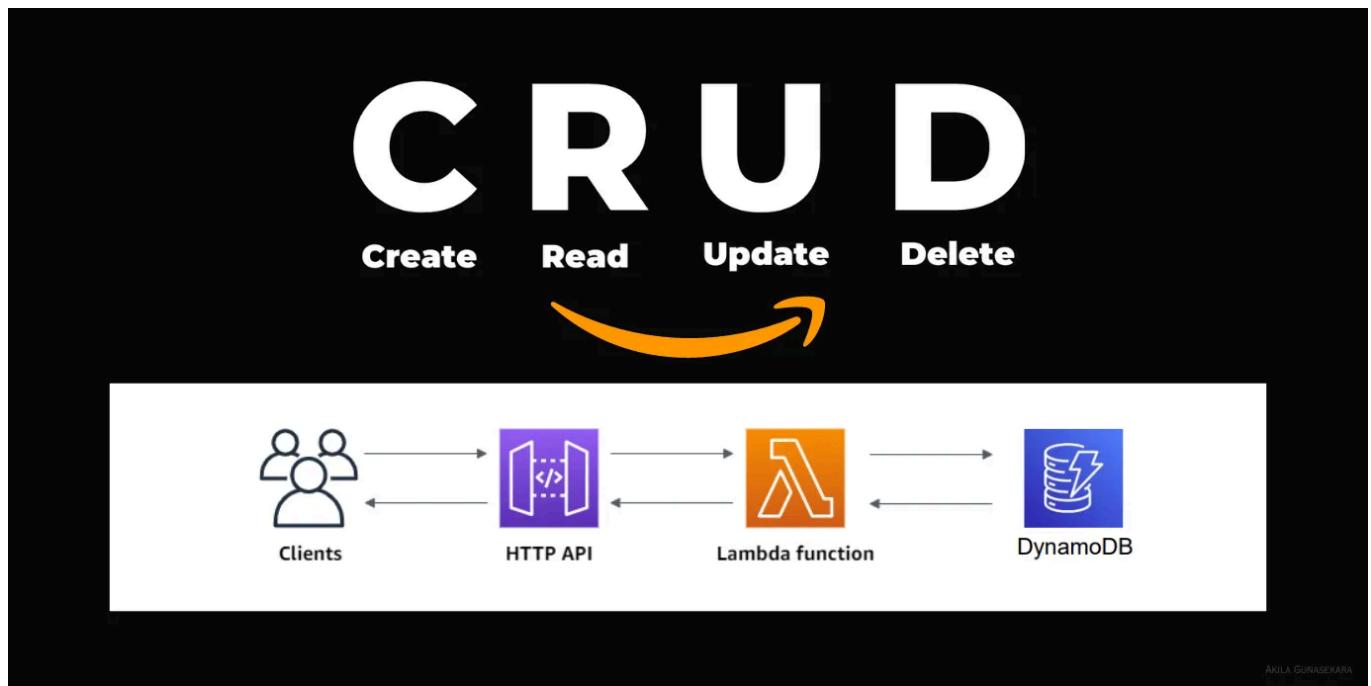


Build a CRUD API with Lambda and DynamoDB

Akila Gunasekara · [Follow](#)

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74



<https://youtu.be/AZmG-9YE6Go>

In this [tutorial](#), I will walk through the process of building a serverless API that enables the *creates, reads, updates, and deletes* of items stored in a DynamoDB table. By following the steps outlined below, you will be able to

develop a scalable and efficient API using AWS Lambda, API Gateway, and DynamoDB. Let's get started with the instructions.

You can do it within the AWS Free Tier.

Here are the high-level steps we'll follow:

Step 1: Create a DynamoDB table

Step 2: Create a Lambda function

Step 3: Create an HTTP API

Step 4: Create routes

Step 5: Create an integration

Step 6: Attach your integration to routes

Step 7: Test your API

Let's dive into the details: <https://youtu.be/AZmG-9YE6Go>

1: Create a DynamoDB table

Your API's data is stored in a DynamoDB table. Each item in the table has a unique ID, which is used as the partition key.

1. Open the DynamoDB console by visiting
<https://console.aws.amazon.com/dynamodb/>

2. Click on the “Create table” button.
3. Provide a name for the table, such as “http-crud-tutorial-items”.
4. Specify the partition key as “id”.
5. Select the “Create table” option.

By following these steps, you will successfully create a DynamoDB table named “http-crud-tutorial-items” with the partition key set to “id”.

2: Create a Lambda function

A single Lambda function is created for the backend of your API, responsible for performing CRUD operations on items in DynamoDB. The function utilizes events from API Gateway to determine the appropriate interaction with DynamoDB. Although this tutorial simplifies the process by using a single function, it is recommended to follow best practices and create separate functions for each API route.

1. Sign in to the Lambda console by visiting
<https://console.aws.amazon.com/lambda>.
2. Click on the “Create function” button.
3. Enter a name for your function, such as “http-crud-tutorial-function”.
4. Under the “Permissions” section, click on “Change default execution role”.
5. Choose the option to “Create a new role from AWS policy templates”.
6. Provide a name for the role, such as “http-crud-tutorial-role”.

7. From the “Policy templates” list, select “Simple microservice permissions”. This policy template grants the Lambda function the necessary permissions to interact with DynamoDB.

8. Choose Create function.

9. Open the console’s code editor and navigate to the *index.mjs* file. Replace the existing code with the following code snippet.

```
import { DynamoDBClient } from "@aws-sdk/client-dynamodb";
import {
  DynamoDBDocumentClient,
  ScanCommand,
  PutCommand,
  GetCommand,
  DeleteCommand,
} from "@aws-sdk/lib-dynamodb";

const client = new DynamoDBClient({});

const dynamo = DynamoDBDocumentClient.from(client);

const tableName = "http-crud-tutorial-items";

export const handler = async (event, context) => {
  let body;
  let statusCode = 200;
  const headers = {
    "Content-Type": "application/json",
  };

  try {
    switch (event.routeKey) {
      case "DELETE /items/{id}":
        await dynamo.send(
          new DeleteCommand({
            TableName: tableName,
            Key: {
              id: event.pathParameters.id,
            },
          })
        );
        body = `Deleted item ${event.pathParameters.id}`;
    }
  } catch (err) {
    console.error(err);
    statusCode = 500;
    body = `Internal Server Error`;
  }
  return {
    statusCode,
    headers,
    body,
  };
}
```

```
        break;
    case "GET /items/{id}":
        body = await dynamo.send(
            new GetCommand({
                TableName: tableName,
                Key: {
                    id: event.pathParameters.id,
                },
            })
        );
        body = body.Item;
        break;
    case "GET /items":
        body = await dynamo.send(
            new ScanCommand({ TableName: tableName })
        );
        body = body.Items;
        break;
    case "PUT /items":
        let requestJSON = JSON.parse(event.body);
        await dynamo.send(
            new PutCommand({
                TableName: tableName,
                Item: {
                    id: requestJSON.id,
                    price: requestJSON.price,
                    name: requestJSON.name,
                },
            })
        );
        body = `Put item ${requestJSON.id}`;
        break;
    default:
        throw new Error(`Unsupported route: "${event.routeKey}"`);
    }
} catch (err) {
    statusCode = 400;
    body = err.message;
} finally {
    body = JSON.stringify(body);
}

return {
    statusCode,
    body,
    headers,
};
};
```

10. Once you've made the necessary changes, click on “Deploy” to update your Lambda function.

By following these steps, you will create a Lambda function named “http-crud-tutorial-function” and set up a new role named “http-crud-tutorial-role” with the appropriate permissions to interact with DynamoDB.

3: Create an HTTP API

To create an HTTP API and establish an HTTP endpoint for your Lambda function, follow these steps:

1. Sign in to the API Gateway console by visiting <https://console.aws.amazon.com/apigateway>.
2. Click on “Create API” and select the “Build” option for creating an HTTP API.
3. Enter a name for your API, such as “http-crud-tutorial-api”, in the “API name” field.
4. Proceed to the next step by clicking on “Next” without configuring routes at this point. You will create routes later.
5. Review the automatically generated stage by API Gateway and ensure its settings meet your requirements. Click on “Next” to proceed.
6. Finally, click on “Create” to create the HTTP API.

By following these steps, you will successfully create an HTTP API named “http-crud-tutorial-api” that serves as an HTTP endpoint for your Lambda function. In the subsequent steps, you can configure routes and integrations to connect your API with the Lambda function.

4: Create routes

The screenshot shows the AWS API Gateway 'Routes' page for a successfully created API named 'http-crud-tutorial-api'. The left sidebar lists routes under 'Routes for http-crud-tutorial-api', including a 'PUT /items' route. The right panel displays 'Route details' for the 'PUT /items' route, which has the ID '11v53ef'. It includes sections for 'Authorization' (with a note about no authorizer attached) and 'Integration' (with a note about no integration attached). Buttons for 'Delete', 'Edit', and 'Deploy' are visible at the top right.

To create routes for your API,

- GET /items/{id}
- GET /items
- PUT /items
- DELETE /items/{id}

which determine how incoming requests are directed to backend resources, follow these steps:

1. Sign in to the API Gateway console by visiting <https://console.aws.amazon.com/apigateway>.

2. Select your API from the available APIs.
3. Navigate to the “Routes” section.
4. Click on “Create” to start creating a new route.
5. Choose the desired HTTP method for the route. For example, select “GET”.
6. Enter the path for the route, such as “/items/{id}”. The “{id}” in the path represents a path parameter that API Gateway extracts from the request path when a client makes a request.
7. Click on “Create” to finalize the creation of the route.
8. Repeat steps 4 to 7 for each of the remaining routes: “GET /items”, “DELETE /items/{id}”, and “PUT /items”.

By following these steps, you will successfully create the necessary routes for your API. Each route specifies an HTTP method and a resource path, allowing API Gateway to appropriately handle incoming requests and direct them to the corresponding backend resources.

5: Create an integration

To create an integration that connects a route to backend resources, follow these steps:

1. Sign in to the API Gateway console by visiting <https://console.aws.amazon.com/apigateway>.
2. Select your API from the available APIs.
3. Navigate to the “Integrations” section.

4. Click on “Manage integrations” and then select “Create” to begin creating a new integration.
5. Skip the step to attach the integration to a route for now. You will complete this step later.
6. Choose “Lambda function” as the integration type.
7. Enter the name of your Lambda function, such as “http-crud-tutorial-function”, in the “Lambda function” field.
8. Click on “Create” to finalize the creation of the integration.

The screenshot shows the AWS API Gateway Integrations page. At the top, a green header bar indicates "Successfully created API http-crud-tutorial-api (o00ekfj393)". Below the header, the navigation bar shows "API Gateway > Integrations". On the right, there is a "Stage: -" dropdown and a prominent orange "Deploy" button. The main content area is titled "Integrations". It features two tabs: "Attach integrations to routes" and "Manage integrations", with "Manage integrations" being the active tab. On the left, a sidebar titled "Integrations for http-crud-tutorial-api" includes a search bar and a "Create" button. A cursor is hovering over the "Create" button. Below the sidebar, a list shows one item: "http-crud-tutorial-func" (AWS Lambda). On the right, the "Integration details" section displays the following information:

- Integration details:** http-crud-tutorial-function
- Lambda function:** http-crud-tutorial-function (us-east-1)
- Integration ID:** csf96qm
- Description:** -
- Payload format version:** 2.0 (interpreted response format)
- Invoke permissions:** The resource policy of the Lambda function determines if API Gateway can invoke it. You can run the AWS CLI

By following these steps, you will create an integration that connects your API's routes to the backend resources. In this example, a single Lambda integration is used for all routes. In the subsequent steps, you will attach this integration to the appropriate routes.

6: Attach your integration to routes

To attach the created integration to your API's routes, follow these steps:

1. Sign in to the API Gateway console by visiting <https://console.aws.amazon.com/apigateway>.
2. Select your API from the available APIs.
3. Navigate to the “Integrations” section.
4. Choose the route you want to attach the integration to.
5. Under the “Choose an existing integration” section, select “http-crud-tutorial-function” as the integration.
6. Click on “Attach integration” to associate the integration with the selected route.
7. Repeat steps 4-6 for all the remaining routes of your API.

The screenshot shows the AWS API Gateway Integrations page. At the top, a green banner indicates "Successfully created API http-crud-tutorial-api (000ekfj393)". Below the banner, the navigation bar includes "API Gateway > Integrations" and a "Stage: -" dropdown with a "Deploy" button. The main area is titled "Integrations". On the left, a sidebar titled "Routes for http-crud-tutorial-api" lists routes: "/items" (PUT, AWS Lambda; GET, AWS Lambda) and "/{id}" (GET, AWS Lambda; DELETE, AWS Lambda). On the right, the "Integration details for route" panel shows a "DELETE /items/{id} (kirkd8a)" entry. It includes fields for "Lambda function" (set to "http-crud-tutorial-function (us-east-1)"), "Integration ID" (csf96qm), and "Description" (empty). Below these are sections for "Payload format version" (set to "2.0 (interpreted response format)") and "Invoke permissions" (with a note about Lambda function resource policy). Buttons for "Detach integration" and "Manage integration" are also present.

By following these steps, you will attach the integration to each route of your API. This ensures that when a client calls any of the routes, the associated

Lambda function will be invoked, enabling the desired functionality and interaction with your backend resources.

7: Test your API

To obtain the URL for invoking your API and test its functionality, follow these steps:

1. Sign in to the API Gateway console by visiting

<https://console.aws.amazon.com/apigateway>.

The screenshot shows the 'Triggers' section of the AWS API Gateway console. There are two triggers listed:

- Trigger**: API Gateway: http-crud-tutorial-api. The ARN is arn:aws:execute-api:us-east-1:980692338090:o00ekfj393/*/*/items. The API endpoint is <https://o00ekfj393.execute-api.us-east-1.amazonaws.com/items>. A 'Details' link is shown below the endpoint.
- Trigger**: API Gateway: http-crud-tutorial-api. The ARN is arn:aws:execute-api:us-east-1:980692338090:o00ekfj393/*/*/items/{id}. The API endpoint is <https://o00ekfj393.execute-api.us-east-1.amazonaws.com/items/{id}>. A 'Details' link is shown below the endpoint.

1. Select your API from the available APIs.
2. Make a note of your API's invoke URL. You can find this URL under the “Invoke URL” section on the Details page of your API.
3. Copy your API's invoke URL. The full URL looks like <https://abcdef123.execute-api.us-west-2.amazonaws.com>.

The screenshot shows the Postman interface with a successful API call. The URL is `https://o00ekfj393.execute-api.us-east-1.amazonaws.com/items`. The response body is:

```

1 [{"id": "300", "price": 600, "name": "Van"}, {"id": "200", "price": 1000, "name": "Bus"}, {"id": "100", "price": 500, "name": "Car"}]

```

Details: Status: 200 OK, Time: 346 ms, Size: 240 B, Save Response.

<https://youtu.be/AZmG-9YE6Go>

By following these steps, you will obtain the invoke URL for your API, which you can use to test its functionality using tools like curl or any other HTTP client of your choice.



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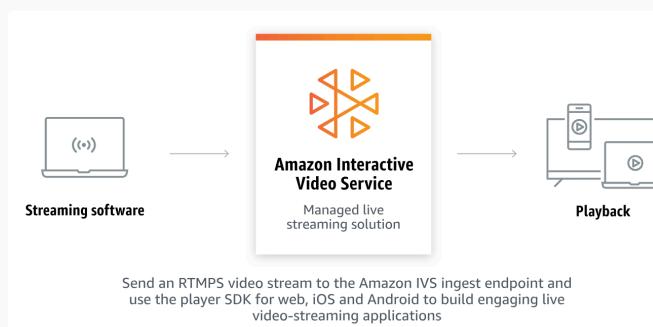
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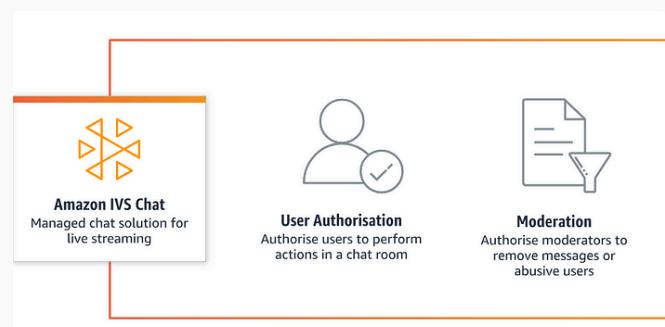


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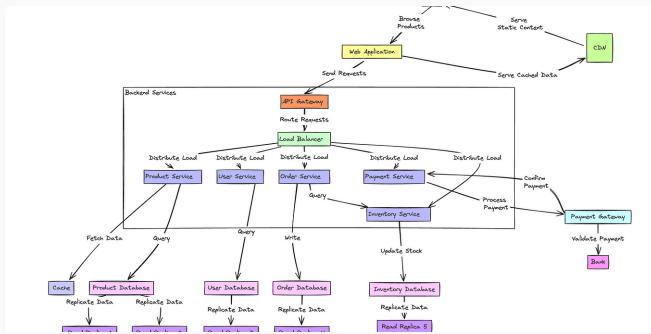
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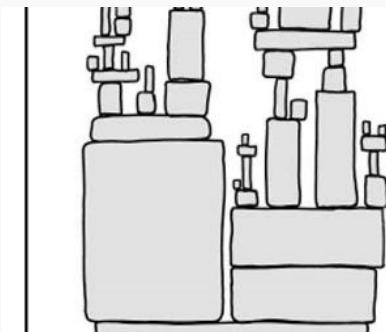
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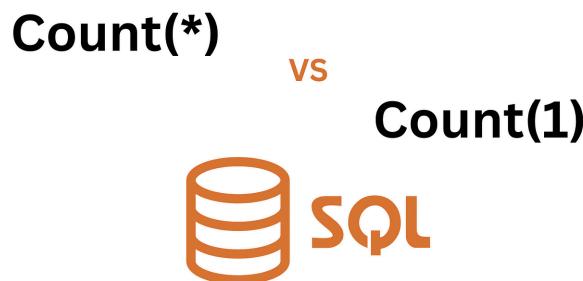
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```

console.log('start');
const promise1 = new Promise((resolve, reject) => {
  console.log(1)
  resolve(2)
})
promise1.then(res => {
  console.log(res)
})
console.log('end');
start

```

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