

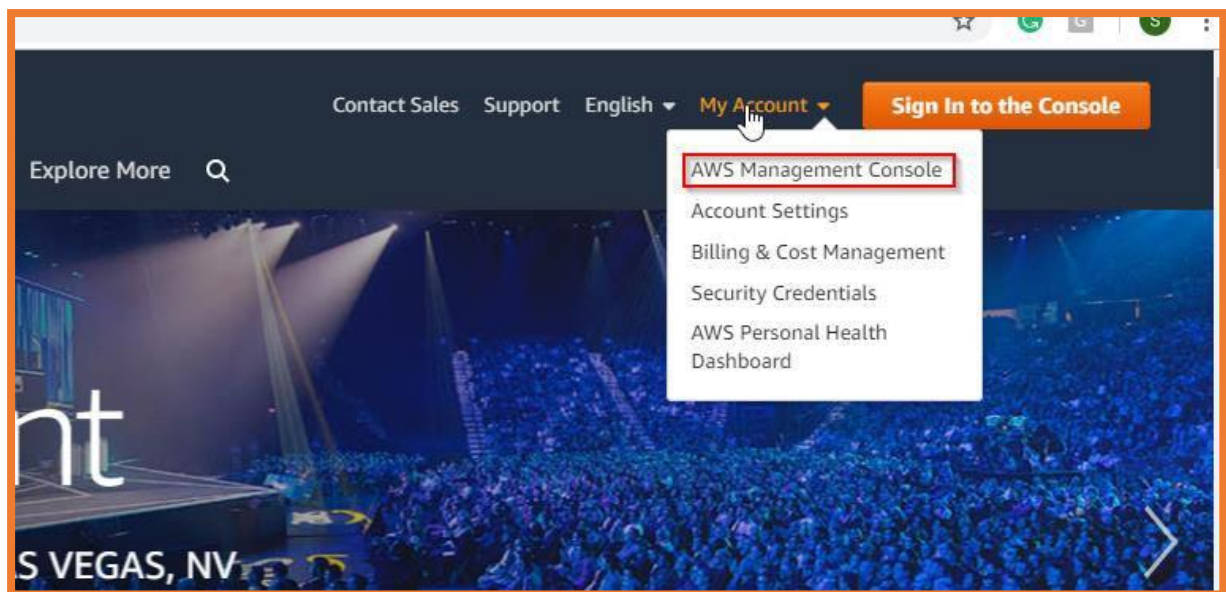
PROJECT 1 - SOLUTION

Connect your system with your EC2 Instance

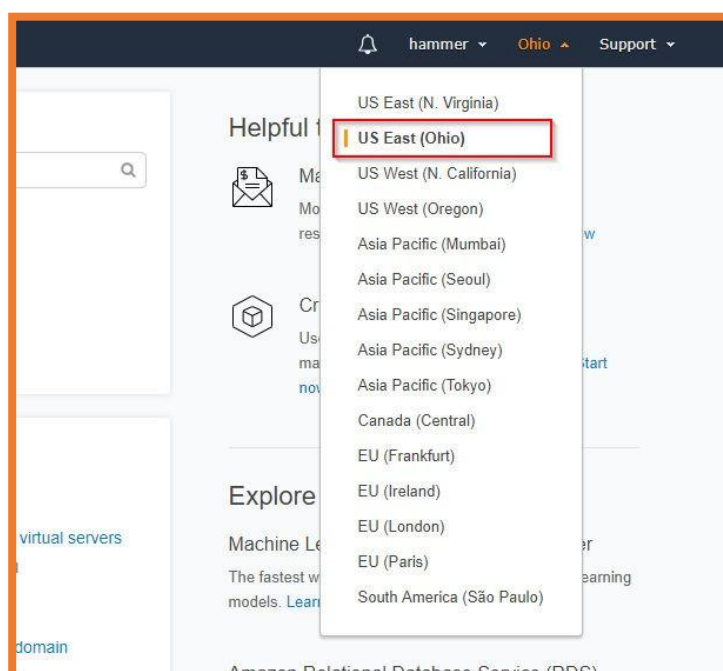
First you need to install **Putty** on your system and then connect it with your EC2 instance.

Below are the steps for it:

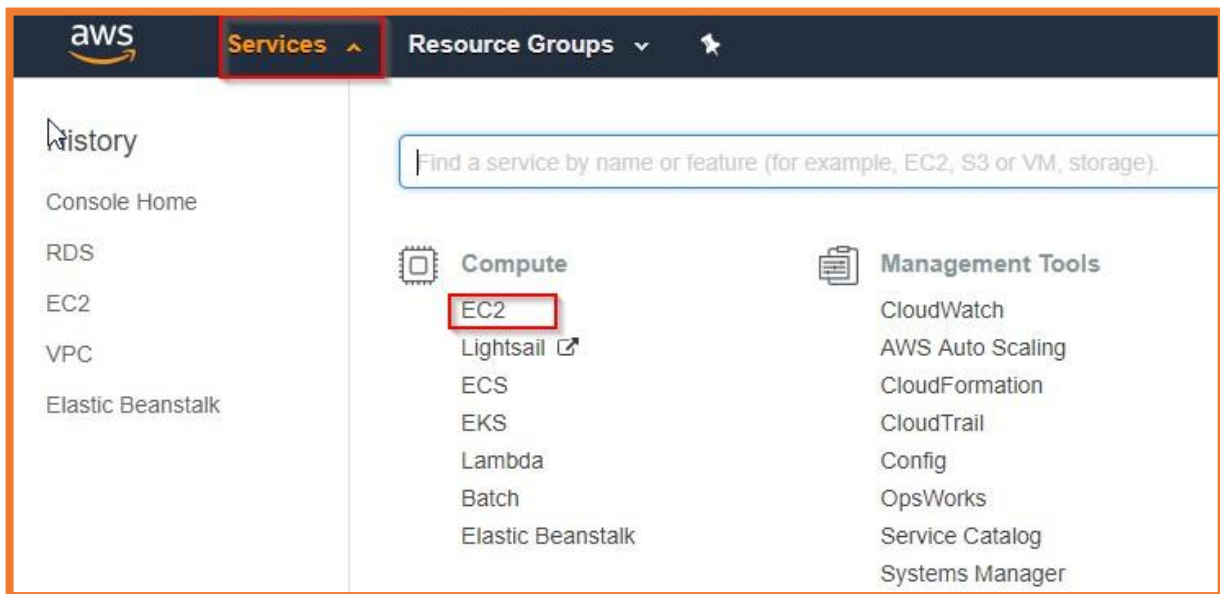
- First sign into the AWS Management Console.



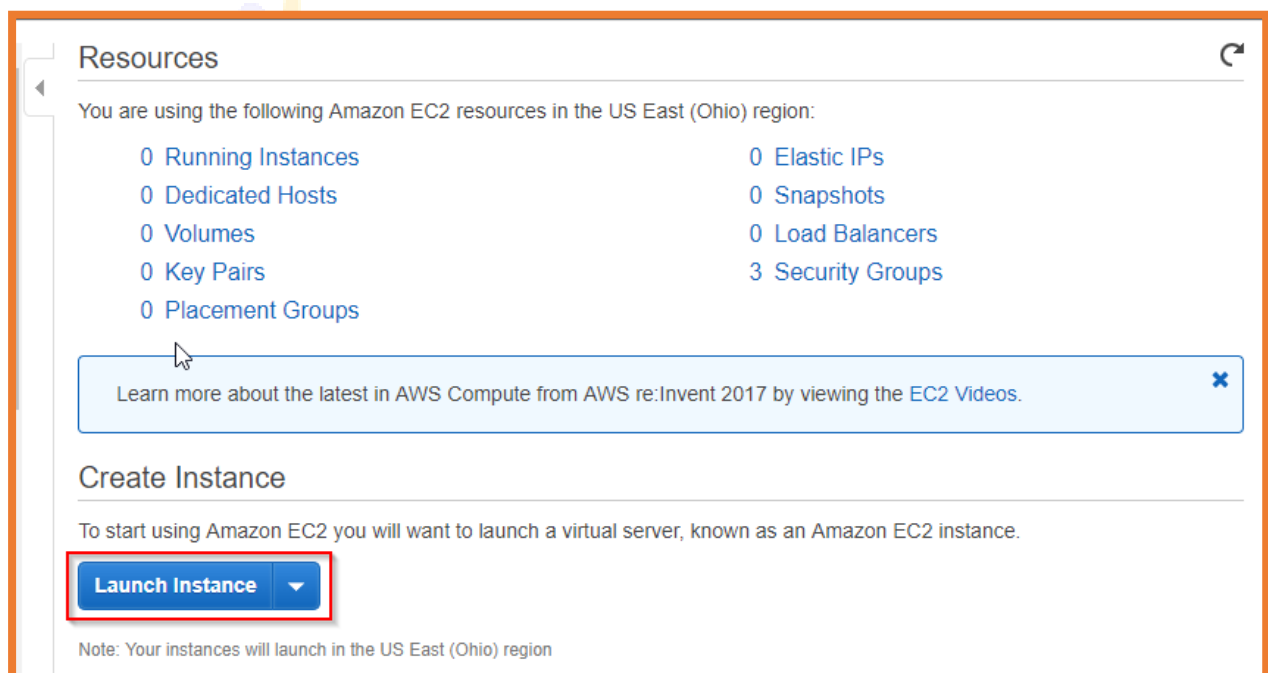
- Select any region you want, like we've selected Ohio here



- In the **Services** section, you must see **Compute** where you need to choose **EC2**



- Then you will see in the Create section, there is **Launch Instance** option, select it



- Then Select an **AMI** or **Amazon Machine Image**


Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0f65671a86f061fcd

Free tier eligible

Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
 Root device type: ebs Virtualization type: hvm

Select
 64-bit (x86)

- Choose your instance type, we're choosing Free tier for the demo purpose

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.


Filter by: All instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

- Next step is to configure your instance details and then there will and **Add storage** option, select it


 Services Resource Groups ★

1. Choose AMI 2. Choose Instance Type **3. Configure Instance** 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances Launch into Auto Scaling Group

Purchasing option ☐ Request Spot instances

Network Create new VPC

Subnet Create new subnet

Auto-assign Public IP

Placement group ☐ Add instance to placement group.

Capacity Reservation Create new Capacity Reservation

IAM role Create new IAM role

Shutdown behavior

Cancel Previous Review and Launch Next: Add Storage

- Then click on Add Tags

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/sda1	snap-0474571d378f0fac2	3	General Purpose SSD (gp2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Tags](#)

- Add tags then name the key and a value, click Configure Security Group

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.
A copy of a tag can be applied to volumes, instances or both.
Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key (127 characters maximum)	Value (255 characters maximum)	Instances	Volumes
intellipaat	ec2-demo	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

- Keep the configuration of security group as it

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: ☒ Create a new security group ☐ Select an existing security group

Security group name:

Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop

[Add Rule](#)

- Then click **Review & Launch**

Cancel

Previous

Review and Launch

- Then directly **Launch** it

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 7: Review Instance Launch

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups [Edit security groups](#)

Security group name: launch-wizard-1
Description: launch-wizard-1 created 2018-11-16T14:27:39.538+05:30

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
SSH	TCP	22	0.0.0.0/0	

Instance Details [Edit instance details](#)

Storage [Edit storage](#)

Tags [Edit tags](#)

Cancel Previous **Launch**

- Then Create a key pair, **download** it and **then Launch** your instance

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name
ec2

Download Key Pair

You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

Cancel **Launch Instances**

- Status

You will be able to see in your status that your Instance is on Initializing stage

Launch Status





Your instances are now launching

The following instance launches have been initiated: i-088b451c63af749af [View launch log](#)

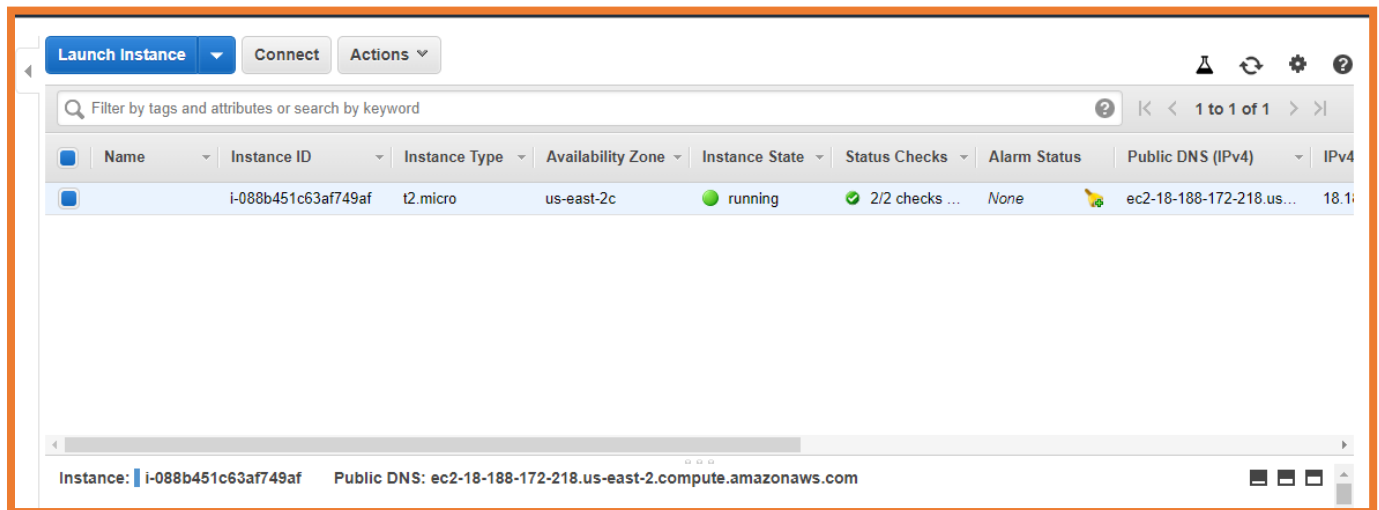


Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

Launch Instance									
Filter by tags and attributes or search by keyword									
	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4
<input checked="" type="checkbox"/>		i-088b451c63af749af	t2.micro	us-east-2c	 running	 Initializing	None	ec2-18-188-172-218.us...	18.1

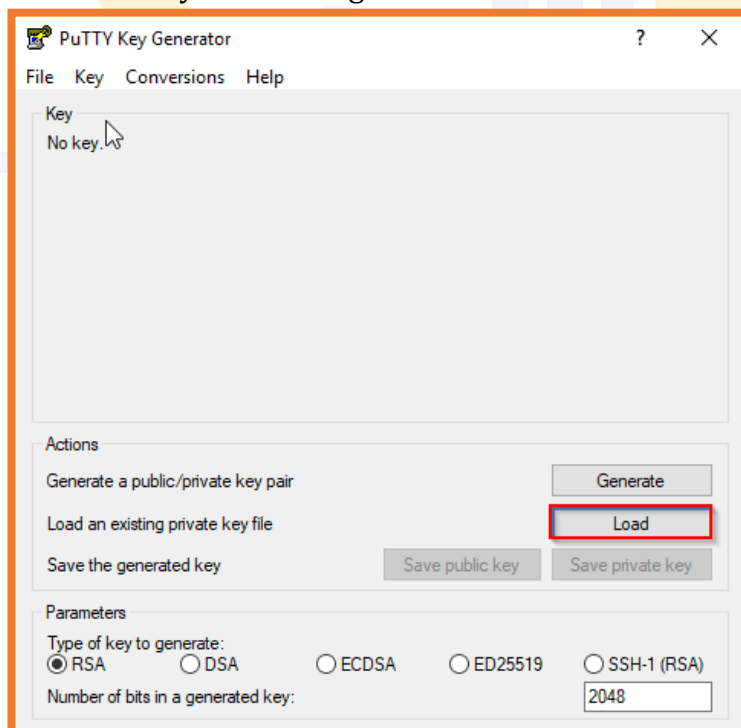
- Then after few minutes, you will see that now your instance is in running stage



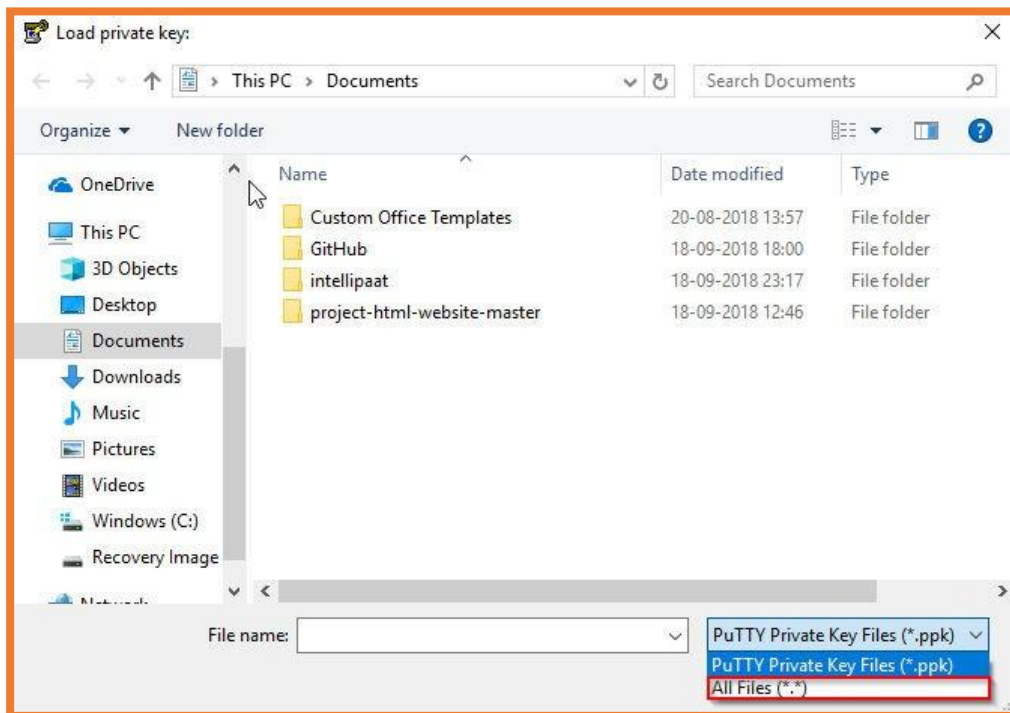
- Now it's time to convert your private key using PuTTYgen

PuTTY won't be able to support this .pem file, so you'd require a PuTTY gen tool which can convert your .pem file into .ppk format, because you need a .ppk file in order to connect it with your instance

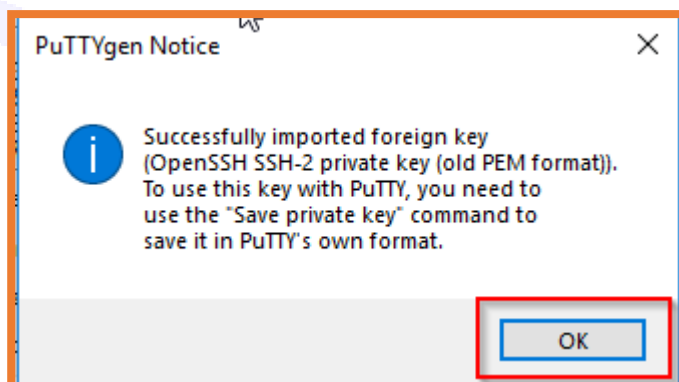
- Click Load in your PuTTY gen



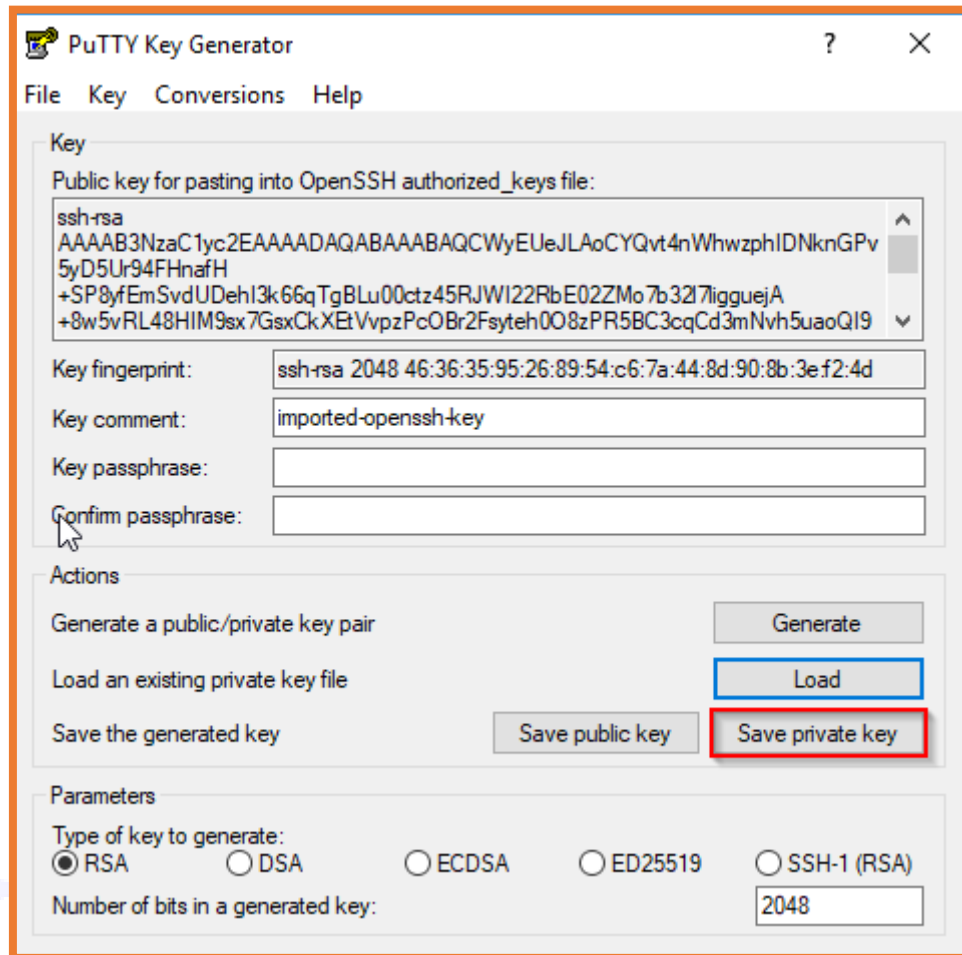
- PuTTY key gen always shows the .ppk format file, so go to the right bottom bar and select the All files option as shown below



- Then select the folder where you downloaded this keypair and load it there
- You will see this option then click OK



- Then click on Save the Private key, PuTTY gen will give a warning about saving the key without Key passphrase, click Yes and specify the same name for your file that you gave it in the key pair



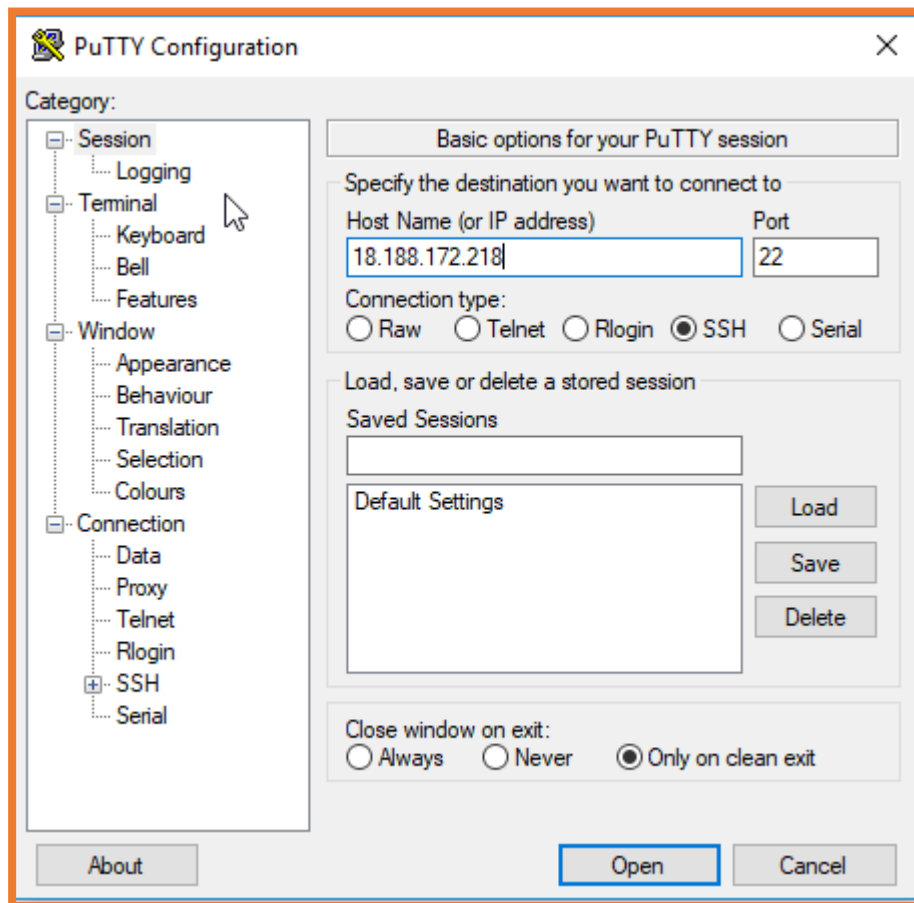
- Now you will see that in your folder, the .ppk file is already added with that name you had given (in our case, it's ec2)

Connecting to your EC2 Instance using SSH & PuTTY

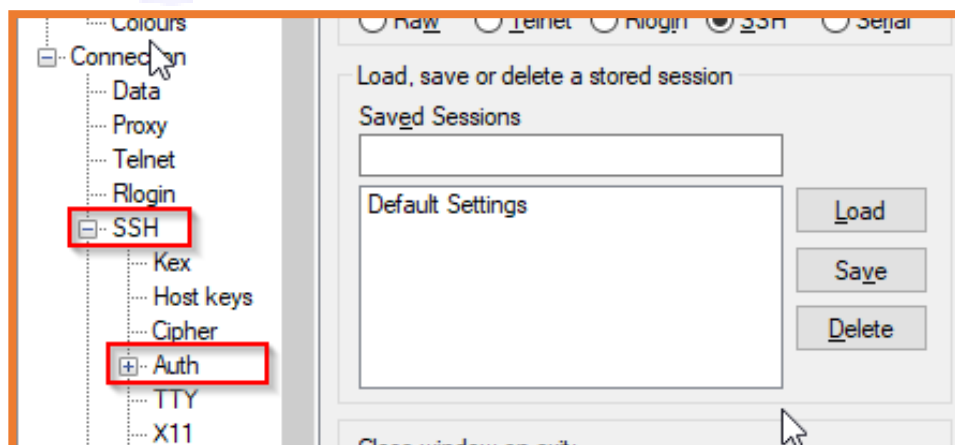
- First open PuTTY.exe then in the Host Name box, add the Public IP of your Instance



- Copy paste this Public IP in your PuTTY Hostname

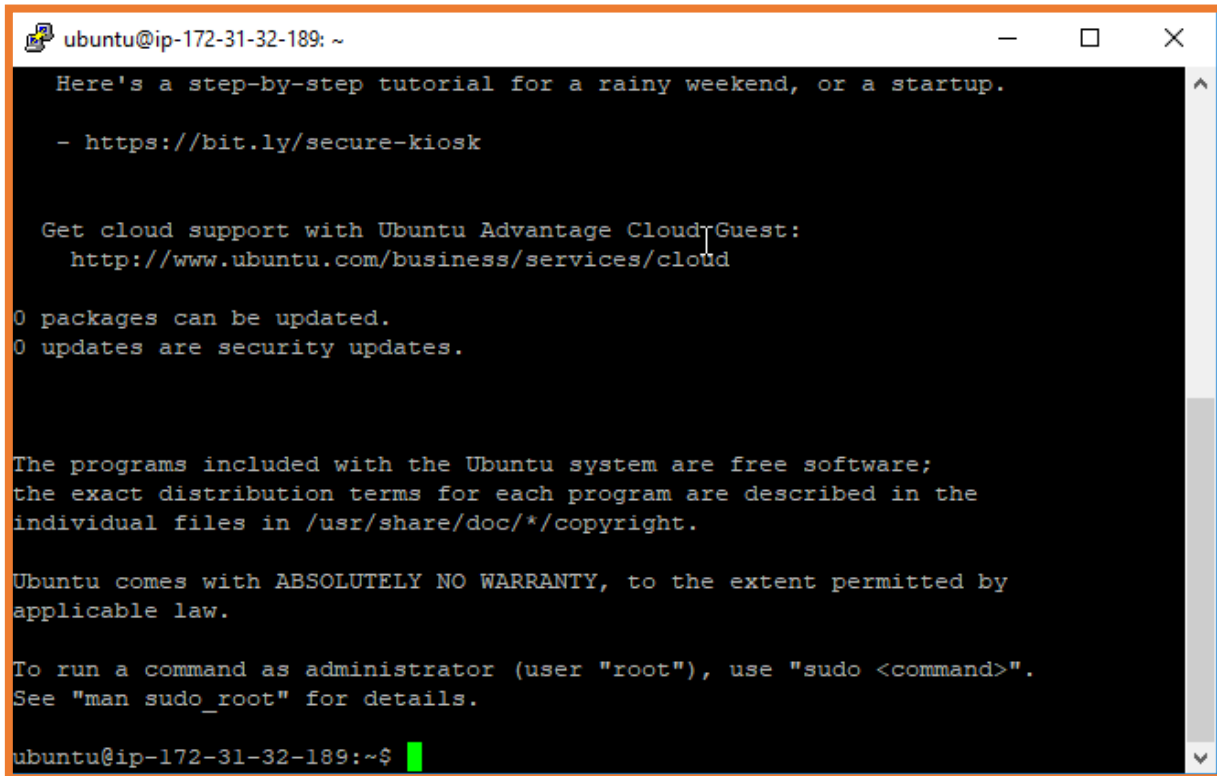


- Then in the category list, expand the SSH and Click on AUTH (but don't expand it)



- Then Click Open

- Login as per your OS, in our case it is ubuntu, so we will **Login as: Ubuntu**



```
ubuntu@ip-172-31-32-189: ~  
Here's a step-by-step tutorial for a rainy weekend, or a startup.  
- https://bit.ly/secure-kiosk  
  
Get cloud support with Ubuntu Advantage CloudGuest:  
http://www.ubuntu.com/business/services/cloud  
  
0 packages can be updated.  
0 updates are security updates.  
  
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-172-31-32-189:~$
```

- First Update your system using the command
sudo apt-get update
- Then use this command in PuTTY to install Apache2
sudo apt-get install apache2
- Then install php-mysql using the following command
sudo add-apt-repository -y ppa:ondrej/php
sudo apt install php5.6 mysql-client php5.6-mysqli
Now everything is updated in your system

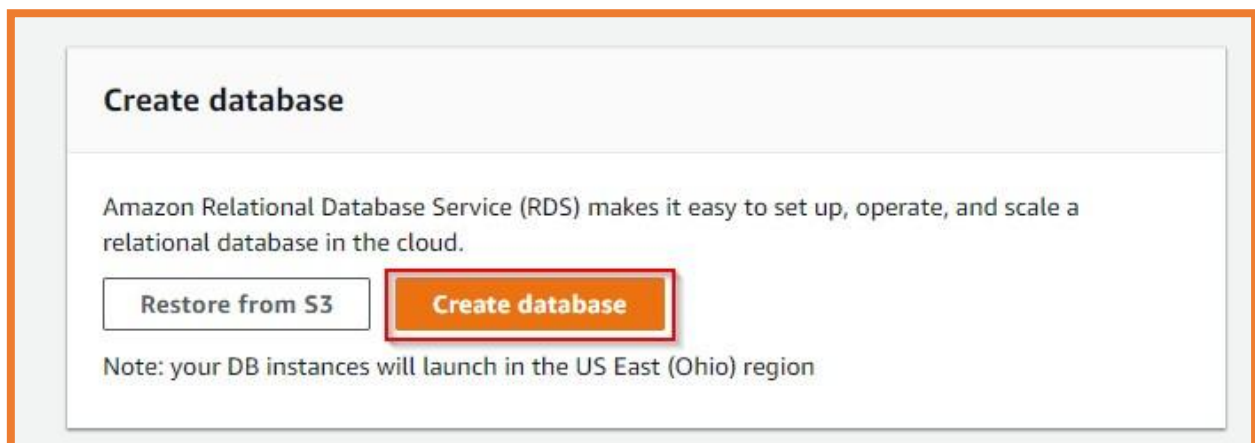
```
Creating config file /etc/php/5.6/mods-available/pdo_mysql.ini with new version  
Creating config file /etc/php/5.6/mods-available/mysql.ini with new version  
Setting up php5.6-json (5.6.38-3+ubuntu18.04.1+deb.sury.org+1) ...  
Creating config file /etc/php/5.6/mods-available/json.ini with new version  
Setting up mysql-client (5.7.24-0ubuntu0.18.04.1) ...  
Setting up php5.6-cli (5.6.38-3+ubuntu18.04.1+deb.sury.org+1) ...  
update-alternatives: using /usr/bin/php5.6 to provide /usr/bin/php (php) in auto mode  
update-alternatives: using /usr/bin/phar5.6 to provide /usr/bin/phar (phar) in auto mode  
update-alternatives: using /usr/bin/phar.phar5.6 to provide /usr/bin/phar.phar (phar.phar) in auto mode  
Creating config file /etc/php/5.6/cli/php.ini with new version  
Setting up libapache2-mod-php5.6 (5.6.38-3+ubuntu18.04.1+deb.sury.org+1) ...  
Creating config file /etc/php/5.6/apache2/php.ini with new version  
Module mpm_event disabled.  
Enabling module mpm_prefork.  
apache2_switch_mpm Switch to prefork  
apache2_invoke: Enable module php5.6  
Setting up php5.6 (5.6.38-3+ubuntu18.04.1+deb.sury.org+1) ...  
Processing triggers for libc-bin (2.27-3ubuntu1) ...  
ubuntu@ip-172-31-32-189:~$
```

Now we connect mysql with the RDS

- Go to your AWS Management Console
- Select **RDS**









- Then click on **Create Database**



- Select the MySQL Engine and click **Next**

Engine options

<input type="radio"/> Amazon Aurora 	<input checked="" type="radio"/> MySQL 	<input type="radio"/> MariaDB 
<input type="radio"/> PostgreSQL 	<input type="radio"/> Oracle 	<input type="radio"/> Microsoft SQL Server 

MySQL

- Since we're using it for the demo purpose, so we'll choose the Dev/Test -MySQL option only and then click **Next**

Choose use case

Use case
Do you plan to use this database for production purposes?

Use case

☐ **Production - Amazon Aurora** Recommended
MySQL-compatible, enterprise-class database at 1/10th the cost of commercial databases.

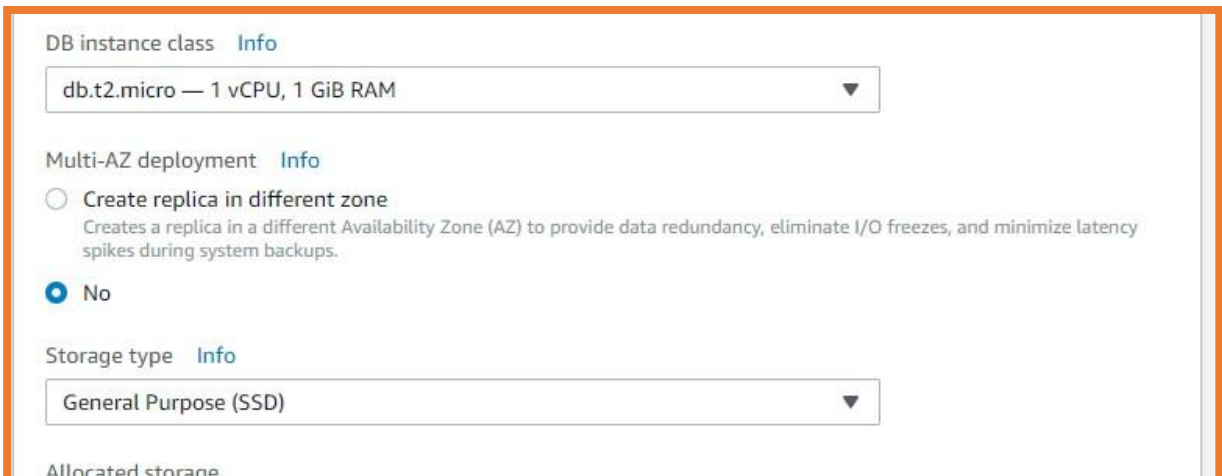
☐ **Production - MySQL**
Use Multi-AZ Deployment and Provisioned IOPS Storage as defaults for high availability and fast, consistent performance.

☒ **Dev/Test - MySQL**
This instance is intended for use outside of production or under the [RDS Free Usage Tier](#).

Billing is based on [RDS pricing](#).

Cancel Previous **Next**

- Specify DB Details, make sure to choose only **db.t2.micro** in DB Instance Class



DB instance class [Info](#)

db.t2.micro — 1 vCPU, 1 GiB RAM

Multi-AZ deployment [Info](#)

☐ Create replica in different zone
Creates a replica in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

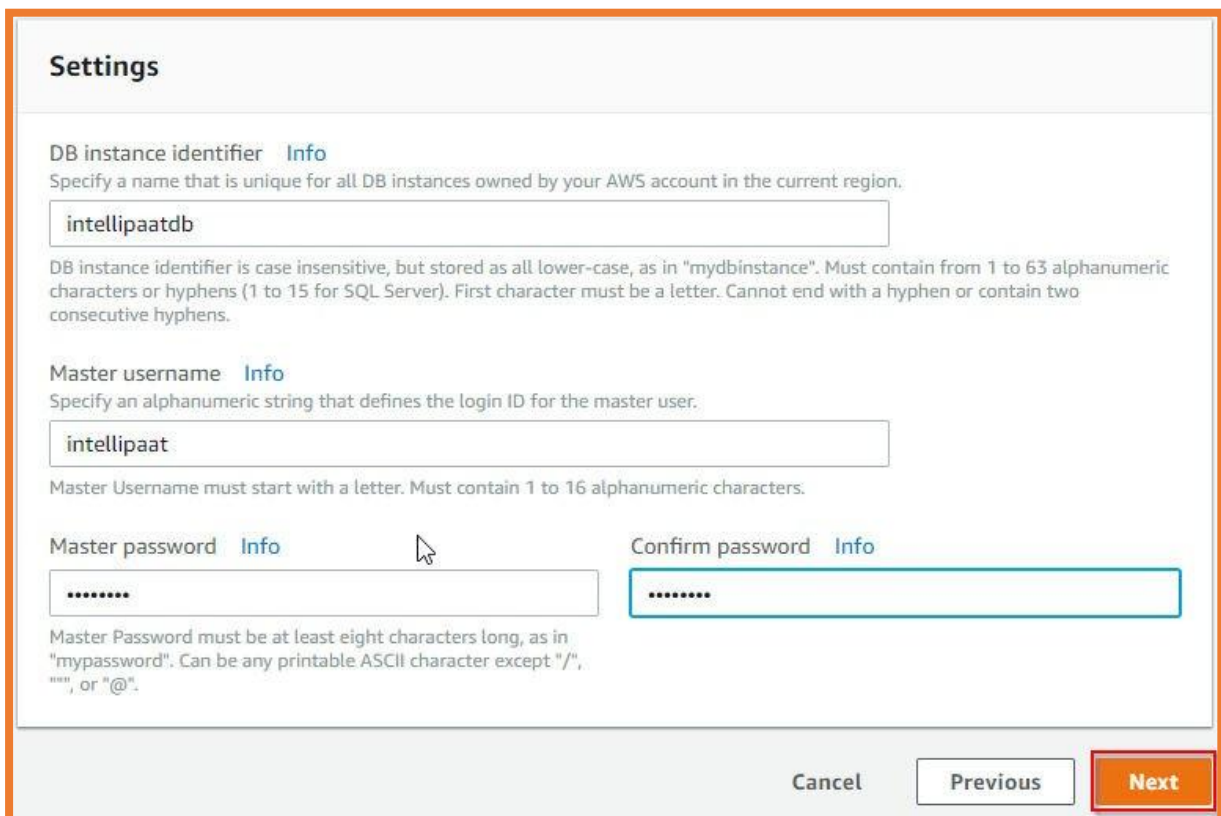
☒ No

Storage type [Info](#)

General Purpose (SSD)

Allocated storage

- Enter these credentials (Note: Make sure you remember these credentials, as they will be required for connecting the RDS with your PuTTY)



Settings

DB instance identifier [Info](#)

Specify a name that is unique for all DB instances owned by your AWS account in the current region.

intellipaatdb

DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance". Must contain from 1 to 63 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

Master username [Info](#)

Specify an alphanumeric string that defines the login ID for the master user.

intellipaat

Master Username must start with a letter. Must contain 1 to 16 alphanumeric characters.

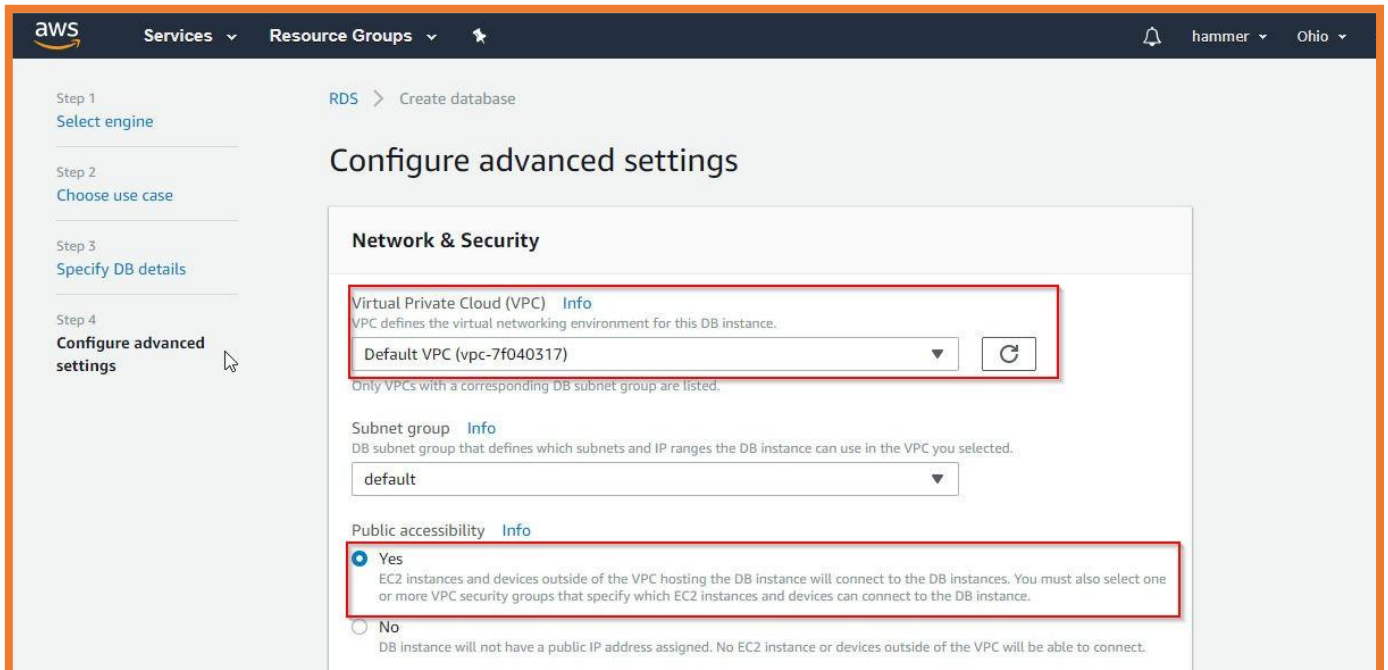
Master password [Info](#)

Confirm password [Info](#)

Master Password must be at least eight characters long, as in "mypassword". Can be any printable ASCII character except "/", "", or "@".

Cancel Previous **Next**

- Then in the **Configure Advanced Option**, make sure to keep the VPC as default, along with the Public Accessibility as **Yes**



aws Services Resource Groups

Step 1 Select engine

Step 2 Choose use case

Step 3 Specify DB details

Step 4 **Configure advanced settings**

Configure advanced settings

Network & Security

Virtual Private Cloud (VPC) Info
VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-7f040317)

Only VPCs with a corresponding DB subnet group are listed.

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

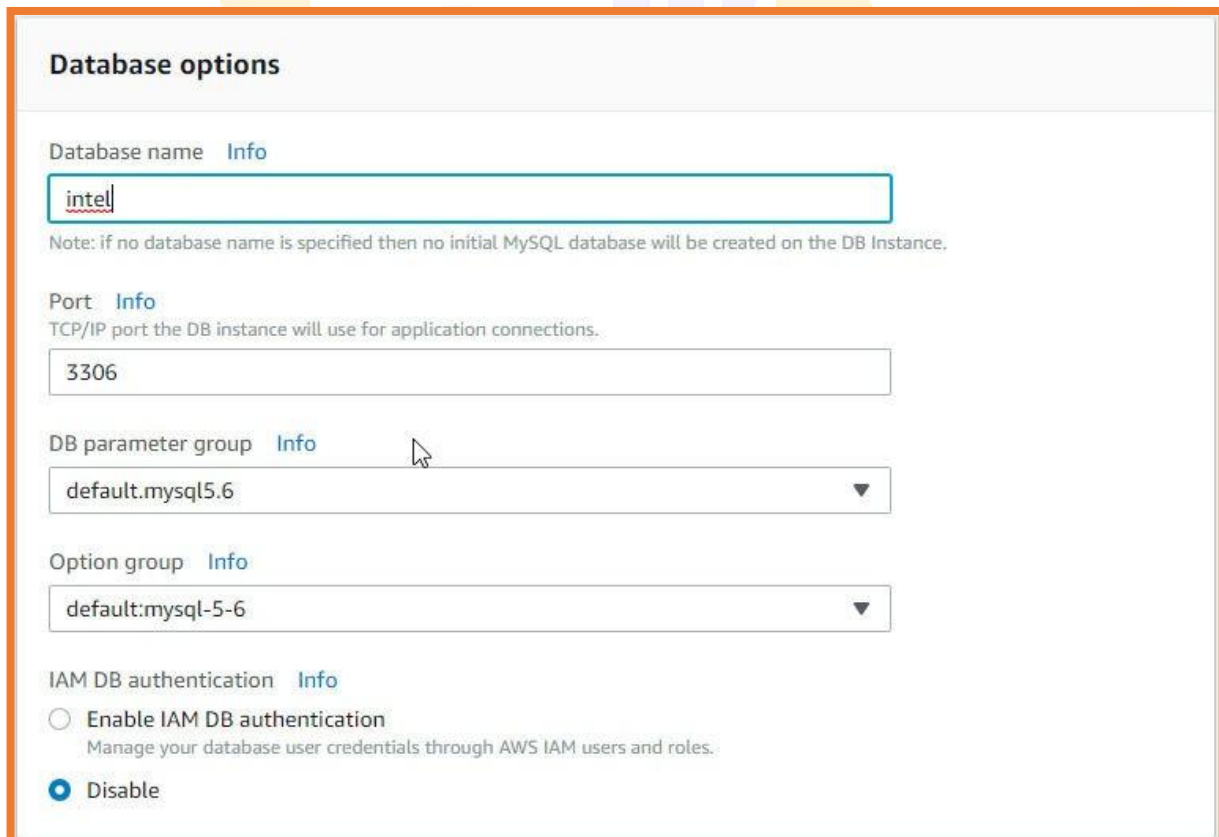
default

Public accessibility Info

☒ **Yes**
EC2 instances and devices outside of the VPC hosting the DB instance will connect to the DB instances. You must also select one or more VPC security groups that specify which EC2 instances and devices can connect to the DB instance.

☐ **No**
DB instance will not have a public IP address assigned. No EC2 instance or devices outside of the VPC will be able to connect.

- In the Database Options, name the Database and keep the other artefacts as it is



Database options

Database name Info

intel

Note: if no database name is specified then no initial MySQL database will be created on the DB Instance.

Port Info
TCP/IP port the DB instance will use for application connections.

3306

DB parameter group Info

default.mysql5.6

Option group Info

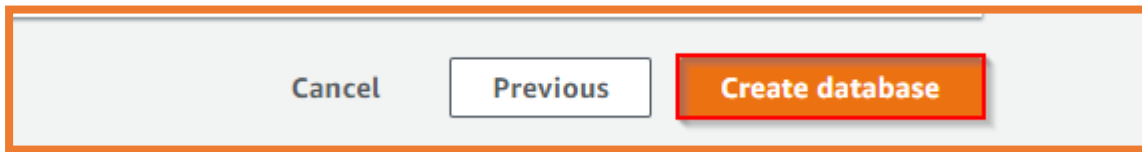
default:mysql-5-6

IAM DB authentication Info

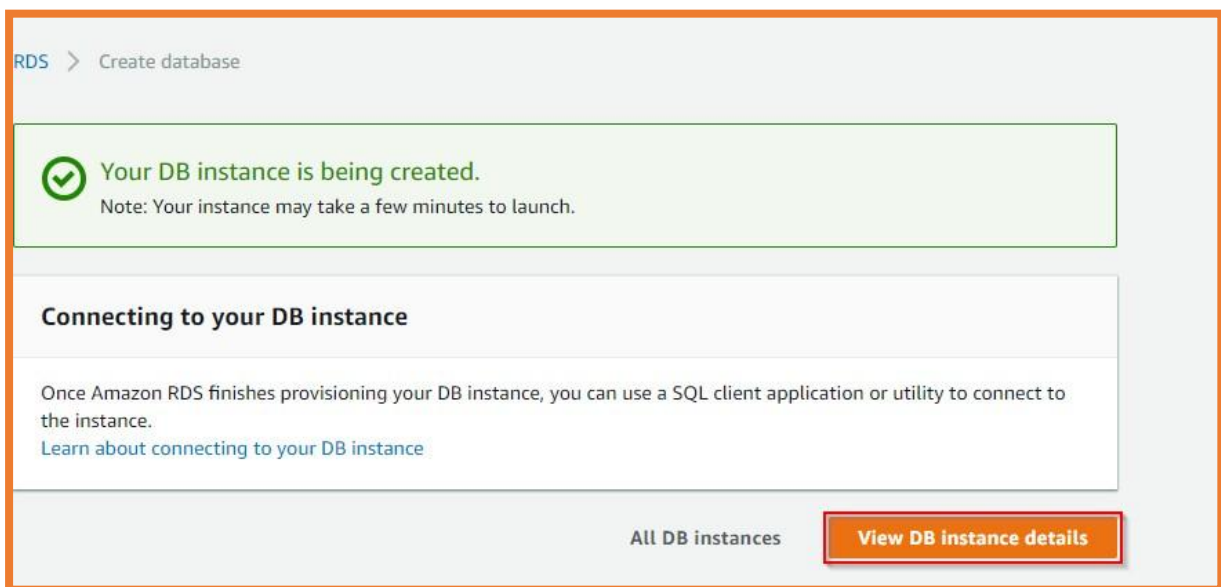
☐ Enable IAM DB authentication
Manage your database user credentials through AWS IAM users and roles.

☒ **Disable**

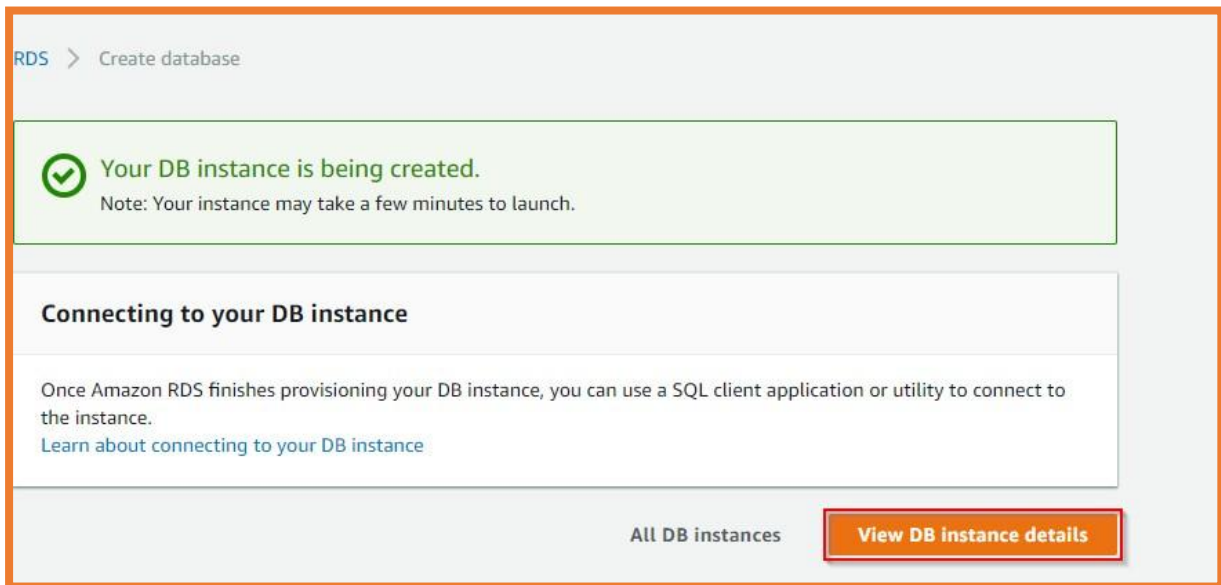
- Then click on Create database



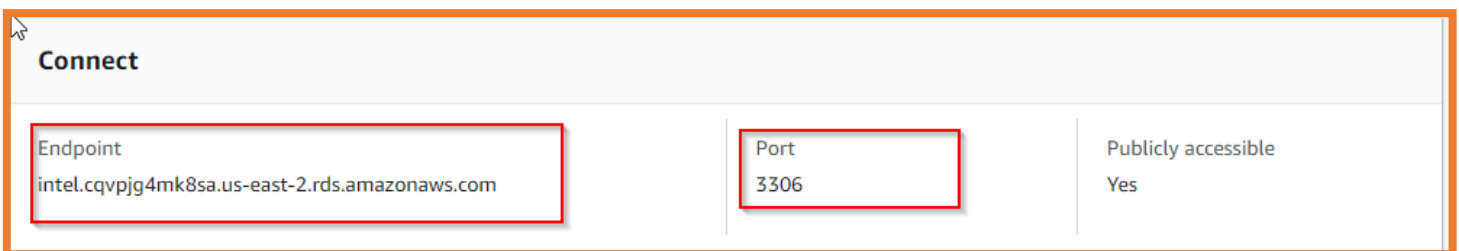
- Then you can check your instance status



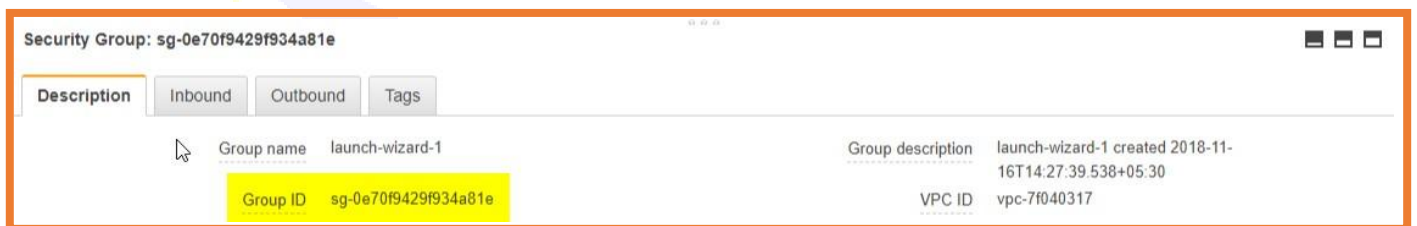
- It may take few minutes for RDS to go from Initial to Running stage, you will observe that Endpoint and Port are not yet available (wait for few minutes)



- In few minutes, you will be able to see the Endpoint and Port



- Also, make sure to change some security configuration in the RDS
- Go to your EC2 Instance Security Groups and select your group ID



- Then go to RDS Security groups and select the Inbound rules panel there and click on Add Rule



Then paste the EC2 Security ID in Source > Custom > **Security Group** by keeping the Type as MYSQL/Aurora



Type	Protocol	Port Range	Source	Description
MYSQL/Aurora	TCP	3306	Custom 182.75.139.2/32	e.g. SSH for Admin Desktop
MYSQL/Aurora	TCP	3306	Custom sg-0e70f9429f934a81e	e.g. SSH for Admin Desktop

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

- Now go back to your PuTTY and use this command as shown below
`mysql -h hostname -u username -p`

NOTE:

- In place of hostname, make sure to use your Endpoint from RDS
- Username which you created

Here, we're using our own Endpoint and username and password used

```
ubuntu@ip-172-31-32-189:~$ mysql -h intel.cqvvpjg4mk8sa.us-east-2.rds.amazonaws.com -u intel -p1
```

Use the command as shown below

- After this, it will ask for your password, in our case, password is: intel123
- Then it will show that you're connected to the mysql

```
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 19
Server version: 5.6.41-log Source distribution

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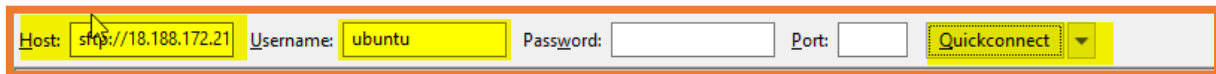
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```


Filezilla

- Now install Filezilla
- In order to connect it, enter hostname as the Endpoint of EC2 and Username as Ubuntu and no need to keep the password, then quickconnect.



Host: Username: Password: Port: Quickconnect

- Now your Filezilla is connected with your EC2 instance
- Create a 'New Folder' of your website in your Desktop
- And copy paste it in your Filezilla Remote Site path: /home/ubuntu

```
ubuntu@ip-172-31-32-189:~$ sudo cp -r New\ folder/ /var/www/html
ubuntu@ip-172-31-32-189:~$ cd /var/www/html
ubuntu@ip-172-31-32-189:/var/www/html$ ls
'New folder'  index.html
```

- Now go back to your PuTTY, where you will see that it contains the index.html file
- Now you need to remove this 'index.html' file and add 'index.php' in its place

For that you need to use "sudo su" and remove this file using remove command

```
ubuntu@ip-172-31-32-189:/var/www/html$ sudo su
root@ip-172-31-32-189:/var/www/html# rm index.html
root@ip-172-31-32-189:/var/www/html# cd New\ folder/
root@ip-172-31-32-189:/var/www/html/New folder# ls
images  index.php
```

- Also, before running this website, you need to create a table in it (its database)

```
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| innodb |
| intel |
| mysql |
| performance_schema |
| sys |
+-----+
6 rows in set (0.00 sec)

mysql> use intel
Database changed
mysql> select * from data;
ERROR 1146 (42S02): Table 'intel.data' doesn't exist
mysql> show tables;
```

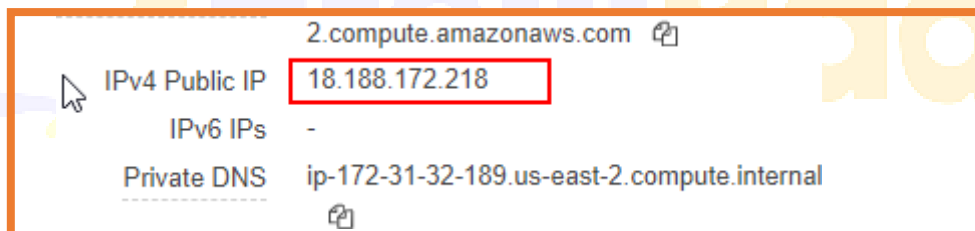
- Now go to the path where website files are kept and run the **index.php** file by using **sudo nano index.php**

```
ubuntu@ip-172-31-32-189:/var/www/html$ sudo nano index.php
```

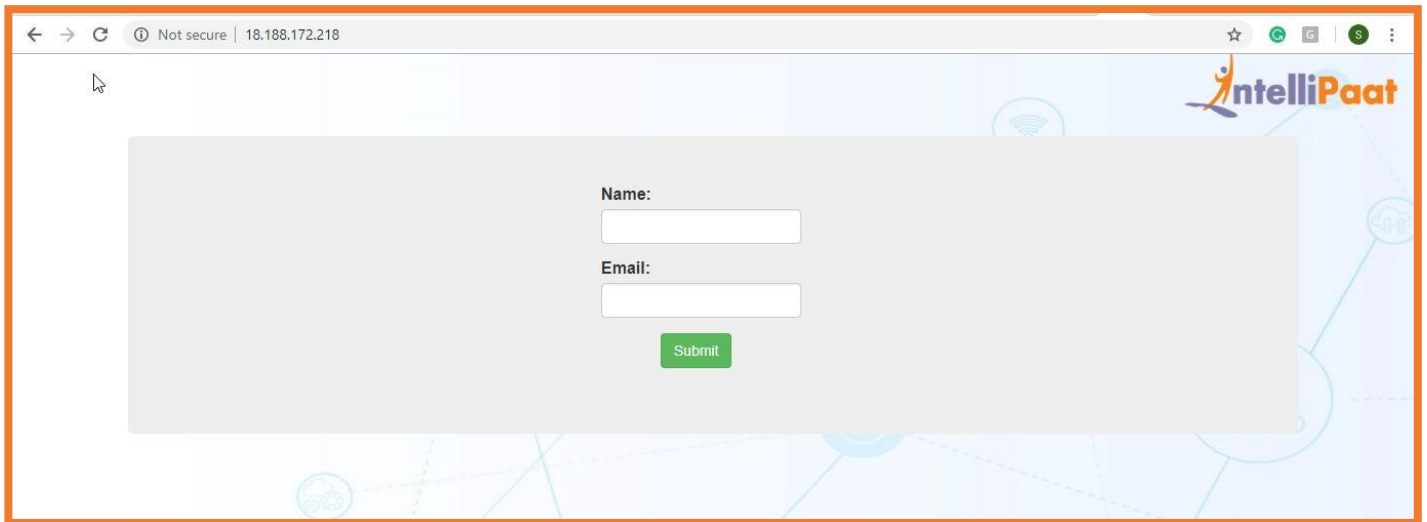
- Now after this, GNU nano will pop up where you have to make changes in your code, you have to check if in your server name, the endpoint of your RDS is there along with username, password and db name

```
<input type="text" value="" /></td><td colspan="4"></td></tr></table></div></div><?php$firstname=$_POST['firstname'];$email=$_POST['email'];$servername = "intellipaadb.cqvpgjg4mk8sa.us-east-2.rds.amazonaws.com";$username = "intellipaath";$password = "intell23";$db = "intel";// Create connection$conn = new mysqli($servername, $username, $password, $db);// Check connection
```

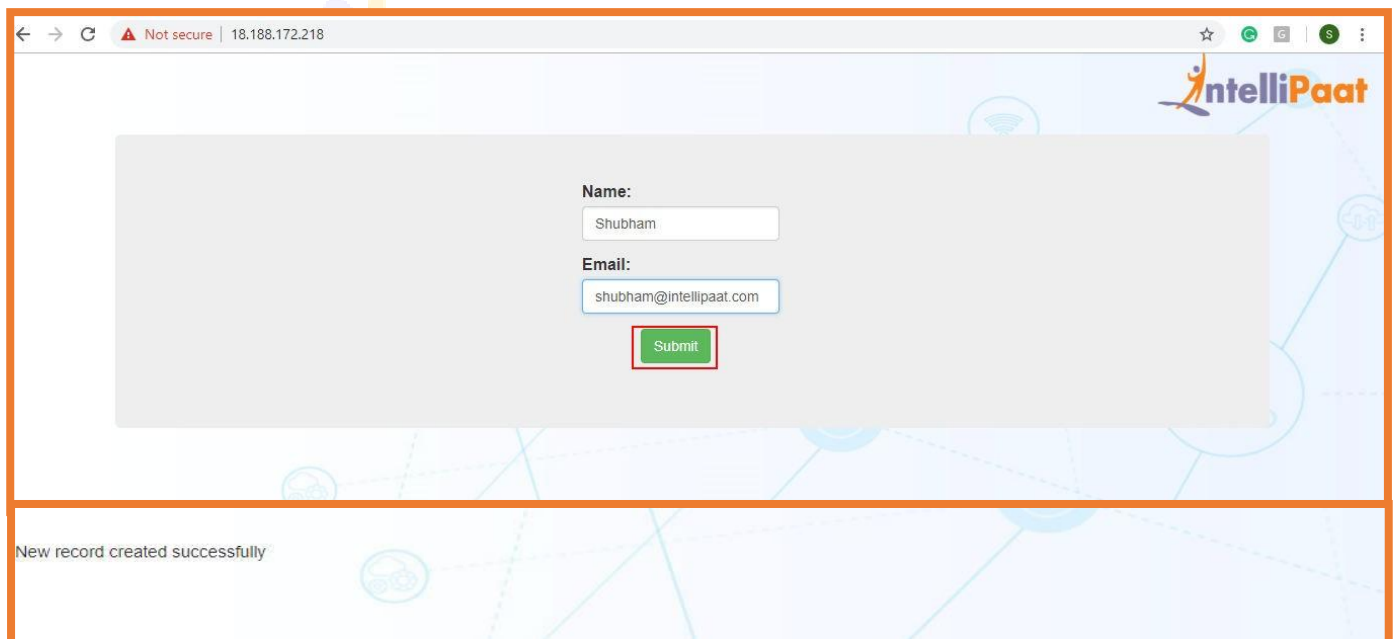
- Now when you will try, and copy paste the Public IP of your EC2 Instance



- After copying this IP to your browser, you will observe that your website is working on it

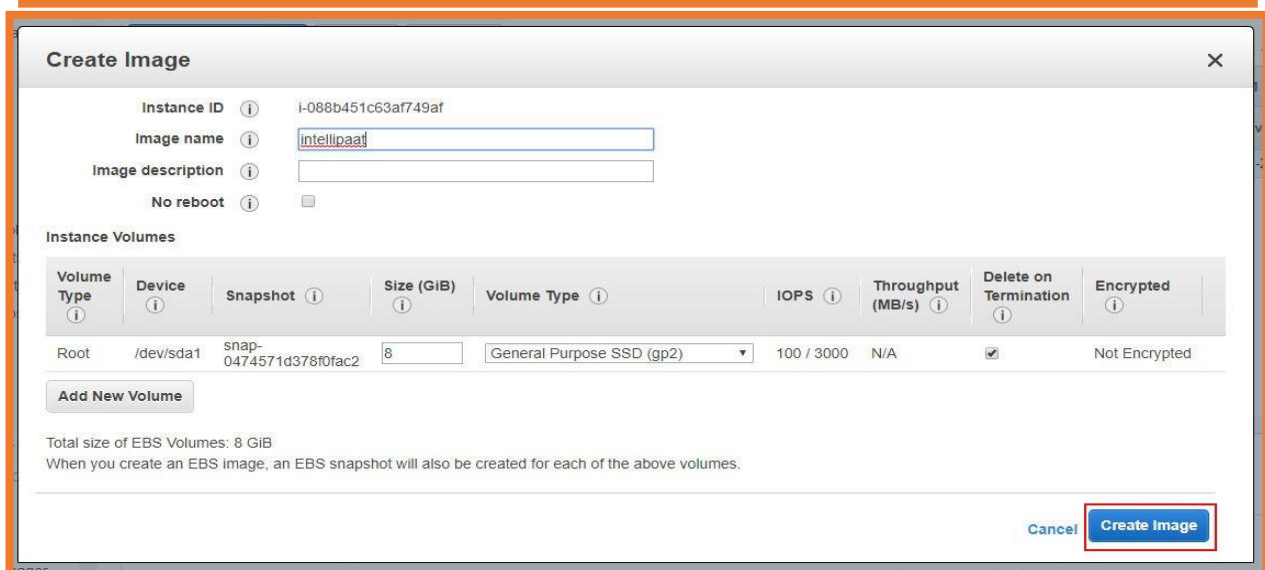
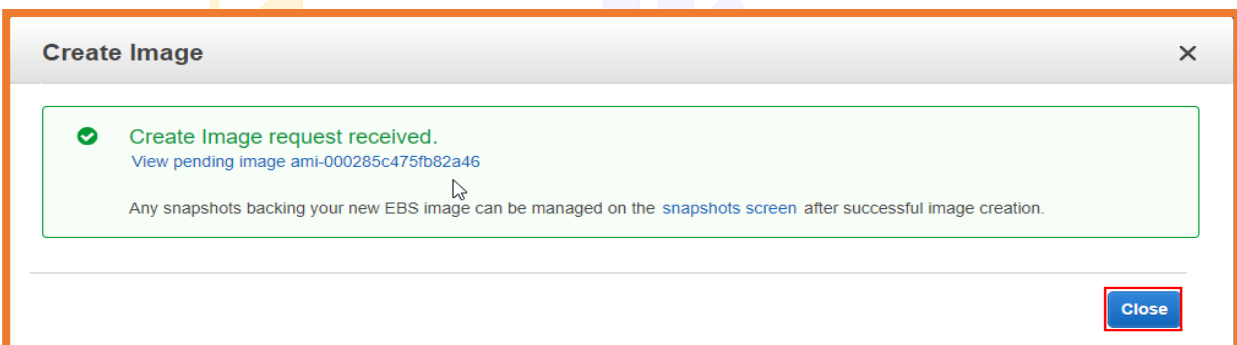
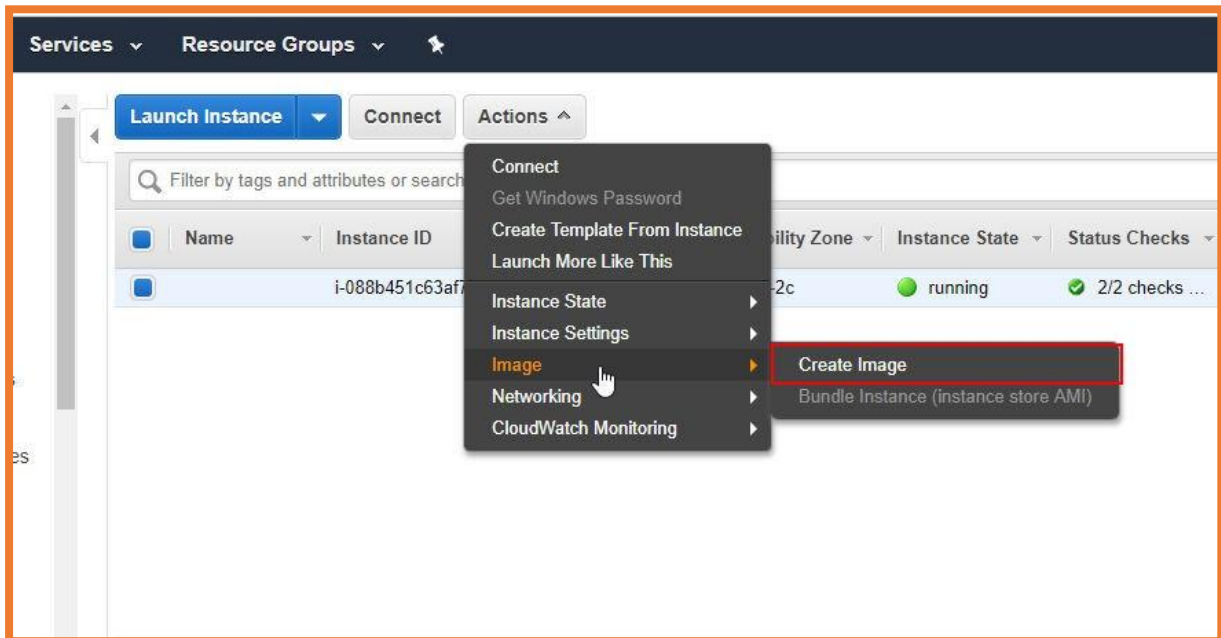


- Now when you enter these details in this website, you will see the following result



AUTO SCALING

Now, we'll do the autoscaling of our website by going to our EC2 Instance and then click on **Actions** and **Create Image**



- Then further, activate its autoscaling and then its classic load balancer which directs the traffic to your website directly

