

## Project – 1

### Deploying a Multi-Tier Website Using AWS EC2

- Ruchitha Bt

**Description:** Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. Using Amazon EC2 eliminates your need to invest in hardware up front so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

**Problem Statement:** Company ABC wants to move their product to AWS. They have the following things set up right now:

1. MySQL DB
2. Website (PHP)

The company wants high availability on this product, therefore wants Auto Scaling to be enabled on this website.

#### **Steps to Solve:**

1. Launch an EC2 Instance
2. Enable Auto Scaling on these instances (minimum 2)
3. Create an RDS Instance
4. Create Database & Table in RDS instance:
  - a. Database name: intel
  - b. Table name: data
  - c. Database password: intel123

## Solutions:

Go to VPC > Create VPC

### Create VPC [Info](#)

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

#### VPC settings

Resources to create [Info](#)  
Create only the VPC resource or the VPC and other networking resources.

☐ VPC only

☒ VPC and more

#### Preview

VPC [Show det](#)  
Your AWS virtu:

Give Name and IP address

#### Name tag auto-generation [Info](#)

Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.

☒ Auto-generate

project01

#### IPv4 CIDR block [Info](#)

Determine the starting IP and the size of your VPC using CIDR notation.

10.0.0.0/24 256 IPs

CIDR block size must be between /16 and /28.

#### IPv6 CIDR block [Info](#)

☒ No IPv6 CIDR block

☐ Amazon-provided IPv6 CIDR block

#### Tenancy [Info](#)

Default ▼

## Select 2 AZ and 2 Private and public Subnets

### Number of Availability Zones (AZs) [Info](#)

Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.

1	2	3
---	---	---

► **Customize AZs**

### Number of public subnets [Info](#)

The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.

0	2
---	---

### Number of private subnets [Info](#)

The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.

0	2	4
---	---	---

► **Customize subnets CIDR blocks**

## Use Nat gateway and Create VPC

**NAT gateways (\$)** [Info](#)

Choose the number of Availability Zones (AZs) in which to create NAT gateways. Note that there is a charge for each NAT gateway

**VPC endpoints** [Info](#)

Endpoints can help reduce NAT gateway charges and improve security by accessing S3 directly from the VPC. By default, full access policy is used. You can customize this policy at any time.

**DNS options** [Info](#)

☒ Enable DNS hostnames  
☒ Enable DNS resolution

► **Additional tags**

VPC is created

**Your VPCs (1/1)** [Info](#)

Search

<input checked="" type="checkbox"/>	Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR
<input checked="" type="checkbox"/>	project01-vpc	<a href="#">vpc-05d1f92295487ee20</a>	Available	10.0.0.0/24	-

2 Private and Public Subnets are created in different zones

**Subnets (4)** [Info](#)

Find resources by attribute or tag

<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CII
<input type="checkbox"/>	project01-subnet-public2-us-east-1b	<a href="#">subnet-091a32caf1dd62d16</a>	Available	<a href="#">vpc-05d1f92295487ee20</a>   <a href="#">proj...</a>	10.0.0.1
<input type="checkbox"/>	project01-subnet-private1-us-east-1a	<a href="#">subnet-02de589712aade1c5</a>	Available	<a href="#">vpc-05d1f92295487ee20</a>   <a href="#">proj...</a>	10.0.0.1
<input type="checkbox"/>	project01-subnet-private2-us-east-1b	<a href="#">subnet-08d66185466599e5e</a>	Available	<a href="#">vpc-05d1f92295487ee20</a>   <a href="#">proj...</a>	10.0.0.1
<input type="checkbox"/>	project01-subnet-public1-us-east-1a	<a href="#">subnet-087107bfc6c7c6b65</a>	Available	<a href="#">vpc-05d1f92295487ee20</a>   <a href="#">proj...</a>	10.0.0.C

3 Route table is created for different zones

<input type="checkbox"/>	Name	Route table ID	Explicit subnet associ...	Edge associations	Main
<input type="checkbox"/>	project01-rtb-private2-us-east-1b	<a href="#">rtb-07340f9ff231acac1</a>	<a href="#">subnet-08d66185466599...</a>	-	No
<input type="checkbox"/>	-	<a href="#">rtb-08b56cb3358a6b118</a>	-	-	Yes
<input type="checkbox"/>	project01-rtb-private1-us-east-1a	<a href="#">rtb-02fbe1f8e880648d5</a>	<a href="#">subnet-02de589712aade...</a>	-	No

1 Internet gateway and 1 NAT gateway is created.

Internet gateways (1) Info				
<input type="checkbox"/>	Name	Internet gateway ID	State	VPC ID
<input type="checkbox"/>	project01-igw	<a href="#">igw-0e20fd37e04ccb048</a>	Attached	<a href="#">vpc-05d1f92295487ee20   project01-v-</a>

NAT gateways (1) Info						
<input type="radio"/>	Name	NAT gateway ID	Connectivity...	State	State message	Primary public
<input type="radio"/>	project01-nat-public...	<a href="#">nat-09460a60285a5d1a3</a>	Public	Available	-	<a href="#">18.233.121.135</a>

As our 2 Private subnets are dedicated to 2 Route tables, make them come under single Route table

Route tables (1/5) Info

Find resources by attribute or tag

< 1 >

	Name	Route table ID	Explicit subnet associ...	Edge associations	Main
<input type="checkbox"/>	project01-rtb-private2-us-east-1b	<a href="#">rtb-07340f9ff231acac1</a>	<a href="#">subnet-08d66185466599...</a>	-	No
<input type="checkbox"/>	-	<a href="#">rtb-08b56cb3358a6b118</a>	-	-	Yes
<input checked="" type="checkbox"/>	project01-rtb-private	<a href="#">rtb-02fbe1f8e880648d5</a>	<a href="#">subnet-02de589712aade...</a>	-	No

Go to Subnet association > Edit > select private subnets > save

VPC > Route tables > [rtb-02fbe1f8e880648d5](#) > Edit subnet associations

## Edit subnet associations

Change which subnets are associated with this route table.

**Available subnets (2/4)**

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input type="checkbox"/>	project01-subnet-public2-us-e...	<a href="#">subnet-091a32caf1dd62d16</a>	10.0.0.16/28	–	<a href="#">rtb-099ad82138f677ffb</a> / project
<input checked="" type="checkbox"/>	project01-subnet-private1-us-...	<a href="#">subnet-02de589712aade1c5</a>	10.0.0.128/28	–	<a href="#">rtb-02fbe1f8e880648d5</a> / project
<input checked="" type="checkbox"/>	project01-subnet-private2-us-...	<a href="#">subnet-08d66185466599e5e</a>	10.0.0.144/28	–	<a href="#">rtb-07340f9ff231acac1</a> / project
<input type="checkbox"/>	project01-subnet-public1-us-e...	<a href="#">subnet-087107bfc6c7c6b65</a>	10.0.0.0/28	–	<a href="#">rtb-099ad82138f677ffb</a> / project

**Selected subnets**

Cancel Save associations

## Delete the other Subnet

Route tables (1/5) Info

	Name	Route table ID	Explicit subnet associ...
<input checked="" type="checkbox"/>	project01-rtb-private2-us-east-1b	<a href="#">rtb-07340f9ff231acac1</a>	–
<input type="checkbox"/>	–	<a href="#">rtb-08b56cb3358a6b118</a>	–
<input type="checkbox"/>	project01-rtb-private	<a href="#">rtb-02fbe1f8e880648d5</a>	2 subnets

rtb-07340f9ff231acac1 / project01-rtb-private2-us-east-1b

Actions

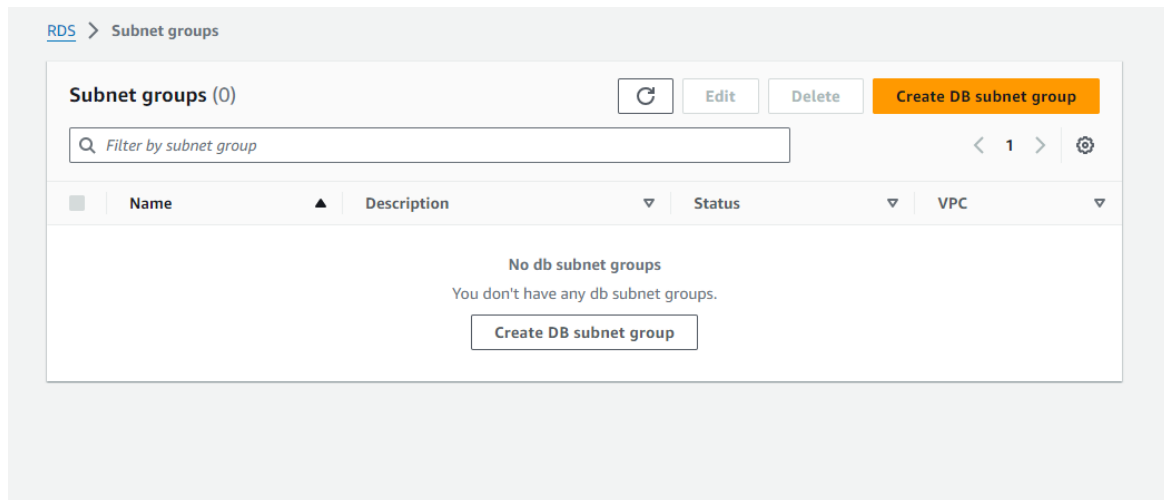
- View details
- Set main route table
- Edit subnet associations
- Edit edge associations
- Edit route propagation
- Edit routes
- Manage tags
- Delete route table

Hence we can see 1 private and 1 public Route tables for each 2 Subnets

Route tables (4) Info

	Name	Route table ID	Explicit subnet associ...	Edge associations	Main
<input type="checkbox"/>	–	<a href="#">rtb-08b56cb3358a6b118</a>	–	–	Yes
<input type="checkbox"/>	project01-rtb-private	<a href="#">rtb-02fbe1f8e880648d5</a>	2 subnets	–	No
<input type="checkbox"/>	–	<a href="#">rtb-0297aa65bd9e8a303</a>	–	–	Yes
<input type="checkbox"/>	project01-rtb-public	<a href="#">rtb-099ad82138f677ffb</a>	2 subnets	–	No

Now create Subnet group for creating Database



Give name and select created VPC

### Subnet group details

**Name**  
You won't be able to modify the name after your subnet group has been created.

Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.

**Description**

**VPC**  
Choose a VPC identifier that corresponds to the subnets you want to use for your DB subnet group. You won't be able to choose a different VPC identifier after your subnet group has been created.

project01-vpc (vpc-05d1f92295487ee20) ▼

Select AZ's and Choose only private subnets associated with IP address

### Add subnets

Availability Zones

Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone ▼

us-east-1a ✕ us-east-1b ✕

Subnets

Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets ▼

subnet-02de589712aade1c5 (10.0.0.128/28) ✕

subnet-08d66185466599e5e (10.0.0.144/28) ✕

For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.

Create the Subnets group

### Subnets selected (2)

Availability zone	Subnet ID	CIDR block
us-east-1a	subnet-02de589712aade1c5	10.0.0.128/28
us-east-1b	subnet-08d66185466599e5e	10.0.0.144/28

Cancel

Create

Subnet group is created

RDS > Subnet groups

Subnet groups (1)

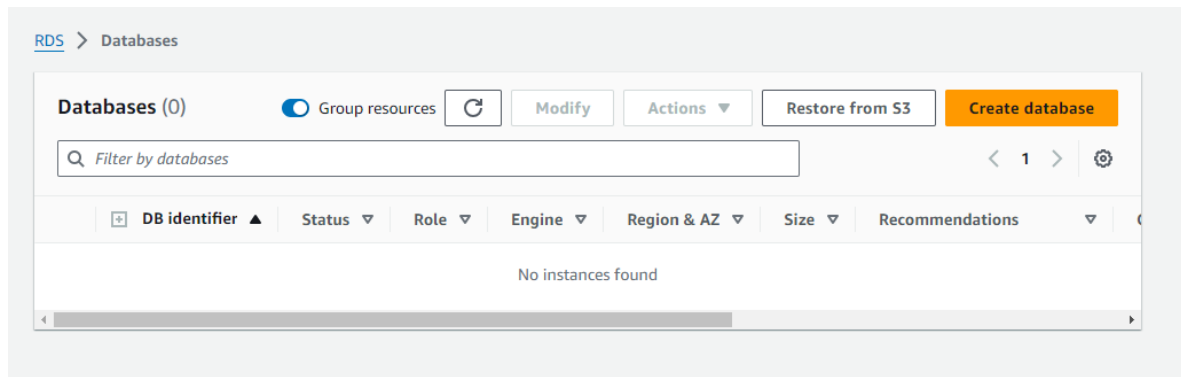
Filter by subnet group

< 1 > ⚙

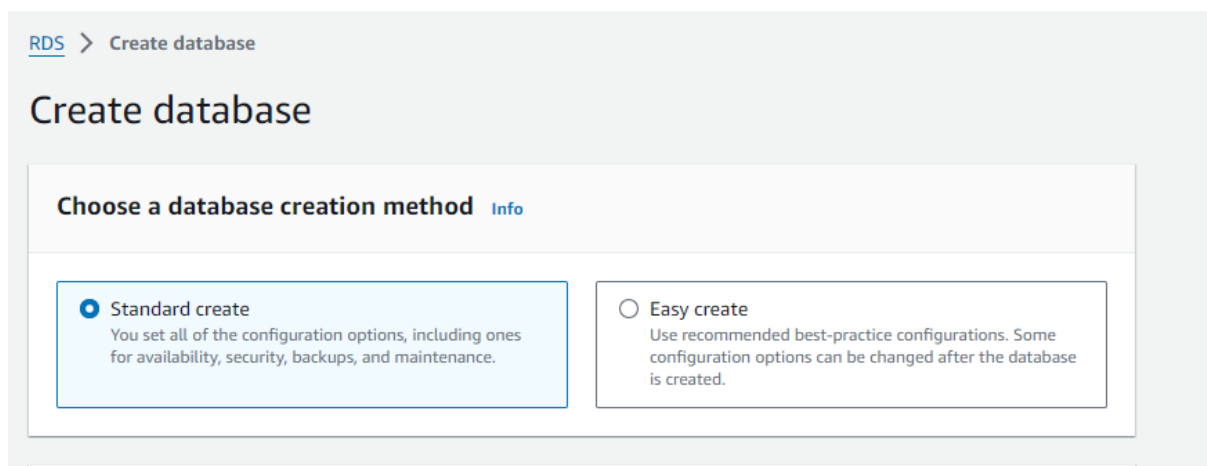
<input type="checkbox"/>	Name	Description	Status	VPC
<input type="checkbox"/>	<a href="#">project01-rds-subnetgroup</a>	This is going to launch DB in private only	Complete	vpc-05d1f92295487ee20

Now create Database

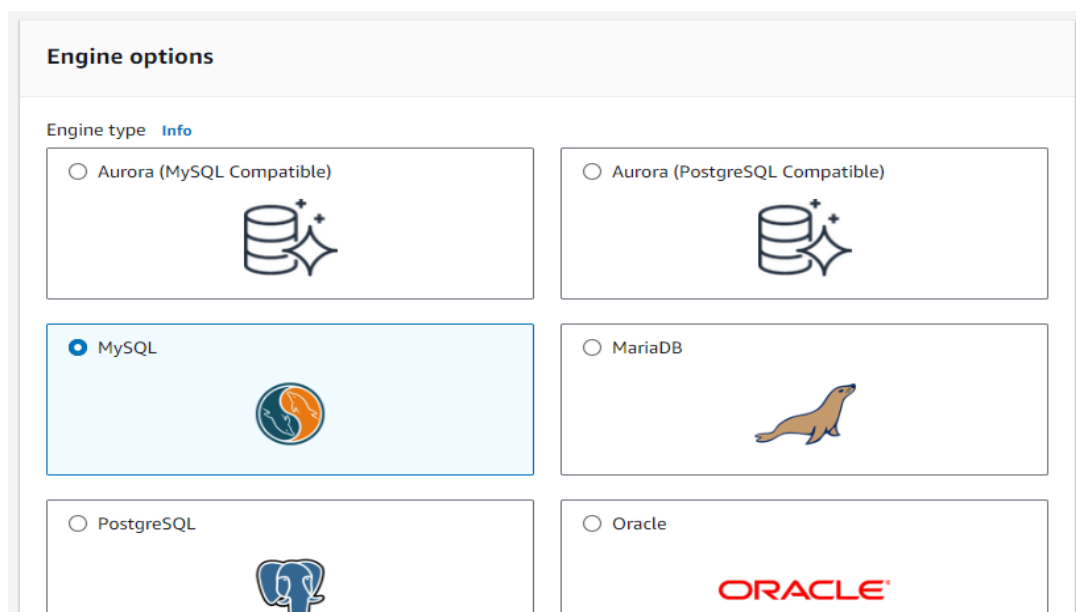




Choose Standard create



Choose MySQL



## Free tier

### Templates

Choose a sample template to meet your use case.

☐ **Production**  
Use defaults for high availability and fast, consistent performance.

☐ **Dev/Test**  
This instance is intended for development use outside of a production environment.

☒ **Free tier**  
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.  
[Info](#)

## Give Database name

### Settings

**DB instance identifier** [Info](#)  
Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.  
  
The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

## Provide Master Username and Password

**▼ Credentials Settings**  
**Master username** [Info](#)  
Type a login ID for the master user of your DB instance.  
  
1 to 16 alphanumeric characters. The first character must be a letter.

**Credentials management**  
You can use AWS Secrets Manager or manage your master user credentials.

☐ **Managed in AWS Secrets Manager - *most secure***  
RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.

☒ **Self managed**  
Create your own password or have RDS create a password that you manage.

☐ **Auto generate password**  
Amazon RDS can generate a password for you, or you can specify your own password.

**Master password** [Info](#)  
  
Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ' " @

**Confirm master password** [Info](#)

## Disable Auto scaling

### ▼ Storage autoscaling

#### Storage autoscaling [Info](#)

Provides dynamic scaling support for your database's storage based on your application's needs.

- ☐ **Enable storage autoscaling**  
Enabling this feature will allow the storage to increase after the specified threshold is exceeded.

## Choose VPC and Subnet Group which are created from our end

### Connectivity [Info](#)

#### Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

- ☒ **Don't connect to an EC2 compute resource**  
Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
- ☐ **Connect to an EC2 compute resource**  
Set up a connection to an EC2 compute resource for this database.

#### Virtual private cloud (VPC) [Info](#)

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

project01-vpc (vpc-05d1f92295487ee20)  
4 Subnets, 2 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

**i** After a database is created, you can't change its VPC.

#### DB subnet group [Info](#)

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

project01-rds-subnetgroupo  
2 Subnets, 2 Availability Zones

## Disable Public access

### Public access [Info](#)

- ☐ **Yes**  
RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
- ☒ **No**  
RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

## Created New Security group and select

### VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

☐ Choose existing

Choose existing VPC security groups

☒ Create new

Create new VPC security group

### New VPC security group name

Project01-RDS-SG

### Availability Zone [Info](#)

No preference

## Give Data base name as Intel as per the question

### ▼ Additional configuration

Database options, encryption turned on, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

### Database options

#### Initial database name [Info](#)

intel

If you do not specify a database name, Amazon RDS does not create a database.

#### DB parameter group [Info](#)

default.mysql8.0

#### Option group [Info](#)

default:mysql-8-0

## Disable Backup and Deletion Protection then give create Database

### Backup

☐ Enable automated backups

Creates a point-in-time snapshot of your database

#### Maintenance window [Info](#)

Select the period you want pending modifications or maintenance applied to the database by Amazon RDS.

- ☐ Choose a window
- ☒ No preference

#### Deletion protection

- ☐ Enable deletion protection
- Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

## Database is created

[RDS](#) > Databases

**Databases (1)** ☒ Group resources

<input type="checkbox"/>	DB identifier ▲	Status ▼	Role ▼	Engine ▼	Region & AZ ▼	Size ▼	Recommendat
<input type="radio"/>	<a href="#">project01-rds</a>	Available	Instance	MySQL Community	us-east-1a	db.t3.micro	

## Now Launch a new instance, give a proper name

[EC2](#) > [Instances](#) > Launch an instance

### Launch an instance [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

#### Name and tags [Info](#)

Name

 [Add additional tags](#)

#### Summ

Number of i

[Software In](#)


Amazon Lin  
ami-04e5276


[Virtual serv](#)


t2.micro


## Select Ubuntu machine


## Quick Start


  
aws


  
Mac

  
ubuntu

  
Microsoft

  
Red Hat

  
SUS

  
[Browse more AMIs](#)  
Including AMIs from  
AWS, Marketplace and  
the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type  
ami-080e1f13689e07408 (64-bit (x86)) / ami-0a55ba1c20b74fc30 (64-bit (Arm))  
Virtualization: hvm   ENA enabled: true   Root device type: ebs

Free tier eligible ▼

## Select Free tier

▼ **Instance type** [Info](#) | [Get advice](#)

Instance type

t2.micro  
Family: t2   1 vCPU   1 GiB Memory   Current generation: true  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour  
On-Demand RHEL base pricing: 0.0716 USD per Hour  
On-Demand Linux base pricing: 0.0116 USD per Hour

Free tier eligible ▼

☒ All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software


## Choose key pair

▼ **Key pair (login)** [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

windows-demo ▼

 [Create new key pair](#)

Select our created VPC and subnets, Disabled Public IP

▼ Network settings Info

VPC - required Info

vpc-05d1f92295487ee20 (project01-vpc)  
10.0.0.0/24

▼

↻

Subnet Info

subnet-02de589712aade1c5 project01-subnet-private1-us-east-1a  
VPC: vpc-05d1f92295487ee20 Owner: 730335274013  
Availability Zone: us-east-1a IP addresses available: 10 CIDR: 10.0.0.128/28

▼

↻ Create new subnet

Auto-assign public IP Info

Disable

▼

Create new Security group for EC2

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Create security group

☐ Select existing security group

Security group name - required

Project01-WebSG

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and .\_-:/()#,@!+=&:{}!\$\*

Description - required Info

launch-wizard-2 created 2024-04-22T10:10:15.320Z

Create another inbound security rule for HTTP

**Inbound Security Group Rules**

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0) Remove

Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>
ssh ▼	TCP	22
Source type <a href="#">Info</a>	Source <a href="#">Info</a>	Description - optional <a href="#">Info</a>
Anywhere ▼	<input type="text" value="Add CIDR, prefix list or security"/>	<input type="text" value="e.g. SSH for admin desktop"/>
	<input type="text" value="0.0.0.0/0"/> X	

▼ Security group rule 2 (TCP, 80, 0.0.0.0/0) Remove

Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>
HTTP ▼	TCP	80
Source type <a href="#">Info</a>	Source <a href="#">Info</a>	Description - optional <a href="#">Info</a>
Anywhere ▼	<input type="text" value="Add CIDR, prefix list or security"/>	<input type="text" value="e.g. SSH for admin desktop"/>
	<input type="text" value="0.0.0.0/0"/> X	

Give Launch, EC2 instance is created

Instances (1) <a href="#">Info</a>							
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>				All states ▼		< 1 > ⚙	
<input type="checkbox"/>	Name <a href="#">↗</a> ▼	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status	Availability Zone
<input type="checkbox"/>	Project-WebSe...	i-0b9309498ac724dac	Running <a href="#">🔍</a>	t2.micro	2/2 checks passed <a href="#">View alarms +</a>		us-east-1a

To connect the EC2 server into Ubuntu Machine, as this our private subnet we need Endpoint.

Create endpoint give a name and Choose EC2 Instance connect Endpoint



VPC > Endpoints > Create endpoint

## Create endpoint [Info](#)

There are three types of VPC endpoints – Interface endpoints, Gateway Load Balancer endpoints, and Gateway endpoints. Interface endpoints and Gateway Load Balancer endpoints are powered by AWS PrivateLink, and use an Elastic Network Interface (ENI) as an entry point for traffic destined to the service. Interface endpoints are typically accessed using the public or private DNS name associated with the service, while Gateway endpoints and Gateway Load Balancer endpoints serve as a target for a route in your route table for traffic destined for the service.

### Endpoint settings

**Name tag - optional**  
Creates a tag with a key of 'Name' and a value that you specify.

**Service category**  
Select the service category

☐ AWS services  
Services provided by Amazon

☐ PrivateLink Ready partner services  
Services with an AWS Service Ready designation

☐ AWS Marketplace services  
Services that you've purchased through AWS Marketplace

☒ EC2 Instance Connect Endpoint  
An elastic network interface that allow you to connect to resources in a private subnet

☐ Other endpoint services  
Find services shared with you by service name

## Choose our created VPC

### VPC

Select the VPC in which to create the endpoint

VPC  
The VPC in which to create your endpoint.

► Additional settings

## Choose created EC2 Security group and private Subnet and give create

### Security groups (1/3) [Info](#)

	Group ID	Group name	VPC ID	Description
<input type="checkbox"/>	<a href="#">sg-0ad339ec802b834ad</a>	default	<a href="#">vpc-05d1f92295487ee20</a>	default VPC security group
<input type="checkbox"/>	<a href="#">sg-07019937837496be1</a>	Project01-RDS-SG	<a href="#">vpc-05d1f92295487ee20</a>	Created by RDS managen
<input checked="" type="checkbox"/>	<a href="#">sg-0f8b4fbd13b8ce1b7</a>	Project01-WebSG	<a href="#">vpc-05d1f92295487ee20</a>	launch-wizard-2 created

### Subnet

Select the Subnet in which to create the endpoint

Subnet  
Select the subnets in which to create the endpoint.

## Endpoints are created

Endpoints (1/1) <a href="#">Info</a>					<a href="#">Refresh</a>	<a href="#">Actions</a>	<a href="#">Create endpoint</a>
<input type="text" value="Search"/>					<a href="#">&lt;</a> <a href="#">1</a> <a href="#">&gt;</a> <a href="#">Settings</a>		
<input checked="" type="checkbox"/>	Name	VPC endpoint ID	VPC ID	Service name			
<input checked="" type="checkbox"/>	Project01-endpoints-vpc	<a href="#">eice-073bce01b3f4391c0</a>	<a href="#">vpc-05d1f92295487ee20   project01-vpc</a>				

Now connect EC2 server, choose connect through endpoint

[EC2](#) > [Instances](#) > [i-0b9309498ac724dac](#) > Connect to instance

## Connect to instance [Info](#)

Connect to your instance i-0b9309498ac724dac (Project-WebServer) using any of these options

EC2 Instance Connect

Session Manager

SSH client

EC2 serial console

Instance ID

i-0b9309498ac724dac (Project-WebServer)

Connection Type

☐ Connect using EC2 Instance Connect  
 Connect using the EC2 Instance Connect browser-based client, with a public IPv4 address.

☒ Connect using EC2 Instance Connect Endpoint  
 Connect using the EC2 Instance Connect browser-based client, with a private IPv4 address and a VPC endpoint.

Private IP address

10.0.0.140

Choose our created Endpoint and Click on Connect

### EC2 Instance Connect Endpoint

Only endpoints that have completed the creation process can be selected. The process can take up to 15 minutes. If you create an endpoint, refresh this list to check if its in the available state.

[Refresh](#)

Use: "eice-073bce01b3f4391c0 (Project01-endpoints-vpc)"

[eice-073bce01b3f4391c0](#)

State: create-complete | AZ: us-east-1a

Name: Project01-endpoints-vpc

You didn't define a custom username, use the default username,

**Note:** In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

[Cancel](#)
[Connect](#)

## Ubuntu machine is connected successfully

```
0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-0-140:~$
```

i-0b9309498ac724dac (Project-WebServer)

PrivateIPs: 10.0.0.140

## Run the Update command: sudo apt update -y

```
Get:30 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [242 kB]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [1744 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [294 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [848 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [162 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [16.8 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.2 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [7588 B]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [260 B]
Fetched 31.0 MB in 6s (5450 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
52 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-10-0-0-140:~$
```

i-0b9309498ac724dac (Project-WebServer)

PrivateIPs: 10.0.0.140

## Make sure our private Route table is connected to NAT gateway

VPC > Route tables > rtb-02f8e1f8e880648d5 > Edit routes

### Edit routes

Destination	Target	Status	Propagated
10.0.0.0/24	local	Active	No
0.0.0.0/0	NAT Gateway	Active	No
	nat-09460a60285a5d1a3		

Add route

Cancel Preview Save changes

Install apache server: `sudo apt install apache2 -y`

```
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-10-0-0-140:~$ sudo apt install apache2 -y
```

In order to open the Apache server in our local browser, as these are private subnet we need Load balancer,

To create Load Balancer First create target group

EC2 > Target groups

### Target groups Info

Filter target groups

Name	ARN	Port	Protocol	Target type
No target groups				

You don't have any target groups in us-east-1

Give Proper Name

Target group name

Project01-Tg

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Protocol : Port

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation

HTTP

80

1-65535

IP address type

Only targets with the indicated IP address type can be registered to this target group.

☒ IPv4

Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.

☐ IPv6

Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). [Learn more](#)

## Choose our created VPC

VPC

Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

project01-vpc  
vpc-05d1f92295487ee20  
IPv4 VPC CIDR: 10.0.0.0/24

## Click on Next

### ► Tags - optional

Consider adding tags to your target group. Tags enable you to categorize your AWS resources so you can more easily manage them.

Cancel

Next

## Select our created EC2 instance

Available instances (1)			
<input type="text" value="Filter instances"/>			
<input type="checkbox"/>	Instance ID	Name	State
<input type="checkbox"/>	i-0b9309498ac724dac	Project-WebServer	Running
<div>Project01-WebSG</div>			

## Review the targets and create target group

Review targets							
<div> <div>Targets (1)</div> <div> <input type="text" value="Filter targets"/> <div> <div>Show only pending</div> <div>&lt; 1 &gt;</div> <div>⚙</div> </div> </div> <div>Remove all pending</div> </div>							
Instance ID	Name	Port	State	Security groups	Zone	Private IP	
i-0b9309498ac724dac	Project-WebServer	80	Running	Project01-WebSG	us-east-1a	10.0.0.1	
<div>1 pending</div> <div> <div>Cancel</div> <div>Previous</div> <div>Create target group</div> </div>							

## Next create Load balancer

<a href="#">EC2</a> > Load balancers					
<div> <div>Load balancers</div> <div> <div>⌂</div> <div>Actions</div> <div>Create load balancer</div> </div> </div>					
<div>Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.</div>					
<input type="text" value="Filter load balancers"/>					
Name	DNS name	State	VPC ID	Availability Zones	
<div>No load balancers</div> <div>You don't have any load balancers in us-east-1</div>					

## Select application load balancer

## Compare and select load balancer type

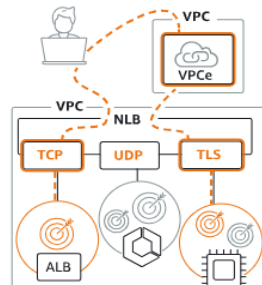
A complete feature-by-feature comparison along with detailed highlights is also available. [Learn more](#)

### Load balancer types

#### Application Load Balancer [Info](#)



#### Network Load Balancer [Info](#)



#### Gateway Load Balancer [Info](#)



## Give Name and select the scheme as Internet facing

### Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

### Scheme [Info](#)

Scheme can't be changed after the load balancer is created.

☒ Internet-facing

An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet. [Learn more](#)

☐ Internal

An internal load balancer routes requests from clients to targets using private IP addresses.

### IP address type [Info](#)

Select the type of IP addresses that your subnets use.

☒ IPv4

Includes only IPv4 addresses.

☐ Dualstack

Includes IPv4 and IPv6 addresses.

## Choose our created VPC

### Network mapping [Info](#)

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

### VPC [Info](#)

Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). Only VPCs with an internet gateway are enabled for selection. The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

project01-vpc  
vpc-05d1f92295487ee20  
IPv4 VPC CIDR: 10.0.0.0/24



Now Choose Public Subnets (Bcoz we need to choose the Subnets which connecting the Internet gateway)

☒ **us-east-1a (use1-az6)**

Subnet

subnet-087107bfc6c7c6b65project01-subnet-public1-us-east-1a ▼

IPv4 address

Assigned by AWS

☒ **us-east-1b (use1-az1)**

Subnet

subnet-091a32caf1dd62d16project01-subnet-public2-us-east-1b ▼

IPv4 address

Assigned by AWS

Create new Security group under same VPC for Load balancing

Create security group [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)

Project01-Alb-Sg

Name cannot be edited after creation.

Description [Info](#)

Project01-Alb-Sg

VPC [Info](#)

vpc-05d1f92295487ee20 (project01-vpc) ▼

Create Inbound rule for Type HTTP and Source Anywhere



**Inbound rules** [Info](#)

Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>	Source <a href="#">Info</a>	Description - optional	
HTTP ▼	TCP	80	Any... ▼	<input type="text"/>	<input type="button" value="Delete"/>
			<input type="text" value="0.0.0.0/0"/> ✕		

Outbound rule is automatically created for All traffic

**Outbound rules** [Info](#)

Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>	Destination <a href="#">Info</a>	Description - optional	
All traffic ▼	All	All	Cus... ▼	<input type="text"/>	<input type="button" value="Delete"/>
			<input type="text" value="0.0.0.0/0"/> ✕		

Next select the created Security groups

**Security groups** [Info](#)

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

Security groups

Project01-Alb-Sg

sg-0b5ef70e0825c32aa VPC: vpc-05d1f92295487ee20

✕

Here select the Target group which we created first

▼ Listener HTTP:80

Protocol	Port	Default action <a href="#">Info</a>	
HTTP ▼	80 1-65535	Forward to	<input type="text" value="Project01-Tg"/> HTTP ▼ <input type="button" value="Refresh"/>
		<input type="button" value="Create target group"/> <a href="#">Info</a>	

Click on create load balancer

Creation workflow and status

► Server-side tasks and status

After completing and submitting the above steps, all server-side tasks and their statuses become available for monitoring.

Cancel

Create load balancer

Load balancer is created successfully

Load balancers (1/1)

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

< 1 >

<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones
<input checked="" type="checkbox"/>	Project01-Alb	Project01-Alb-687114383....	Active	vpc-05d1f92295487ee...	2 Availability Zones

Now Copy the DNS server from Load balancer and Browse it

Load balancer: Project01-Alb

Internet-facing

Z35SXDOTRQ7X7K

subnet-091a32caf1dd62d16

us-east-1b (use1-az1)

subnet-087107bfc6c7c6b65

us-east-1b (use1-az6)

April 22, 2024, 17:29 (UTC+05:30)

Load balancer ARN


arn:aws:elasticloadbalancing:us-east-1:730335274013:loadbalancer/app/Project01-Alb/3a2cc3de2cb26c2f

Project01-Alb-687114383.us-east-1.elb.amazonaws.com (A Record)

DNS name copied

Now apache2 Default page will be opened

← → 🔍 Not secure project01-alb-687114383.us-east-1.elb.amazonaws.com ☆ 📄 🗑️



Apache2 Default Page

Ubuntu

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|-- ports.conf
|-- mods-enabled
|-- *.Load
--
```

Give the following commands in order to replace the HTML page from default

- wget <https://lms.intellipaat.com/mediaFiles/2020/10/code.zip>
- ls
- sudo apt install unzip -y
- unzip code.zip
- ls
- cd 1243/
- ls

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-10-0-0-140:~$ ls
code.zip
ubuntu@ip-10-0-0-140:~$ ls
code.zip
ubuntu@ip-10-0-0-140:~$ unzip code.zip
Archive:  code.zip
   creating: 1243/images/
  inflating: 1243/images/1.png
  inflating: 1243/images/2.png
  inflating: 1243/index.php
ubuntu@ip-10-0-0-140:~$ ls
1243  code.zip
ubuntu@ip-10-0-0-140:~$ cd 1243/
ubuntu@ip-10-0-0-140:~/1243$ ls
images  index.php
ubuntu@ip-10-0-0-140:~/1243$
```

We need to replace the index.html file, run the following command

- Sudo mv \* /var/www/html
- ls
- Cd /var/www/html
- ls
- sudo rm index.html

```

1243 code.zip
ubuntu@ip-10-0-0-140:~$ cd 1243/
ubuntu@ip-10-0-0-140:~/1243$ ls
images index.php
ubuntu@ip-10-0-0-140:~/1243$ sudo mv * /var/www/html
ubuntu@ip-10-0-0-140:~/1243$ ls
ubuntu@ip-10-0-0-140:~/1243$ cd /var/www/html
ubuntu@ip-10-0-0-140:/var/www/html$ ls
images index.html index.php
ubuntu@ip-10-0-0-140:/var/www/html$ sudo rm index.html
ubuntu@ip-10-0-0-140:/var/www/html$ ls
images index.php
ubuntu@ip-10-0-0-140:/var/www/html$

```

i-0b9309498ac724dac (Project-WebServer)

PrivateIPs: 10.0.0.140

If you refresh the page you will see the new web page

← → ↻ ⚠ Not secure project01-alb-687114383.us-east-1.elb.amazonaws.com ☆ 📄 📄 📄 📄 📄

**IntelliPaat**

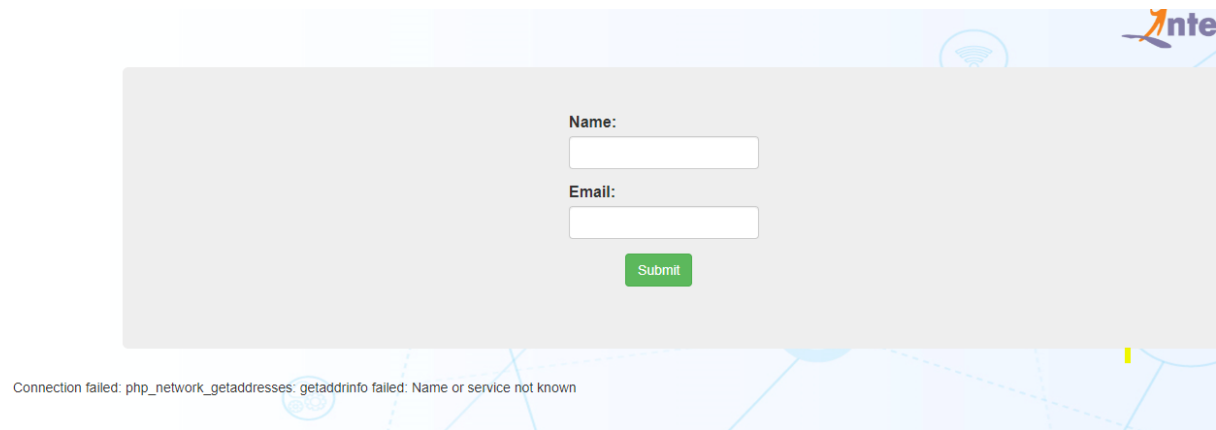
Name:

Email:

connect\_error) { die("Connection failed: " . \$conn->connect\_error); } if(isset(\$\_POST['firstname']) && isset(\$\_POST['email'])) { \$sql = "INSERT INTO data (firstname,email) VALUES ('".\$\_POST['firstname']."','".\$\_POST['email']."')"; if (\$conn->query(\$sql) === TRUE) { echo "New record created successfully"; } else { echo "Error: " . \$sql . " " . \$conn->error; } \$conn->close(); } ?>

In order to exit from the above errors, run the following commands

- `sudo add-apt-repository -y ppa:ondrej/php`
- `sudo apt install php5.6 mysql-client php5.6-mysqli -y`



Name:

Email:

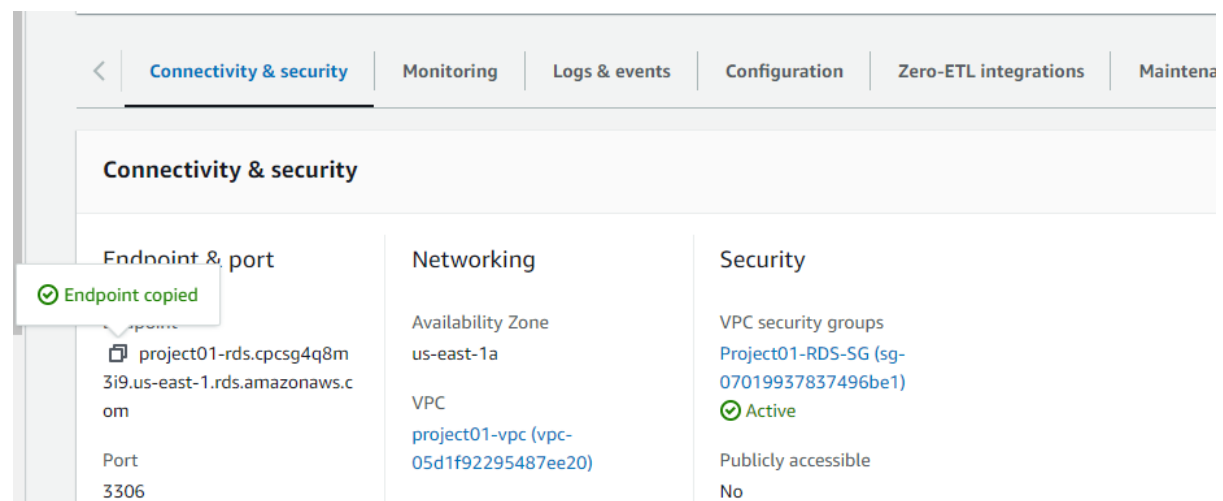
Connection failed: php\_network\_getaddresses: getaddrinfo failed: Name or service not known

Now Front end is working but we found the error in database server

So Go inside index.php file and edit the servername, username and password

- `sudo nano index.php`

Servername is basically the Endpoint of the RDS



Endpoint & port	Networking	Security
<b>Endpoint</b> project01-rds.cpcsg4q8m3i9.us-east-1.rds.amazonaws.com	<b>Availability Zone</b> us-east-1a	<b>VPC security groups</b> Project01-RDS-SG (sg-07019937837496be1) Active
<b>Port</b> 3306	<b>VPC</b> project01-vpc (vpc-05d1f92295487ee20)	<b>Publicly accessible</b> No

When you enter the details, you face these errors

**Name:**

**Email:**

Error: INSERT INTO data (firstname,email) VALUES ('Ruchi', 'ruchitharuthu123@gmail.com')  
Table 'intel.data' doesn't exist

To exit from the above error, we need connect to the database, Follow as per the following commands

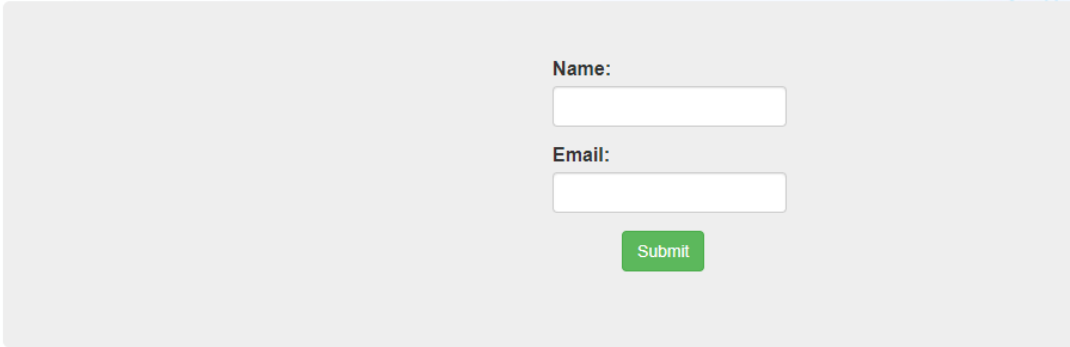
```
sudo add-apt-repository -y ppa:ondrej/php  
sudo apt install php5.6 mysql-client php5.6-mysqli -y  
  
mysql -h <rds-endpoint> -u <username> -p  
  
create database intel;  
use intel;  
create table data (firstname varchar(20), email varchar(25));  
select * from data;
```

Now enter the credentials and submit

**Name:**

**Email:**

Now we can see that the records are created successfully



A screenshot of a web form on a light blue background. The form has two input fields: 'Name:' and 'Email:'. Below the 'Email:' field is a green 'Submit' button. Below the form, a message 'New record created successfully' is displayed next to a gear icon.

Name:

Email:

New record created successfully

And reflected into our machine.

```
mysql> select * from data;
+-----+-----+
| firstname | email |
+-----+-----+
| Ruchi    | ruchitharuthul23@gmail.co |
| ruchil 1 | 123@gmail.com |
+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

i-0b9309498ac724dac (Project-WebServer)  
PrivateIPs: 10.0.0.140

=====