



Multi-Region Application

HOMEWORK #4

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Data 228 - Big Data Technologies and Applications

Department of Applied Data Science

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Build a Multi-Region Serverless Application for Resilience and High Availability

- <https://github.com/enghwa/MultiRegion-Serverless-Workshop>

1. Create AWS Cloud9 Environment

Creating AWS Cloud9 Environment

The screenshot shows the AWS Cloud9 'Environments' page with the environment 'DataDivasCloud9Env' selected. The 'Environment details' section displays the following configuration:

Environment details	
Name	DataDivasCloud9Env
Description	No description provided
Type	EC2
Permissions	Owner
Owner ARN	arn:aws:iam::986684184155:root
EC2 instance type	t2.micro
Memory	1 GiB
vCPU	1
Storage	EBS only
Security groups	sg-073ddafac109615fc
VPC	vpc-094169b7e210c755b
Subnet	subnet-019dfc6867dac635b
EC2 Instance	Go To Instance
Environment path	/home/ec2-user/environment
Environment ARN	arn:aws:cloud9:us-east-1:986684184155:environment:8c5a9b94c32d465198514b389d144108
Number of members	1
Lifecycle State	CREATED

Executing the shell commands in Cloud9

```
ec2-user:~/environment $ nvm install 8.9.1
Downloading and installing node v8.9.1...
Downloaded https://nodejs.org/dist/v8.9.1/node-v8.9.1-linux-x64.tar.xz...
#####
Computing checksum with sha256sum
Checksums matched!
Now using node v8.9.1 (npm v5.5.1)
ec2-user:~/environment $ nvm alias default v8.9.1
default -> v8.9.1
```

Verifying right node and npm

```
ec2-user:~/environment $ npm -v
5.5.1
ec2-user:~/environment $ node -v
v8.9.1
ec2-user:~/environment $ $ nvm ls
bash: $: command not found
ec2-user:~/environment $ nvm ls
->      v8.9.1
      v16.14.2
      system
default -> v8.9.1
iojs -> N/A (default)
unstable -> N/A (default)
node -> stable (-> v16.14.2) (default)
stable -> 16.14 (-> v16.14.2) (default)
lts/* -> lts/gallium (-> v16.14.2)
lts/argon -> v4.9.1 (-> N/A)
lts/boron -> v6.17.1 (-> N/A)
lts/carbon -> v8.17.0 (-> N/A)
lts/dubnium -> v10.24.1 (-> N/A)
lts/erbium -> v12.22.11 (-> N/A)
lts/fermium -> v14.19.1 (-> N/A)
lts/gallium -> v16.14.2
```

Cloning the Workshop Project

```
ec2-user:~/environment $ git clone https://github.com/enghwa/MultiRegion-Serverless-Workshop.git
Cloning into 'MultiRegion-Serverless-Workshop'...
remote: Enumerating objects: 874, done.
remote: Total 874 (delta 0), reused 0 (delta 0), pack-reused 874
Receiving objects: 100% (874/874), 15.52 MiB | 29.60 MiB/s, done.
Resolving deltas: 100% (377/377), done.
```

2. Build an API layer

Using CLI Method

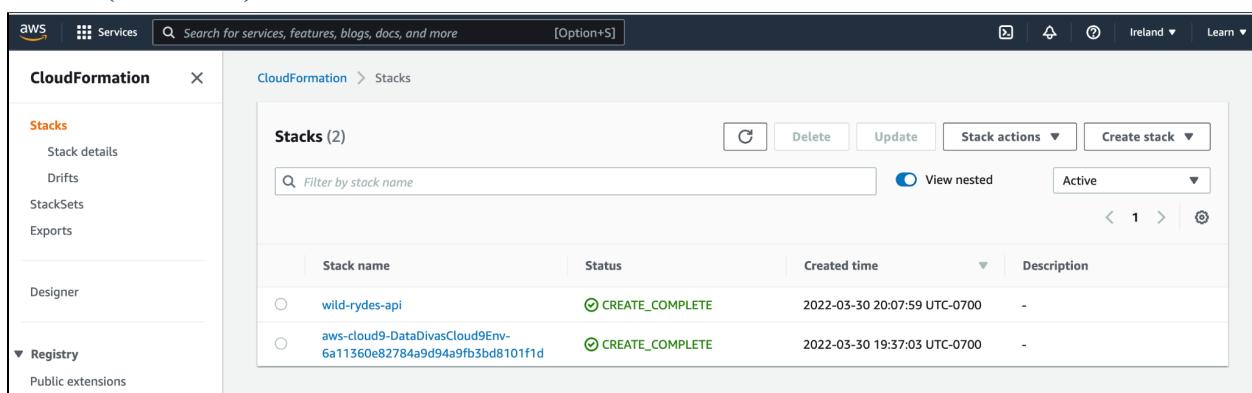
1. Create an S3 bucket to store the app code

```
bash - "ip-172-31-18-91.ei" ✘ Immediate ✘ +  
ec2-user:~/environment $ aws s3 mb s3://multiregion-wildrydesdatadivas-ireland --region eu-west-1  
make_bucket: multiregion-wildrydesdatadivas-ireland  
ec2-user:~/environment $ aws s3 mb s3://multiregion-wildrydesdatadivas-singapore --region ap-southeast-1  
make_bucket: multiregion-wildrydesdatadivas-singapore  
ec2-user:~/environment $ cd /home/ec2-user/environment/MultiRegion-Serverless-Workshop/1_API  
ec2-user:~/environment/MultiRegion-Serverless-Workshop/1_API (master) $ aws cloudformation package \  
> --region eu-west-1 \  
> --template-file wild-rydes-api.yaml \  
> --output-template-file wild-rydes-api-output.yaml \  
> --s3-bucket multiregion-wildrydesdatadivas-ireland  
Uploading to 65dc089c5f6445553f1cc3b732684e25 4516395 / 4516395.0 (100.00%)  
Successfully packaged artifacts and wrote output template to file wild-rydes-api-output.yaml.  
Execute the following command to deploy the packaged template  
aws cloudformation deploy --template-file /home/ec2-user/environment/MultiRegion-Serverless-Workshop/1_API/wild-rydes-api-output.yaml --stack-name <YOUR STACK NAME>
```

2. Package up the API code and push to S3

```
bash - "ip-172-31-18-91.ei" ✘ Immediate (Javascript (brow ✘ +  
}  
ec2-user:~/environment/MultiRegion-Serverless-Workshop/1_API (master) $ aws cloudformation deploy \  
> --region eu-west-1 \  
> --template-file wild-rydes-api-output.yaml \  
> --stack-name wild-rydes-api \  
> --capabilities CAPABILITY_IAM  
  
Waiting for changeset to be created..  
Waiting for stack create/update to complete  
Successfully created/updated stack - wild-rydes-api  
ec2-user:~/environment/MultiRegion-Serverless-Workshop/1_API (master) $ aws cloudformation deploy \  
> --region ap-southeast-1 \  
> --template-file wild-rydes-api-output-ap-southeast-1.yaml \  
> --stack-name wild-rydes-api \  
> --capabilities CAPABILITY_IAM  
  
Waiting for changeset to be created..  
Waiting for stack create/update to complete  
Successfully created/updated stack - wild-rydes-api
```

Ireland(eu-west-1)



The screenshot shows the AWS CloudFormation console with the 'CloudFormation' service selected. On the left, there's a navigation sidebar with 'CloudFormation' selected, followed by 'Stacks', 'Designer', and 'Registry' sections. The main area is titled 'CloudFormation > Stacks' and shows a table of stacks. The table has columns for 'Stack name', 'Status', 'Created time', and 'Description'. There are two entries:

Stack name	Status	Created time	Description
wild-rydes-api	CREATE_COMPLETE	2022-03-30 20:07:59 UTC-0700	-
aws-cloud9-DataDivasCloud9Env-6a11360e82784a9d94a9fb3bd8101f1d	CREATE_COMPLETE	2022-03-30 19:37:03 UTC-0700	-

Singapore(ap-southeast-1)

The screenshot shows the AWS CloudFormation console with the 'Stacks' tab selected. A single stack named 'wild-rydes-api' is listed, showing a status of 'CREATE_COMPLETE' and a creation time of '2022-03-30 20:10:31 UTC-0700'. The interface includes standard navigation and action buttons like 'Delete', 'Update', 'Stack actions', and 'Create stack'.

3. Deploy a stack of resources

Confirming that API is working by copying the API URL for /ticket

Ireland(eu-west-1)

A screenshot of a browser window showing a successful API response. The URL is 'ccjzsk8xpf.execute-api.eu-west-1.amazonaws.com/prod/ticket'. The response body is a JSON object: {"Items": [], "Count": 0, "ScannedCount": 0}.

Singapore(ap-southeast-1)

A screenshot of a browser window showing a successful API response. The URL is 'nreh9fxnx9.execute-api.ap-southeast-1.amazonaws.com/prod/ticket'. The response body is a JSON object: {"Items": [], "Count": 0, "ScannedCount": 0}.

Confirming that API is working by copying the API URL for /health

Ireland(eu-west-1)

A screenshot of a browser window showing a successful API response. The URL is 'ccjzsk8xpf.execute-api.eu-west-1.amazonaws.com/prod/health'. The response body is a JSON object: {"region": "eu-west-1", "message": "Successful response reading from DynamoDB table."}.

Singapore(ap-southeast-1)

A screenshot of a browser window showing a successful API response. The URL is 'nreh9fxnx9.execute-api.ap-southeast-1.amazonaws.com/prod/health'. The response body is a JSON object: {"region": "ap-southeast-1", "message": "Successful response reading from DynamoDB table."}.

Enable DynamoDB Global Table using CLI

```
bash - "ip-172-31-18-91.ei" ✘ Immediate (Javascript (brow × ④
ec2-user:~/environment/MultiRegion-Serverless-Workshop/1_API (master) $ aws dynamodb create-global-table \
> --global-table-name SXRTickets \
> --replication-group RegionName=eu-west-1 RegionName=ap-southeast-1 \
> --region eu-west-1
{
  "GlobalTableDescription": {
    "GlobalTableStatus": "CREATING",
    "GlobalTableName": "SXRTickets",
    "ReplicationGroup": [
      {
        "RegionName": "ap-southeast-1"
      },
      {
        "RegionName": "eu-west-1"
      }
    ],
    "CreationDateTime": 1648696978.964,
    "GlobalTableArn": "arn:aws:dynamodb::461442691217:global-table/SXRTickets"
  }
}
```

3. Build a UI layer

1. Create the AWS Cognito Identity Pool, S3 bucket and Cloudfront distribution

AWS CloudFormation Deploy in eu-west-1 (Ireland)

```
aws cloudformation deploy \
--region eu-west-1 \
--template-file web-ui-stack.yaml \
--stack-name ticket-service-ui \
--capabilities CAPABILITY_IAM
```

```
ec2-user:~/environment/MultiRegion-Serverless-Workshop/1_API (master) $ cd /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI/cfn
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI/cfn (master) $ aws cloudformation deploy \
> --region eu-west-1 \
> --template-file web-ui-stack.yaml \
> --stack-name ticket-service-ui \
> --capabilities CAPABILITY_IAM

Waiting for changeset to be created..
Waiting for stack create/update to complete
Successfully created/updated stack - ticket-service-ui
```

The screenshot shows the AWS CloudFormation console interface. On the left, there's a sidebar with options like Stacks, Drifts, StackSets, and Registry. The main area shows a list of stacks under 'Stacks (3)'. One stack is selected: 'ticket-service-ui' (Status: CREATE_COMPLETE, Last updated: 2022-03-30 20:24:11 UTC-0700). The 'Outputs' tab is active, listing two outputs:

Key	Value	Description	Export name
BucketName	ticket-service-ui-websitebucket-1v6h833bd5d1y	The name of the website bucket	-
CognitoIdentityPoolId	eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015	Cognito Identity Pool Id	ticket-service-ui-CognitoIdentityPoolId

CognitoIdentityPoolID Value:

eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015

BucketName Value:

Ticket-service-ui-websitebucket-1v6h833bd5d1y

Cloudfront distribution for S3 Bucket

```
aws cloudformation deploy \
--region eu-west-1 \
--template-file webs3bucket_with_cloudfront.yaml \
--stack-name ticket-service-ui-cloudfront \
--parameter-overrides S3BucketName=ticket-service-ui-websitebucket-1v6h833bd5d1y
```

```
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI/cfn (master) $ aws cloudformation deploy \
> --region eu-west-1 \
> --template-file webs3bucket_with_cloudfront.yaml \
> --stack-name ticket-service-ui-cloudfront \
> --parameter-overrides S3BucketName=ticket-service-ui-websitebucket-1v6h833bd5d1y

Waiting for changeset to be created..
Waiting for stack create/update to complete
Successfully created/updated stack - ticket-service-ui-cloudfront
```

The screenshot shows the AWS CloudFormation console interface. On the left, there's a sidebar with navigation links like 'Stacks', 'Drifts', 'StackSets', 'Exports', 'Designer', 'Registry' (with 'Public extensions', 'Activated extensions', and 'Publisher' listed), and 'Feedback'. The main area is titled 'ticket-service-ui-cloudfront' and shows a list of stacks. One stack, 'ticket-service-ui-cloudfront', is selected and highlighted with a blue border. It was created on 2022-03-30 at 20:32:09 UTC-0700 and is in the 'CREATE_COMPLETE' state. Below this, there are other stacks like 'ticket-service-ui' and 'wild-rydes-api', also in 'CREATE_COMPLETE' state. To the right of the stack list, there are tabs for 'Stack info', 'Events', 'Resources', 'Outputs' (which is currently selected and highlighted in orange), 'Parameters', 'Template', and 'Change sets'. Under the 'Outputs' tab, there is a table with three rows:

Key	Value	Description	Export name
CfDistributionDomainNameWithOAI	d16rls6uyd624v.cloudfront.net	Domain name for our cloudfront distribution	-
CfDistributionWithOAI	E2CCGF1I42D5MJ	Id for our cloudfront distribution	-
S3BucketName	ticket-service-ui-websitebucket-1v6h833bd5d1y	Bucket name	-

CfDistributionDomainNameWithOAI Value:

d16rls6uyd624v.cloudfront.net

2. Configure Federated Identities with Cognito

Creating a New App

Meta for Developers

Provide basic information

Type: wildryde-TT

Display name: wildryde-TT

App contact email: saranya_july4@yahoo.co.in

Business Account · Optional: No Business Manager account selected

By proceeding, you agree to the [Facebook Platform Terms](#) and [Developer Policies](#).

Previous Create app

Meta for Developers

App ID: 823899738592555 In development

Still using saranya_july4@yahoo.co.in? Visit your [developer settings](#) to update your email address and notification settings.

Dashboard

Settings

Roles

Alerts

App Review

Products Add Product

Activity Log

Activity Log

Add a product

Facebook Login

The world's number one social login product.

Read Docs Set up

Audience Network

Monetize your app and grow revenue with ads from Meta advertisers.

Read Docs Set up

App Events

Understand how people engage with your business across apps, devices, platforms and websites.

Read Docs Set up

Adding Platform

Select Platform

 Website <input checked="" type="checkbox"/>	 Xbox <input type="checkbox"/>
 iOS <input type="checkbox"/>	 PlayStation <input type="checkbox"/>
 Android 12 app stores available <input type="checkbox"/>	
 Windows App <input type="checkbox"/>	
 Page Tab <input type="checkbox"/>	

Cancel **Next**

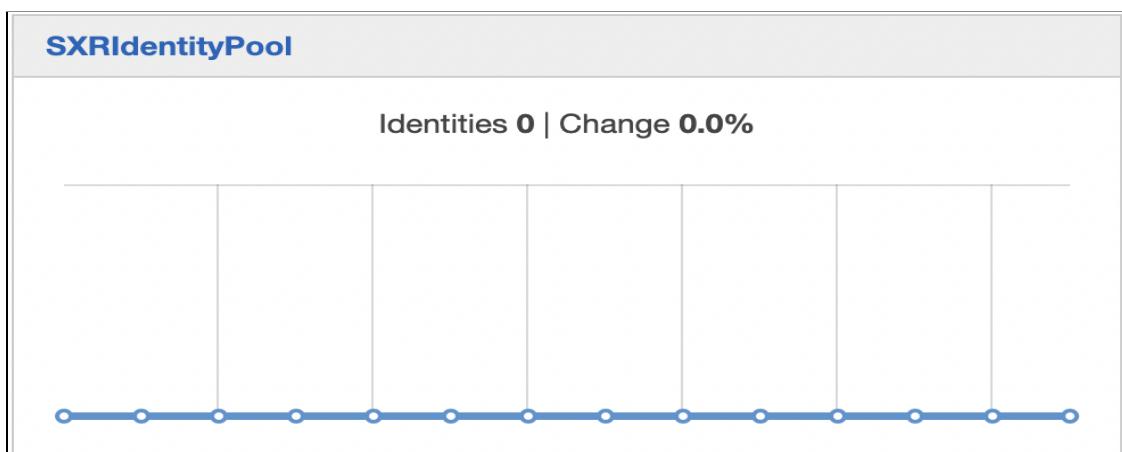
Website

Site URL

Quick Start **X**

App ID: 823899738592555

Cognito Identity Pool with Facebook as identity provider



Edit identity pool

From this page you can modify the details of your identity pool. An identity pool must have a unique name and a set of authenticated and unauthenticated roles. The roles are saved with your identity pool and whenever we receive a request to authorize a user we will automatically utilize the roles you specify here. You will be required to specify the identity pool id from this page when initializing the Amazon Cognito client SDK. [Learn more about using IAM roles with Amazon Cognito.](#)

Identity pool name*

Identity pool ID ⓘ eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015 [\(Show ARN\)](#)

Identity pool ID: eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015

▼ Authentication providers ⓘ

Amazon Cognito supports the following authentication methods with Amazon Cognito Sign-In or any public provider. If you allow your users to authenticate using any of these public providers, you can specify your application identifiers here. Warning: Changing the application ID that your identity pool is linked to will prevent existing users from authenticating using Amazon Cognito. [Learn more about public identity providers.](#)

Facebook App ID

3. Configure and build the application code

Configuring the attributes in Environment.ts file

```
1 export const environment = {
2   production: true,
3
4   // TODO: make sure you have the correct region
5   region: 'eu-west-1',
6
7
8   // TODO: This id can be retrieved in output section of the cognito ui
9   // cloud formation stack.
10  // cognitoIdentityPoolId: 'eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015 ',
11  // TODO: Facebook app id can be retrieved from the application in your
12  // facebook developer account.
13  // facebookAppId: '823899738592555',
14
15  // TODO: The API URL is available in the API Gateway console under Stage
16  // NOTE: don't forget trailing "/" For example:
17  // https://api.example.com/prod/
18  // ticketAPI: 'https://ccjzsk8xp.f.execute-api.eu-west-1.amazonaws.com/prod/'
```

```

ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ aws s3 sync --delete dist/ s3://ticket-service-ui-websitebucket-1v6h833bd5d1y
upload: dist/assets/js/aws-cognito-sdk.min.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/cognito-sdk.min.js
upload: dist/main.bundle.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/main.bundle.js
upload: dist/data-table.bce071e976865da51100.eot to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/data-table.bce071e976865da51100.eot
upload: dist/data-table.b0aebd744ce7adb780a9.svg to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/data-table.b0aebd744ce7adb780a9.svg
upload: dist/assets/js/aws/amazon-cognito-identity.min.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/amazon-cognito-identity.min.js
upload: dist/inline.bundle.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/inline.bundle.js.map
upload: dist/index.html to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/index.html
upload: dist/favicon.ico to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/favicon.ico
upload: dist/main.bundle.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/main.bundle.js.map
upload: dist/assets/js/aws/amazon-cognito-identity.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/amazon-cognito-identity.js
upload: dist/assets/js/aws/aws-cognito-sdk.min.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/cognito-sdk.min.js.map
upload: dist/polyfills.bundle.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/polyfills.bundle.js
upload: dist/assets/js/aws-cognito-sdk.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/cognito-sdk.js
upload: dist/polyfills.bundle.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/polyfills.bundle.js.map
upload: dist/inline.bundle.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/inline.bundle.js
upload: dist/assets/js/amazon-login.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/amazon-login.js
upload: dist/assets/js/aws-aws-sdk.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws-aws-sdk.js
upload: dist/styles.bundle.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/styles.bundle.js
upload: dist/styles.bundle.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/styles.bundle.js.map
upload: dist/views.module.chunk.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/views.module.chunk.js
upload: dist/views.module.chunk.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/views.module.chunk.js.map
upload: dist/assets/js/aws/amazon-cognito-identity.min.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/assets/js/aws/amazon-cognito-identity.min.js.map
upload: dist/vendor.bundle.js to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/vendor.bundle.js
upload: dist/vendor.bundle.js.map to s3://ticket-service-ui-websitebucket-1v6h833bd5d1y/vendor.bundle.js.map
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ 

```

Build your AngularJS Project

Running npm install to install project dependencies

```

ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI/cfn (master) $ cd /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ npm install
npm WARN deprecated core-js@2.6.12: core-js@3.4 is no longer maintained and not recommended for usage due to the number of issues. Because of the V8 engine warnings, feature detection in old core-js versions could cause a slowdown up to 100x even if nothing is polyfilled. Please, upgrade your dependencies to the actual version of core-js.
npm WARN deprecated @angular/http@4.4.7: Package no longer supported. Use @angular/common instead, see https://angular.io/guide/deprecations#angularhttp
npm WARN deprecated chokidar@1.7.0: Chokidar 2 will break on node v14+. Upgrade to chokidar 3 with 15x less dependencies.
npm WARN notice [SECURITY] lodash has the following vulnerabilities: 4 high, 2 low. Go here for more details: https://github.com/advisories?query=lodash - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] socket.io has the following vulnerability: 1 moderate. Go here for more details: https://github.com/advisories?query=socket.io - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN deprecated extract-text-webpack-plugin@3.0.0: Deprecated. Please use https://github.com/webpack-contrib/mini-css-extract-plugin
npm WARN deprecated html-webpack-plugin@2.30.1: out of support
npm WARN notice [SECURITY] webpack-dev-server has the following vulnerability: 1 high. Go here for more details: https://github.com/advisories?query=webpack-dev-server - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] moment has the following vulnerability: 1 high. Go here for more details: https://github.com/advisories?query=moment - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] glob-parent has the following vulnerability: 1 moderate. Go here for more details: https://github.com/advisories?query=glob-parent - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN deprecated fsevents@1.2.13: fsevents 1 will break on node v14+ and could be using insecure binaries. Upgrade to fsevents 2.
npm WARN notice [SECURITY] braces has the following vulnerability: 1 low. Go here for more details: https://github.com/advisories?query=braces - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] minimist has the following vulnerability: 1 moderate. Go here for more details: https://github.com/advisories?query=minimist - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] debug has the following vulnerability: 1 low. Go here for more details: https://github.com/advisories?query=debug - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN notice [SECURITY] https-proxy-agent has the following vulnerabilities: 1 critical, 1 moderate. Go here for more details: https://github.com/advisories?query=https-proxy-agent - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.
npm WARN deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
npm WARN notice [SECURITY] postcss has the following vulnerability: 1 moderate. Go here for more details: https://github.com/advisories?query=postcss - Run `npm i npm@latest -g` to upgrade your npm version, and then `npm audit` to get more info.

```

```

> https://opencollective.com/core-js
> https://www.patreon.com/zloirock

Also, the author of core-js ( https://github.com/zloirock ) is looking for a good job -)

> es5-ext@0.10.59 postinstall /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI/node_modules/es5-ext
> node -e "try{require('./_postinstall')}catch(e){}"

> uglifyjs-webpack-plugin@0.4.6 postinstall /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI/node_modules/uglifyjs-webpack-plugin
> node lib/post_install.js

> node-sass@4.14.1 postinstall /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI/node_modules/node-sass
> node scripts/build.js

Binary found at /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI/node_modules/node-sass/vendor/linux-x64-57/binding.node
Testing binary
Binary is fine
npm notice created a lockfile as package-lock.json. You should commit this file.
npm warn optional SKIPPING OPTIONAL DEPENDENCY: fsevents@~2.3.2 (node_modules/chokidar/node_modules/fsevents):
npm warn notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@2.3.2: wanted {"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"})
npm warn optional SKIPPING OPTIONAL DEPENDENCY: fsevents@^1.2.7 (node_modules/watchpack-chokidar2/node_modules/chokidar/node_modules/fsevents):
npm warn notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.13: wanted {"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"})
npm warn optional SKIPPING OPTIONAL DEPENDENCY: fsevents@~1.0.0 (node_modules/webpack-dev-server/node_modules/chokidar/node_modules/fsevents):
npm warn notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.13: wanted {"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"})
npm warn optional SKIPPING OPTIONAL DEPENDENCY: fsevents@^1.0.0 (node_modules/karma/node_modules/chokidar/node_modules/fsevents):
npm warn notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.13: wanted {"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"})
added 1385 packages in 52.792s

```

Building the app

```

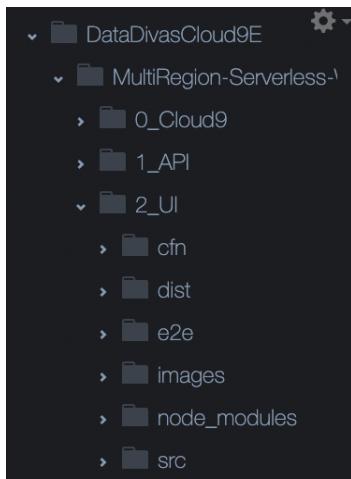
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ npm run build

> sxr-ui@0.0.0 build /home/ec2-user/environment/MultiRegion-Serverless-Workshop/2_UI
> ng build

Date: 2022-03-31T01:34:03.081Z
Hash: 6e7760fe9333ea6c3ae4
Time: 13398ms
chunk {inline} inline.bundle.js, inline.bundle.js.map (inline) 5.83 kB [entry] [rendered]
chunk {main} main.bundle.js, main.bundle.js.map (main) 41.3 kB [vendor] [initial] [rendered]
chunk {polyfills} polyfills.bundle.js, polyfills.bundle.js.map (polyfills) 235 kB {inline} [initial] [rendered]
chunk {styles} styles.bundle.js, styles.bundle.js.map (styles) 574 kB {inline} [initial] [rendered]
chunk {vendor} vendor.bundle.js, vendor.bundle.js.map (vendor) 3 MB [initial] [rendered]
chunk {views.module} views.module.chunk.js, views.module.chunk.js.map () 396 kB {main} [rendered]
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ 

```

Creating a dist/ folder containing the compiled app



4. Upload the application

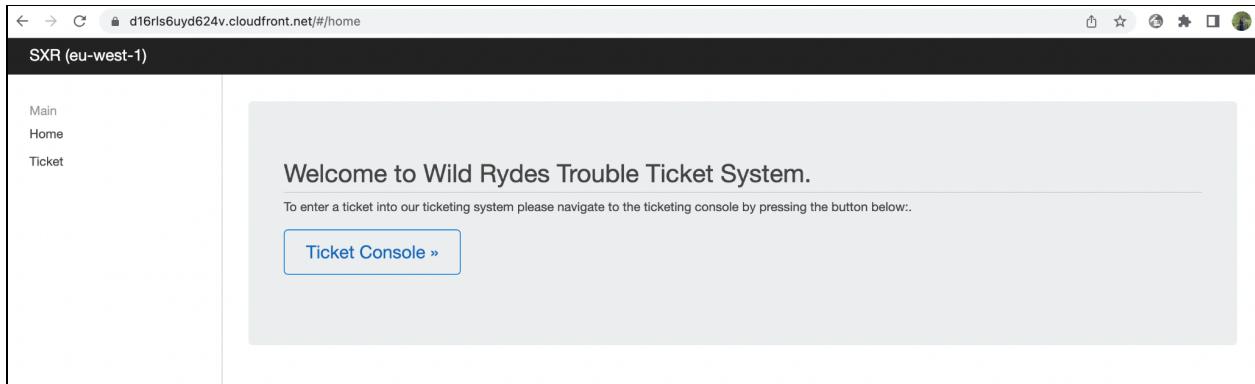
```
aws s3 sync --delete dist/ s3://ticket-service-ui-websitebucket-1v6h833bd5d1y
```

The screenshot shows the Facebook App Review settings page for an app with App ID 823899738592555. The app is named 'wildryde-TT' and has the domain 'd16rls6uyd624v.cloudfront.net'. The privacy policy URL is 'http://d16rls6uyd624v.cloudfront.net/'. The app icon is a placeholder image. The category is set to 'Education'. The contact email is 'saranya_july4@yahoo.co.in'. The terms of service URL is 'Terms of Service for Login dialog and App Details'. The namespace is empty. The app purpose is described as 'This app's primary purpose is to access and use data from Facebook's Platform on behalf of:'.

App ID 823899738592555	App secret ***** Show
Display name wildryde-TT	Namespace
App domains d16rls6uyd624v.cloudfront.net	Contact email ⓘ saranya_july4@yahoo.co.in
Privacy Policy URL http://d16rls6uyd624v.cloudfront.net/	Terms of Service URL Terms of Service for Login dialog and App Details
App icon (1024 x 1024) 	Category Education
Find out more information about app categories here	
App purpose This app's primary purpose is to access and use data from Facebook's Platform on behalf of:	

Went Live:

The screenshot shows the Facebook App Dashboard for the same app. The status is now 'Live'. The dashboard includes sections for Settings (Basic, Advanced), Roles, Alerts (with 1 notification), App Review (with 1 notification), Products, Activity Log, and an Activity Log section. The right side of the screen displays the same app configuration details as the previous screenshot, including the app ID, display name, domains, URLs, icon, category, and contact information.



4. Route53

1. Configure Route53 Domain

Purchasing a domain Name

Domain Name	Status	Price /1 Year	Action
datadivasdomain.com	✓ Available - In Cart	\$12.00	Add to cart

Domain Name	Status	Price /1 Year	Action
bigdatadivasdomain.com	✓ Available	\$12.00	Add to cart
clouddivasdomain.com	✓ Available	\$12.00	Add to cart
clouddivasdomain.net	✓ Available	\$11.00	Add to cart
datadivasdomain.net	✓ Available	\$11.00	Add to cart

Domain Name	Privacy Protection	Expiration Date	Auto Renew	Transfer Lock
datadivasdomain.com	All contacts	March 30, 2023	✓	✗

2. Configure ACM and Custom Domains in API Gateway

2.1 Configure a certificate in Certificate Manager in each region

Request public certificate

Domain names

Fully qualified domain name [Info](#)
datadivasdomain.com

Add another name to this certificate
You can add additional names to this certificate. For example, if you're requesting a certificate for "www.example.com", you might want to add the name "example.com" so that customers can reach your site by either name.

Select validation method [Info](#)
Select a method for validating domain ownership

DNS validation - recommended
Choose this option if you are authorized to modify the DNS configuration for the domains in your certificate request.

Email validation
Choose this option if you do not have permission or cannot obtain permission to modify the DNS configuration for the domains in your certificate request.

AWS Certificate Manager > Certificates > 07b6b0ec-1e95-4339-9b90-40f2191b6a44

07b6b0ec-1e95-4339-9b90-40f2191b6a44

Delete

Certificate status

Identifier 07b6b0ec-1e95-4339-9b90-40f2191b6a44	Status Pending validation
ARN arn:aws:acm:eu-west-1:461442691217:certificate/07b6b0ec-1e95-4339-9b90-40f2191b6a44	Detailed status The status of this certificate request is "Pending validation". Further action is needed to validate and approve the certificate. Info
Type Amazon Issued	

Domains (2)

Create records in Route 53 Export to CSV

Domain	Status	Renewal status	Type	CNAME name	CNAME value
datadivasdomain.com	Pending validation	-		Edit	Edit
*.datadivasdomain.com	Pending validation	-		Edit	Edit

AWS Certificate Manager > Certificates > 07b6b0ec-1e95-4339-9b90-40f2191b6a44 > Create DNS records in Amazon Route 53

Create DNS records in Amazon Route 53 (2/2)

<input checked="" type="checkbox"/> Domain	Validation status	Type	CNAME name	CNAME value	Is domain in Route 53?
datadivasdomain.com	Pending validation	CNAME	_89987a30725c4f1cc05fdfd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.	Yes
*.datadivasdomain.com	Pending validation	CNAME	_89987a30725c4f1cc05fdfd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.	Yes

[Cancel](#) [Create records](#)

⌚ Successfully created DNS records

Successfully created DNS records in Amazon Route 53 for certificate with ID 07b6b0ec-1e95-4339-9b90-40f2191b6a44.

Ireland

AWS Certificate Manager > Certificates > 07b6b0ec-1e95-4339-9b90-40f2191b6a44

Certificate status

Identifier 07b6b0ec-1e95-4339-9b90-40f2191b6a44	Status Issued
ARN arn:aws:acm:eu-west-1:461442691217:certificate/07b6b0ec-1e95-4339-9b90-40f2191b6a44	Detailed status The certificate was issued at March 30, 2022, 21:50:52 (UTC-07:00).
Type Amazon Issued	

Domains (2)

Domain	Status	Renewal status	Type	CNAME name	CNAME value
datadivasdomain.com	Success	-	CNAME	_89987a30725c4f1cc05fdfd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.
*.datadivasdomain.com	Success	-	CNAME	_89987a30725c4f1cc05fdfd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.

[Create records in Route 53](#) [Export to CSV](#)

Singapore

The screenshot shows the AWS Certificate Manager console. A certificate named "452d4507-8f71-449f-863c-e954a477d199" has been issued. The "Domains" section lists two entries:

Domain	Status	Renewal status	Type	CNAME name	CNAME value
datadivasdomain.com	Success	-	CNAME	_89987a30725c4f1cc05fd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.
*.datadivasdomain.com	Success	-	CNAME	_89987a30725c4f1cc05fd7cb11258e.datadivasdomain.com.	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.

2.2 Configure custom domains on each API in each region

The screenshot shows the AWS API Gateway console under the "Custom domain names" section. A new domain name "api.datadivasdomain.com" is being created. The "Domain details" section includes the following configuration:

- Domain name: api.datadivasdomain.com
- Minimum TLS version: TLS 1.2 (recommended)
- Mutual TLS authentication: Enabled

The "Endpoint configuration" section shows the "Regional" endpoint type selected.

ACM certificate

Select an AWS Certificate Manager certificate for your custom domain name. [Learn more](#)

datadivasdomain.com

[Create a new ACM certificate](#)

Tags

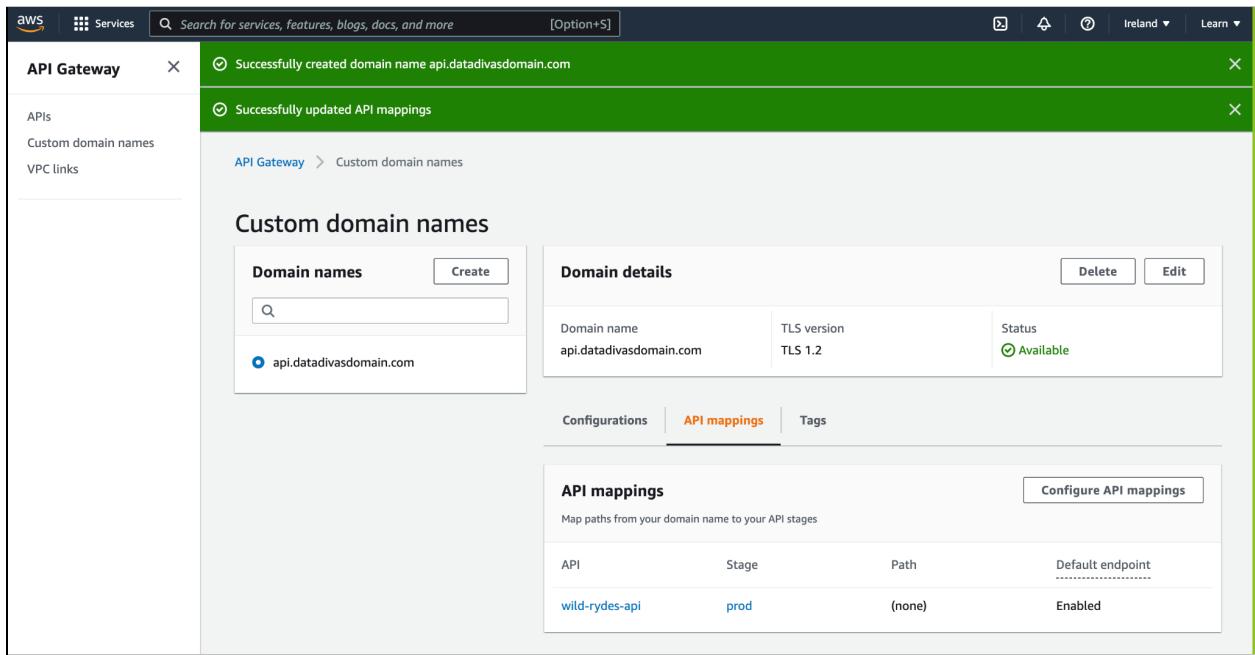
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

[Add tag](#)

[Cancel](#)
Create domain name

Configuring API Mapping



The screenshot shows the AWS API Gateway interface for managing custom domain names. A success message at the top indicates "Successfully created domain name api.datadivasdomain.com". Below it, another message says "Successfully updated API mappings". The main area displays the "Custom domain names" section, which includes a "Domain names" table listing "api.datadivasdomain.com" and a "Domain details" table showing TLS 1.2 and an available status. The "API mappings" tab is selected, showing a single mapping for the "wild-rydes-api" API to the "prod" stage with a default endpoint and an enabled status.

Domain names	Create
<input type="text"/>	
api.datadivasdomain.com	

Domain details		
Domain name	TLS version	Status
api.datadivasdomain.com	TLS 1.2	Available

API mappings			
Map paths from your domain name to your API stages			
API	Stage	Path	Default endpoint
wild-rydes-api	prod	(none)	Enabled

Ireland

The screenshot shows the AWS API Gateway console under the 'Ireland' region. The left sidebar lists 'APIs', 'Custom domain names', and 'VPC links'. The main area displays a success message: 'Successfully created domain name ireland.datadivasdomain.com' and 'Successfully updated API mappings'. Below this, the 'Custom domain names' section is shown. On the left, the 'Domain names' list includes 'api.datadivasdomain.com' (unchecked) and 'ireland.datadivasdomain.com' (checked). On the right, the 'Domain details' card shows the domain name 'ireland.datadivasdomain.com', TLS version 'TLS 1.2', and status 'Available'. The 'API mappings' tab is selected, showing a single mapping for the 'wild-rydes-api' API stage 'prod' with path '(none)' and default endpoint 'Enabled'. A 'Configure API mappings' button is also present.

Singapore

The screenshot shows the AWS API Gateway console under the 'Singapore' region. The left sidebar lists 'APIs', 'Custom domain names', and 'VPC links'. The main area displays a success message: 'Successfully created domain name api.datadivasdomain.com' and 'Successfully updated API mappings'. Below this, the 'Custom domain names' section is shown. On the left, the 'Domain names' list includes 'api.datadivasdomain.com' (checked) and 'singapore.datadivasdomain.com' (unchecked). On the right, the 'Domain details' card shows the domain name 'api.datadivasdomain.com', TLS version 'TLS 1.2', and status 'Available'. The 'API mappings' tab is selected, showing a single mapping for the 'wild-rydes-api' API stage 'prod' with path '(none)' and default endpoint 'Enabled'. A 'Configure API mappings' button is also present.

3. Configure Route53 DNS records

3.1 Configure DNS records

Ireland

Quick create record [Info](#) [Switch to wizard](#)

Record 1

Record name [Info](#) ireland .datadivasdomain.com
Valid characters: a-z, 0-9, ! " # \$ % & ' () * + , - / ; < = > ? @ [\] ^ _ ` { | } . ~

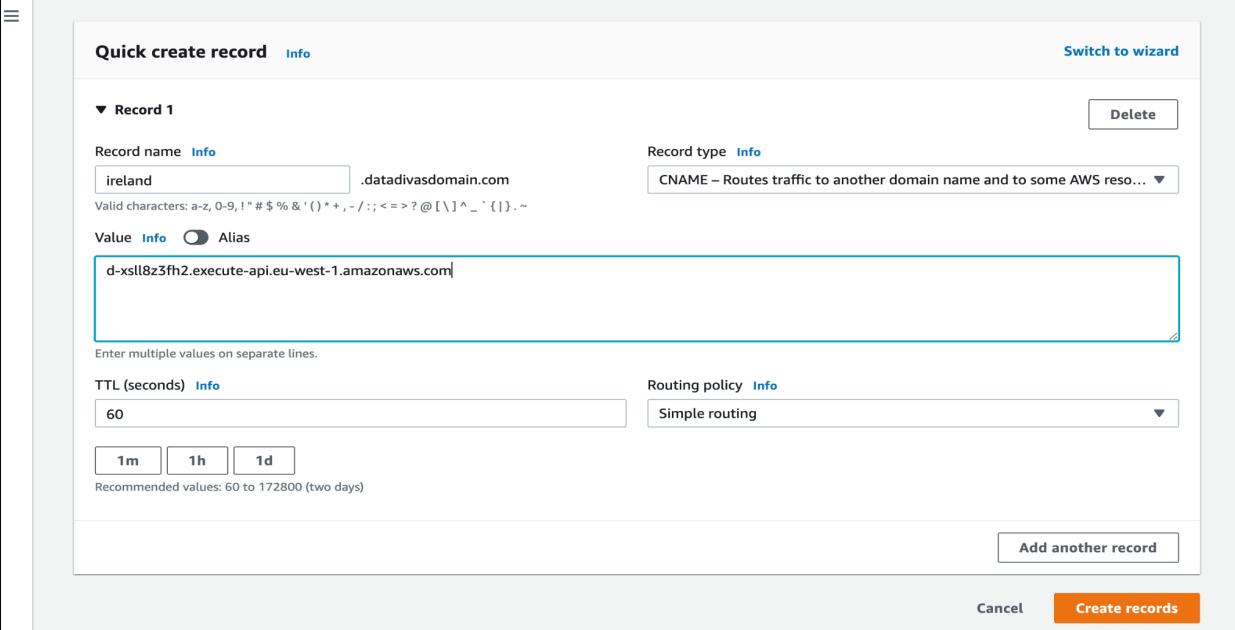
Value [Info](#) Alias
d-xsl8z3fh2.execute-api.eu-west-1.amazonaws.com

Enter multiple values on separate lines.

TTL (seconds) [Info](#) 60
1m 1h 1d
Recommended values: 60 to 172800 (two days)

Record type [Info](#) CNAME – Routes traffic to another domain name and to some AWS reso...
Simple routing

[Add another record](#) [Cancel](#) [Create records](#)



Singapore

Route 53 > Hosted zones > datadivasdomain.com > Create record

Quick create record [Info](#) [Switch to wizard](#)

Record 1

Record name [Info](#) singapore .datadivasdomain.com
Valid characters: a-z, 0-9, ! " # \$ % & ' () * + , - / ; < = > ? @ [\] ^ _ ` { | } . ~

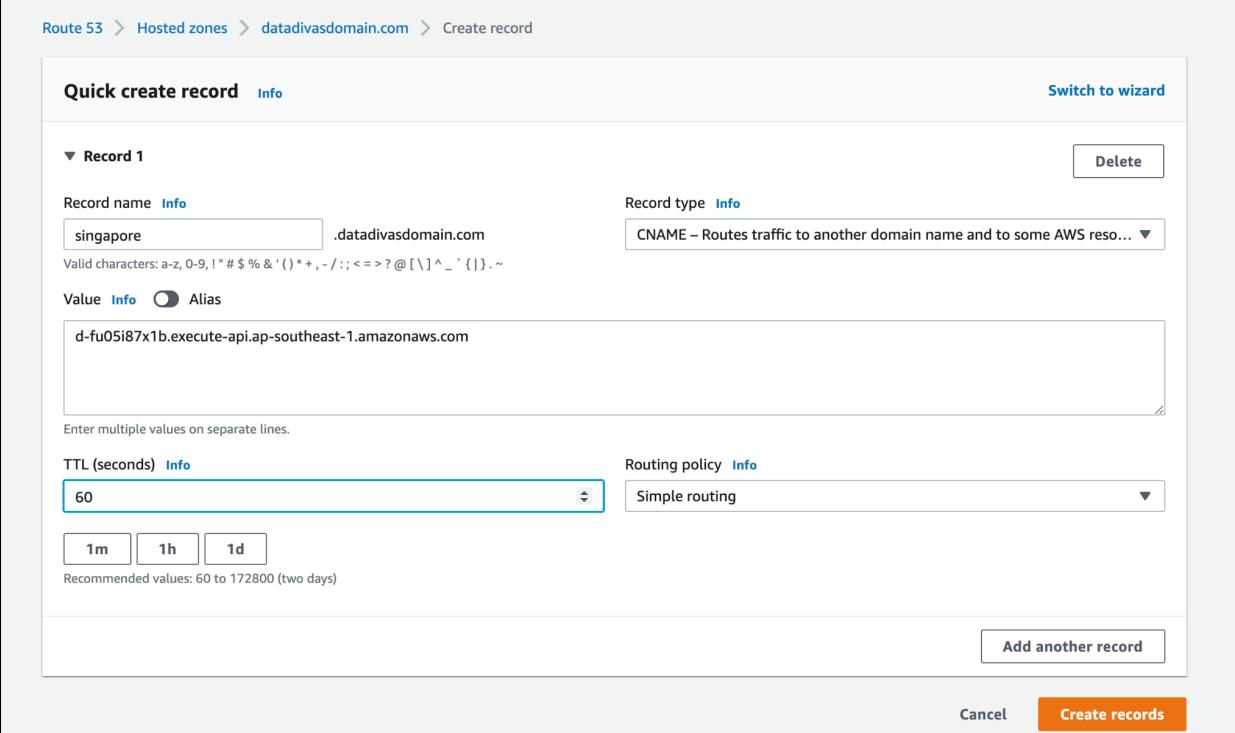
Value [Info](#) Alias
d-fu05i87x1b.execute-api.ap-southeast-1.amazonaws.com

Enter multiple values on separate lines.

TTL (seconds) [Info](#) 60
1m 1h 1d
Recommended values: 60 to 172800 (two days)

Record type [Info](#) CNAME – Routes traffic to another domain name and to some AWS reso...
Simple routing

[Add another record](#) [Cancel](#) [Create records](#)



Records (5)						DNSSEC signing	Hosted zone tags (0)
						Delete record Import zone file	Create record
<input type="text"/> Filter records by property or value						Type ▾ Routing policy ▾ Alias ▾	< 1 >
<input type="checkbox"/>	Record name	Type ▾	Routin... ▾	Differ... ▾	Value/Route traffic to		
<input type="checkbox"/>	datadivasdomain.com	NS	Simple	-	ns-1065.awsdns-05.org. ns-982.awsdns-58.net. ns-1884.awsdns-43.co.uk. ns-390.awsdns-48.com.		
<input type="checkbox"/>	datadivasdomain.com	SOA	Simple	-	ns-1065.awsdns-05.org. awsdns-hostmaster.amazon.com. 1 7200 900 1209600 86400		
<input type="checkbox"/>	_89987a30725c4f1cc05fdfd7cb1125...	CNAME	Simple	-	_02f233e5591bdd33a4ae764b9a674478.qvvhjqbvbg.acm-validations.aws.		
<input type="checkbox"/>	ireland.datadivasdomain.com	CNAME	Simple	-	d-xsl8z3fh2.execute-api.eu-west-1.amazonaws.com		
<input type="checkbox"/>	singapore.datadivasdomain.com	CNAME	Simple	-	d-fu05i87x1b.execute-api.ap-southeast-1.amazonaws.com		

Checking endpoint on API :<https://ireland.datadivasdomain.com/health>

```
← → C  https://ireland.datadivasdomain.com/health
{
  "region": "eu-west-1",
  "message": "Successful response reading from DynamoDB table."
}
```

Checking endpoint on API :<https://singapore.datadivasdomain.com/health>

```
← → C  singapore.datadivasdomain.com/health
{
  "region": "ap-southeast-1",
  "message": "Successful response reading from DynamoDB table."
}
```

3.2 Configure a health check for both regions

Ireland

Create health check

Step 1: Configure health check

Step 2: Get notified when health check fails

Configure health check

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name: ireland-api [?](#)

What to monitor: Endpoint Status of other health checks (calculated health check) State of CloudWatch alarm

Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy. [Learn more](#)

Specify endpoint by: IP address Domain name [?](#)

Protocol: HTTPS [?](#)

Domain name *: ireland.datadivasdomain.com [?](#)

Port *: 443 [?](#)

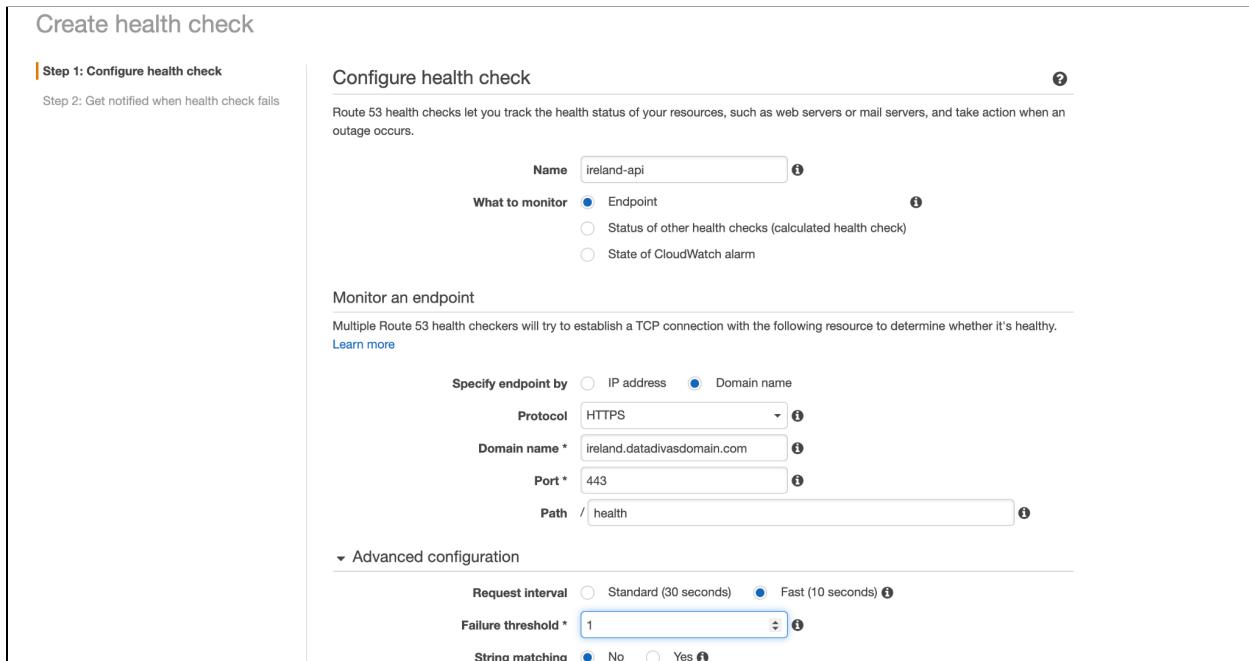
Path: /health [?](#)

Advanced configuration

Request interval: Standard (30 seconds) Fast (10 seconds) [?](#)

Failure threshold *: 1 [?](#)

String matching: No Yes [?](#)



Singapore

Create health check

Step 1: Configure health check

Step 2: Get notified when health check fails

Configure health check

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name: singapore-api [?](#)

What to monitor: Endpoint Status of other health checks (calculated health check) State of CloudWatch alarm

Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy. [Learn more](#)

Specify endpoint by: IP address Domain name [?](#)

Protocol: HTTPS [?](#)

Domain name *: singapore.datadivasdomain.com [?](#)

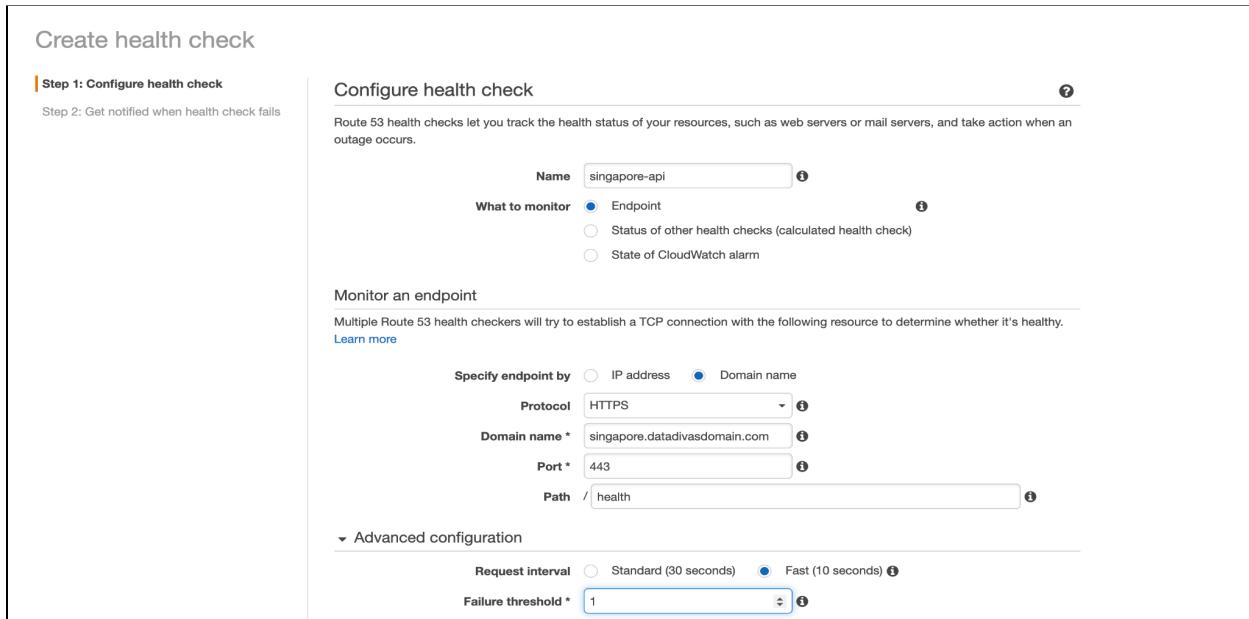
Port *: 443 [?](#)

Path: /health [?](#)

Advanced configuration

Request interval: Standard (30 seconds) Fast (10 seconds) [?](#)

Failure threshold *: 1 [?](#)



Health Check

Filter by keyword						
	Name	Status	Description	Alarms	ID	
<input type="checkbox"/>	ireland-api	15 minutes ago now	Healthy	https://ireland.datadivasdomain.com:44... No alarms configured.	73d4108d-b168-4	
<input type="checkbox"/>	singapore-api	15 minutes ago now	Healthy	https://singapore.datadivasdomain.com:... No alarms configured.	d217b409-1dcf-4	

3.3 Configure DNS Routing Policy

Ireland

Route 53 > Hosted zones > datadivasdomain.com > Create record

Quick create record [Info](#) [Switch to wizard](#)

▼ Record 1 [Delete](#)

Record name [Info](#) .datadivasdomain.com
Valid characters: a-z, 0-9, !"#\$%&'()*+,-/:<=?@[\]^_`{|}~,

Record type [Info](#) CNAME – Routes traffic to another domain name and to some AWS resources

Route traffic to [Info](#) Alias

Alias to another record in this hosted zone
US East (N. Virginia)
An alias to a CloudFront distribution and another record in the same hosted zone are global and available only in US East (N. Virginia).

ireland.datadivasdomain.com [X](#)

Routing policy [Info](#) Evaluate target health
Simple routing Yes

[Add another record](#)

[Cancel](#) [Create records](#)

Screenshot of the AWS Route 53 Hosted Zone Details page for `datadivasdomain.com`.

Hosted zone details:

- Records (6)**: Shows 6 records.
- Create record**: Orange button to add new records.
- Filter records by property or value**: Search bar.
- Type**: Dropdown menu.
- Routing policy**: Dropdown menu.
- Alias**: Dropdown menu.
- Value/Route traffic to**: Column showing target values for each record.

Record name	Type	Routine...	Differ...	Value/Route traffic to
datadivasdomain.com	NS	Simple	-	ns-1065.awsdns-05.org. ns-982.awsdns-58.net. ns-1884.awsdns-43.co.uk. ns-390.awsdns-48.com.
datadivasdomain.com	SOA	Simple	-	ns-1065.awsdns-05.org.awsd...
_89987a30725c4f1cc05fdfd7cb1125...	CNAME	Simple	-	_02f233e5591bdd33a4ae764...
<input checked="" type="checkbox"/> api.datadivasdomain.com	CNAME	Simple	-	ireland.datadivasdomain.com.
ireland.datadivasdomain.com	CNAME	Simple	-	d-xsl18z3fh2.execute-api.eu-w...
singapore.datadivasdomain.com	CNAME	Simple	-	d-fu05i87x1b.execute-api.ap...

Record type Info: CNAME – Routes traffic to another domain name and to some AWS resources.

Route traffic to: Alias (radio button selected). Alias to another record in this hosted zone: US East (N. Virginia) [us-east-1].

Routing policy: Weighted.

Weight: 50.

Health check - optional: ireland-api.

Evaluate target health: Yes.

Record ID: ireland api gateway.

Buttons: Cancel, Save.

Singapore

Screenshot of the AWS Route 53 Create Record page for `datadivasdomain.com`.

Quick create record: Info. Switch to wizard.

Record 1:

Record name: `api`.datadivasdomain.com. Valid characters: a-z, 0-9, ! " # % & ' () * + , - / ; ; < = > @ [\] ^ _ ` { } . ~

Record type: Info. CNAME – Routes traffic to another domain name and to some AWS resources.

Route traffic to: Alias (radio button selected). Alias to another record in this hosted zone: US East (N. Virginia).

Target: singapore.datadivasdomain.com.

Routing policy: Simple routing. Evaluate target health: Yes.

Buttons: Add another record, Create records, Cancel.

The screenshot shows the 'Hosted zone details' section of the AWS CloudFront console. At the top, there's a header with 'Hosted zone details' and a 'Edit hosted zone' button. Below the header, there are tabs for 'Records (7)', 'DNSSEC signing', and 'Hosted zone tags (0)'. A sub-header 'Records (7) Info' indicates 'Automatic mode is the current search behavior optimized for best filter results. To change modes go to settings.' Below this are buttons for 'Delete record', 'Import zone file', and 'Create record'. A search bar 'Filter records by property or value' is followed by filters for 'Type', 'Routing policy', and 'Alias'. The main table lists 7 records:

	Record name	Type	Routin...	Differ...	Value/Route traffic to
<input type="checkbox"/>	datadivasdomai...	NS	Simple	-	ns-1065.awsdns-05.org. ns-982.awsdns-58.net. ns-1884.awsdns-43.co.uk. ns-390.awsdns-48.com.
<input type="checkbox"/>	datadivasdomai...	SOA	Simple	-	ns-1065.awsdns-05.org. awsdns-hostmaster.amazon.com. 1 7200 900 1209600 86400
<input type="checkbox"/>	_89987a30725c...	CNAME	Simple	-	_02f233e5591bdd33a4ae764b9a674478.qvwhjqbvbg.acm-validations.aws.
<input type="checkbox"/>	api.datadivasdo...	CNAME	Weighted	50	ireland.datadivasdomain.com.
<input type="checkbox"/>	api.datadivasdo...	CNAME	Weighted	50	singapore.datadivasdomain.com.
<input type="checkbox"/>	ireland.datadiva...	CNAME	Simple	-	d-xssl8z3fh2.execute-api.eu-west-1.amazonaws.com
<input type="checkbox"/>	singapore.datadi...	CNAME	Simple	-	d-fu05i87x1b.execute-api.ap-southeast-1.amazonaws.com

Checking endpoint on API :<https://api.datadivasdomain.com/health>

The screenshot shows a browser developer tools Network tab. The request URL is 'https://api.datadivasdomain.com/health'. The response body is a JSON object: {"region": "eu-west-1", "message": "Successful response reading from DynamoDB table."}

4. Update your UI with new API Gateway Endpoint

Changing the environment file

The screenshot shows a code editor with multiple tabs. The active tab is 'environment.ts'. The code contains a single export const environment = {} block with several properties defined:

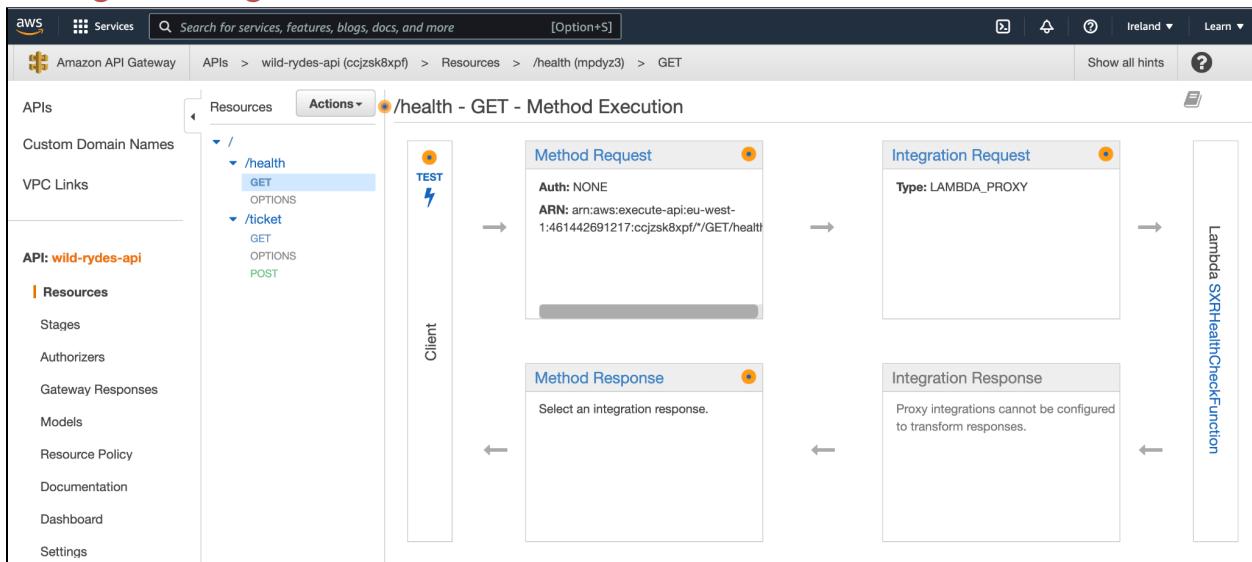
```

1  export const environment = {
2    production: true,
3
4    // TODO: make sure you have the correct region
5    region: 'eu-west-1',
6
7
8    // TODO: This id can be retrieved in output section of the cognito ui
9    // cloud formation stack.
10   cognitoIdentityPoolId: 'eu-west-1:a4b4a085-f727-42c2-8328-f16b9bfc9015',
11
12   // TODO: Facebook app id can be retrieved from the application in your
13   // facebook developer account.
14   facebookAppId: '823899738592555',
15
16   // TODO: The API URL is available in the API Gateway console under Stage
17   // NOTE: don't forget trailing "/" For example:
18   // https://api.example.com/prod/
19   ticketAPI: 'https://api.datadivasdomain.com/'
20
21
22 };
23

```

5. Test failover

Testing Multi-region Active-active



Breaking the primary region

The screenshot shows the configuration for the /health resource. Under 'Actions', the 'Method Execution' tab is selected. The 'Integration type' is set to 'Lambda Function'. The 'Lambda Region' is 'eu-west-1'. The 'Lambda Function' field contains 'TicketPostFunction'. The 'Execution role' is listed as 'TicketPostFunctionRole'. Under 'Invoke with caller credentials', the 'Credentials cache' option is checked. The 'Use Default Timeout' checkbox is also checked.

Deploying the API to prod stage

Deploy API 

Choose a stage where your API will be deployed. For example, a test version of your API could be deployed to a stage named beta.

Deployment stage 

Deployment description

Cancel **Deploy**

AWS Services Search for services, features, blogs, docs, and more [Option+S]

APIs Stages prod Stage Editor Delete Stage Configure Tags

Custom Domain Names VPC Links

API: wild-rydes-api Resources

Stages  prod Stage

Authorizers Gateway Responses Models Resource Policy Documentation Dashboard Settings Usage Plans API Keys Client Certificates Settings

prod Stage Editor

Invoke URL: <https://ccjzsk8xp.execute-api.eu-west-1.amazonaws.com/prod>

Settings Logs/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Cache Settings Enable API cache

Default Method Throttling Enable throttling

Rate 10000 requests per second

Burst 5000 requests

Web Application Firewall (WAF) [Learn more.](#)

Select the Web ACL to be applied to this stage.

Web ACL None [Create Web ACL](#)

Client Certificate

Select the client certificate that API Gateway will use to call your integration endpoints in this stage.

Certificate None

Verifying the failure for Ireland

Create health check Delete health check Edit health check

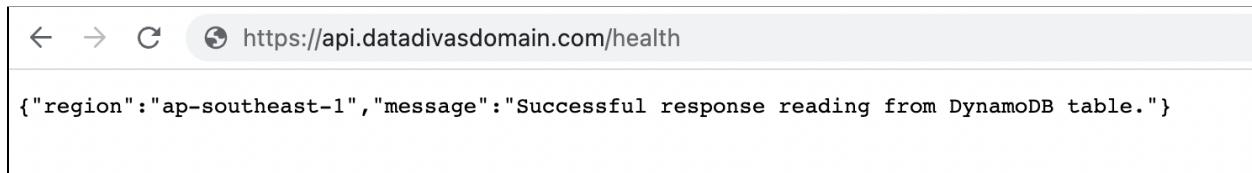
Filter by keyword

1 to 2 of 2 health checks

Name	Status	Description	Alarms	ID
ireland-api	Unhealthy	https://ireland.datadivsdomain.com:44... 30 minutes ago now	No alarms configured.	73d4108d-b168-4

Checking endpoint on API :<https://api.datadivasdomain.com/health>

The end point is displaying ap-southeast-1(singapore) as a region when the ireland is unhealthy



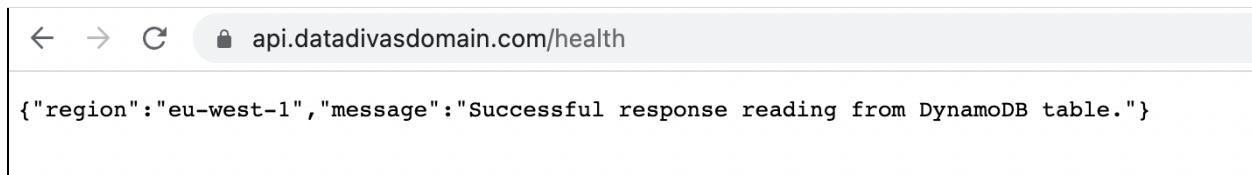
A screenshot of a web browser window. The address bar shows the URL <https://api.datadivasdomain.com/health>. The main content area displays a JSON response:

```
{"region": "ap-southeast-1", "message": "Successful response reading from DynamoDB table."}
```

Verifying the failure for Singapore

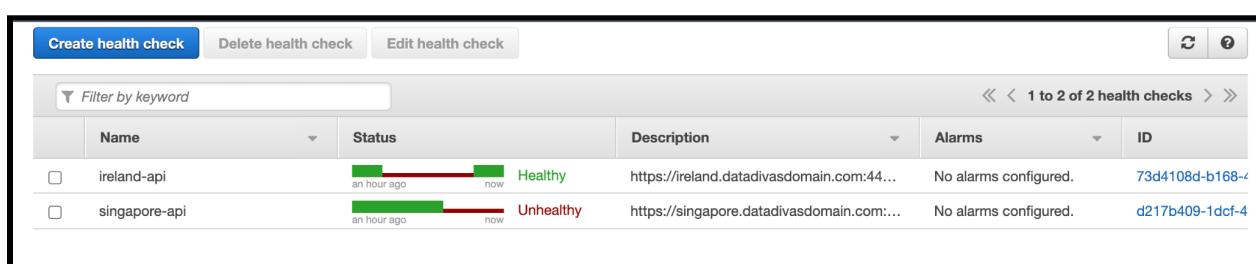
Now Ireland became healthy, and Singapore became unhealthy and the end point is displaying eu-west-1(Ireland) as a region.

Checking endpoint on API :<https://api.datadivasdomain.com/health>



A screenshot of a web browser window. The address bar shows the URL <https://api.datadivasdomain.com/health>. The main content area displays a JSON response:

```
{"region": "eu-west-1", "message": "Successful response reading from DynamoDB table."}
```



A screenshot of the AWS CloudWatch Metrics Health Checks interface. The table lists two health checks:

	Name	Status	Description	Alarms	ID
<input type="checkbox"/>	ireland-api	 Healthy	https://ireland.datadivasdomain.com:44... an hour ago	No alarms configured.	73d4108d-b168-4
<input type="checkbox"/>	singapore-api	 Unhealthy	https://singapore.datadivasdomain.com:... an hour ago	No alarms configured.	d217b409-1dcf-4

Creating First Ticket for the Singapore being unhealthy and assigning to EngHwa

Main
Home
Ticket

Create Ticket:

- * Description (min 10 characters):
Creating ticket test1|
- * Assigned:
EngHwa
- * Priority:
Medium
- * Status:
Open

* = required field

Create

All Tickets: Refresh				
assigned	priority	status	createdOn	createdBy
No data to display				
0 total				

All Tickets: [Refresh](#)

assigned	priority	status	createdOn	createdBy
enghwa	medium	open	2022-03-31 06:45:42	saranya_july4@yahoo.co.in

1 total

Verifying the failure for Ireland Again

Now Ireland became unhealthy, and Singapore became Healthy, and the end point is displaying ap-southeast-1(Singapore) as a region.

[Create health check](#) [Delete health check](#) [Edit health check](#)

[Filter by keyword](#)

Name	Status	Description	Alarms	ID
ireland-api	2 hours ago now Unhealthy	https://ireland.datadivasdomain.com:44...	No alarms configured.	73d4108d-b168-4
singapore-api	2 hours ago now Healthy	https://singapore.datadivasdomain.com:...	No alarms configured.	d217b409-1dcf-4

Checking endpoint on API : <https://api.datadivasdomain.com/health>

The screenshot shows a browser window with the URL <https://api.datadivasdomain.com/health>. The page content is a JSON object:

```
{"region": "ap-southeast-1", "message": "Successful response reading from DynamoDB table."}
```

Creating Second Ticket for the Ireland being unhealthy and assigning to Jay

The screenshot shows the SXR ticket creation interface. The left sidebar has links for Main, Home, and Ticket. The right panel shows a form titled "Create Ticket:" with fields for Description, Assigned, Priority, and Status. The "Assigned" field is set to "Jay". The "Status" field is set to "Open". A "Create" button is at the bottom. Below the form is a table titled "All Tickets" with one row.

assigned	priority	status	createdOn	createdBy
enghwa	medium	open	2022-03-31 06:45:42	saranya_july4@yahoo.co.in

1 total

The screenshot shows a table titled "All Tickets" with a "Refresh" button. It lists two tickets: one assigned to "enghwa" and another to "jay".

All Tickets:	Refresh			
assigned	priority	status	createdOn	createdBy
enghwa	medium	open	2022-03-31 06:45:42	saranya_july4@yahoo.co.in
jay	medium	open	2022-03-31 07:03:32	saranya_july4@yahoo.co.in

DynamoDB tables Information in Ireland

The screenshot shows the AWS DynamoDB console interface for the Ireland region. On the left, the navigation sidebar is visible with options like Dashboard, Tables, Update settings, Explore items, PartiQL editor, Backups, Exports to S3, Reserved capacity, DAX, Clusters, Subnet groups, Parameter groups, and Events. A feedback section at the bottom encourages users to tell what they think and return to the previous console experience.

The main area displays the 'Tables (1)' section, where the 'SXRTickets' table is selected. The table details page for 'SXRTickets' is shown on the right, featuring tabs for Autopreview, Actions, Create item, and Update table settings. Below these are sections for Scan/Query items (with Scan and Query buttons), Table or index (set to SXRTickets), and Filters. A 'Completed' status message indicates 0.5 read capacity units consumed. The 'Items returned (2)' section lists two items:

	id	assigned	aws:rep:...	aws:rep:...	aws:rep:...
<input type="checkbox"/>	2022-03-3...	jay	false	ap-southea...	164871021...
<input type="checkbox"/>	2022-03-3...	enghwa	false	eu-west-1	164870914...

DynamoDB tables Information in Singapore

This screenshot is identical to the one above, showing the AWS DynamoDB console for the Singapore region. The navigation sidebar, table selection, and table details page for 'SXRTickets' are all the same. The 'Items returned (2)' section displays the same two items as the Ireland region:

	id	assigned	aws:rep:...	aws:rep:...	aws:rep:...
<input type="checkbox"/>	2022-03-3...	jay	false	ap-southea...	164871021...
<input type="checkbox"/>	2022-03-3...	enghwa	false	eu-west-1	164870914...

7. S3 Replication and CloudFront with Multi-Region S3 Origins

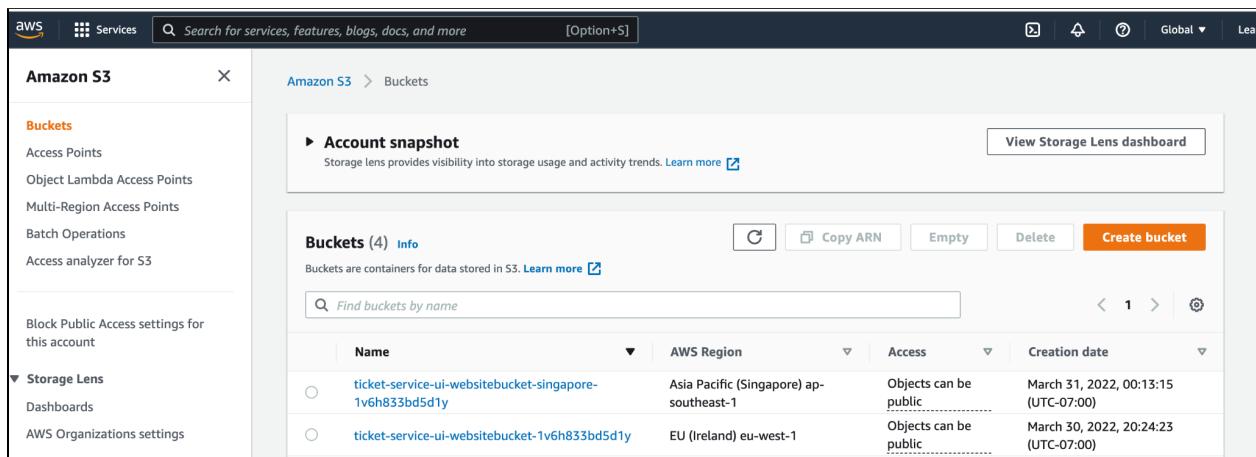
S3 Cross-Region Replication (CRR)

1. Enable versioning on your source bucket in Ireland region

```
aws s3api put-bucket-versioning \
--bucket ticket-service-ui-websitebucket-1v6h833bd5d1y \
--versioning-configuration Status=Enabled
```

2. Create a destination bucket and enable versioning on it

```
aws s3api create-bucket \
--bucket ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y \
--region ap-southeast-1 \
--create-bucket-configuration LocationConstraint=ap-southeast-1
```



Name	AWS Region	Access	Creation date
ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y	Asia Pacific (Singapore) ap-southeast-1	Objects can be public	March 31, 2022, 00:13:15 (UTC-07:00)
ticket-service-ui-websitebucket-1v6h833bd5d1y	EU (Ireland) eu-west-1	Objects can be public	March 30, 2022, 20:24:23 (UTC-07:00)

Enabling Version

```
aws s3api put-bucket-versioning \
--bucket ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y \
--versioning-configuration Status=Enabled
```

3. Create an IAM role

IAM > Roles > Create role

Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
crrDataDivas

Description
Add a short explanation for this policy.
Allows S3 to call AWS services on your behalf.

Step 1: Select trusted entities Edit

```
1 - []
2 -   "Version": "2012-10-17",
3 -   "Statement": [
4 -     {
5 -       "Effect": "Allow",
6 -       "Principal": {
7 -         "Service": "s3.amazonaws.com"
8 -       },
9 -       "Action": "sts:AssumeRole"
10  }
11 ]
```

Step 2: Add permissions Edit

Permissions policy summary

Policy name	Type	Attached as
crrRolePolicy	Customer managed	Permissions policy

Tags

Add tags (Optional)
Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

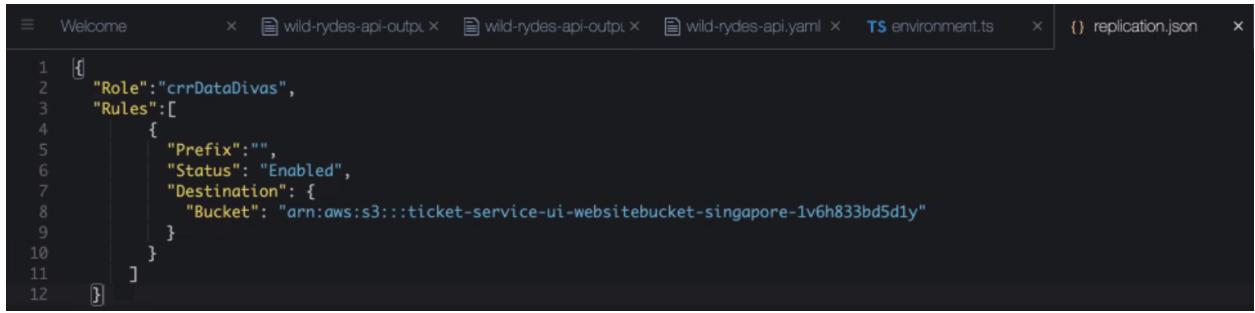
No tags associated with the resource.

[Add tag](#)
You can add up to 50 more tags

[Cancel](#) [Previous](#) [Create role](#)



Replication.json



```
1 [ {  
2     "Role": "crrDataDivas",  
3     "Rules": [  
4         {  
5             "Prefix": "",  
6             "Status": "Enabled",  
7             "Destination": {  
8                 "Bucket": "arn:aws:s3:::ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y"  
9             }  
10        }  
11    ]  
12 }]
```

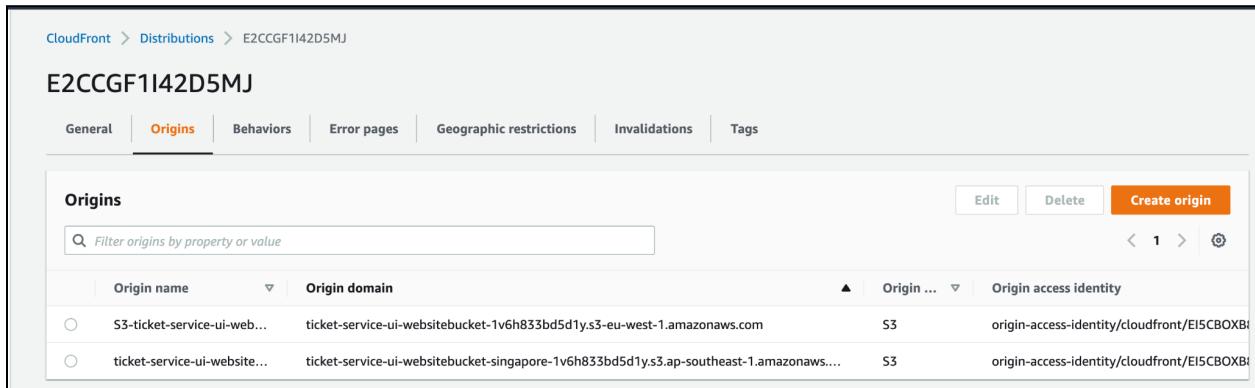
Running the following command to add the replication configuration to your source bucket.

```
aws s3api put-bucket-replication \  
--replication-configuration file://replication.json \  
--bucket ticket-service-ui-websitebucket-1v6h833bd5d1y
```

Building the App

```
aws s3 sync --delete dist/ s3://ticket-service-ui-websitebucket-1v6h833bd5d1y
```

CloudFront Origin Failover



CloudFront > Distributions > E2CCGF1I42D5MJ

E2CCGF1I42D5MJ

Origins

Origin name	Origin domain	Origin ...	Origin access identity
S3-ticket-service-ui-web...	ticket-service-ui-websitebucket-1v6h833bd5d1y.s3-eu-west-1.amazonaws.com	S3	origin-access-identity/cloudfront/E15CBOXB1
ticket-service-ui-website...	ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y.s3.ap-southeast-1.amazonaws...	S3	origin-access-identity/cloudfront/E15CBOXB1

Create Origin

Create origin group

Settings

Origins
Choose the origins for this group, then put them in priority order.

<input type="button" value="Choose origins to add to group"/>	<input type="button" value="Add"/>
1: S3-ticket-service-ui-websitebucket-1v6h833bd5d1y (primary)	X <input type="button" value="▲"/> <input type="button" value="▼"/>
2: ticket-service-ui-websitebucket-singapore-1v6h833bd5d1y.s3.ap-southeast-1.amazonaws.com	X <input type="button" value="▲"/> <input type="button" value="▼"/>

Name
Enter a name for this origin group.

Failover criteria
Select the origin errors to use as failover criteria.

- 400 Bad Request
- 403 Forbidden
- 404 Not found
- 416 Range Not Satisfiable
- 500 Internal server error
- 502 Bad gateway
- 503 Service unavailable
- 504 Gateway timeout

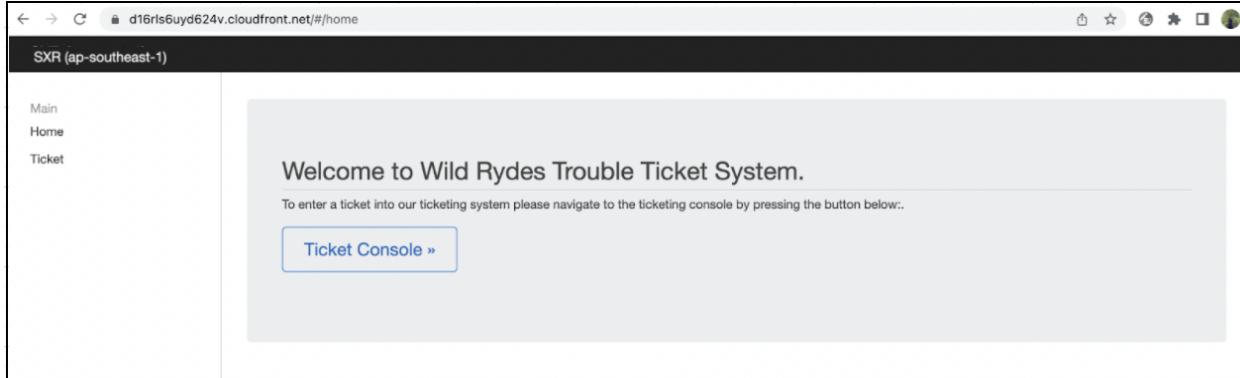
```
aws cloudfront create-invalidation --distribution-id E2CCGF1I42D5MJ --paths
```

```
"/images/app-screenshot.png" "/images/app-screenshot2.png"
```

```
ec2-user:~/environment/MultiRegion-Serverless-Workshop/2_UI (master) $ aws cloudfront create-invalidation --distribution-id E2CCGF1I42D5M
J --paths "/images/app-screenshot.png" "/images/app-screenshot2.png"
{
    "Invalidation": {
        "Status": "InProgress",
        "InvalidationBatch": {
            "Paths": {
                "Items": [
                    "/images/app-screenshot2.png",
                    "/images/app-screenshot.png"
                ],
                "Quantity": 2
            },
            "CallerReference": "cli-1648714098-32824"
        },
        "Id": "I18M6H0DOY46BG",
        "CreateTime": "2022-03-31T08:08:19.392Z"
    },
    "Location": "https://cloudfront.amazonaws.com/2020-05-31/distribution/E2CCGF1I42D5MJ/invalidation/I18M6H0DOY46BG"
}
```

Test CloudFront Failover

Checking the multi-region active-active ticketing system working perfectly though the primary region (Ireland) has an issue in S3 (Deleted the S3 bucket in the source region)



References

- GitHub - enghwa/MultiRegion-Serverless-Workshop: Build an Active/Active Multi-Region Serverless Application for Resilience and High Availability. GitHub. (2022). Retrieved 31 March 2022, from <https://github.com/enghwa/MultiRegion-Serverless-Workshop>.