ECV-SVR-310
Build Serverless Environment with AWS Lambda

2017.08.28

Version 1.1

Agenda

Introduction

Overview

This lab demonstrated how to create a serverless environment which leverage AWS Serverless service. To build an environment which offload maintain loading from customer side.

Topics covered

By the end of this lab, you will be able to:

- Create a static website hosting through S3
- Create a Lambda function
- Create DynamoDB Table
- Create API though API Gateway

Introducing the Technologies

Amazon S3?

Amazon S3 is storage for the Internet. It's a simple storage service that offers software developers a highly-scalable, reliable, and low-latency data storage infrastructure at very low costs.

Amazon DynamoDB

Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability. Amazon DynamoDB enables customers to offload the administrative burdens of operating and scaling distributed databases to AWS, so they don't have to worry about hardware provisioning, setup and configuration, throughput capacity planning, replication, software patching, or cluster scaling.

AWS Lambda

AWS Lambda lets you run code without provisioning or managing servers. You pay only for the compute time you consume - there is no charge when your code

is not running. With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code and Lambda takes care of everything required to run and scale your code with high availability. You can set up your code to automatically trigger from other AWS services or call it directly from any web or mobile app.

Amazon API Gateway

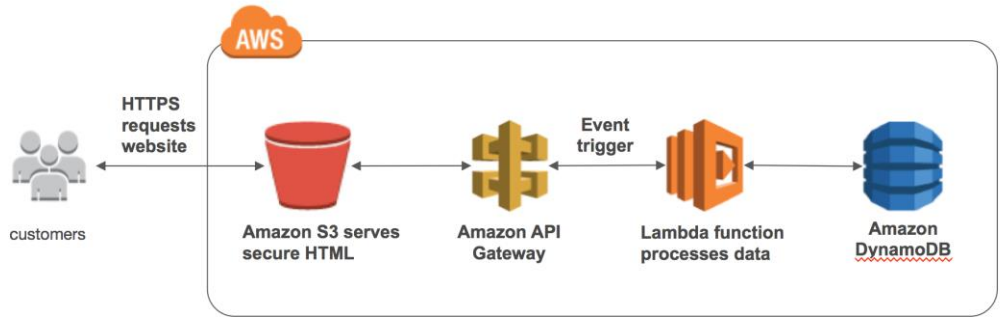
Amazon API Gateway is a fully managed service that makes it easy for developers to publish, maintain, monitor, and secure APIs at any scale. With a few clicks in the AWS Management Console, you can create an API that acts as a "front door" for applications to access data, business logic, or functionality from your back-end services, such as applications running on Amazon Elastic Compute Cloud (Amazon EC2), code running on AWS Lambda, or any web application. Amazon API Gateway handles all of the tasks involved in accepting and processing up to hundreds of thousands of concurrent API calls, including traffic management, authorization and access control, monitoring, and API version management. Amazon API Gateway has no minimum fees or startup costs. You pay only for the API calls you receive and the amount of data transferred out.

About this lab

Scenario

First, you will hosting a static website in S3. You will use DyanmoDB as a database which will record the data. All we need to do is retrieve the data from DynamoDB and show the record in S3 web page.

Architecture Diagram

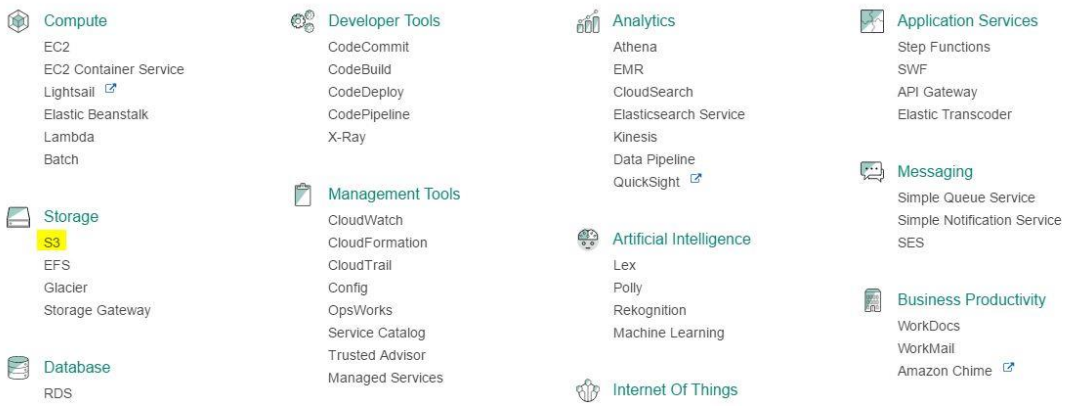


The workshop's region will be in 'Oregon'

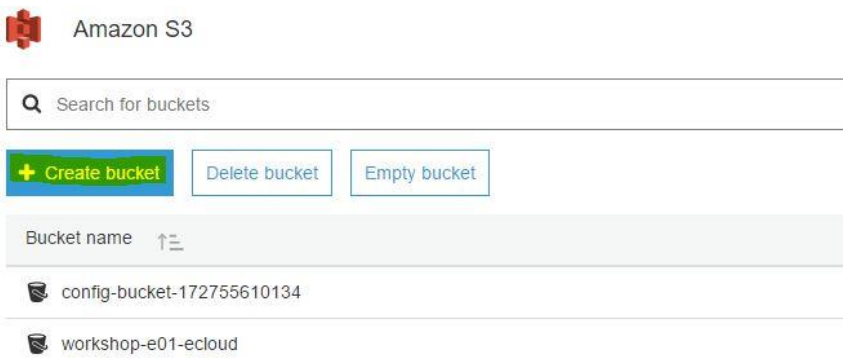
Create a website hosting through S3

Create S3 bucket

1.1. On the service menu, click 'S3'



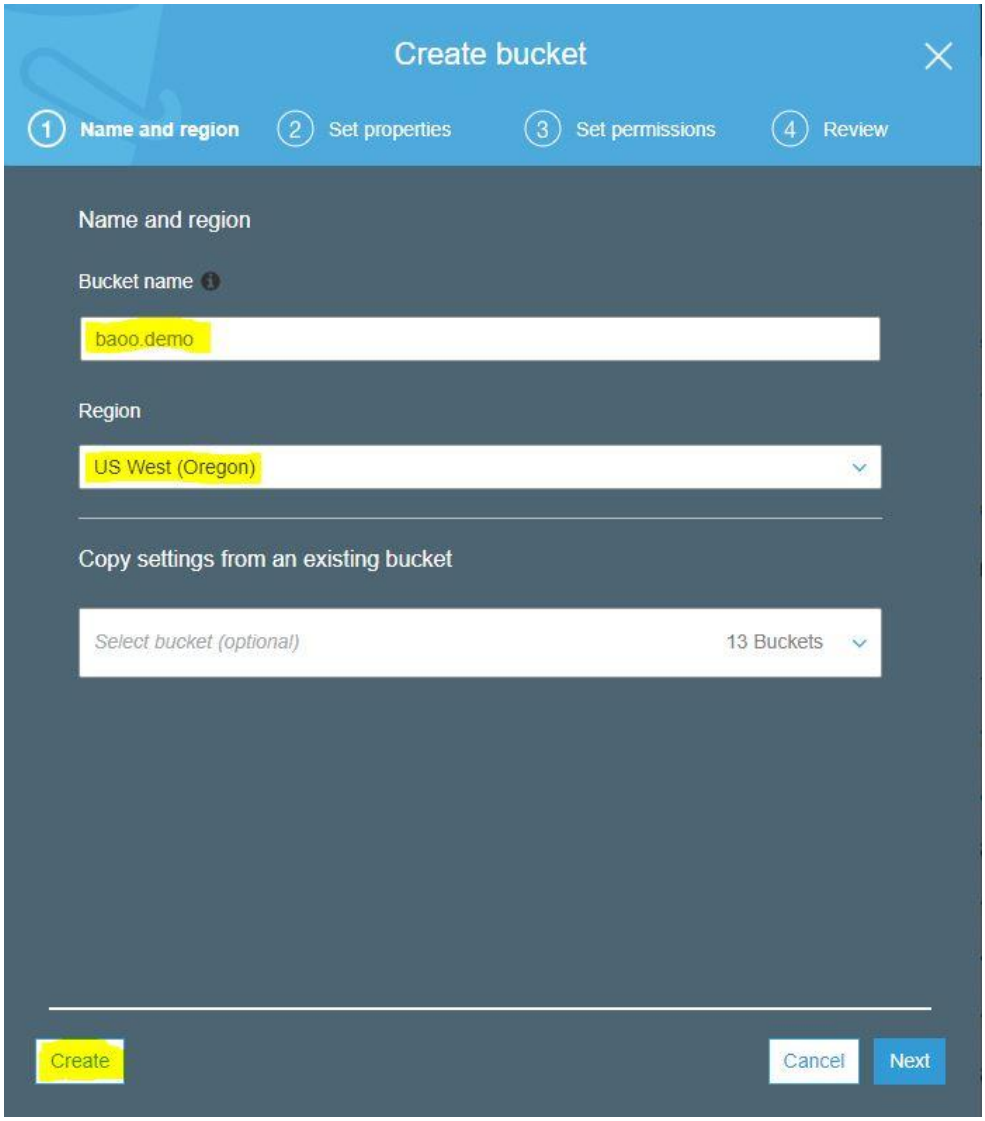
1.2. Click 'Create Bucket'



1.3. For Bucket Name, type 'Unique Name'

1.4. For Region, choose 'US West(Oregon)

1.5. Click "Create" to create S3 bucket without any setting

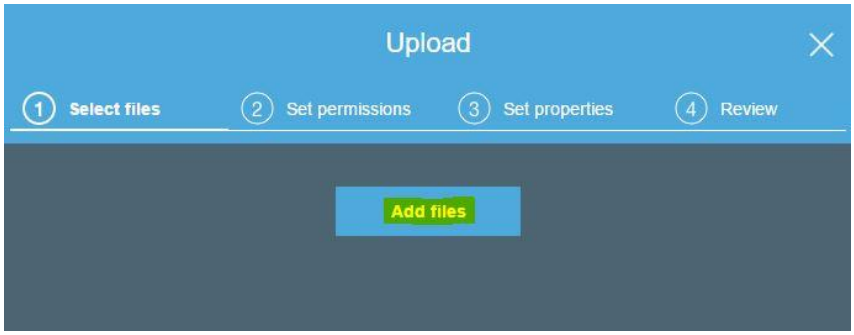


Upload files to S3 Bucket

1.6. Select the bucket which you created before

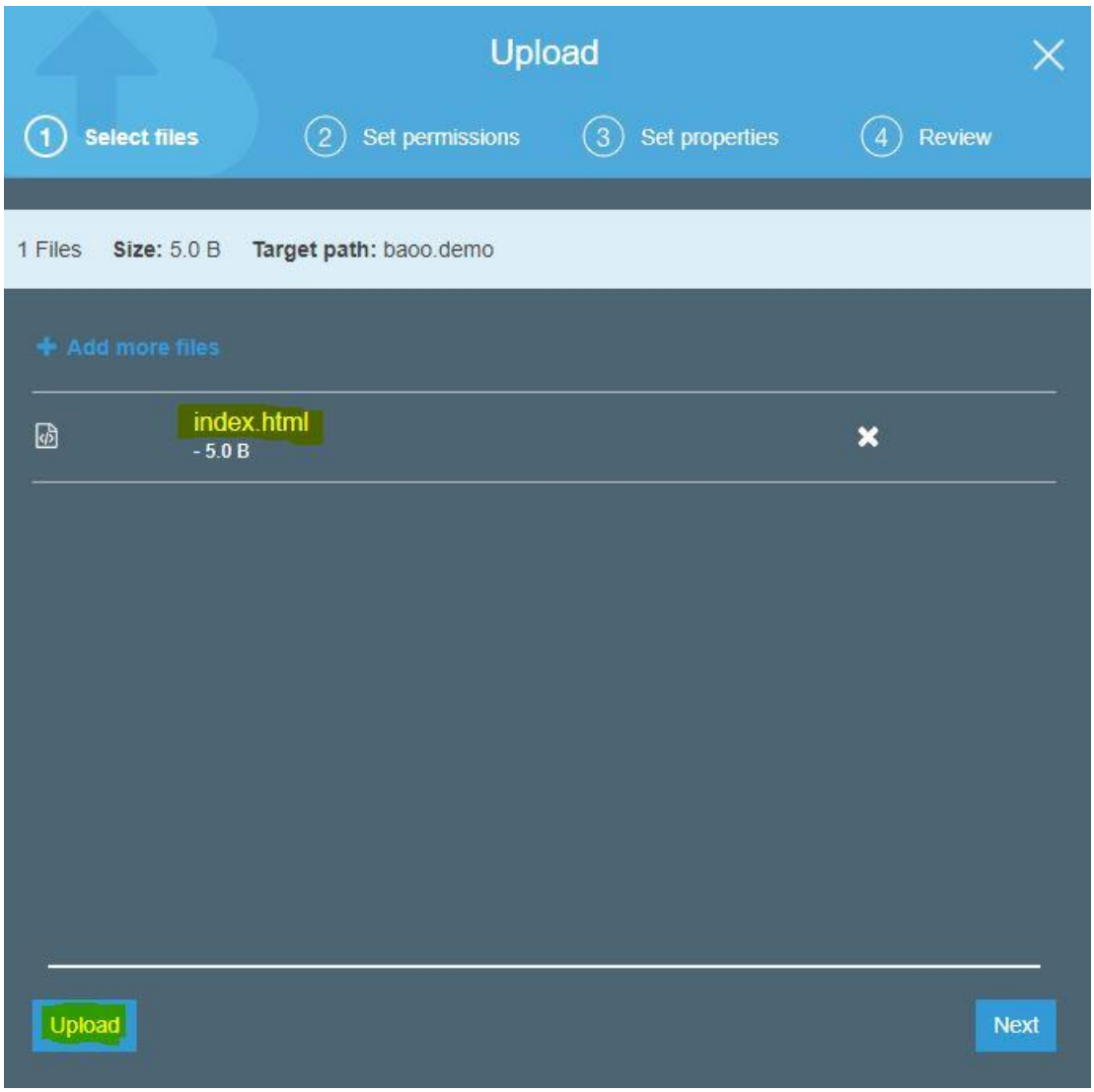
1.7. Click 'Upload'

1.8. Click 'Add files'

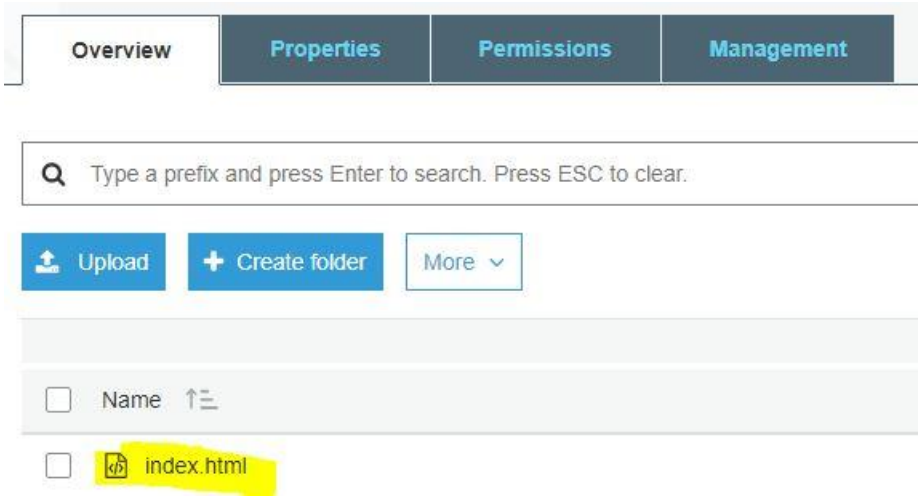


1.9. Select the html file which in the download folder, then choose

1.10. Click 'Upload' without any setting.

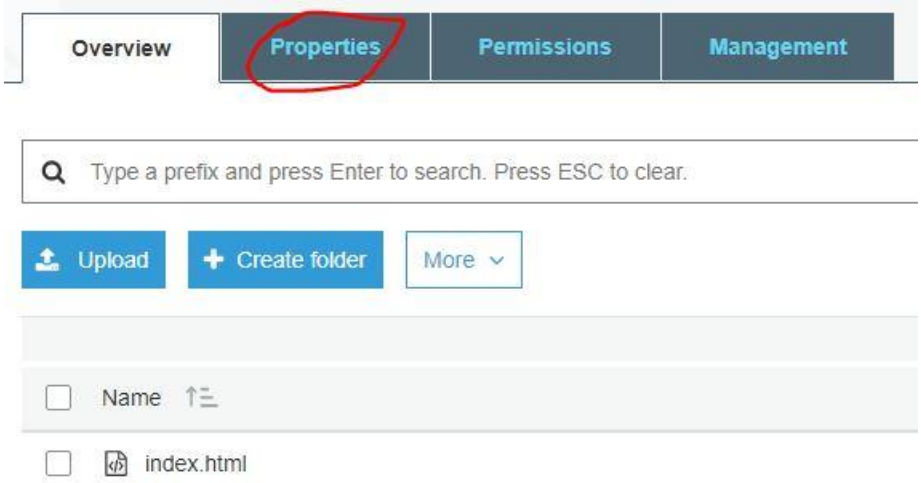


1.11. Check the status of the object which exists in S3 bucket

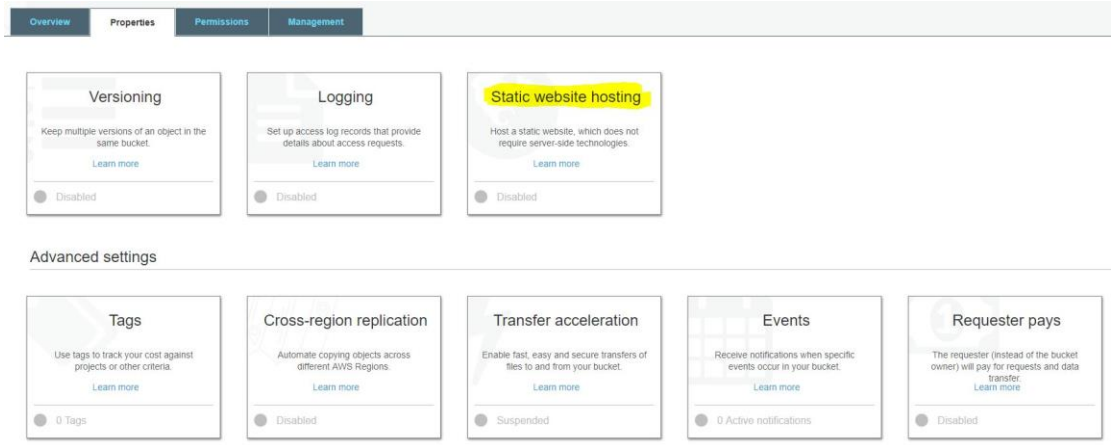


Enable Static website hosting through S3

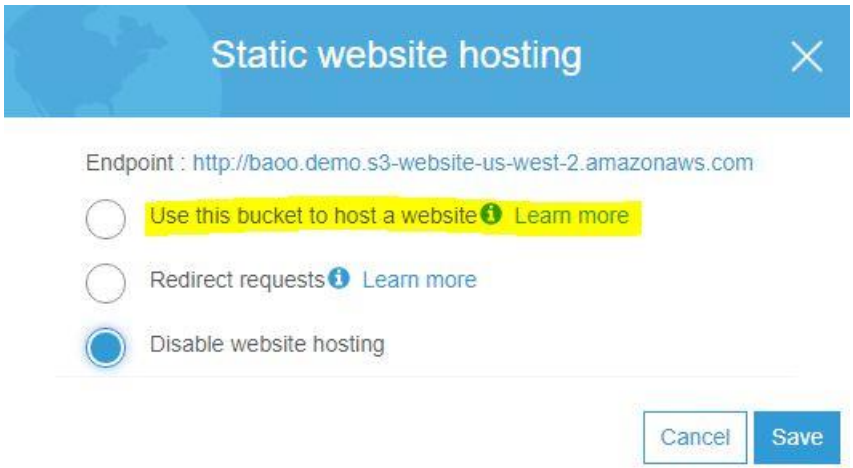
1.12. Select 'Properties' tab



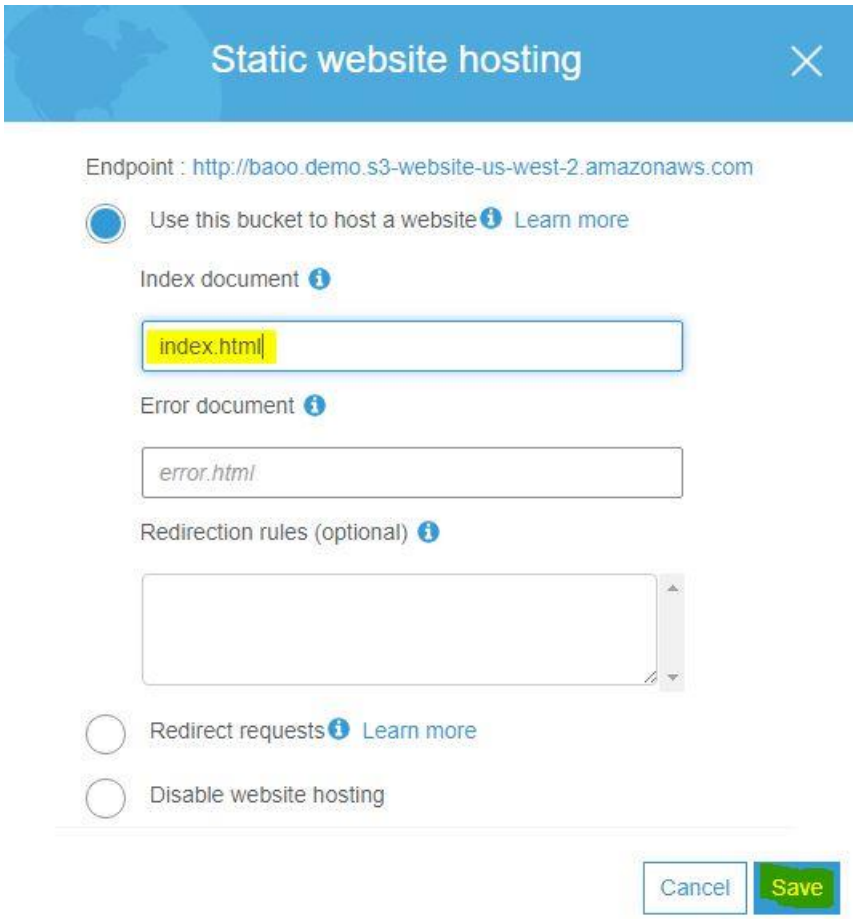
1.13. Select 'Static website hosting'



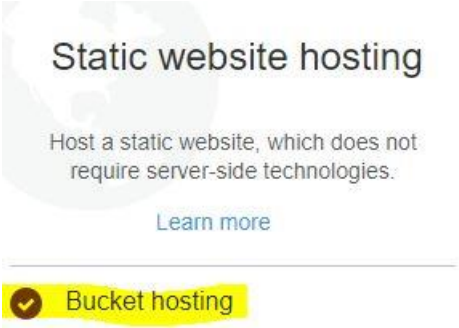
1.14. Select 'Use this bucket to host a website'



1.15. Type the file name for the index document, then click 'Save'

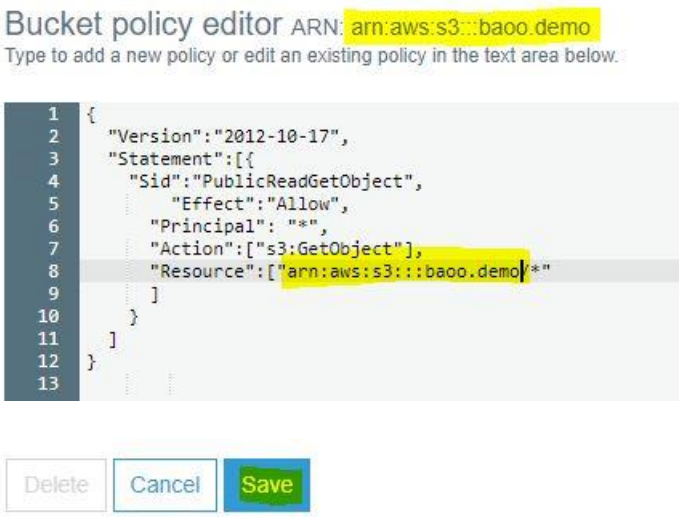


1.16. Verify status of 'Bucket hosting'



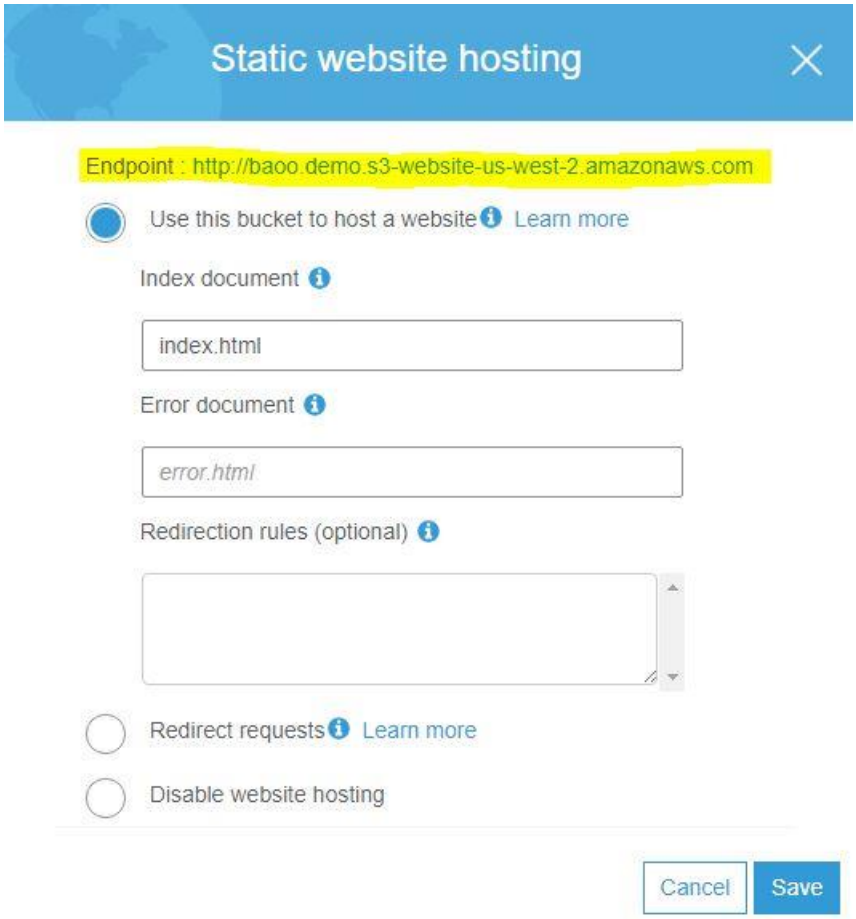
1.17. Choose 'Bucket Policy' tab in 'Permissions'

1.18. Update the bucket policy by giving example policy, and modify the resource to your own S3 ARN. Then click "Save"

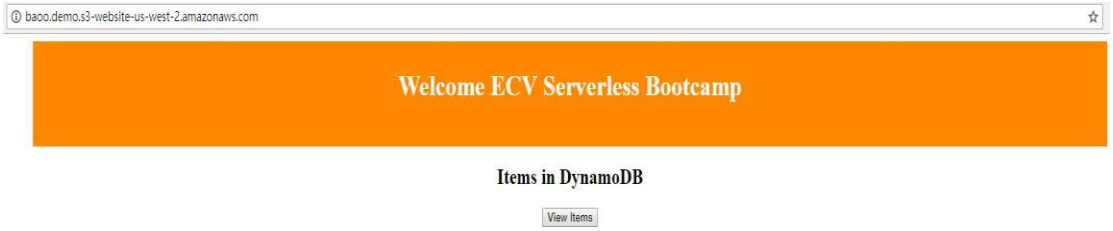


View S3 static website hosting

1.19. Select the 'Endpoint' in the 'Static website hosting' tab



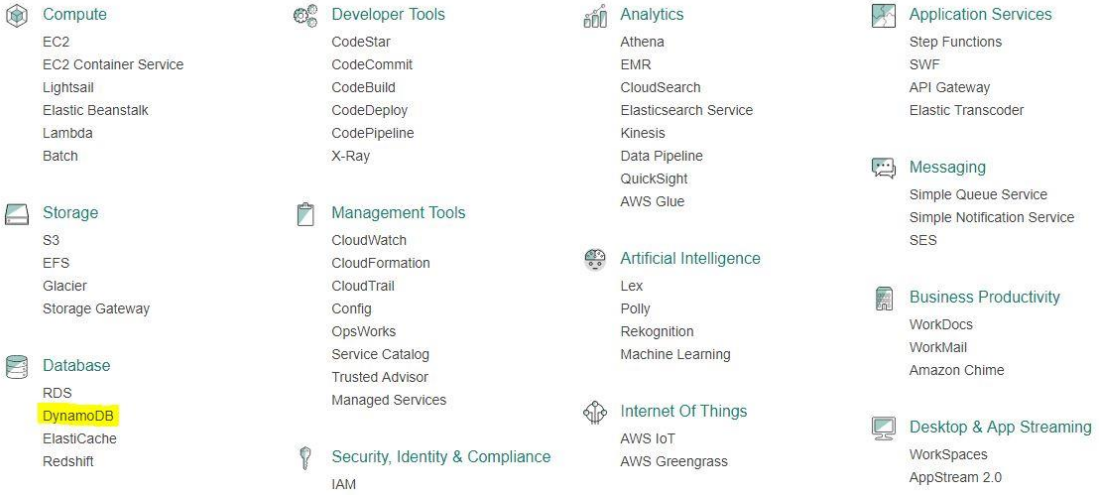
1.20. You will see the website as below:



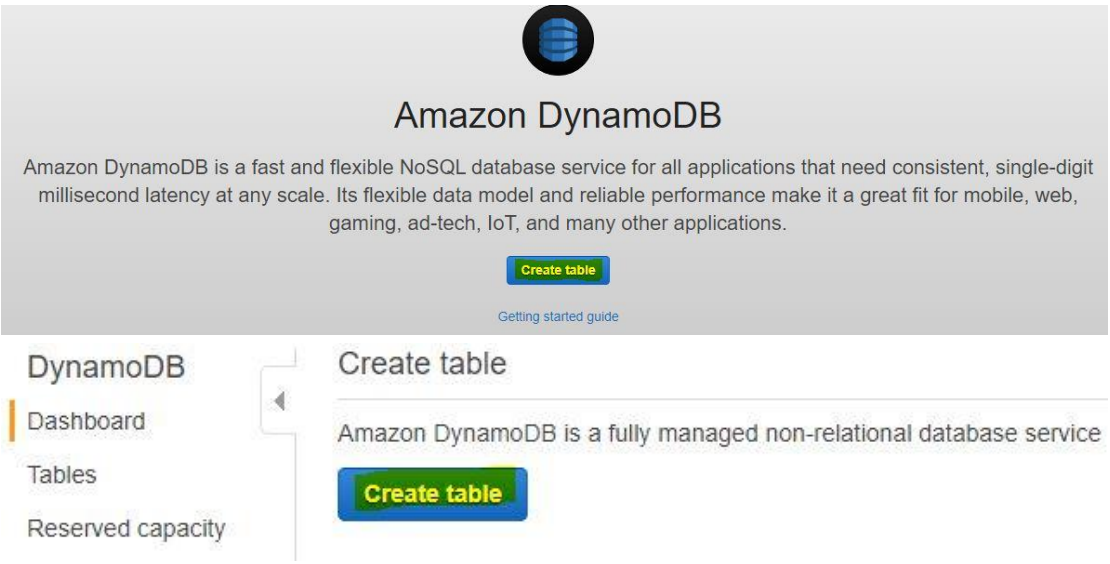
Working with Amazon DynamoDB

Create DynamoDB Table

2.1. On the service menu, click 'DynamoDB'



2.2. Click 'Create table' in the welcome page

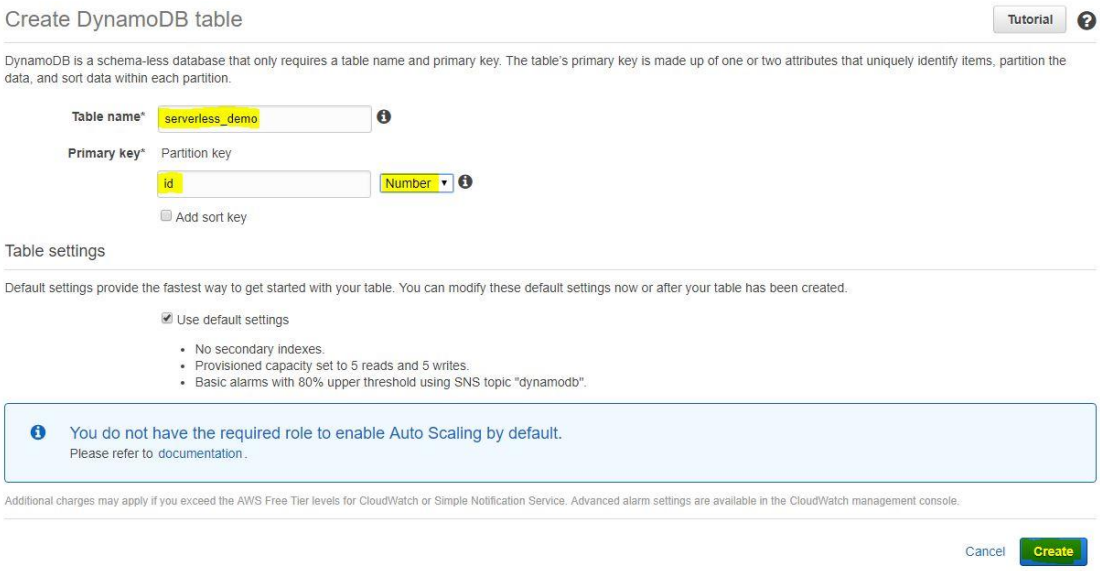


2.3. In the "Create DynamoDB table" section, do the following as below:

2.4. For 'Table name', type <YOUR_TABLE_NAME>

2.5. For 'Primary key', in the 'Primary key', type "id". Set data type as 'Number'.

2.6. Click 'Create'.

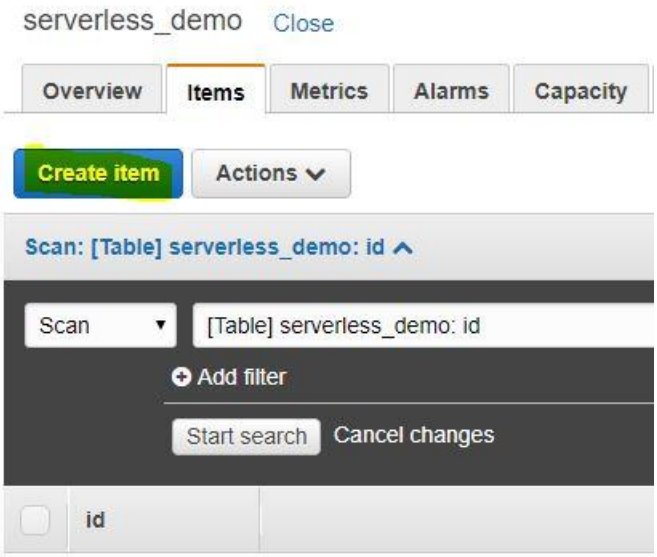


2.7. Waiting for the table create successful.

Create Items in DynamoDB Table

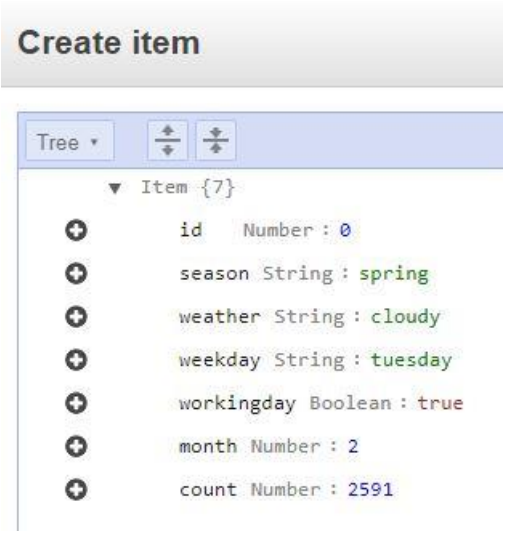
2.8. In the DynamoDB console, choose the "Items" tab.

2.9. Select 'Create item'.



2.10. In the prompt console, type data type & data value which you want.

2.11. Then click 'Save'.



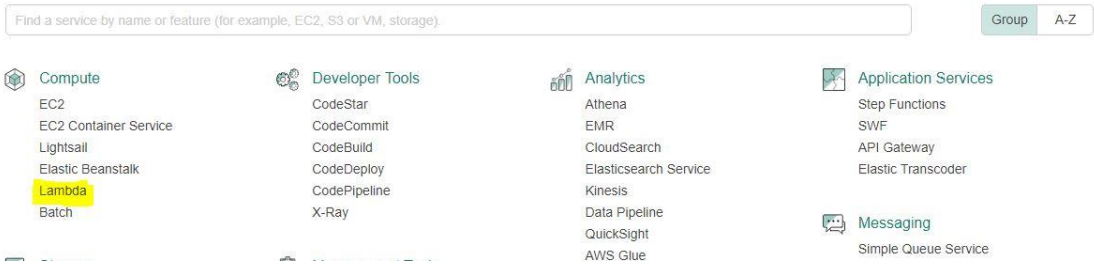
2.12. You can review the item which just type-in via console

id	count	month	season	weather	weekday	workingday
0	2591	2	spring	cloudy	tuesday	true

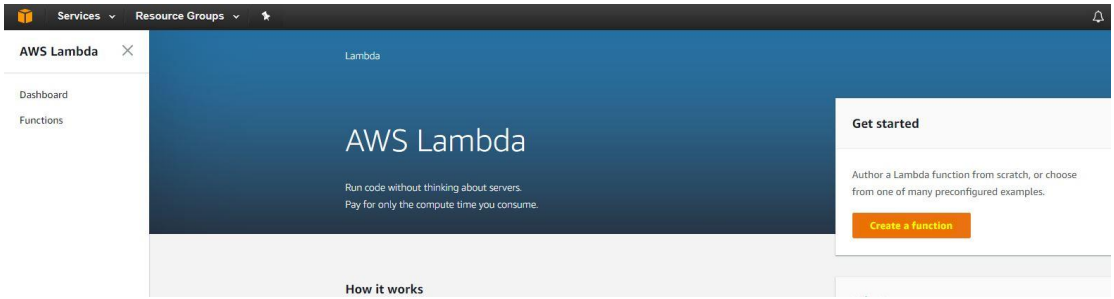
Working with Lambda Function

Create Lambda Function

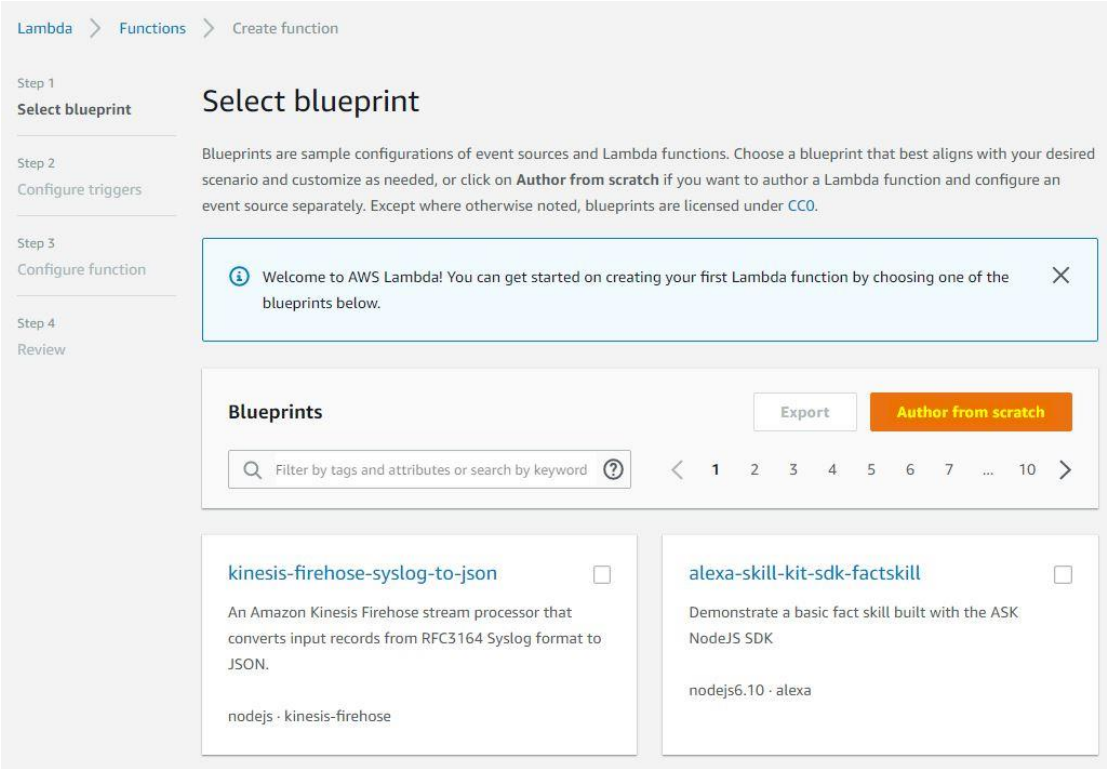
3.1. In the service menu, select 'Lambda'



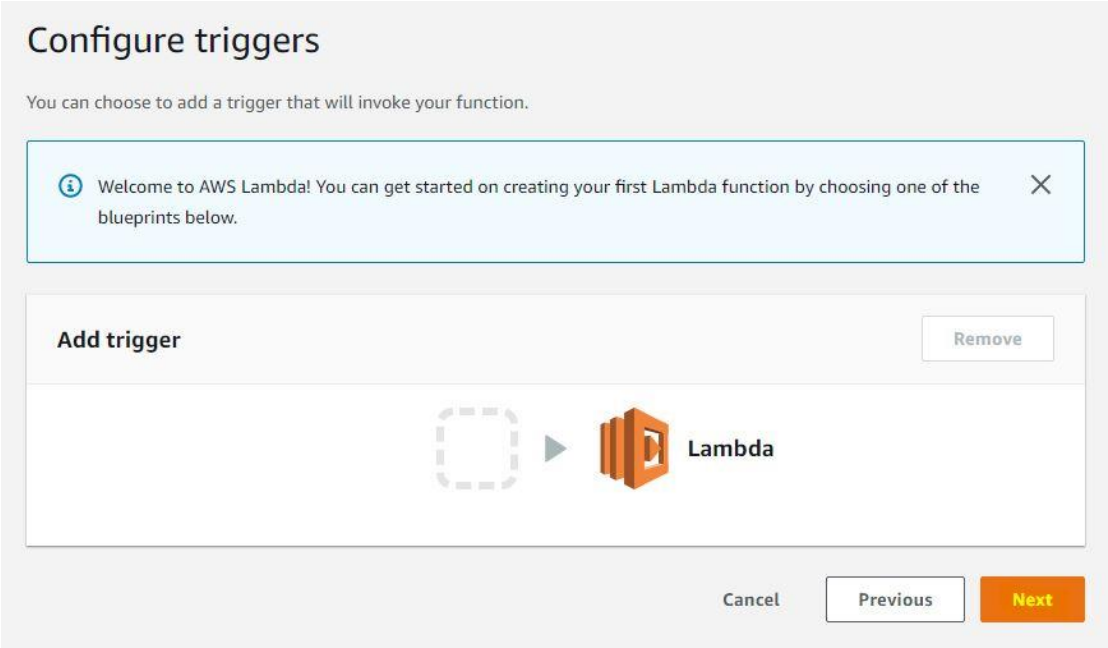
3.2. Select 'Create a function' on the right panel.



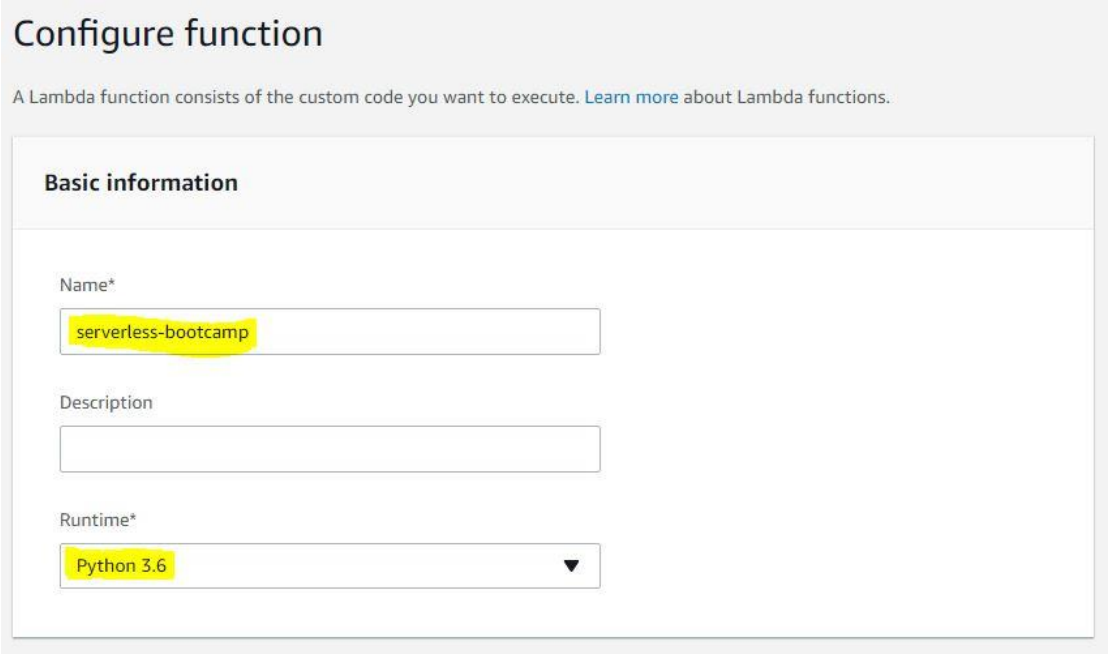
3.3. Select 'Author from scratch' for a blank function



3.4. Select 'Next ', without setting trigger.

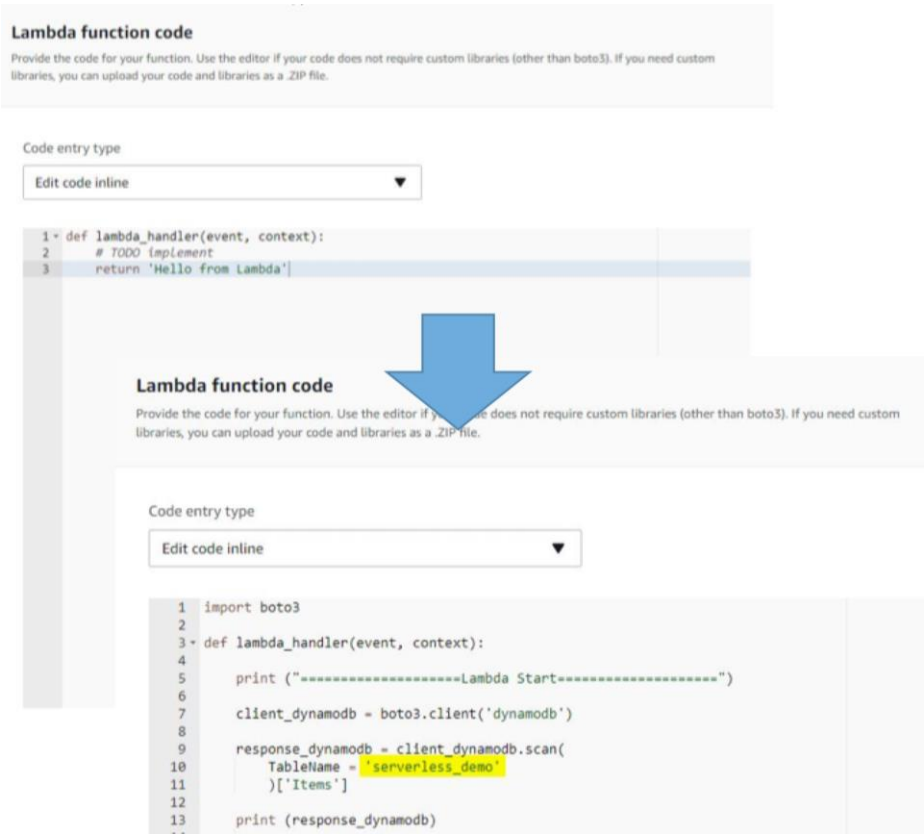


3.5. For the 'Basic Information' section, type the function name and select 'Python 3.6' for Runtime.



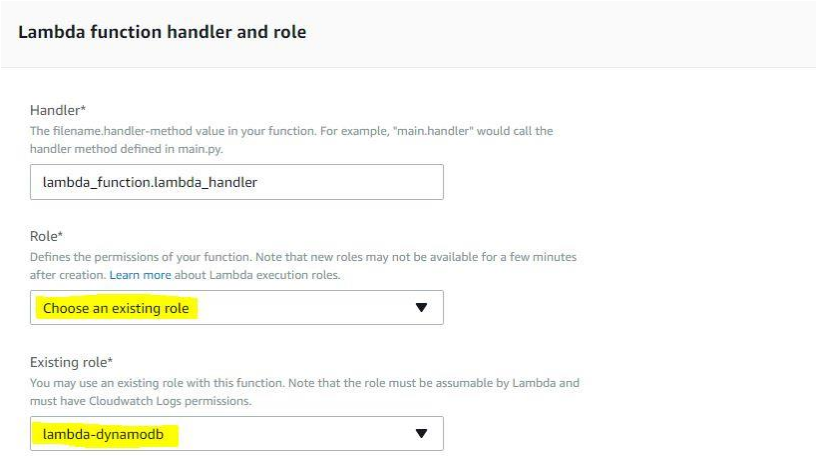
3.6. In the "Lambda function code" section, copy the code from download materials which named 'lambda_function'

3.7. Modify the "TableName" to <YOUR_TABLE_NAME> in DynamoDB in the code.



3.8. In the "Lambda function handler and role" section

3.9. Select "Choose an existing role" in the Role field and "lambda-dynamodb" in the Existing role field.



3.10. After complete the configure in this section, click 'Next' at the bottom.

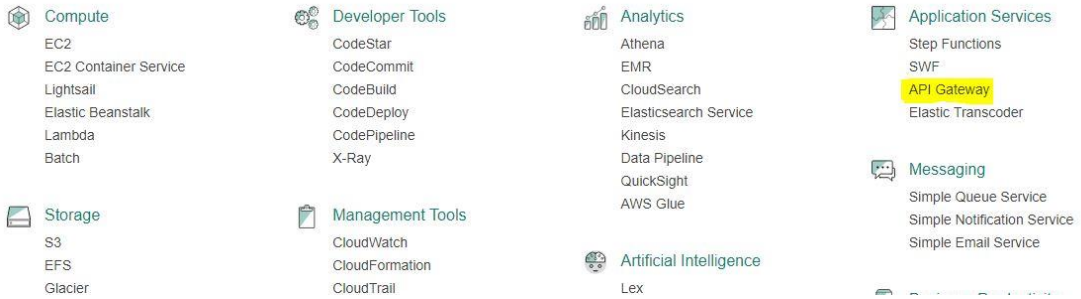
3.11. Take a review and click 'Create function' to create lambda function.

3.12. You will see the message as below which means create lambda function successful.

Working with API Gateway

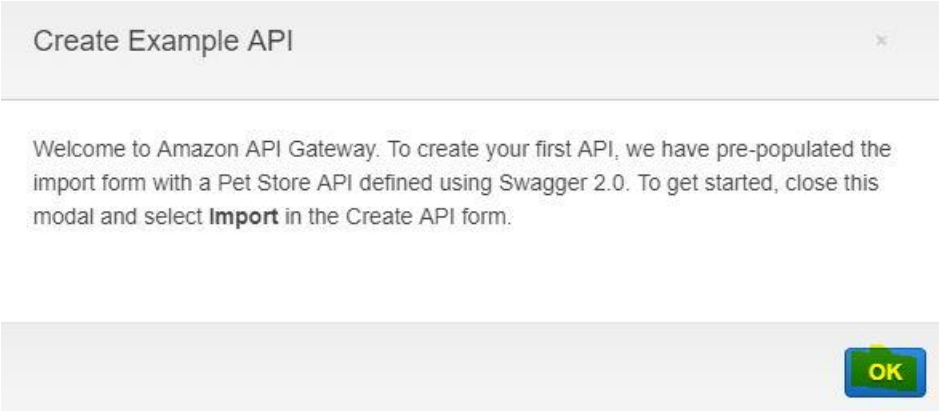
Create APIs in API Gateway

4.1. On the service menu, click 'API Gateway'.



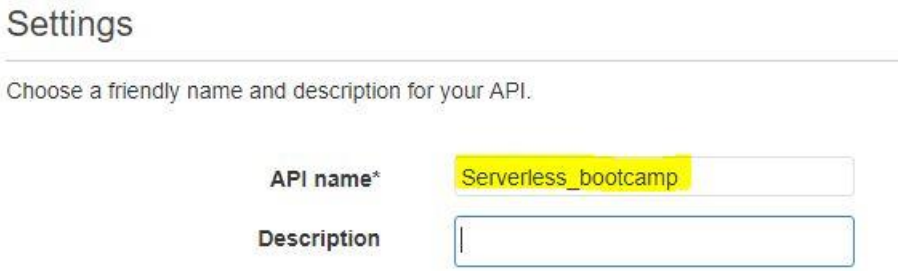
4.2. In the welcome page, click 'Get Started'.

4.3. In the prompt, click 'OK' to create a new API



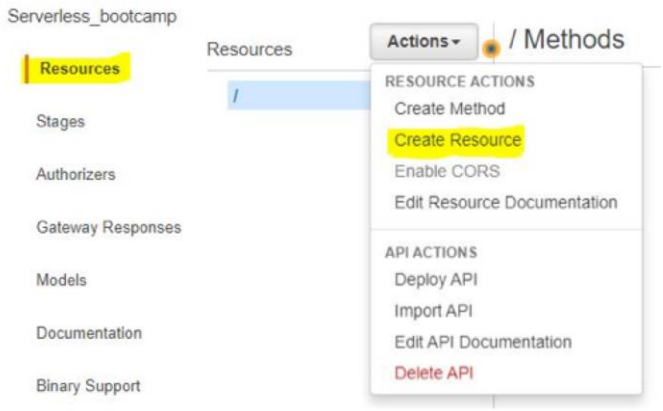
4.4. Select 'New API' in the 'Create new API'

4.5. Type-in API name in 'API name', then click 'Create API'



4.6. The console will show the information as below:

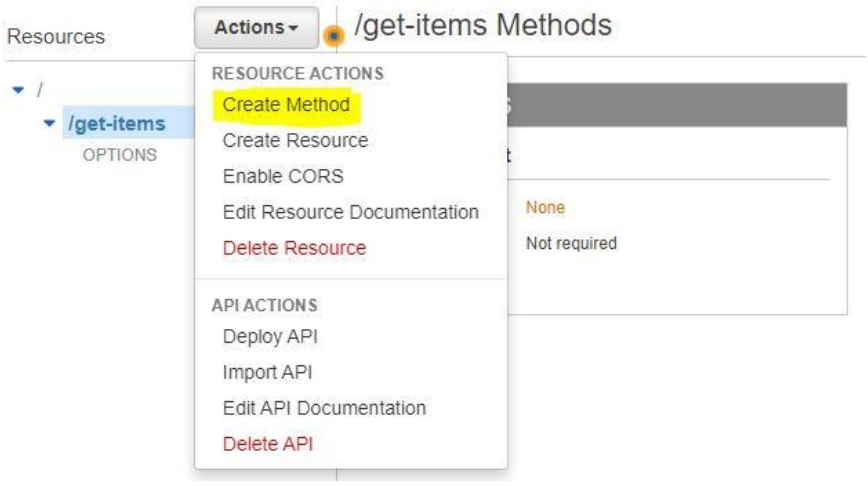
4.7. In the "Resources" tab, choose the root "/", click "Actions" and select "Create Resource".



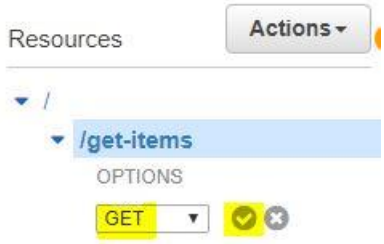
4.8. Type a name in the 'Resource Name', for example: 'get-item'.

4.9. Make sure 'Enable API Gateway CORS' is enabled.

4.10. After resource being created, click "Actions" and select "Create Method" to add method



4.11. In the drop-down list, select 'GET' method and click 'yes'.



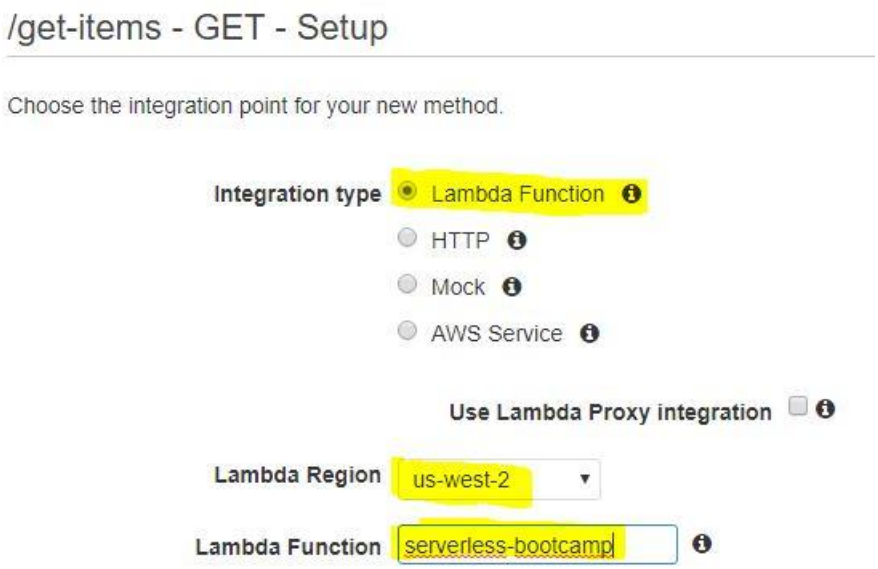
4.12. In the setup page as below:

a. Select "Lambda Function" for "Integration type"

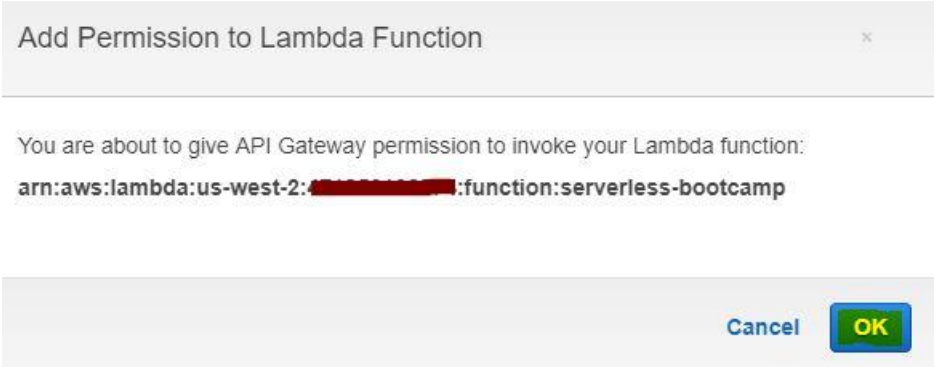
b. Choose "us-west-2" in the "Lambda Region"

c. Type-in the Lambda function created in previous chapter in the "Lambda Function"

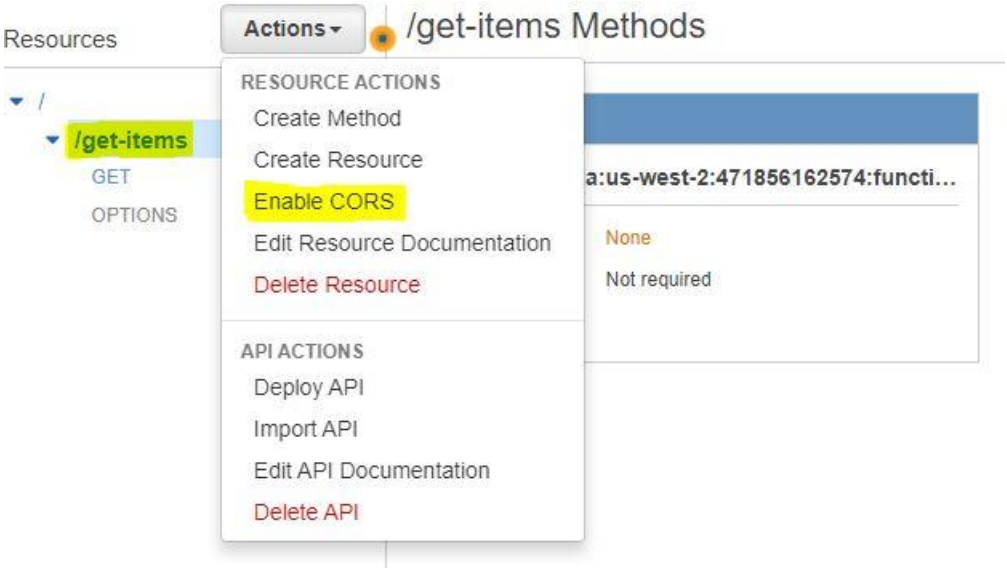
d. Click "Save"



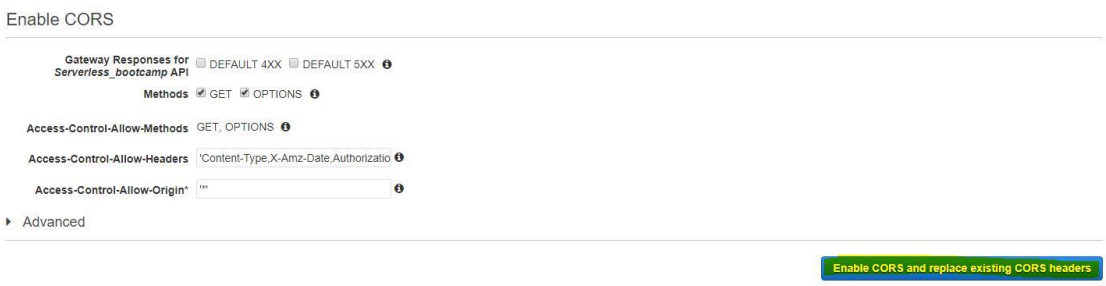
4.13. Click 'OK' to give API Gateway permission to invoke Lambda function



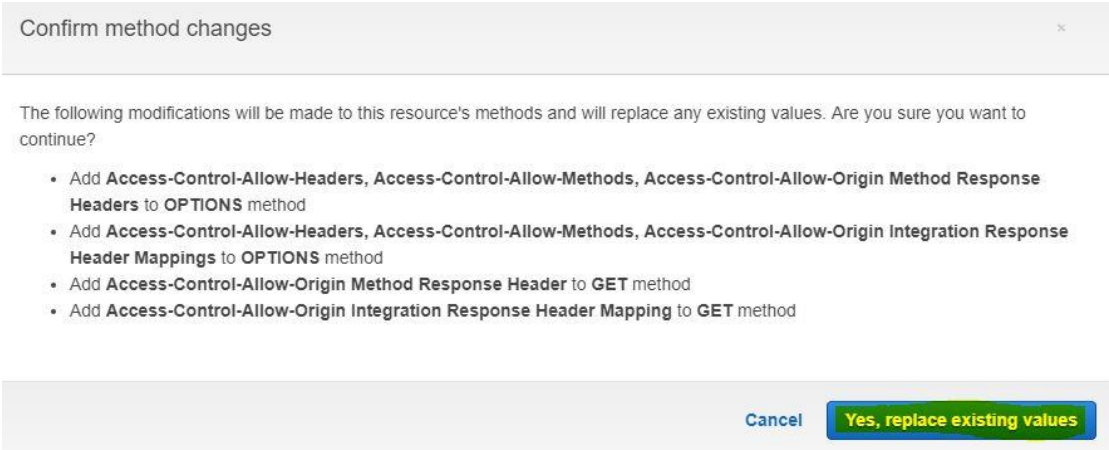
4.14. Click 'Actions' within Resource layer, and select 'Enable CORS'



4.15. Select "Enable CORS and replace existing CORS headers"



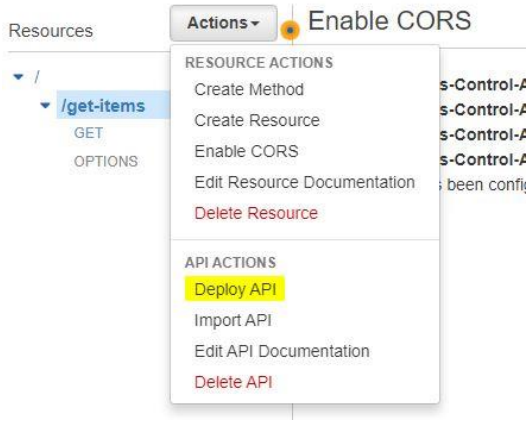
4.16. Review and click "Yes, replace existing values"



4.17. Waiting the steps all be checked

Deploy APIs

4.18. Click 'Actions' and select 'Deploy API'

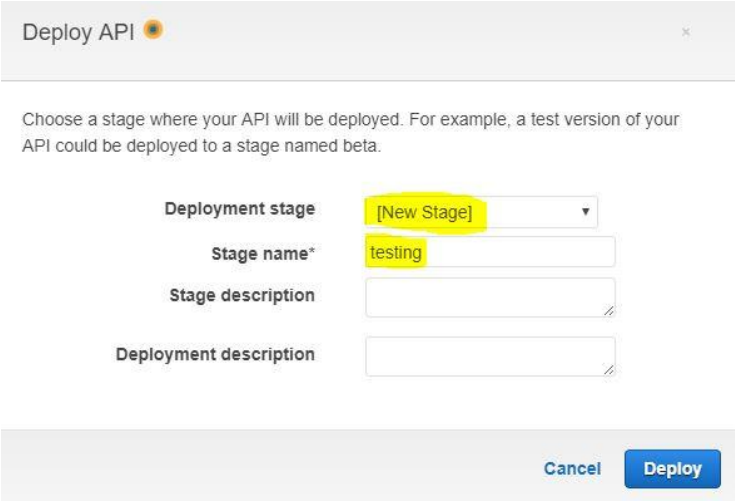


4.19. In the prompt console,

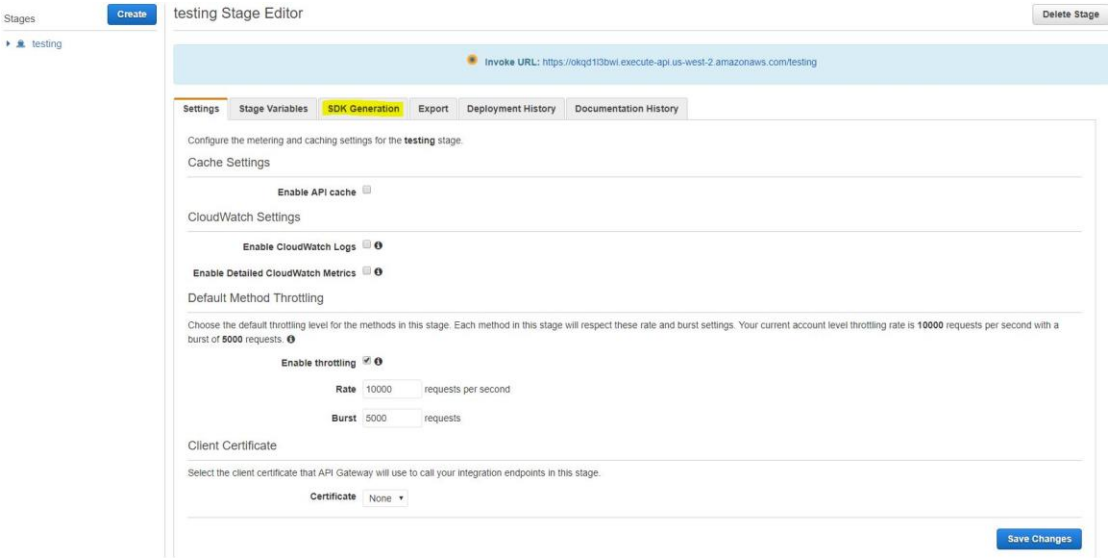
a. Select '[New Stage]' in Deployment stage

b. Give the name for "Stage name"

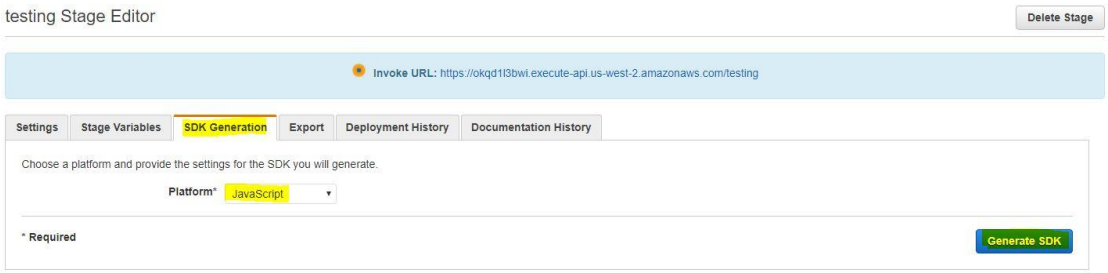
c. Click 'Deploy'



4.20. The console would jump out as below, select the 'SDK Generation' tab



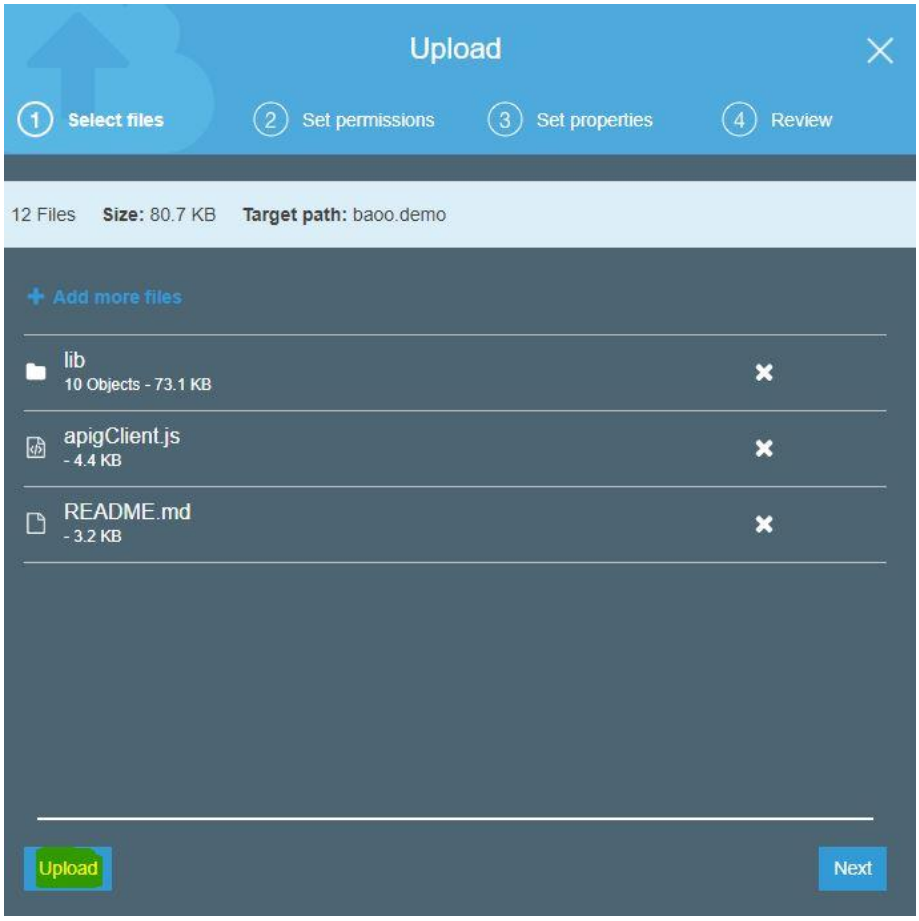
4.21. In the 'SDK Generation' tab, select 'JavaScript' in the 'Platform' field and click 'Generate SDK'



4.22. The browser would ask you to confirm download a zip file named as 'javascript_<TIMESTAMP>.zip'

4.23. Save and unzip the zip file, after entering the folder, there would be files show as below:

4.24. Upload those files to the S3 Bucket created in Chapter S3, must to be the same layer as the html.



4.25. Modify the javascript in the html file to your APIs & data in DynamoDB

```
apigClient.getItemsGet(params, body, additionalParams)
    .then(function(result){
        var txt = '';
          myObj = JSON.parse(this.responseText);
        txt += "<table border='1'>"
        txt += "<tr>";
        txt += "<td>" + "id" + "</td>";
        txt += "<td>" + "season" + "</td>";
        txt += "<td>" + "weather" + "</td>";
        txt += "<td>" + "weekday" + "</td>";
        txt += "<td>" + "workingday" + "</td>";
        txt += "<td>" + "month" + "</td>";
        txt += "<td>" + "count" + "</td>";
        txt += "</tr>";
        for (x in result.data) {
          console.log(result.data[x]);
          txt += "<tr>";
          txt += "<td>" + result.data[x].id.N + "</td>";
          txt += "<td>" + result.data[x].season.S + "</td>";
          txt += "<td>" + result.data[x].weather.S + "</td>";
          txt += "<td>" + result.data[x].weekday.S + "</td>";
          txt += "<td>" + result.data[x].workingday.BOOL + "</td>";
          txt += "<td>" + result.data[x].month.N + "</td>";
          txt += "<td>" + result.data[x].count.N + "</td>";
          txt += "</tr>";
        }
        txt += "</table>"
        document.getElementById("items_list").innerHTML = txt;
        return result;
    }).catch( function(result){
        console.log(result);
    });
```

4.26. Reload the web page and click button to test your API

Conclusion

Congratulations! You now have learned how to:

- Create a static website hosting through S3
- Create a Lambda function
- Create DynamoDB Table
- Create API though API Gateway