Book Collection API:
Problem:
● **Create a serverless REST API to create, delete, get, and update book.**
● **The solution should use AWS Lambda, Amazon DynamoDB, & Amazon API Gateway.**
● **Development and deployment should be taken care by AWS SAM CLI**
● **Please write the API using Python3.**

Solution:

Lambda function to handle CRUD operations on DynamoDB

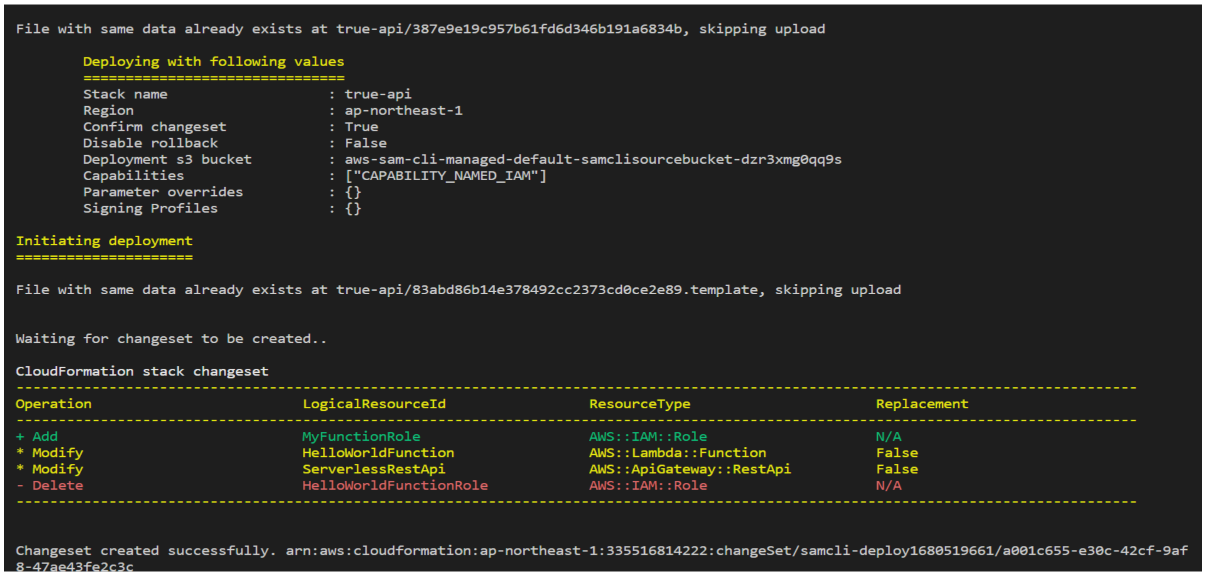
```
import boto3
import json

# define the DynamoDB table that Lambda will connect to
tableName = "part2dynamo"

# create the DynamoDB resource
dynamo = boto3.resource('dynamodb').Table(tableName)

print('Loading function')

def lambda_handler(event, context):
    print(event)
 s

    def ddb_create(x):
        print(x)
        dynamo.put_item(**x)
        return x

    def ddb_read():
        response = dynamo.scan()
        return(response['Items'])
    def ddb_update(x):
        dynamo.update_item(**x)
        return x

    def ddb_delete(x):
        dynamo.delete_item(**x)
    def echo(x):
        return x

    operations = {
        'create': ddb_create,
        'read': ddb_read,
        'update': ddb_update,
        'delete': ddb_delete,
        'echo': echo,
    }

    if(event['httpMethod']!='GET'):
        body=json.loads(event['body'])
        operation=body['operation']
        payload = body['payload']
        if operation in operations:
            operations[operation](payload)
            statusCode=200
            data = "success"
            return{
                "statusCode":statusCode,
                "body":json.dumps(data),
                "headers":{
                    "Content-Type":"application/json"

                }
            }

    else:
        data=ddb_read()
        statusCode=200
        return{
        "statusCode":statusCode,
        "body":json.dumps(data),
        "headers":{
            "Content-Type":"application/json"
        }
        }
```

SAM template to create resources , lambda, API gateway

```yaml
AWSTemplateFormatVersion: '2010-09-09'
Transform: AWS::Serverless-2016-10-31
Description: >
  march

  Sample SAM Template for march

# More info about Globals:
https://github.com/awslabs/serverless-application-model/blob/master/docs/g
lobals.rst
Globals:
  Function:
    Timeout: 3
    MemorySize: 128

Resources:
  MyFunctionRole:
    Type: AWS::IAM::Role
    Properties:
      RoleName: MyFunctionRole
      AssumeRolePolicyDocument:
        Version: '2012-10-17'
        Statement:
          - Effect: Allow
            Principal:
              Service: lambda.amazonaws.com
            Action: sts:AssumeRole
      Policies:
        - PolicyName: dynamodb-access
          PolicyDocument:
            Version: '2012-10-17'
            Statement:
              - Effect: Allow
                Action:
                  - dynamodb:GetItem
                  - dynamodb:PutItem
                  - dynamodb:UpdateItem
                  - dynamodb:DeleteItem
                  - dynamodb:Query
                  - dynamodb:Scan
                Resource:
arn:aws:dynamodb:ap-northeast-1:335516814222:table/part2dynamo

  HelloWorldFunction:
    Type: AWS::Serverless::Function # More info about Function Resource:
https://github.com/awslabs/serverless-application-model/blob/master/versio
ns/2016-10-31.md#awsserverlessfunction
    Properties:
      CodeUri: hello_world/
      FunctionName: trueapi
      Handler: app.lambda_handler
      Runtime: python3.9
      Role: !GetAtt MyFunctionRole.Arn
      Architectures:
      - x86_64
      Events:
        HelloWorldget:
          Type: Api # More info about API Event Source:
https://github.com/awslabs/serverless-application-model/blob/master/versio
ns/2016-10-31.md#api
          Properties:
            Path: /hello
            Method: get
        HelloWorldpost:
          Type: Api # More info about API Event Source:
https://github.com/awslabs/serverless-application-model/blob/master/versio
ns/2016-10-31.md#api
          Properties:
            Path: /hello
            Method: post
        HelloWorlddelete:
          Type: Api # More info about API Event Source:
https://github.com/awslabs/serverless-application-model/blob/master/versio
ns/2016-10-31.md#api
          Properties:
            Path: /hello
            Method: delete
        HelloWorldput:
          Type: Api # More info about API Event Source:
https://github.com/awslabs/serverless-application-model/blob/master/versio
ns/2016-10-31.md#api
          Properties:
            Path: /hello
            Method: put

  ApplicationResourceGroup2:
    Type: AWS::ResourceGroups::Group
    Properties:
      Name:
        Fn::Join:
        - ''
        - - ApplicationInsights-SAM-
          - Ref: AWS::StackName
      ResourceQuery:
        Type: CLOUDFORMATION_STACK_1_0
  ApplicationInsightsMonitoring2:
    Type: AWS::ApplicationInsights::Application
    Properties:
      ResourceGroupName:
        Fn::Join:
        - ''
        - - ApplicationInsights-SAM-
          - Ref: AWS::StackName
      AutoConfigurationEnabled: 'true'
    DependsOn: ApplicationResourceGroup2
Outputs:
  # ServerlessRestApi is an implicit API created out of Events key under
Serverless::Function
  # Find out more about other implicit resources you can reference within
SAM
  #
https://github.com/awslabs/serverless-application-model/blob/master/docs/i
nternals/generated_resources.rst#api
  HelloWorldApi:
    Description: API Gateway endpoint URL for Prod stage for Hello World
function
```

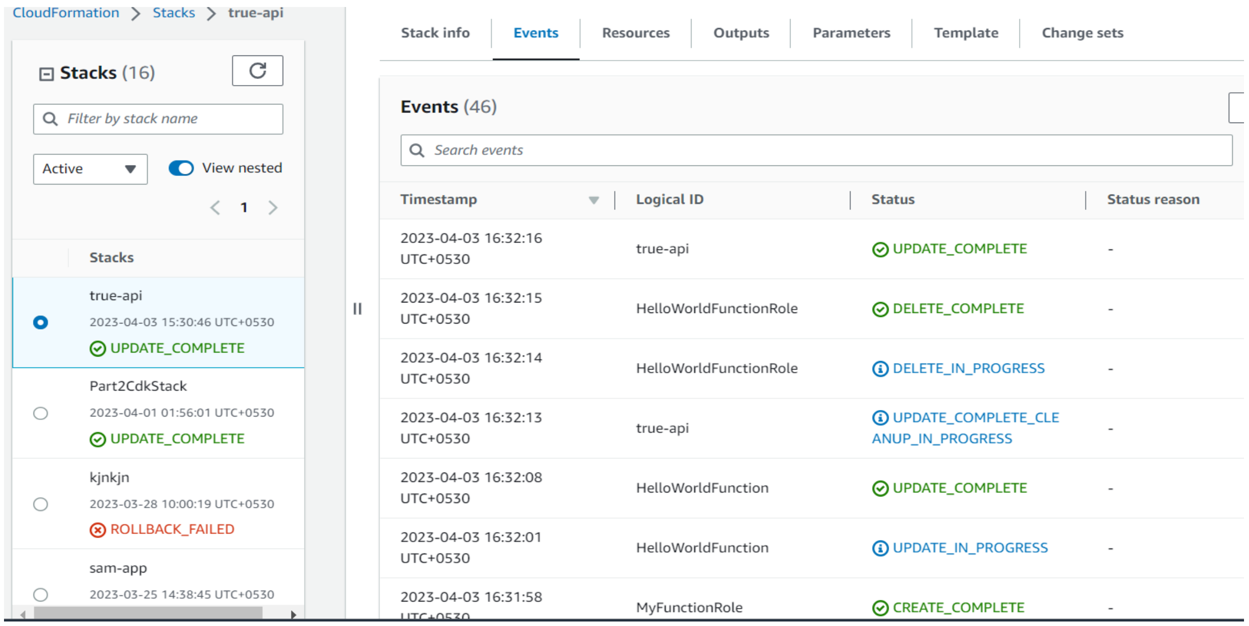
```
    Value: !Sub
"https://${ServerlessRestApi}.execute-api.${AWS::Region}.amazonaws.com/Pro
d/hello/"
  HelloWorldFunction:
    Description: Hello World Lambda Function ARN
    Value: !GetAtt HelloWorldFunction.Arn
  HelloWorldFunctionIamRole:
    Description: Implicit IAM Role created for Hello World function
    Value: !GetAtt MyFunctionRole.Arn
```

SAM deploy:
sam deploy --guided --capabilities CAPABILITY_NAMED_IAM



```
File with same data already exists at true-api/387e9e19c957b61fd6d346b191a6834b, skipping upload

        Deploying with following values
        ===============================
        Stack name                   : true-api
        Region                       : ap-northeast-1
        Confirm changeset            : True
        Disable rollback             : False
        Deployment s3 bucket         : aws-sam-cli-managed-default-samclisourcebucket-dzr3xmg0qq9s
        Capabilities                 : ["CAPABILITY_NAMED_IAM"]
        Parameter overrides          : {}
        Signing Profiles             : {}

Initiating deployment
=====================

File with same data already exists at true-api/83abd86b14e378492cc2373cd0ce2e89.template, skipping upload


Waiting for changeset to be created..

CloudFormation stack changeset
-------------------------------------------------------------------------------------------------------------------------------------
Operation                          LogicalResourceId                  ResourceType                       Replacement
-------------------------------------------------------------------------------------------------------------------------------------
+ Add                              MyFunctionRole                     AWS::IAM::Role                     N/A
* Modify                           HelloWorldFunction                 AWS::Lambda::Function              False
* Modify                           ServerlessRestApi                  AWS::ApiGateway::RestApi           False
- Delete                           HelloWorldFunctionRole             AWS::IAM::Role                     N/A
-------------------------------------------------------------------------------------------------------------------------------------


Changeset created successfully. arn:aws:cloudformation:ap-northeast-1:335516814222:changeSet/samcli-deploy1680519661/a001c655-e30c-42cf-9af
8-47ae43fe2c3c
```

Resources are created successfully:



CloudFormation > Stacks > true-api

Stacks (16)

Active — View nested

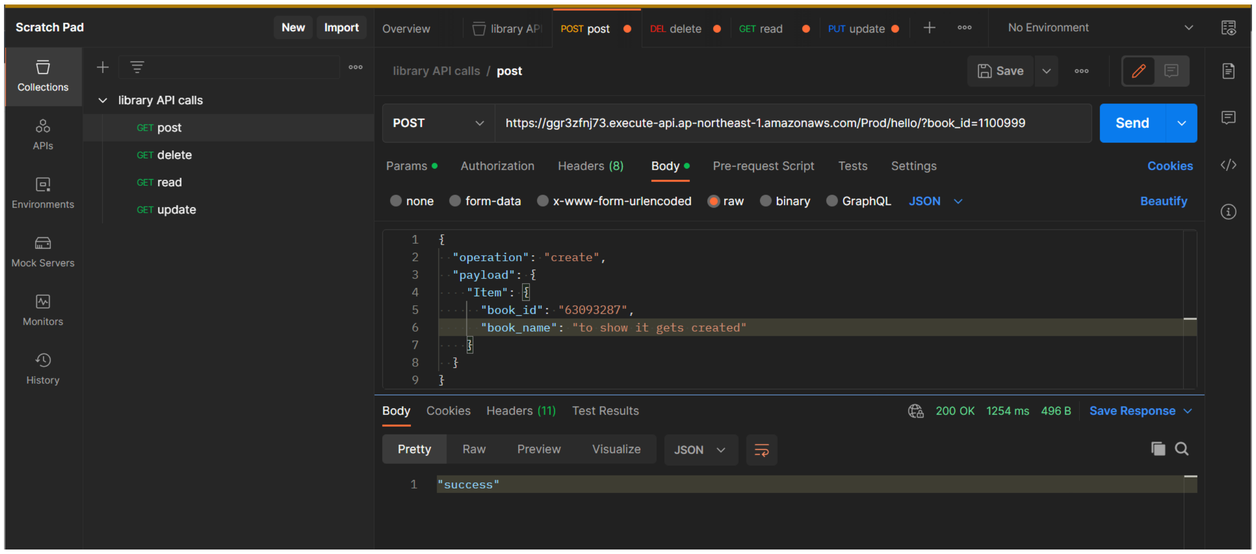
	Stacks
●	true-api 2023-04-03 15:30:46 UTC+0530 UPDATE_COMPLETE
○	Part2CdkStack 2023-04-01 01:56:01 UTC+0530 UPDATE_COMPLETE
○	kjnkjn 2023-03-28 10:00:19 UTC+0530 ROLLBACK_FAILED
○	sam-app 2023-03-25 14:38:45 UTC+0530

Stack info | Events | Resources | Outputs | Parameters | Template | Change sets

Events (46)

Timestamp	Logical ID	Status	Status reason
2023-04-03 16:32:16 UTC+0530	true-api	UPDATE_COMPLETE	-
2023-04-03 16:32:15 UTC+0530	HelloWorldFunctionRole	DELETE_COMPLETE	-
2023-04-03 16:32:14 UTC+0530	HelloWorldFunctionRole	DELETE_IN_PROGRESS	-
2023-04-03 16:32:13 UTC+0530	true-api	UPDATE_COMPLETE_CLEANUP_IN_PROGRESS	-
2023-04-03 16:32:08 UTC+0530	HelloWorldFunction	UPDATE_COMPLETE	-
2023-04-03 16:32:01 UTC+0530	HelloWorldFunction	UPDATE_IN_PROGRESS	-
2023-04-03 16:31:58 UTC+0530	MyFunctionRole	CREATE_COMPLETE	-

POST operation on dynamoDB Table:



Scratch Pad — library API calls: GET post, GET delete, GET read, GET update

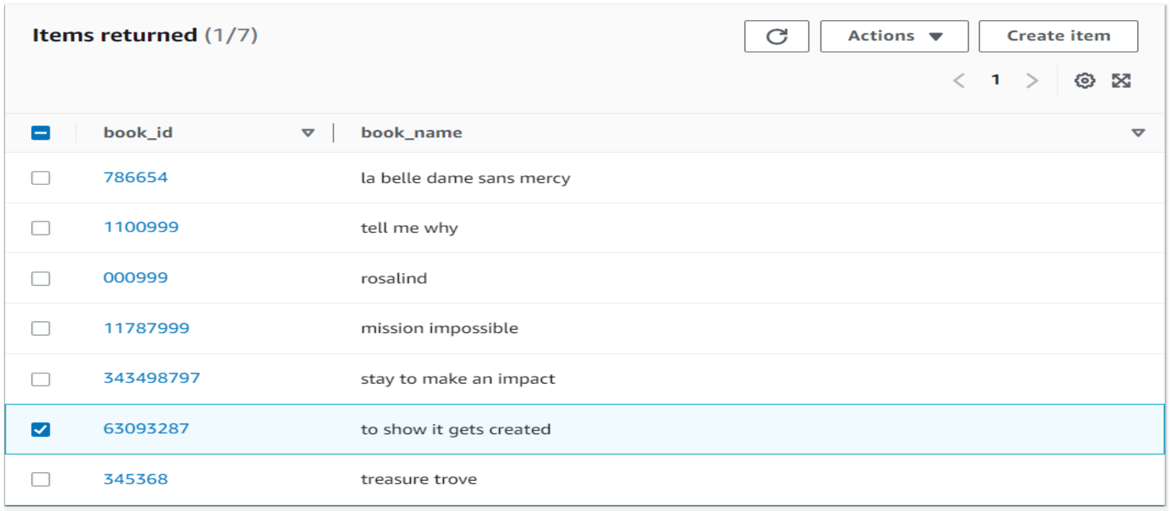
library API calls / post

POST https://ggr3zfnj73.execute-api.ap-northeast-1.amazonaws.com/Prod/hello/?book_id=1100999

```
{
  "operation": "create",
  "payload": {
    "Item": {
      "book_id": "63093287",
      "book_name": "to show it gets created"
    }
  }
}
```

200 OK 1254 ms 496 B

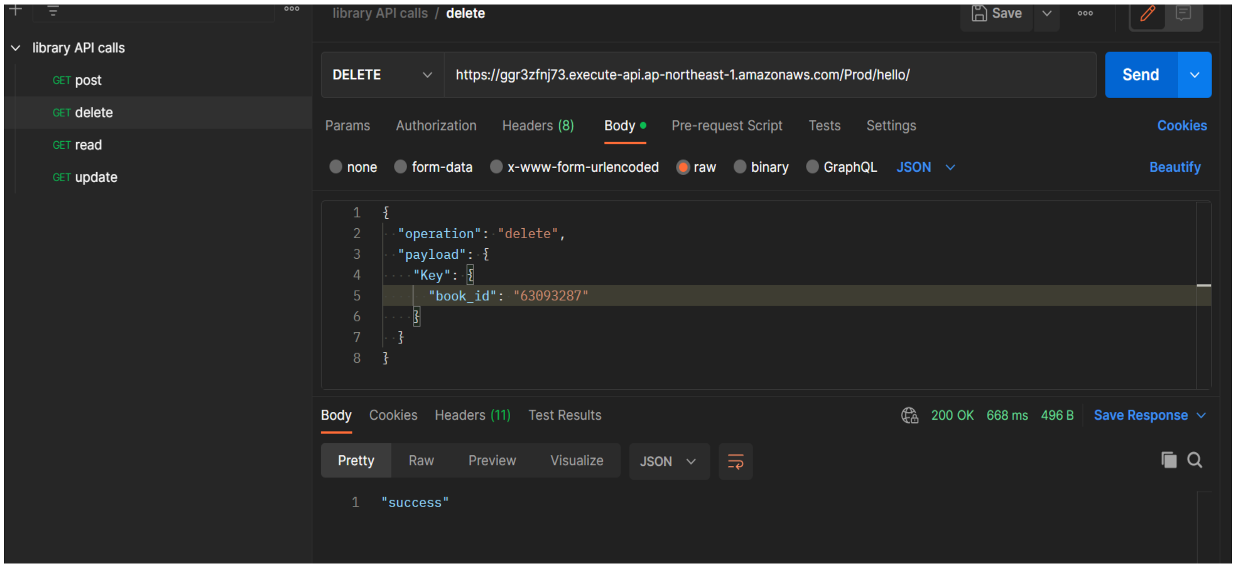
```
"success"
```



Items returned (1/7)

	book_id	book_name
☐	786654	la belle dame sans mercy
☐	1100999	tell me why
☐	000999	rosalind
☐	11787999	mission impossible
☐	343498797	stay to make an impact
✓	63093287	to show it gets created
☐	345368	treasure trove

DELETE operation on dynamoDB Table:

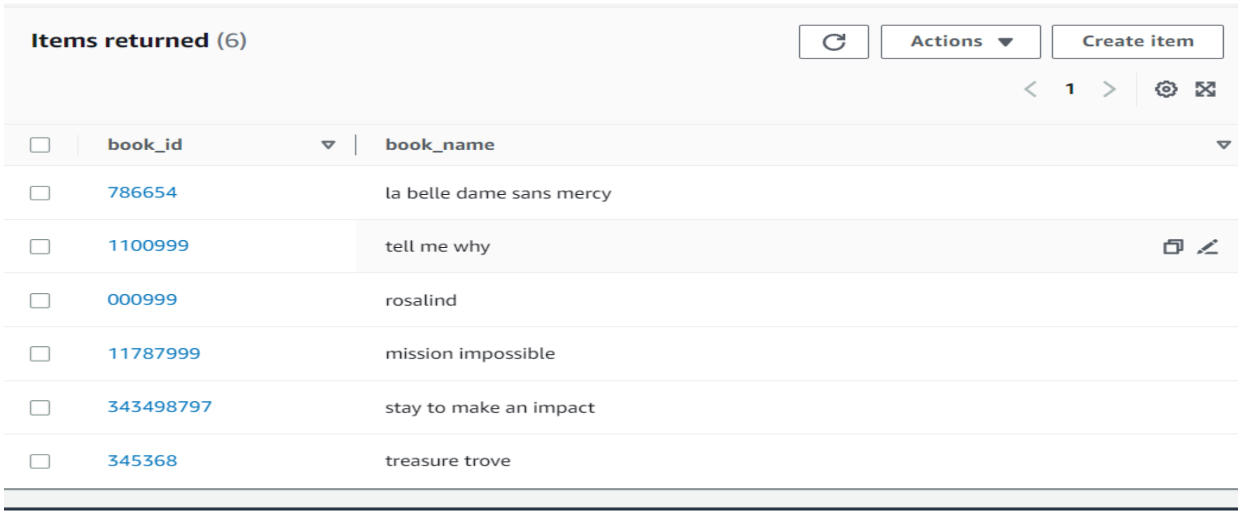


DELETE https://ggr3zfnj73.execute-api.ap-northeast-1.amazonaws.com/Prod/hello/

```
{
  "operation": "delete",
  "payload": {
    "Key": {
      "book_id": "63093287"
    }
  }
}
```

200 OK 668 ms 496 B

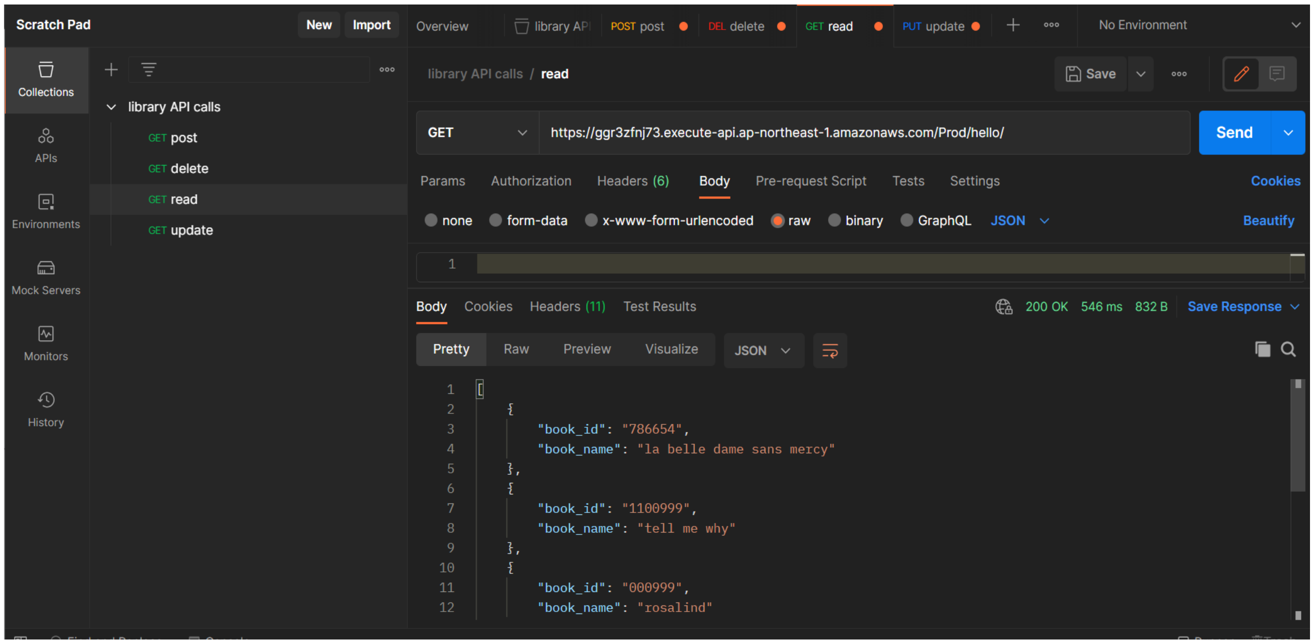
```
"success"
```



Items returned (6)

	book_id	book_name
☐	786654	la belle dame sans mercy
☐	1100999	tell me why
☐	000999	rosalind
☐	11787999	mission impossible
☐	343498797	stay to make an impact
☐	345368	treasure trove

GET operation on dynamoDB Table:



Scratch Pad | library API calls / read

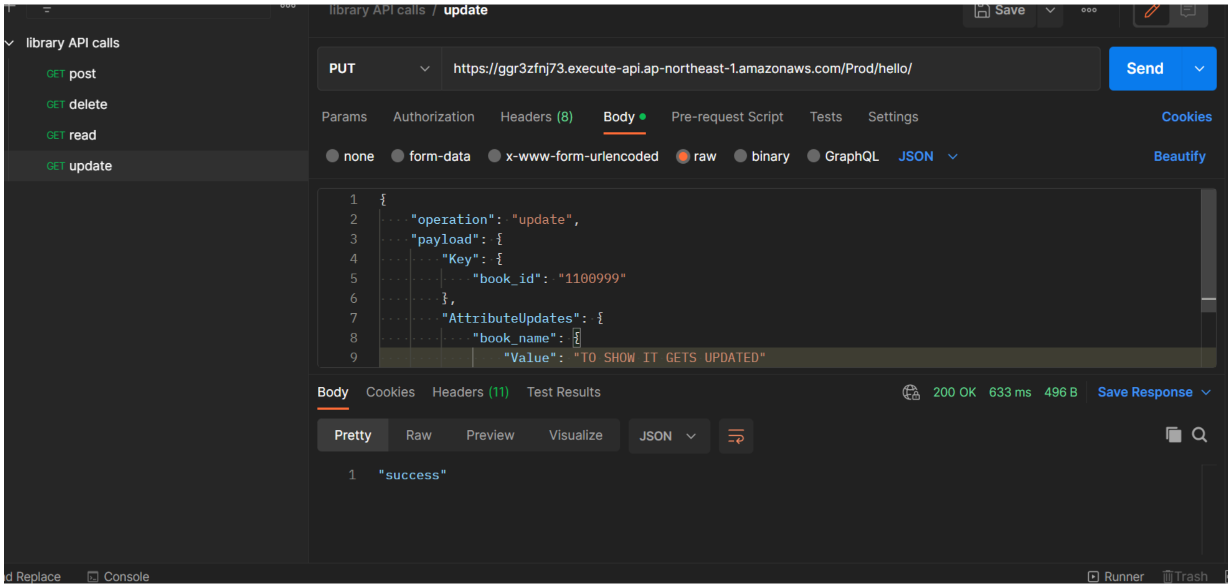
GET https://ggr3zfnj73.execute-api.ap-northeast-1.amazonaws.com/Prod/hello/

Body: raw JSON

200 OK 546 ms 832 B

```
[
    {
        "book_id": "786654",
        "book_name": "la belle dame sans mercy"
    },
    {
        "book_id": "1100999",
        "book_name": "tell me why"
    },
    {
        "book_id": "000999",
        "book_name": "rosalind"
```

PUT operation on dynamoDB Table:



library API calls / update

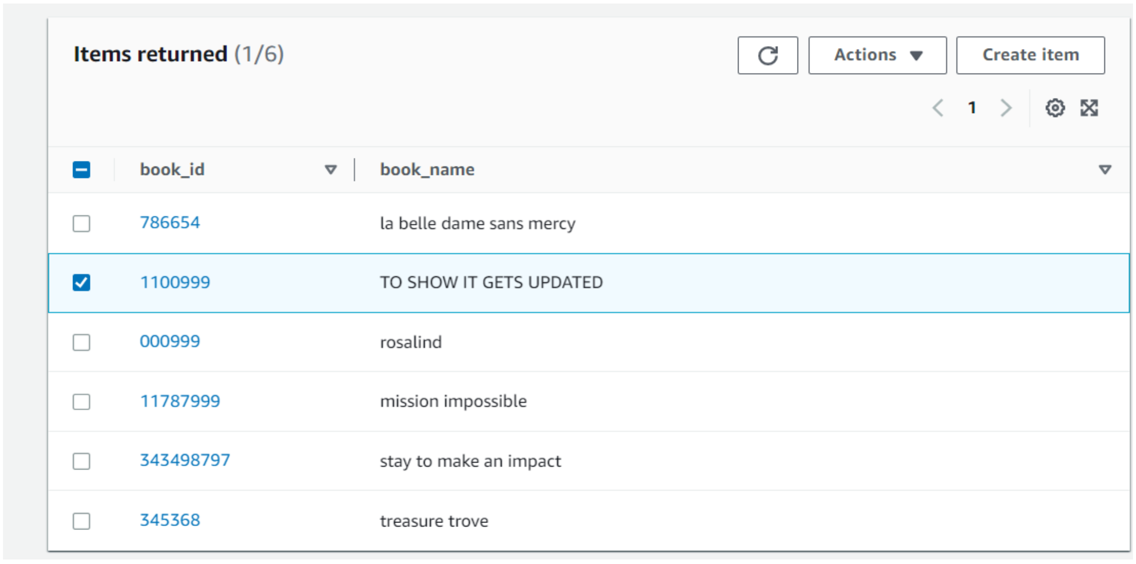
PUT https://ggr3zfnj73.execute-api.ap-northeast-1.amazonaws.com/Prod/hello/

Body: raw JSON

```
{
    "operation": "update",
    "payload": {
        "Key": {
            "book_id": "1100999"
        },
        "AttributeUpdates": {
            "book_name": {
                "Value": "TO SHOW IT GETS UPDATED"
```

200 OK 633 ms 496 B

```
"success"
```



Items returned (1/6)

	book_id	book_name
☐	786654	la belle dame sans mercy
✓	1100999	TO SHOW IT GETS UPDATED
☐	000999	rosalind
☐	11787999	mission impossible
☐	343498797	stay to make an impact
☐	345368	treasure trove