sun 06 Oct 2024 16:38:20	<div>UpdateDelete</div>

Our Collections



DynamoDB

Dashboard

Tables

Explore Items

PartiQL editor

Backups

Exports to S3

Imports from S3

Integrations

Reserved capacity

Settings

▼ DAX

Clusters

Subnet groups

Parameter groups

Events

DynamoDB

Explore Items

PharmaPlus

Tables (1)

Any tag key

Any tag value

Find tables

PharmaPlus

PharmaPlus

Scan or query items

ScanQuery

Select a table or index

Table - PharmaPlus

Select attribute projection

All attributes

Filters

RunReset

Completed. Read capacity units consumed: 0.5

Items returned (2)

medicined (String)

createdAt

daysLeft

expiryDate

medicineNa...

use

2	Sun 06 Oct ...	2	2024-10-09	Saibol	Cream all-in one not for inner use
1	Sun 06 Oct ...	10	2024-10-17	Paracetmol	Fever