# **Guide to Creating a New API with AWS Lambda and API Gateway**

This document outlines the steps to create a new API using AWS Lambda, set up API Gateway, deploy the API, and connect it to a frontend application.

## **1. Design the API**

* **Determine functionality**: Define the purpose of the API, endpoints, input/output formats, and HTTP methods (e.g., GET, POST, PUT, DELETE).
* **Plan the data model**: Identify the data structure and decide on any integrations (e.g., databases, external APIs).

## **2. Create an AWS Lambda Function**

1. **Navigate to AWS Lambda Console**:
   * Log in to your AWS Management Console.
   * Go to the AWS Lambda Console.
2. **Create a new Lambda function**:
   * Click Create function.
   * Choose an Author from scratch.
   * Provide a name (e.g., my-api-function).
   * Select the runtime (e.g., Node.js, Python, Java).
   * Configure permissions by attaching an appropriate IAM role.
3. **Write the function code**:
   * Use the in-line editor or upload a .zip file/container image.
4. **Test the function**:
   * Configure a test event.
   * Run the test and verify the output.

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## **3. Set Up API Gateway**

1. **Navigate to the API Gateway Console**:
   * Go to the [API Gateway Console](https://aws.amazon.com/api-gateway/).
2. **Create a new API**:
   * Click Create API.
   * Choose HTTP API or REST API (recommended for Lambda).
   * Provide a name (e.g., MyAPI).
3. **Integrate with Lambda**:
   * Add a new resource (e.g., /hello).
   * Add a method (e.g., GET).
   * Select **Lambda Function** as the integration type.
   * Specify the Lambda function name.
   * Grant API Gateway permissions to invoke the Lambda function.
4. **Deploy the API**:
   * Create a new stage (e.g., dev or prod).
   * Deploy the API.
   * Note the endpoint URL (e.g., https://<api-id>.execute-api.<region>.amazonaws.com/dev).

## **4. Deploy the Lambda Function**

* Use the AWS Management Console, AWS CLI, or CI/CD pipelines (e.g., GitHub Actions, CodePipeline) to deploy updates to your Lambda function.
* Example CLI deployment steps:
  1. Zip your code:  
     zip function.zip index.js
  2. Deploy

## **5. Connect the API to the Frontend**

1. **Fetch data from the API**:
   * Use the endpoint URL from API Gateway.
2. **Frontend code integration**

## **6. Test the Integration**

* Verify API Gateway and Lambda functionality via Postman or curl.
* Ensure the frontend communicates correctly with the API.
* Check logs in CloudWatch for debugging.

## **7. Monitor and Maintain**

* **Enable logging**: Use AWS CloudWatch to monitor Lambda logs and API Gateway access logs.
* **Set up alerts**: Use AWS CloudWatch Alarms for error monitoring.
* **Optimize performance**: Tune the Lambda memory and timeout settings.