

# **Cloud Based Enterprise System**

## **Mini-Project**

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## Abstract

Developed an Employee Website which has operations like adding new employees, deleting and modifying the details of the employee using react and node js. Application hosted on **AWS EC2** machine and mysql is hosted on **amazon RDS**.

## 1. User details in AWS.

### 1.1 Adding new user

Add user

1

2

3

4

5

#### Review

Review your choices. After you create the user, you can view and download the autogenerated password and access key.

#### User details

User name	amit
AWS access type	AWS Management Console access - with a password
Console password type	Custom
Require password reset	Yes
Permissions boundary	Permissions boundary is not set

#### Permissions summary

The user shown above will be added to the following groups.

Type	Name
Managed policy	<a href="#">IAMUserChangePassword</a>

#### Tags

The new user will receive the following tags

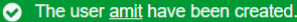
Key	Value
name	amit
email	amitgpatil215@gmail.com

[Cancel](#)

[Previous](#)

[Create user](#)

## 1.2 User Details



IAM > Users

Users (2) Info

An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.

Refresh

Delete

Add users

Find users by username or access key

< 1 > ⚙

<input type="checkbox"/>	User name	Groups	Last activity	MFA	Password a...	A
<input type="checkbox"/>	amit	None	Never	None	✓ Now	-
<input type="checkbox"/>	amplify-user	None	✓ 16 days ago	None	None	✓

## 2. Region/Zone selected (Indian/ Data center) in AWS.

for services, features, blogs, docs, and more [Alt+S]

EC2 > Instances > i-0496082021cbd12cb

Instance summary for i-0496082021cbd12cb (cloud\_mini\_project) Info

Updated less than a minute ago

Refresh

Connect

Instance state ▼

Actions ▼

Instance ID

i-0496082021cbd12cb (cloud\_mini\_project)

IPv6 address

-

Hostname type

IP name: ip-172-31-11-140.ap-south-1.compute.internal

Instance type

t2.micro

VPC ID

vpc-0e9fbe82ea693d588

Subnet ID

Public IPv4 address

13.126.69.22 | open address

Instance state

✓ Running

Private IP DNS name (IPv4 only)

ip-172-31-11-140.ap-south-1.compute.internal

Elastic IP addresses

-

AWS Compute Optimizer finding

Opt-in to AWS Compute Optimizer for recommendations. | Learn more

Auto Scaling Group name

US East (N. Virginia) us-east-1

US East (Ohio) us-east-2

US West (N. California) us-west-1

US West (Oregon) us-west-2

Africa (Cape Town) af-south-1

Asia Pacific (Hong Kong) ap-east-1

Asia Pacific (Jakarta) ap-southeast-3

Asia Pacific (Mumbai) ap-south-1

Asia Pacific (Osaka) ap-northeast-3

Asia Pacific (Seoul) ap-northeast-2

Asia Pacific (Singapore) ap-southeast-1

Asia Pacific (Sydney) ap-southeast-2

Asia Pacific (Tokyo) ap-northeast-1

### 3. Developed application should have a database in AWS

#### 3.1 AWS RDS

## Create database

### Choose a database creation method [Info](#)



#### Standard create

You set all of the configuration options, including ones for availability, security, backups, and maintenance.



#### Easy create

Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

### Engine options

#### Engine type [Info](#)



Amazon Aurora



MySQL



MariaDB



#### 3.2 Creating react\_mysql database

```
MariaDB [(none)]> create database react_node  
-> ;
```

#### 3.3 Creating tables

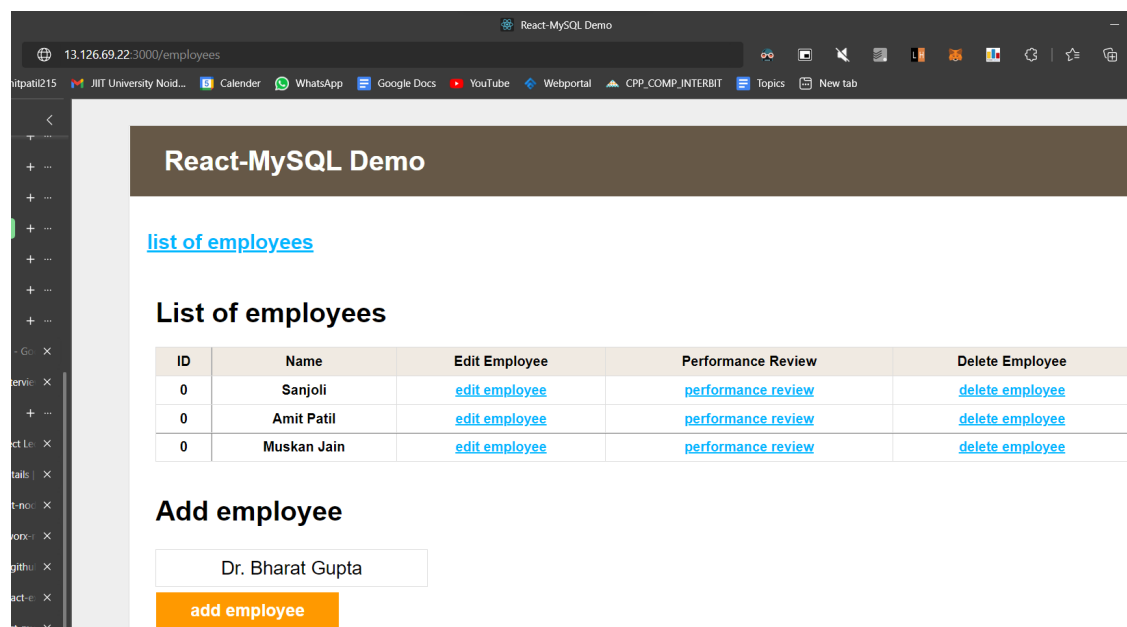
```
MariaDB [(none)]> use react_node  
Database changed  
MariaDB [react_node]> CREATE TABLE admin ( id int(11) NOT NULL, name varchar(30) NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8;  
Query OK, 0 rows affected (0.052 sec)  
  
MariaDB [react_node]> CREATE TABLE employees ( id int(11) NOT NULL, adminId int(11) NOT NULL, name varchar(30) NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8;  
Query OK, 0 rows affected (0.043 sec)  
  
MariaDB [react_node]> CREATE TABLE performreview ( id int(11) NOT NULL, refid int(11) NOT NULL, content text NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8;  
Query OK, 0 rows affected (0.033 sec)  
  
MariaDB [react_node]>
```

### 3.4 Show employee table

```
MariaDB [react_node]> select * from employees;
+-----+-----+-----+
| id | adminId | name |
+-----+-----+-----+
| 0 | 1 | Amit patil |
| 0 | 1 | Dr. Bharat Gupta |
| 0 | 1 | Sanjoli Goyal |
| 0 | 1 | Muskan Jain |
+-----+-----+-----+
4 rows in set (0.003 sec)
```

## 4 The application should be able to insert/ delete/ query data from a database stored in AWS.

### 4.1 Insert New Employee



The screenshot shows a web browser window with the URL `13.126.69.22:3000/employees`. The page title is "React-MySQL Demo". Below the title, there is a link "list of employees". The main content area is titled "List of employees" and contains a table with the following data:

ID	Name	Edit Employee	Performance Review	Delete Employee
0	Sanjoli	<a href="#">edit employee</a>	<a href="#">performance review</a>	<a href="#">delete employee</a>
0	Amit Patil	<a href="#">edit employee</a>	<a href="#">performance review</a>	<a href="#">delete employee</a>
0	Muskan Jain	<a href="#">edit employee</a>	<a href="#">performance review</a>	<a href="#">delete employee</a>

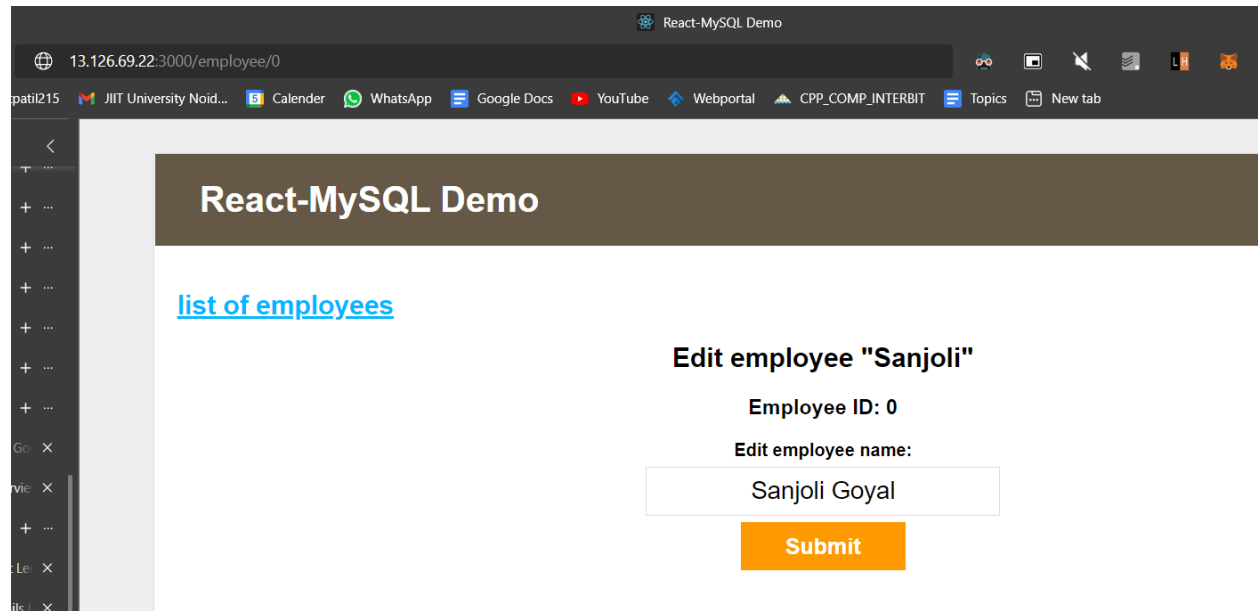
Below the table, there is a section titled "Add employee" with a text input field containing "Dr. Bharat Gupta" and an orange "add employee" button.

### Console logs

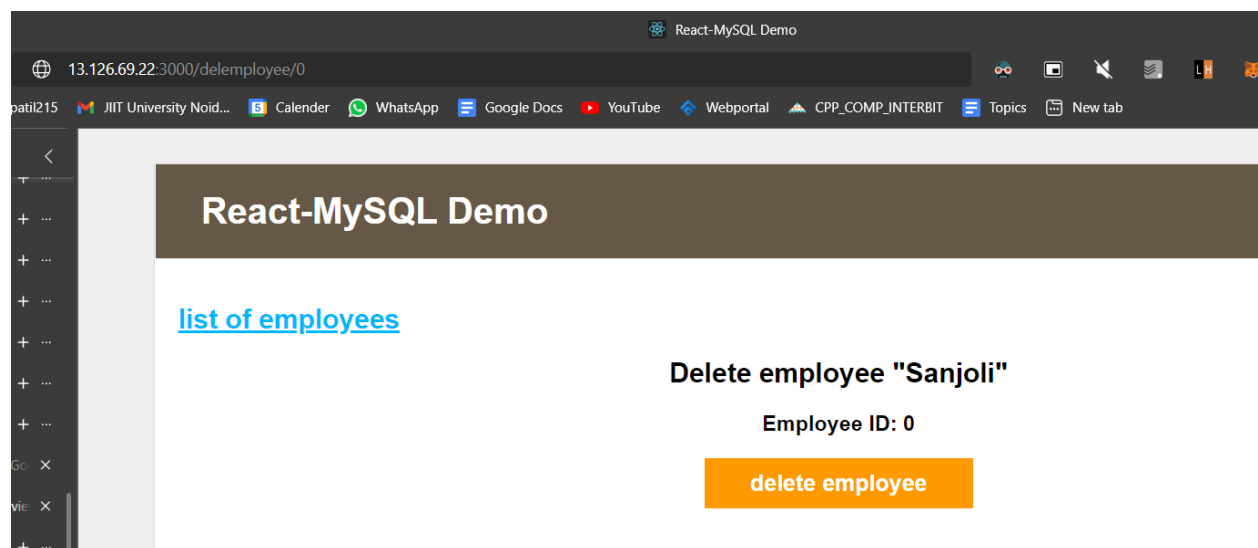
```
Inserting a new employee...
{ newname: 'Amit Patil' }
OkPacket {
  fieldCount: 0,
```

```
affectedRows: 1,  
insertId: 0,  
serverStatus: 2,  
changedRows: 0  
}
```

## 4.2 Edit Employee Name



## 4.3 Delete Employee

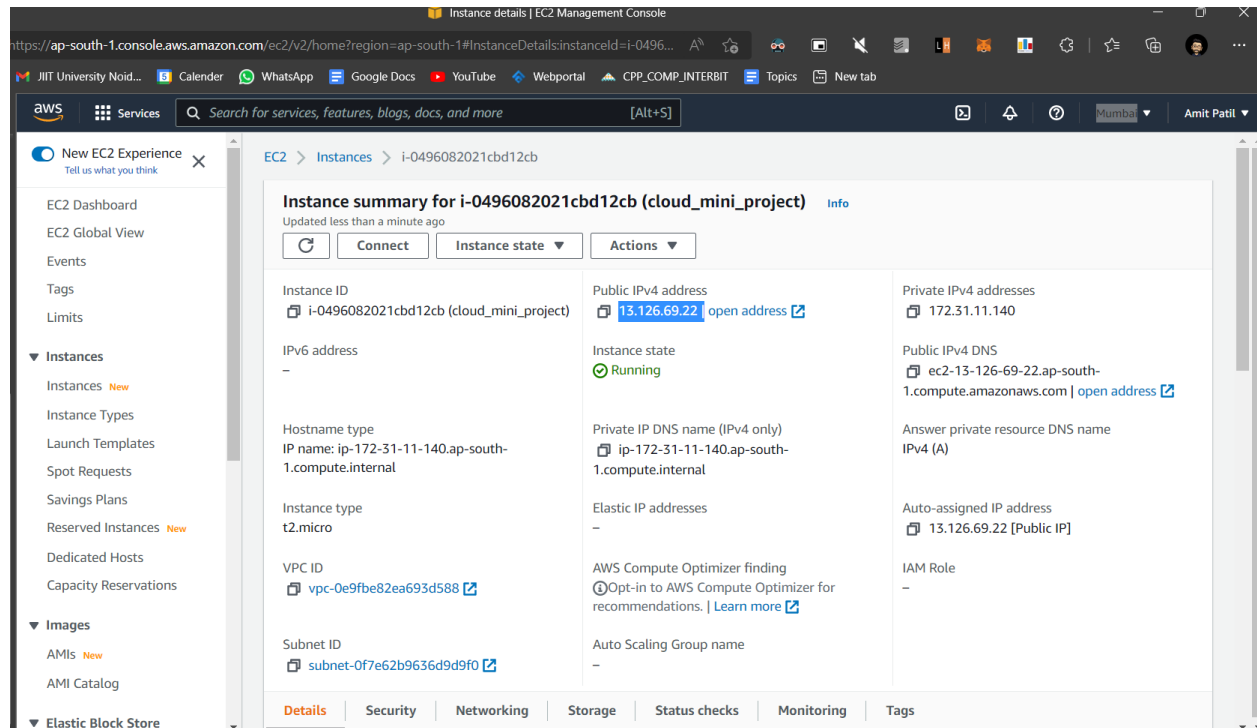




## 5 Snapshots of IP address, starting page URI of the application from the browser.

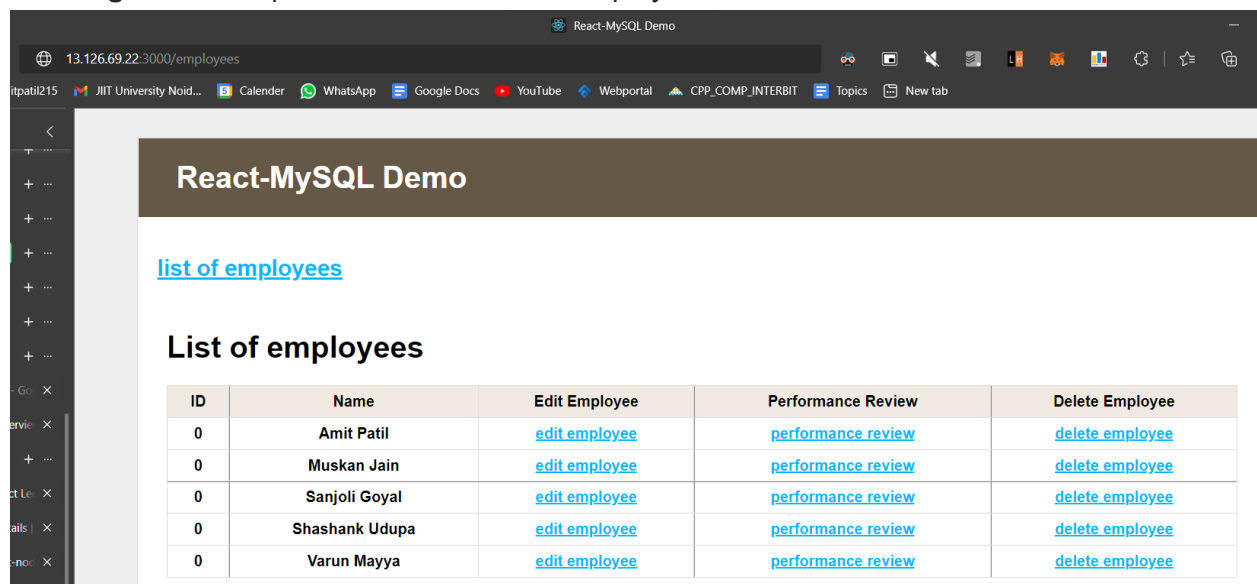
### 5.1 EC2 IP address Snapshot

IP address : **13.126.69.22**



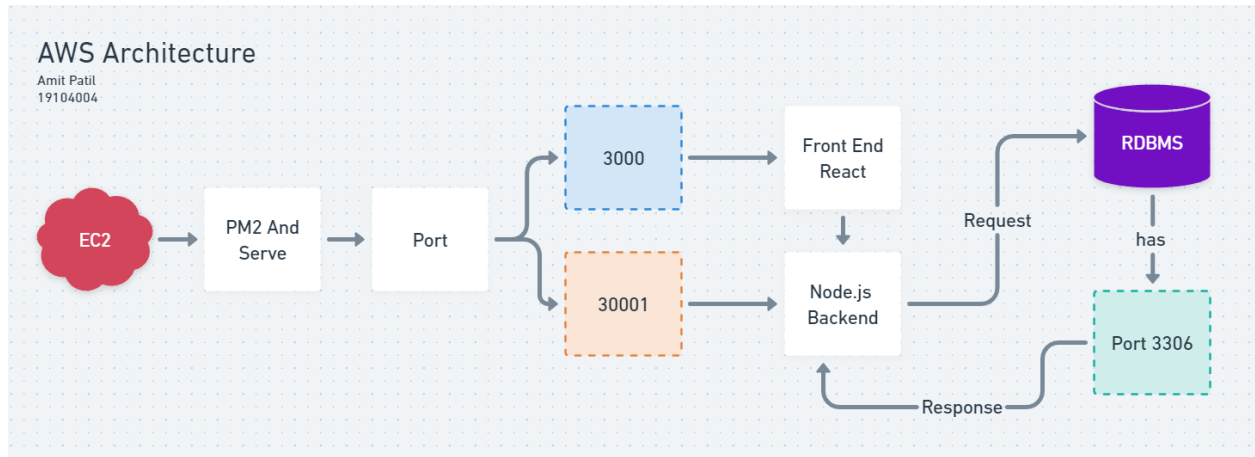
### 5.2 Application Web Browser URL

Running on url : **https://13.126.69.22:3000/employees**

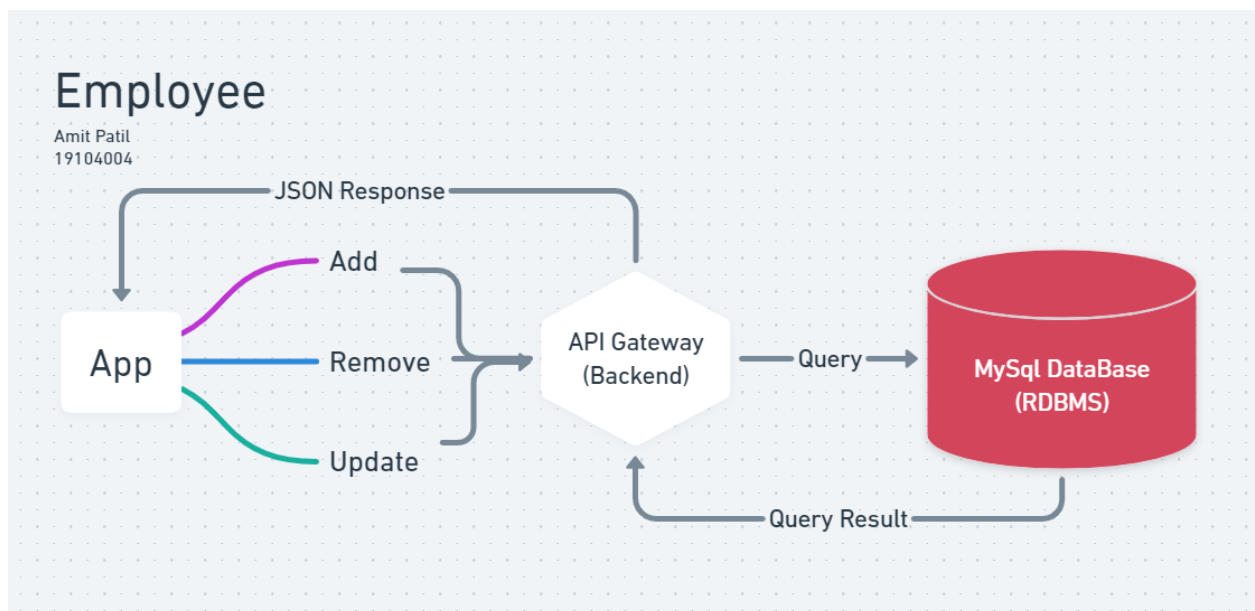


## 6 Architecture diagram/ Flow Chart of the application

### 6.1 AWS Architecture flow



### 6.2 Application Flow



## 7 Tools and techniques used in AWS

**EC2** - For hosting frontend and backend

**RDS** - For MYSQL relational database

**IAM** - Access management for ec2 and RDS

**PM2** -Process manager and For scalability of employee frontend and backend

**Serve** - for running npm servers on both ports

## 8 Interaction between different modules in AWS ( EC2, Database, S3, etc)

### 8.1 Code to connect with RDS from EC2 using endpoints

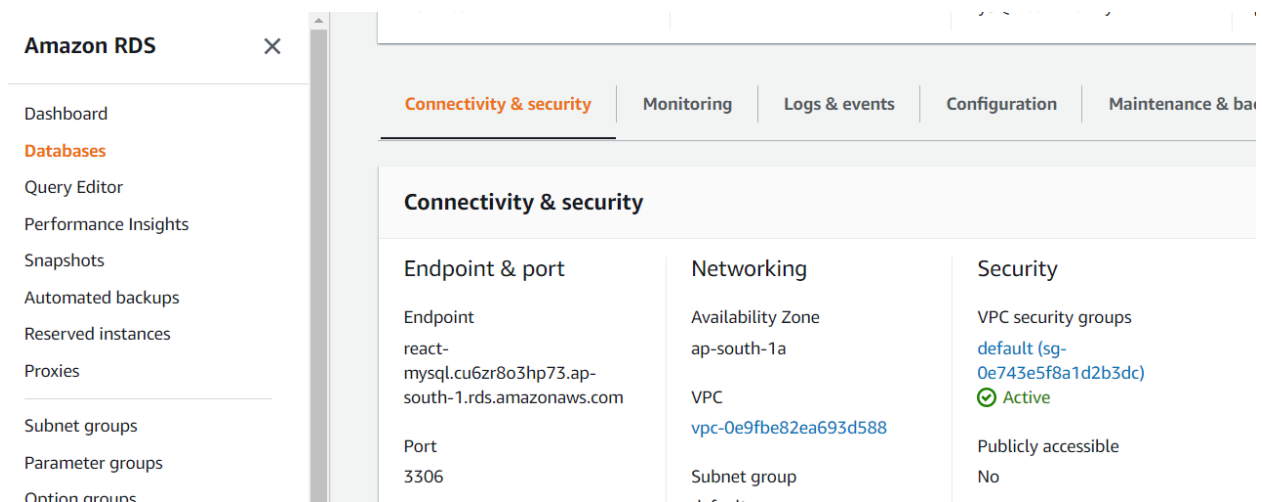
```
// Create MySQL connection
const db = mysql.createConnection({
  host      : 'react-mysql.cu6zr8o3hp73.ap-south-1.rds.amazonaws.com',
  user      : 'root',
  password  : 'root',
  port      : "3306",
  database  : 'react_node',
})
```

## 9 Data stored in Storage bucket (if used)

S3 not used

## 10 Snapshots of End point(s).

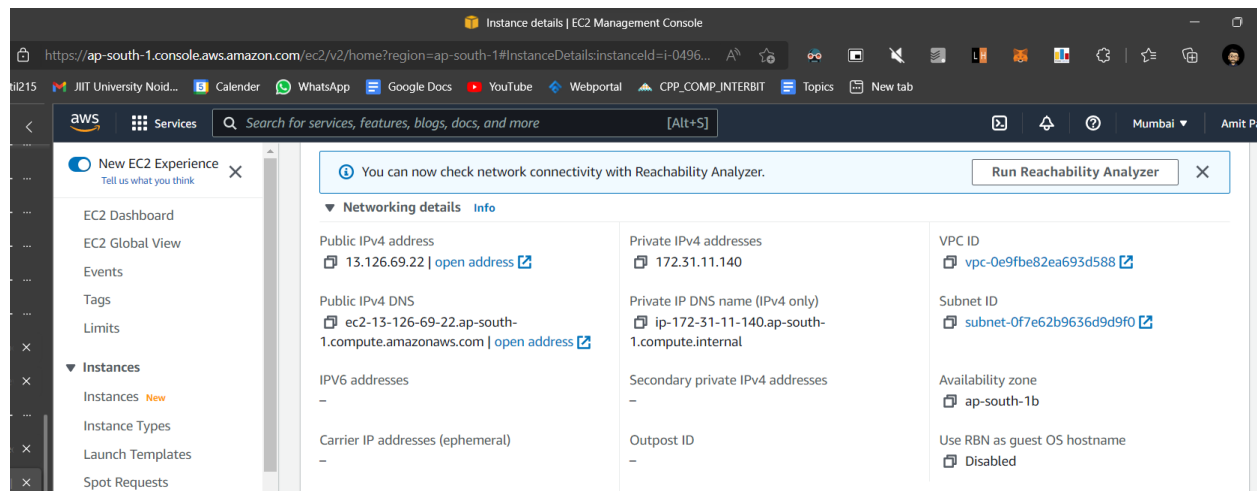
### 10.1 RDS Endpoints



The screenshot shows the Amazon RDS console interface. On the left is a navigation sidebar with options like Dashboard, Databases, Query Editor, Performance Insights, Snapshots, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, and Option groups. The main panel displays the 'Connectivity & security' tab for a specific RDS instance. This tab is divided into three columns: Endpoint & port, Networking, and Security.

Endpoint & port	Networking	Security
Endpoint react-mysql.cu6zr8o3hp73.ap-south-1.rds.amazonaws.com	Availability Zone ap-south-1a	VPC security groups default (sg-0e743e5f8a1d2b3dc)
Port 3306	VPC vpc-0e9fbe82ea693d588	Active (indicated by a green checkmark)
	Subnet group	Publicly accessible No

## 10.2 EC2 Endpoints



## 11 Installation of the software(s) in AWS

**Note:** Using private IP address to connect through SSH

### 11.1 Getting root access

```
ubuntu@ip-172-31-11-140:~$ sudo su
root@ip-172-31-11-140:/home/ubuntu#
```

### 11.2 Creating Workspace Folder in home directory

```
root@ip-172-31-11-140:/home/ubuntu# cd ..
root@ip-172-31-11-140:/home# mkdir workspace
root@ip-172-31-11-140:/home# cd workspace
root@ip-172-31-11-140:/home/workspace#
```

### 11.3 Install nvm

```
root@ip-172-31-11-140: /home/workspace/react-mysql
root@ip-172-31-11-140:/home/workspace/react-mysql/server/src# cd ..
root@ip-172-31-11-140:/home/workspace/react-mysql/server# cd ..
root@ip-172-31-11-140:/home/workspace/react-mysql# curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.34.0/install.sh | bash
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
100 13226  100 13226    0     0  35040      0 --:--:-- --:--:-- --:--:-- 35082
=> Downloading nvm from git to '/root/.nvm'
=> Cloning into '/root/.nvm'...
remote: Enumerating objects: 278, done
```

### 11.4 Activate nvm

```
root@ip-172-31-11-140: /home/workspace/react-mysql
[ -s "$NVM_DIR/bash_completion" ] && \. "$NVM_DIR/bash_completion" # This loads nvm bash completion
root@ip-172-31-11-140:/home/workspace/react-mysql# . ~/.nvm/nvm.sh
root@ip-172-31-11-140:/home/workspace/react-mysql#
root@ip-172-31-11-140:/home/workspace/react-mysql#
root@ip-172-31-11-140:/home/workspace/react-mysql#
```

### 11.5 Install nodejs

```
root@ip-172-31-11-140: /home/workspace/react-mysql
root@ip-172-31-11-140:/home/workspace/react-mysql#
root@ip-172-31-11-140:/home/workspace/react-mysql# nvm install node
Downloading and installing node v18.2.0...
Downloading https://nodejs.org/dist/v18.2.0/node-v18.2.0-linux-x64.tar.xz...
##### 100.0%
Computing checksum with sha256sum
Checksums matched!
Now using node v18.2.0 (npm v8.9.0)
```

### 11.6 Install PM2 Server

```
root@ip-172-31-11-140: /home/workspace/react-mysql
root@ip-172-31-11-140:/home/workspace/react-mysql#
root@ip-172-31-11-140:/home/workspace/react-mysql# npm install -g pm2
npm WARN deprecated uid@3.4.0: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
```

## 11.7 Install Serve

```
root@ip-172-31-11-140: /home/workspace/react-mysql
root@ip-172-31-11-140:/home/workspace/react-mysql# npm install -g serve

added 93 packages, and audited 94 packages in 5s

10 packages are looking for funding
  run `npm fund` for details
```

## 12 Steps of developed application execution

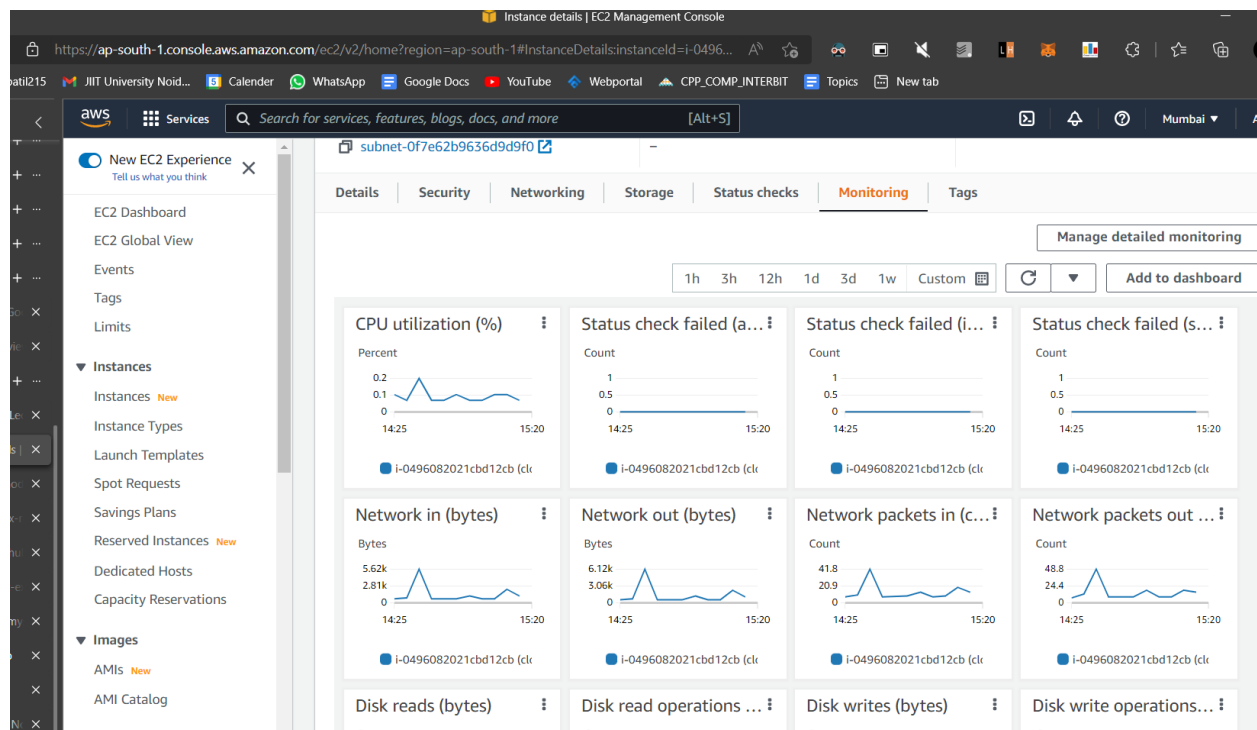
**Step 1:** Go to the url <https://13.126.69.22:3000/employees>

**Step 2:** Click on add new employee button

**Step 3:** Click on Delete Employee button to delete that employee

**Step 4:** Edit employee to edit the name of the employee

## 13 EC2 usage in the application



## 14 Code storage location (screenshots)

### 14.1 Workspace folder

```
root@ip-172-31-11-140:/home/workspace# cd react-mysql/  
root@ip-172-31-11-140:/home/workspace/react-mysql# ls  
README.md  client  react_node.sql  screenshot.png  server  
root@ip-172-31-11-140:/home/workspace/react-mysql#
```

### 14.2 Client Directory

```
root@ip-172-31-11-140:/home/workspace/react-mysql# cd client/  
root@ip-172-31-11-140:/home/workspace/react-mysql/client# ls  
package-lock.json  package.json  public  src
```

### 14.3 Server Directory

```
root@ip-172-31-11-140:/home/workspace/react-mysql# cd server/  
root@ip-172-31-11-140:/home/workspace/react-mysql/server# ls  
package-lock.json  package.json  src  
root@ip-172-31-11-140:/home/workspace/react-mysql/server# cd src  
root@ip-172-31-11-140:/home/workspace/react-mysql/server/src# ls  
endpoints.js  seed-data  server.js  
root@ip-172-31-11-140:/home/workspace/react-mysql/server/src#
```

## 15. References

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7. "Global Infrastructure Regions & AZs." *Amazon Web Services, Inc.*, [aws.amazon.com, https://aws.amazon.com/about-aws/global-infrastructure/regions\\_az/](https://aws.amazon.com/about-aws/global-infrastructure/regions_az/). Accessed 30 May 2022.