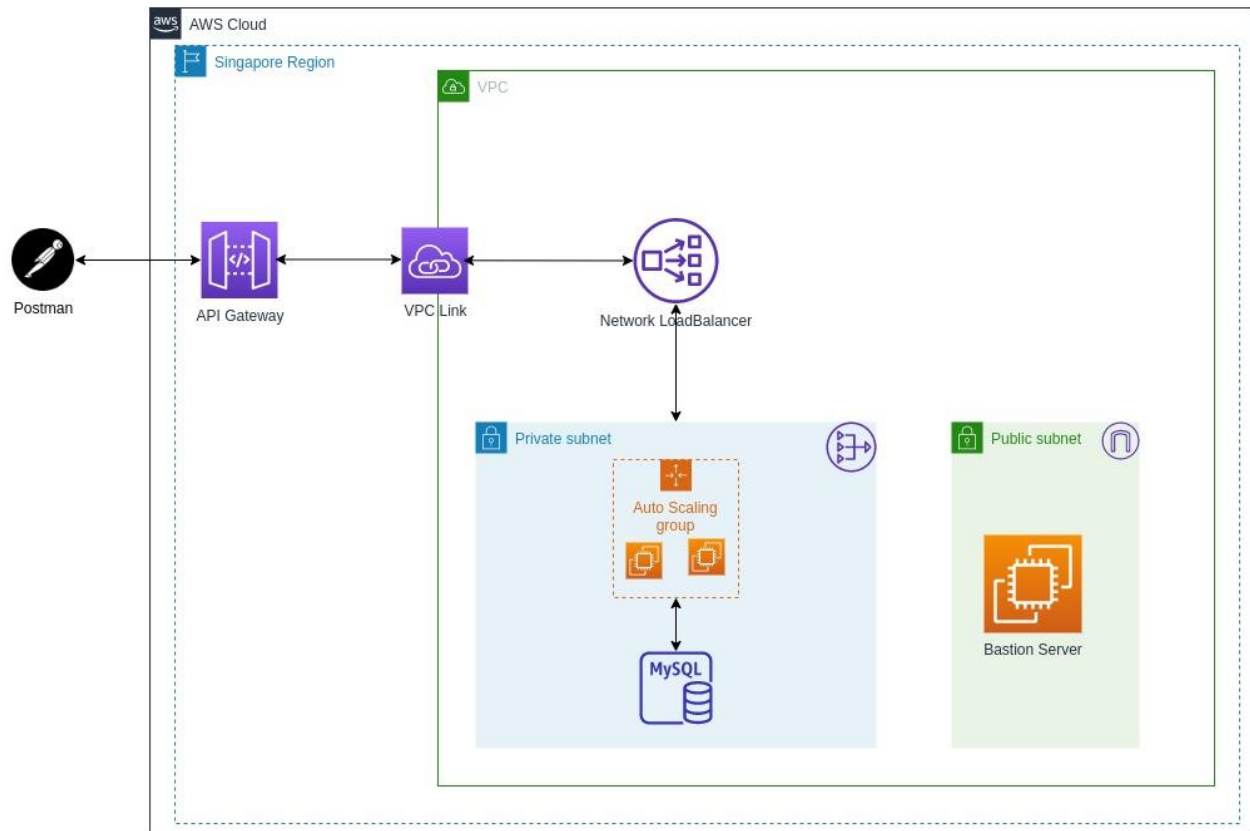


Deploy a Rest API using API Gateway with NLB via VPC Private Link

Design a highly available and scalable architecture using AWS services

1. Trigger rest call via postman or command prompt -> API Gateway -> NLB -> EC2 to host REST API (Auto Scaling /launch configuration/AMI static 2 instances) -> MySQL DB

Architecture Diagram:



Assumptions: We do have a NodeJS student rest API application in a docker image in a Docker registry.

Steps

1> We need to create an instance of RDS MYSQL in private subnet and create database inside for the application. Also, pls open port 3306 only to the SG of Autoscaling instances.

DB Identifier
database-1

Role
Instance

CPU
1.67%

Current activity
0 Connections

Info
Available

Engine
MySQL Community

Class
db.t2.xl

Region
ap-southeast-1

Connectivity & security

Monitoring

Logs & events

Configuration

Maintenance & backups

Tags

Connectivity & security

Endpoint & port

Endpoint
database-1.c2xvauj0e5mm.ap-southeast-1.rds.amazonaws.com

Port
3306

Networking

Availability zone
ap-southeast-1c

VPC
vpc-8fb9bbe8

Subnet group
default-vpc-8fb9bbe8

Subnets
subnet-a9cb3dcf
subnet-cfb35587
subnet-a1a10cf8

Security

VPC security groups
default (sg-2ca91e53)
(active)

Public accessibility
No

Certificate authority
rds-ca-2019

Certificate authority date
Aug 23rd, 2024

Security group rules (4)

Filter security group rules

| Security group | Type | Rule |
|-----------------------|------------------------------|----------------------|
| default (sg-2ca91e53) | EC2 Security Group - Inbound | sg-043697095203bf93f |
| default (sg-2ca91e53) | CIDR/IP - Outbound | 0.0.0.0/0 |

2> We need to create an Autoscaling Launch Config with user data to pull the docker image and run it. Also, we need to open only certain ports which is required like 80, 443, 22 (only from Public Bastion server) and 3306.

EC2 > Launch configurations

Launch configurations (1/1) [Info](#)

| <input checked="" type="checkbox"/> | Name | AMI ID | Instance type | Spot price | Creation time |
|-------------------------------------|---------------------|--------------------|---------------|------------|---|
| <input checked="" type="checkbox"/> | nodejs-express-ASLC | ami-0ba35dc9caf... | t2.micro | - | Sat Oct 31 2020 03:28:14 GMT+0800 (Singapore Standard Time) |

Launch configuration: nodejs-express-ASLC

Details

| | | |
|--|---|----------------------------|
| AMI ID ami-0ba35dc9caf73d1c7 | Instance type t2.micro | IAM instance profile - |
| Kernel ID - | Key name devops-eks-wm | Monitoring false |
| EBS optimized false | Security groups sg-043697095203bf93f | Spot price - |
| Create time Sat Oct 31 2020 03:28:14 GMT+0800 (Singapore Standard Time) | RAM disk ID - | IP address type Private |
| Metadata accessible - | Token hop limit - | Metadata version - |
| User data View user data | | |

User data

```
#!/bin/bash
yum install docker -y
service docker start
usermod -aG docker ec2-user
service docker restart
docker run -d -p 80:3000 -p 3306:3306 --name nodejs-rest-api-app nicksrj/nodejs-rest-express:9
```

3> We need to create an Autoscaling group within private subnets and give the desired, min and max counts. We also need to select NLB. We can create the internal NLB later and can also attach is it later.

EC2 > Auto Scaling groups

Auto Scaling groups (1/2)

Search your Auto Scaling groups

| Name | Launch template/configuration | Instances | Status | Desired capacity | Min | Max | Availability Zones |
|--|-------------------------------|-----------|--------|------------------|-----|-----|----------------------------------|
| <input checked="" type="checkbox"/> nodejs-express-ASG | nodejs-express-ASLC | 2 | - | 2 | 2 | 2 | ap-southeast-1c, ap-southeast-1b |

Network

| | |
|--|--|
| Availability Zones ap-southeast-1c, ap-southeast-1b | Subnet ID subnet-0d88bf3bc459d9d2, subnet-016a186b1b9616a69 |
|--|--|

Load balancing

| | |
|--|----------------------------|
| Load balancer target groups nodejs-app-nlbtgp | Classic Load Balancer - |
|--|----------------------------|

4> We need to create an Internal ELB with listener to port 80 and select the private subnets that we selected while creating Autoscaling Group. Later then register the servers in NLB and later check whether the target group is healthy. Post that we can also whether we are able to reach to API via Public Bastion server cause it's within the VPC.

nodejs-app-nlbtgp

arn:aws:elasticloadbalancing:ap-southeast-1:143765990603:targetgroup/nodejs-app-nlbtgp/ef986e929281c280

Basic configuration

| | | | |
|-------------------------|-----------------------------|-------------------------------------|--|
| Target type Instance | Protocol : Port TCP : 80 | VPC vpc-8fb9bbe8 | Load balancer nodejs-rest-mysql-internalNLB |
|-------------------------|-----------------------------|-------------------------------------|--|

Group details | **Targets** | Monitoring | Tags

Registered targets (2)

Filter resources by property or value

| Instance ID | Name | Port | Zone | Status |
|--|--------------------|------|-----------------|---------|
| <input type="checkbox"/> i-04851dc9d272add41 | nodejs-express-ASG | 80 | ap-southeast-1c | healthy |
| <input type="checkbox"/> i-0a356d13489eeb02b | nodejs-express-ASG | 80 | ap-southeast-1b | healthy |

5> We need to create a VPC link in API Gateway with the above created internal NLB. It will take few minutes to create.

VPC Link details

nodejs-express-mysql-intNLB (2afcz2)

This VPC link can only be used with REST APIs.

Details

Name (ID)

nodejs-express-mysql-intNLB (2afcz2)

Target NLB

The Network Load Balancer of the VPC targeted by the VPC link.

nodejs-rest-mysql-internalNLB [🔗](#)

Status

Available

Tags

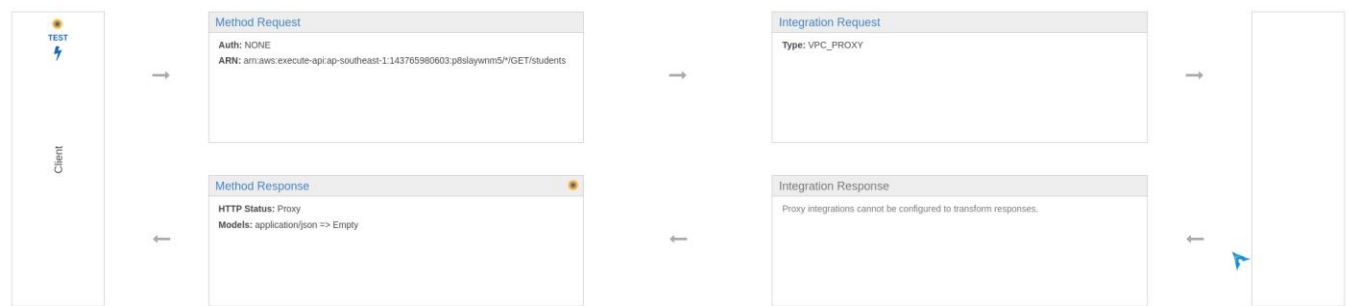
| <input type="text" value="Find resources"/> | |
|---|-----------------------------|
| Key | Value |
| Name | nodejs-express-mysql-intNLB |

6> Create an API with a name “student-nodejs” and give the scope to regional. Post that create a root resource “/students” and then create two methods inside the resource, which is [GET] and [POST]. Both the method request will be integrating with VPC link and need to select the VPC link that we created above. The endpoint to these request will be NLB DNS like <http://nlbdns/students>

/students Methods

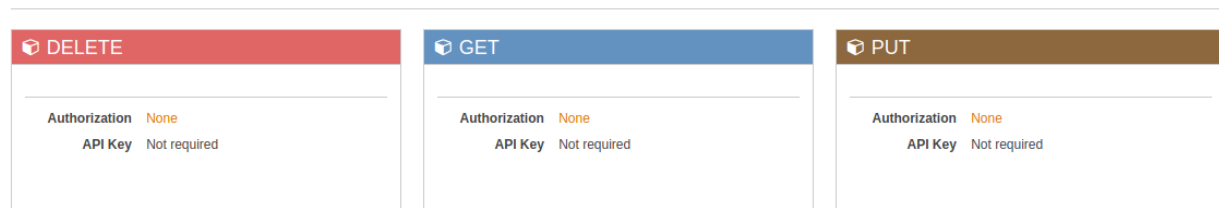
| GET | POST |
|--|--|
| <p>Authorization None</p> <p>API Key Not required</p> | <p>Authorization None</p> <p>API Key Not required</p> |

/students - GET - Method Execution

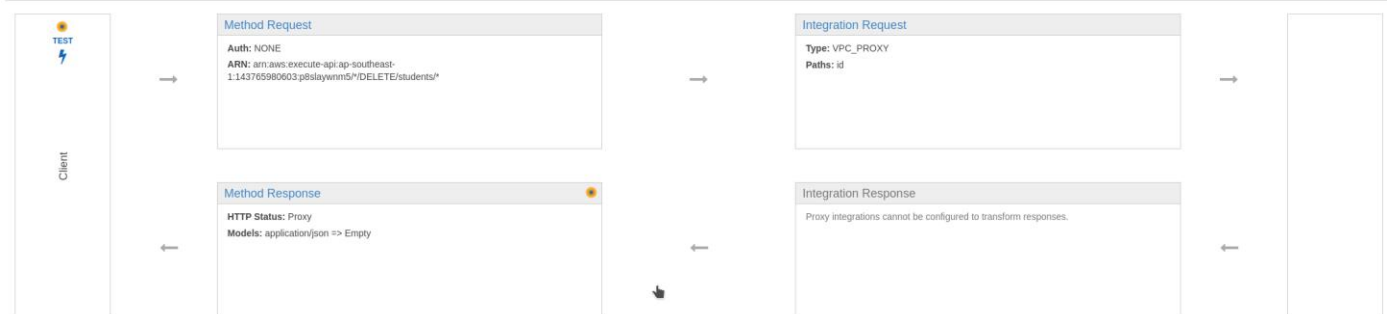


7> Create sub resource in /students as /students/{id} and create three methods GET, POST and DELETE and these three-method request will also via VPC Link, and need to append {id} at the of endpoint. Like <http://nlbdns/students/{id}>

/students/{id} Methods



/students/{id} - DELETE - Method Execution



8> Once we are done with the resources then we need to deploy the API and create a stage. In our case, I have created dev stage. Once we deploy an API, we will get an API endpoint, which we will use to invoke to call the API.

APIs > student-nodejs (p8slaywnm5) > Stages > dev

Stages

Create

dev

/

/students

POST

GET

/students/{id}

DELETE

GET

PUT

dev Stage Editor

Invoke URL: <https://p8slaywnm5.execute-api.ap-southeast-1.amazonaws.com/dev>

Settings

Logs/Tracing

Stage Variables

SDK Generation

Export

Deployment History

Documentation History

Canary

Cache Settings

9> We need to export the stage as swagger+Postman extensions and import it in the Postman collection and test it.

► /students

GET ▼ https://p8slaywnm5.execute-api.ap-southeast-1.amazonaws.com/dev/students

Params Authorization Headers (7) Body Pre-request Script Tests Settings

Query Params

| KEY | VALUE |
|-----|-------|
|-----|-------|

Body Cookies Headers (11) Test Results

Pretty Raw Preview Visualize JSON ≡

```
1  [
2    {
3      "id": 1,
4      "firstname": "shinchan",
5      "lastname": "Nohara",
6      "class": "2E",
7      "nationality": "Japan",
8      "createdAt": "2020-10-28T18:41:20.000Z",
9      "updatedAt": "2020-10-29T20:12:41.000Z"
10   },
11   {
12     "id": 2,
13     "firstname": "Christopher",
14     "lastname": "Wong",
15     "class": "BTech",
16     "nationality": "Singapore",
17     "createdAt": "2020-10-30T21:29:01.000Z",
18     "updatedAt": "2020-10-30T21:35:08.000Z"
19   },
20   {
21     "id": 3,
22     "firstname": "Tony",
23     "lastname": "Stark",
24     "class": "1A",
25     "nationality": "USA",
26     "createdAt": "2020-10-30T21:04:26.000Z",
27     "updatedAt": "2020-10-30T21:04:26.000Z"
28   }
29 ]
```