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Assignment No. 3

Title: Deploy Web application on AWS Cloud (or any cloud)(PHP/Python/Node js any application) using EC2 instance.

Theory:

What is cloud computing?

Cloud computing is a virtualization-based technology that allows us to create, configure, and customize applications via an internet connection. The cloud technology includes a development platform, hard disk, software application, and database.

The term cloud refers to a network or the internet. It is a technology that uses remote servers on the internet to store, manage, and access data online rather than local drives. The data can be anything such as files, images, documents, audio, video, and more.

Developing new applications and services

- Storage, back up, and recovery of data
- Hosting blogs and websites
- Delivery of software on demand
- Analysis of data
- Streaming videos and audios

Characteristics of Cloud Computing:

The characteristics of cloud computing are given below:

1) Agility

The cloud works in a distributed computing environment. It shares resources among users and works very fast.

2) High availability and reliability

The availability of servers is high and more reliable because the chances of infrastructure failure are minimum.

3) High Scalability

Cloud offers "on-demand" provisioning of resources on a large scale, without having engineers for peak loads.

4) Multi-Sharing

With the help of cloud computing, multiple users and applications can work more efficiently with cost reductions by sharing common infrastructure.

5) Device and Location Independence

Cloud computing enables the users to access systems using a web browser regardless of their location or what device they use e.g. PC, mobile phone, etc. As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet, users can connect from anywhere.

6) Maintenance

Maintenance of cloud computing applications is easier, since they do not need to be installed on each user's computer and can be accessed from different places. So, it reduces the cost also.

Cloud Service models and Deployment models:

Types Of Cloud Computing Services:

SaaS(Software-as-a-Service):

Saas provides clients with ability to use software applications over the internet via subscription basis. Clients can access applications from anywhere via web.

Examples: Google Applications and Salesforce.

PaaS(Platform-as-a-Service):

PaaS provides a platform where the clients can deploy their own applications and host them. The client is free from hassles of setting up infrastructure, managing storage, servers, network etc.

Examples: Amazon Web Services and Rackspace.

IaaS(Infrastructure-as-a-Service):

The IaaS provides just the hardware and network, the clients should install and develop software and applications.

Examples: IBM, Google and Amazon Web Services.

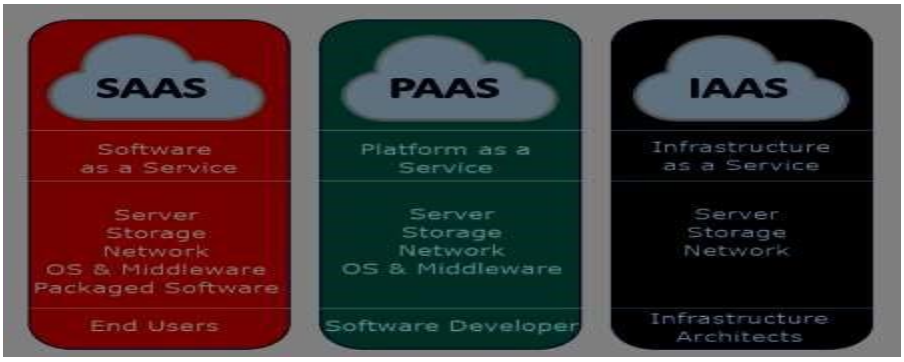


Fig. 1 Cloud Services Models

Use Cases:

SaaS(Software-as-a-Service)

Use case**:** Suppose you choose to take a taxi**,** the car agency is responsible for car finance, servicing of the car. Besides that they take care of insurance and road tax. The driver, fuel requirements is taken care as well. You just need to pay for your ride.

Similarly Software-as-a-Service provider delivers software applications over the Internet, on demand and basically on a subscription basis. You just need to pay for the service you are utilizing. Entire software and hardware stack is hosted by the provider and made available to users over the Wide Area Network(WAN) like Internet or other dedicated networks.

SaaS eliminates the need for hardware acquisition, provisioning and maintenance, as well as software licensing, installation and support. Provides scalability, flexible payments and auto updates.

Examples: Google Applications like Gmail, Google Docs.

PaaS(Platform-as-a-Service)

Use case**:** You plan to travel to a nearby place so decided to rent a car, then you might have to take care of fuel needs, road tolls and hire a driver as well. Rest of the work like finance of the car, car service, insurance, road tax, garage etc is responsibility of the car renting agency.

Likewise Platform-as-a-Service provider offers core computing services like storage, virtualization and network. In addition, hosts OS, middleware frameworks or other development services such as web services, database management system and SD'kits compatible with various programming languages. The service provider builds and renders a secure and optimized environment on which users can install applications and data sets.

The prime benefits of this type of service include its simplicity and convenience for users–the Platform-as-a-Service users can focus on creating and running applications rather than constructing and maintaining underlying infrastructural stack and services.

Examples**:** Google app Engine, Microsoft Azure, Salesforce.

IaaS(Infrastructure-as-a-Service)

Use case: You made long travel plans to a far away place so chose to **lease a car.** Here you have to worry about servicing a car, road tax, insurance and garage requirements, pay for the fuel, road tolls and hire a driver. Most of the work is done by you. The car agency takes care of just the finance related to leasing a car.

Similarly, Infrastructure-as-a-Service provider offers end users with bare computing resources like storage capacity, virtualization, networking, security and maintenance on a pay-as-you-use basis. The users are no longer concerned with location and purchase costs. Furthermore, IaaS provider supplies additional services that complement the above features like load balancing, billing details, data backup, recovery and storage.

IaaS model users handle most of the workload like installing, maintaining and managing software layers.

Example: Amazon AWS, Rack space, Flex scale and Google Cloud Platform are some well-known IaaS providers.

Cloud Deployment Models:

There are 3 fundamental Deployment Models of cloud computing: Public Cloud, Private Cloud and Hybrid Cloud.

Public cloud:

In Public Cloud model, services and infrastructure are hosted on premise of cloud provider and are provisioned for open use by general public. The end users can access the services via public network like internet. Public Cloud services are delivered mostly on demand. Popular for hosting everyday apps like email, CRM and other business support apps.

Public Cloud model offers high scalability, automated maintenance but more vulnerable to attacks due to high levels of accessibility.

Common Public Cloud providers include Amazon Web Services and Microsoft Azure. You can even check out the details of Azure with the Azure Course.

Private Cloud:

Private Cloud model provides cloud services and infrastructure exclusively to a single tenant. The tenant can control and customize it to his need. The cloud infrastructure can be monitored either by cloud provider or the tenant. Many companies are migrating their data centre's to Private Cloud to run core business fields like research, manufacturing human resource etc.

The Private Cloud model offers great levels of security and control, though cost benefits ought to be sacrificed to some extent.

Hybrid Cloud:

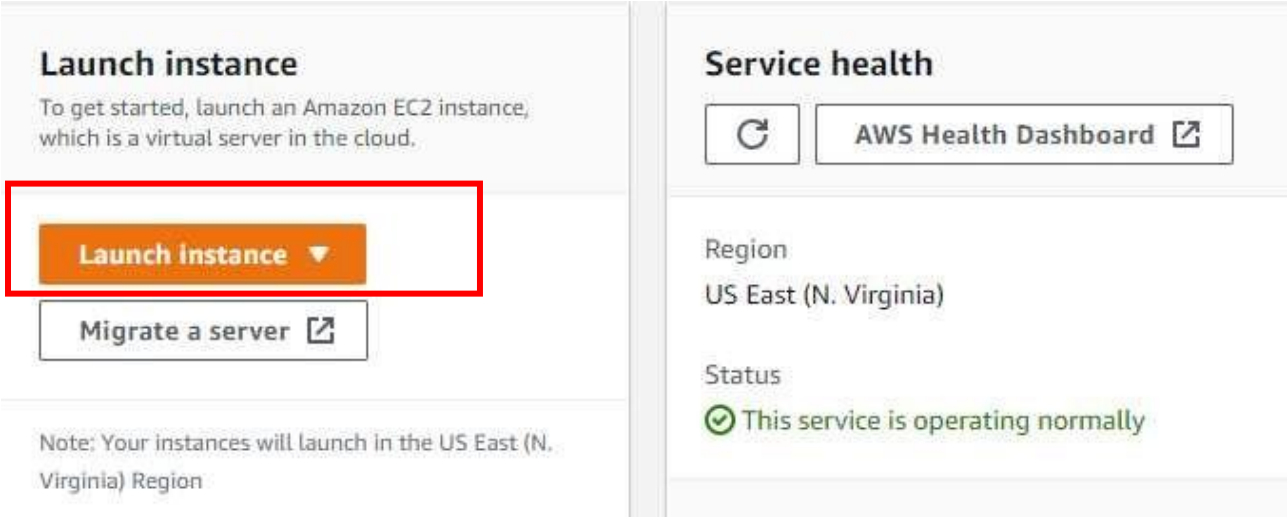
As the name suggests Hybrid Cloud is composition of both Public Cloud and Private Cloud infrastructure. The company can use Private Cloud to run mission critical operations and Private Cloud to run non sensitive high demand operations.

The companies using Hybrid Cloud model benefit with the security and control aspect of Private Cloud and off-hand management and cost benefits of Public Cloud.

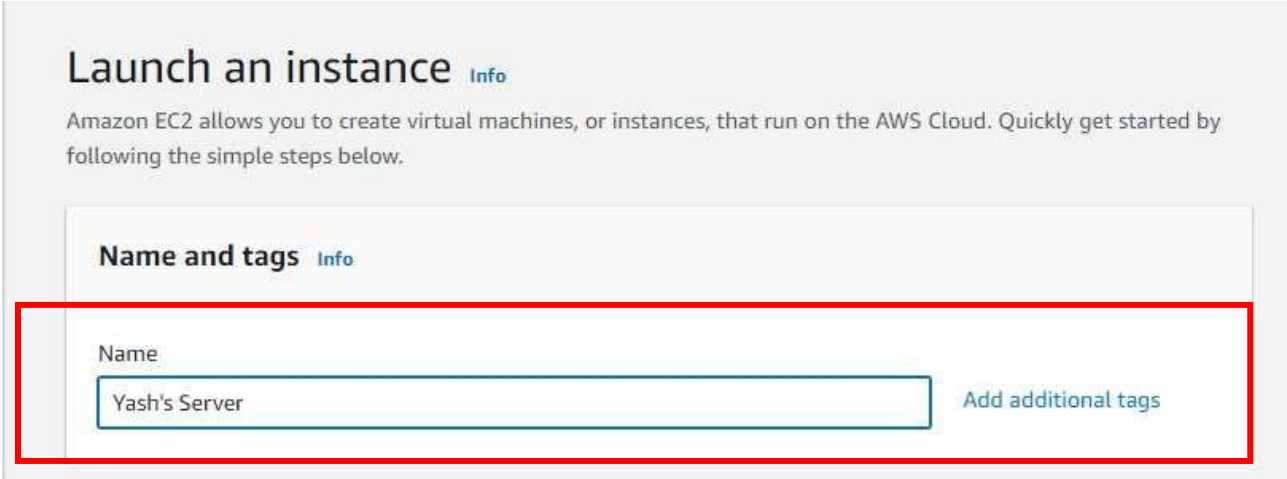
Procedure:

First Login into AWS account and create a new EC2 instance

Step: 1] Go to EC2>Instances>Launch Instances



Step: 2] Enter the instance name



Step: 3] Select Ubuntu Server

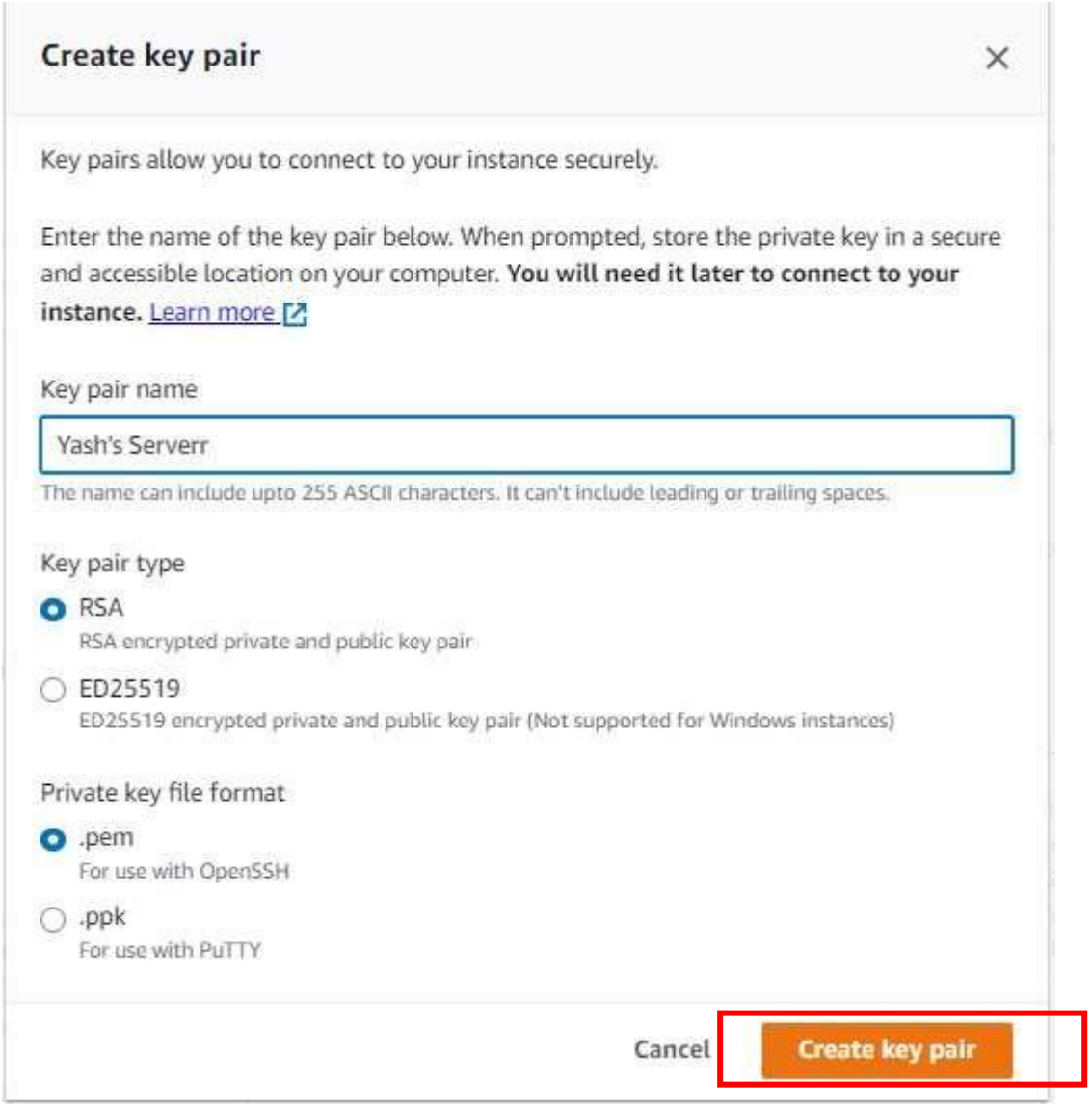
Step: 4] Select architecture for instance

Step: 5] select instance Type

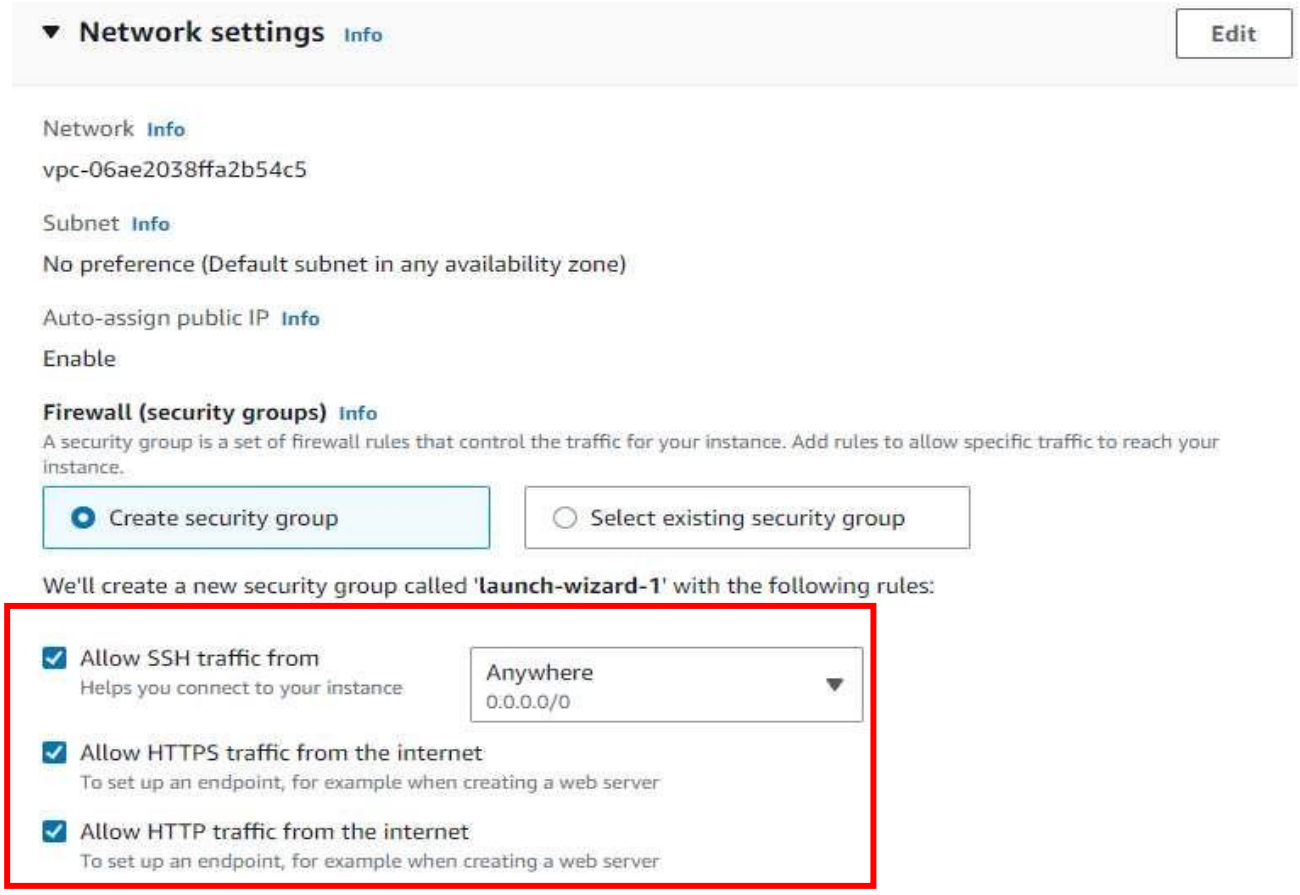
Step: 6] Click on create new key pair.

Step: 7] Click on create key Pair

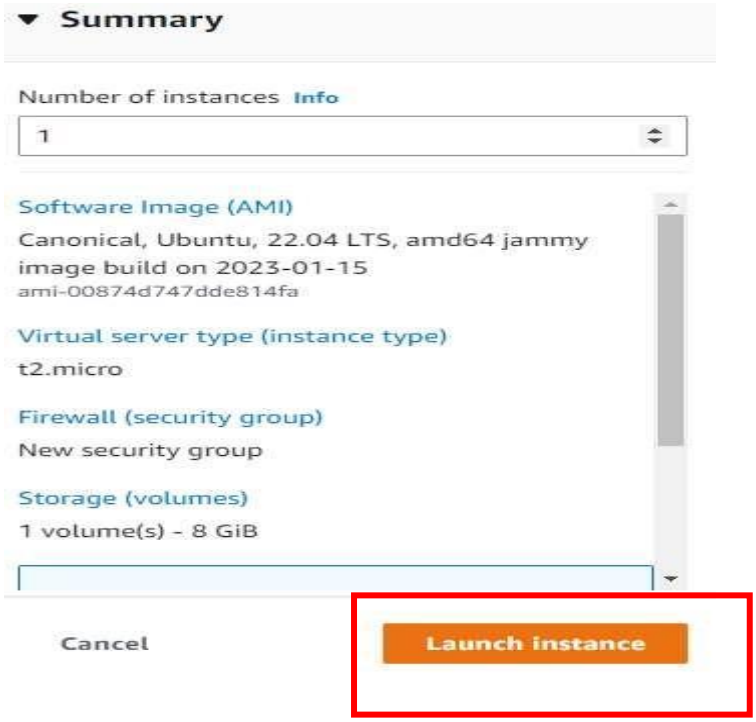
Generate ssh key pair for your instance. You will get an .pem file which you can use to authenticate yourself while logging to SSH.

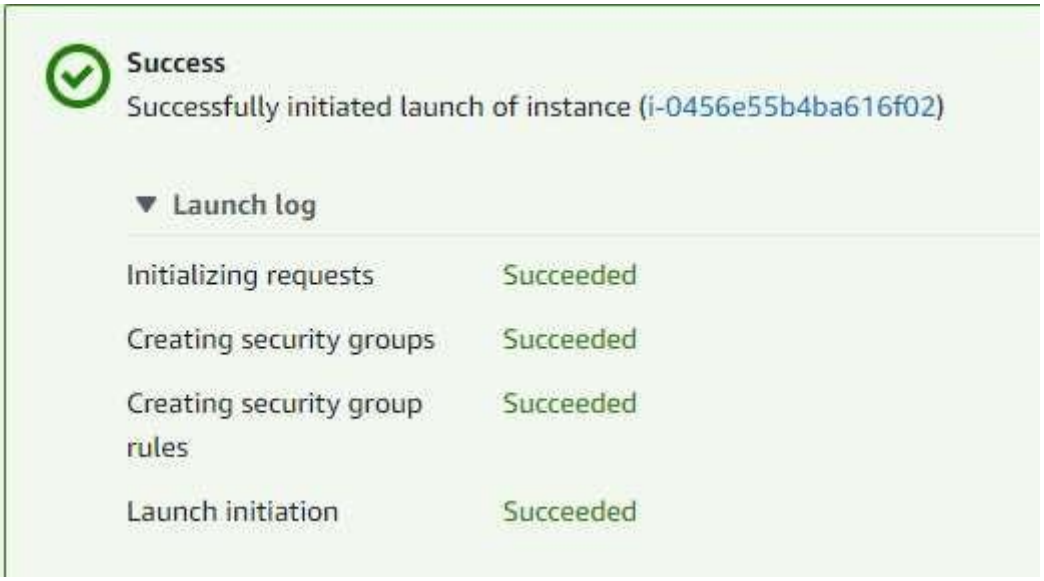


8] Select checkbox to allow traffic from SSH, HTTP and HTTPS in the Network Settings.

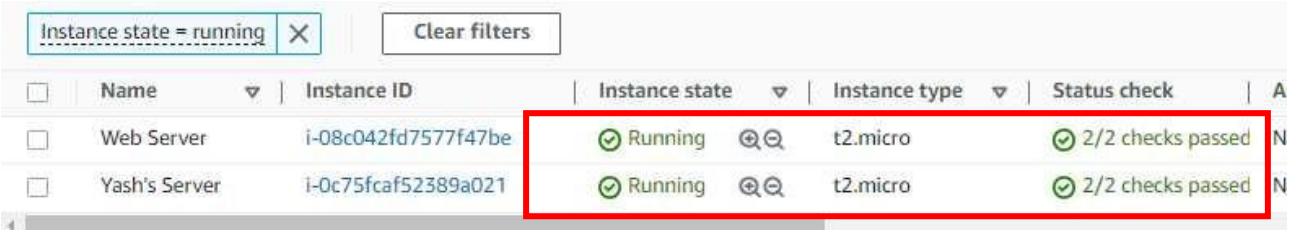


9] Leave other settings as default and then click on Launch instance

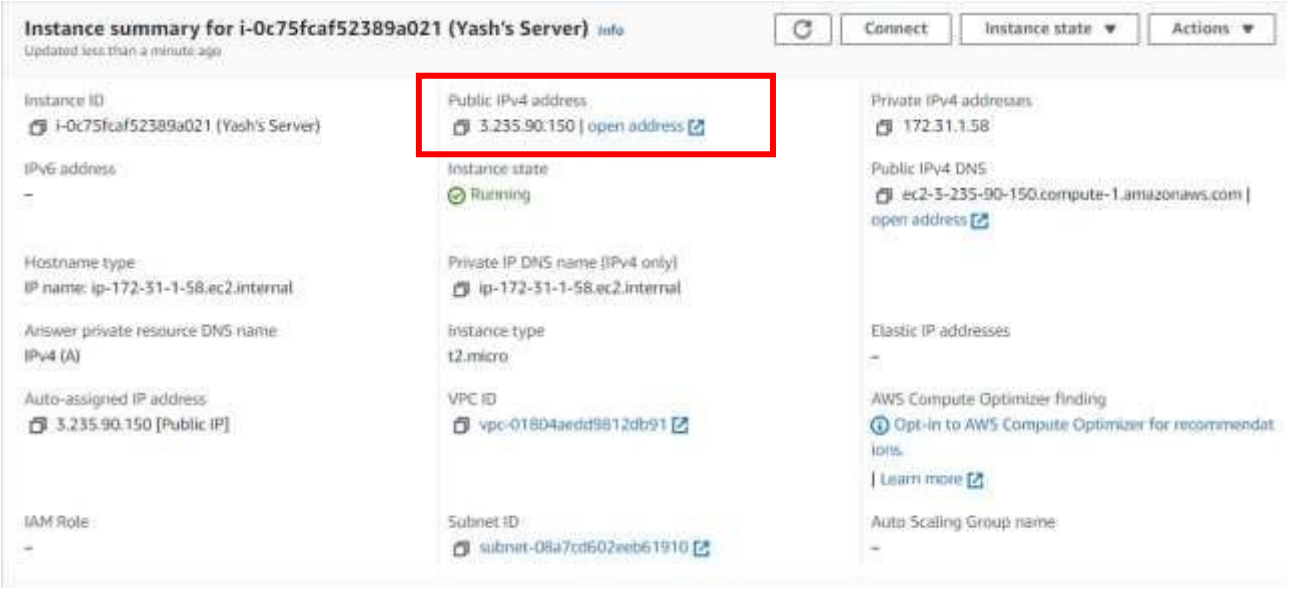




10] Check the status

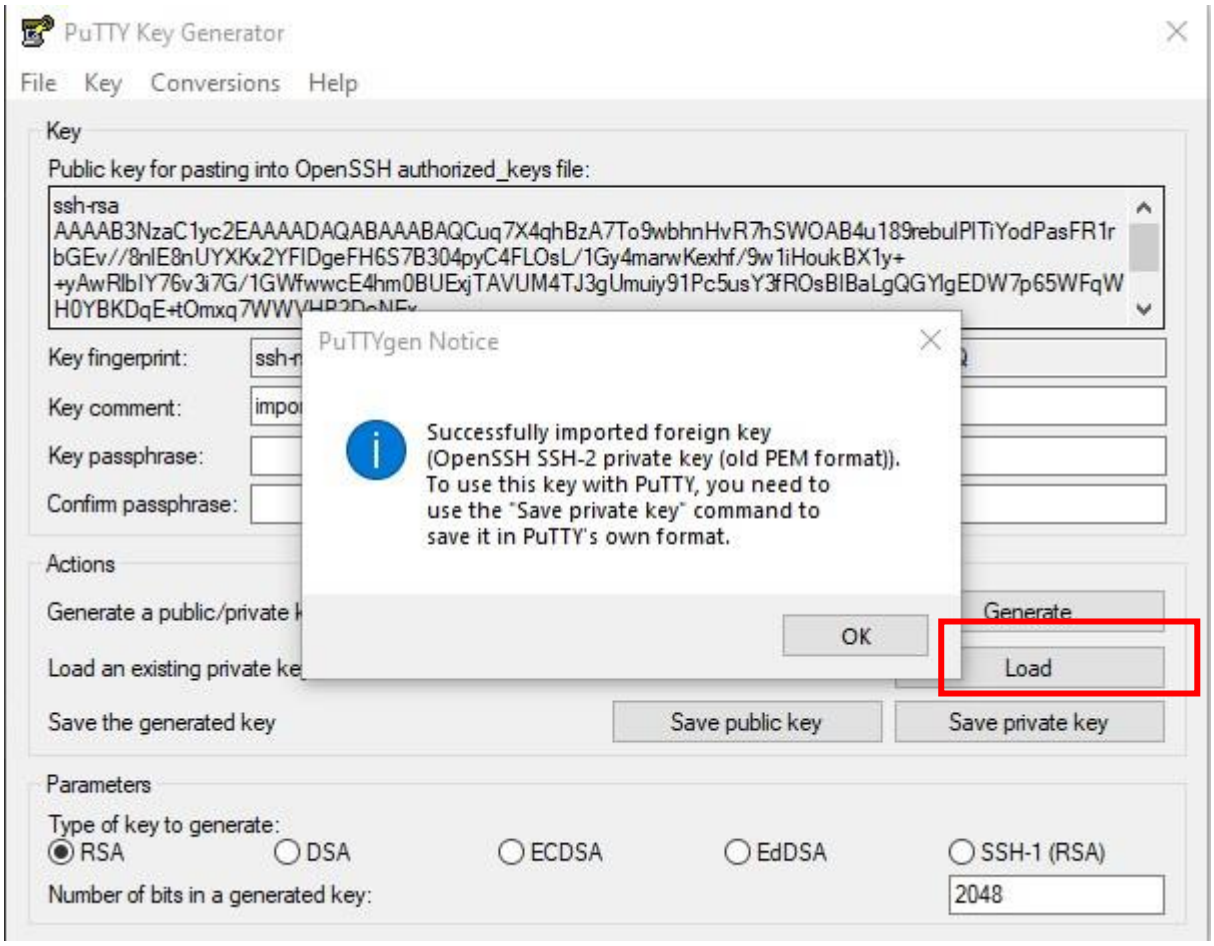


11] Copy the public key

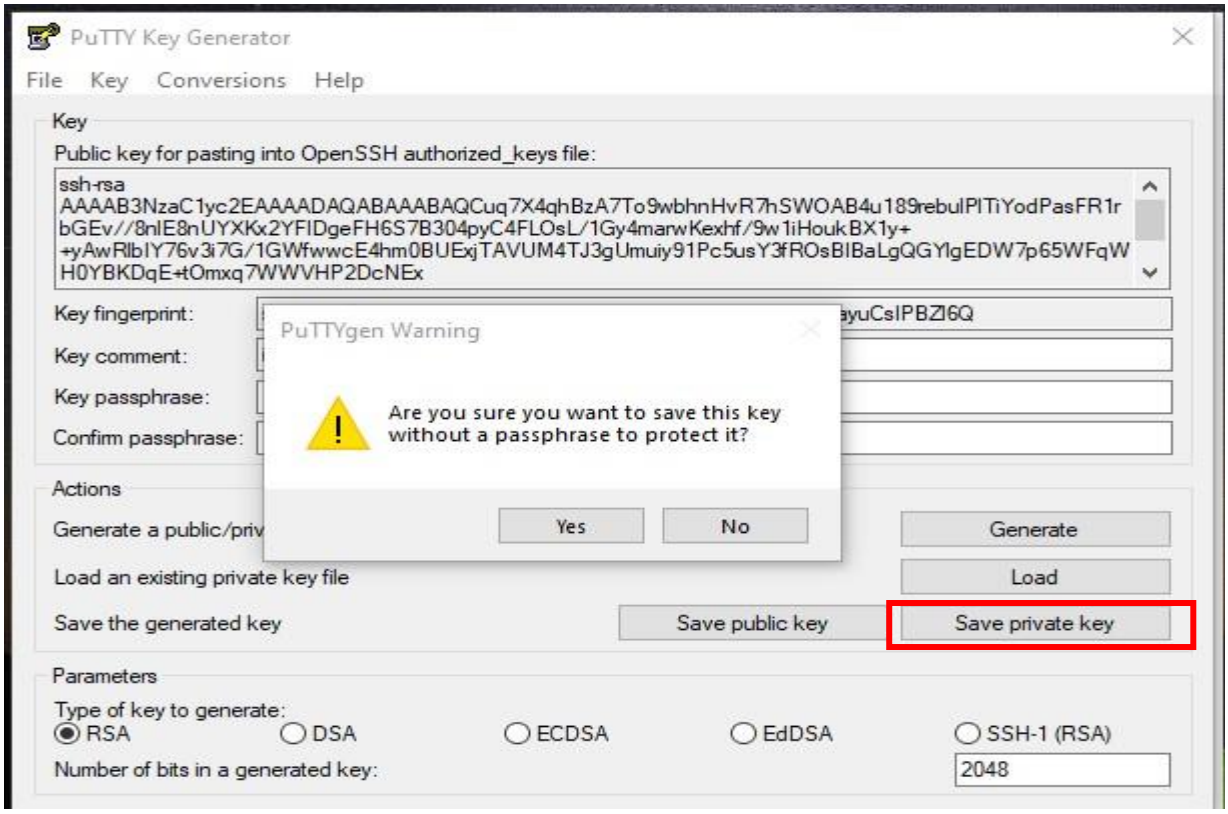


Steps to convert .pem file .ppk using “puttygen software”

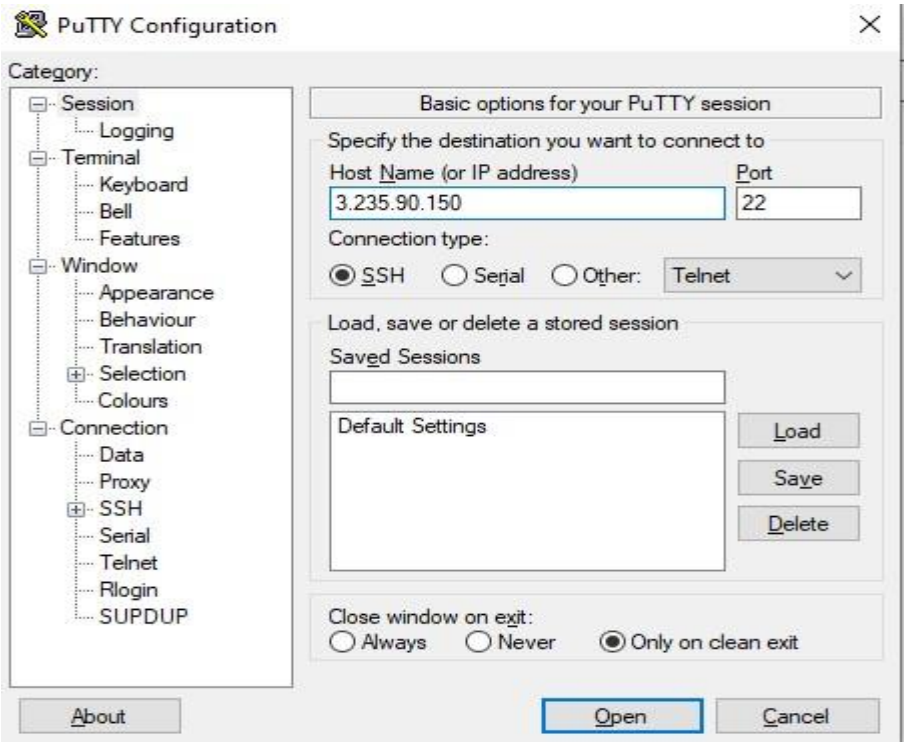
1] Open puttygen software click on “load” and select the path of your downloaded .pem file.



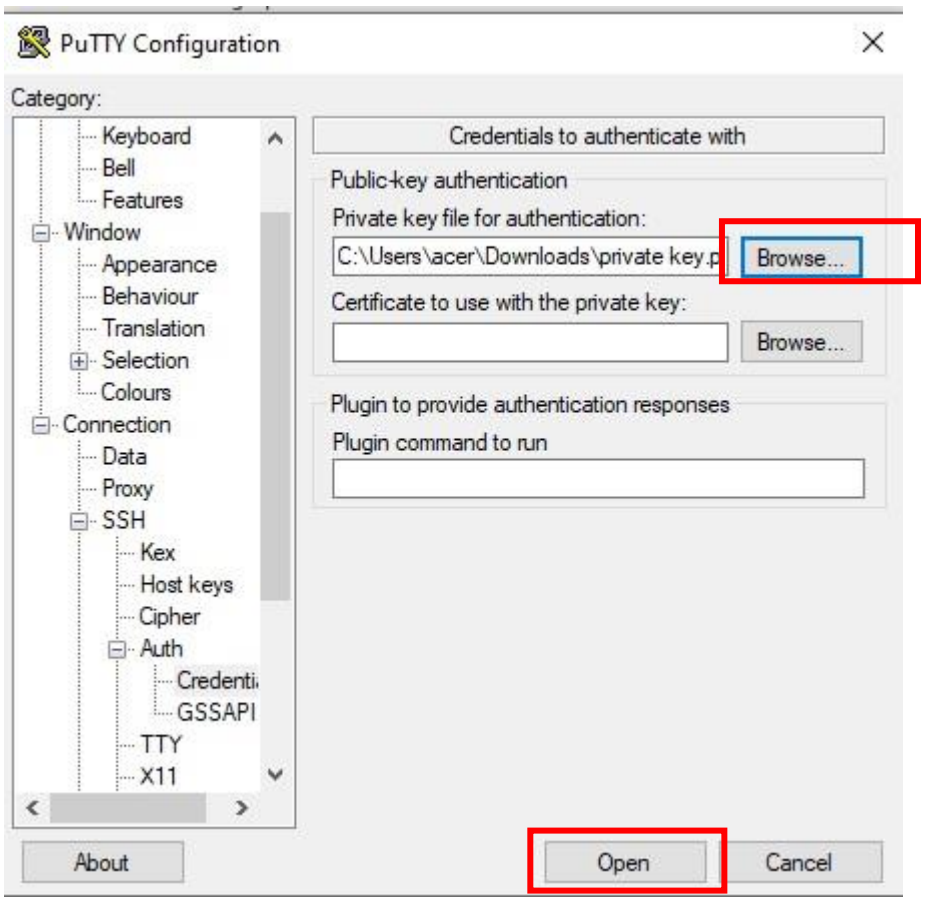
2] Click on save private key and save the key with new name



3] Now start the Putty software and copy the public ip of Ubuntu machine of aws in Host name and paste it in the PuTTY software hostname input box.



4] Click on SSH>Auth>credentials-> Browse Give the path of downloaded path of private key. And click on open. It will open a command prompt.



5] Login as Ubuntu. Now you are in Ubuntu machine running in AWS.

```
ubuntu@ip-172-31-5-48: ~
login as: ubuntu
Authenticating with public key "imported-openssh-key"
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1028-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Fri Feb 10 08:29:15 UTC 2023

  System load:  0.0               Processes:             95
  Usage of /:   36.3% of 7.57GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for eth0: 172.31.5.48
  Swap usage:   0%


0 updates can be applied immediately.


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

Last login: Thu Feb  9 19:41:02 2023 from 49.36.48.136
ubuntu@ip-172-31-5-48:~$
```

Steps to Deploy Web application:

1] Make myweb directory for storing web application.

```
ubuntu@ip-172-31-5-48:~/workspace$ mkdir myweb
```

2] Clone github repository using git

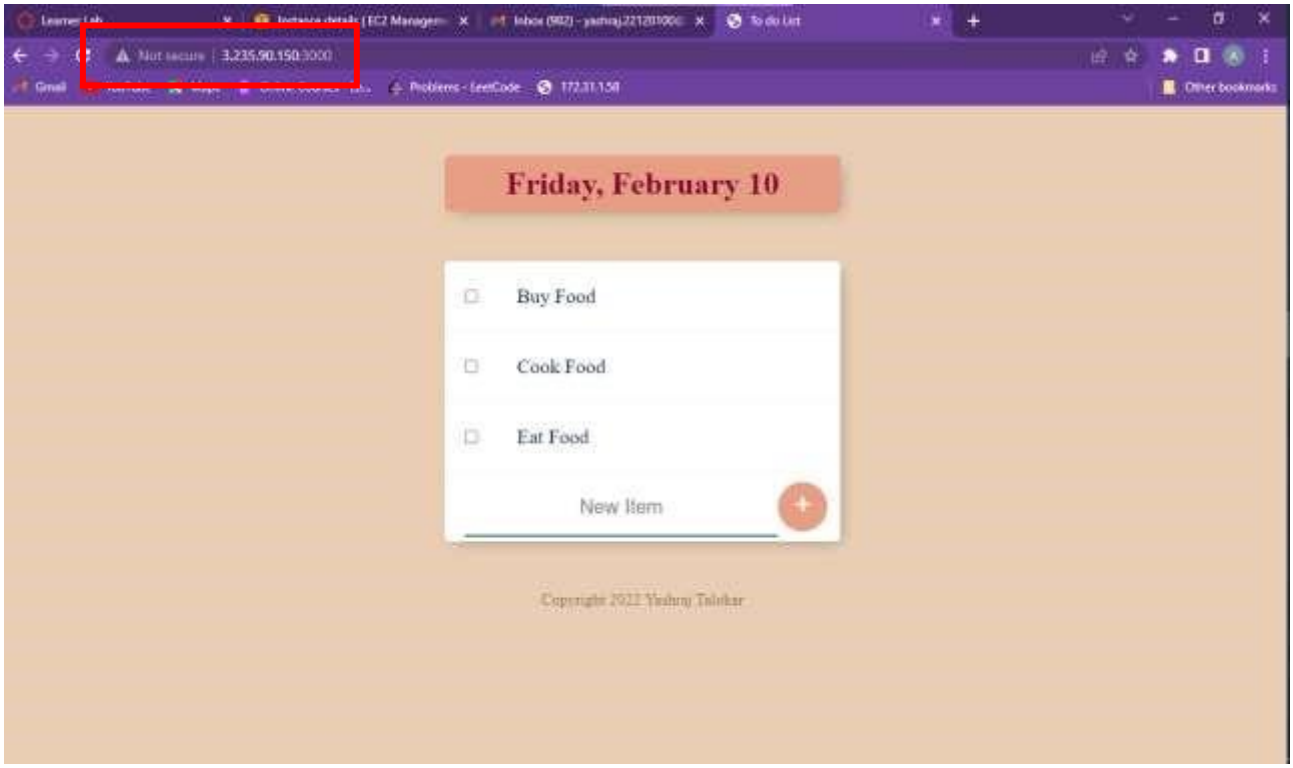
```
ubuntu@ip-172-31-1-58:~/workspace/app$ git clone https://github.com/yashrajtalokar/ToDo.git
Cloning into 'ToDo'...
remote: Enumerating objects: 24, done.
remote: Counting objects: 100% (24/24), done.
remote: Compressing objects: 100% (18/18), done.
remote: Total 24 (delta 3), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (24/24), 5.66 KiB | 1.88 MiB/s, done.
Resolving deltas: 100% (3/3), done.
ubuntu@ip-172-31-1-58:~/workspace/app$
```

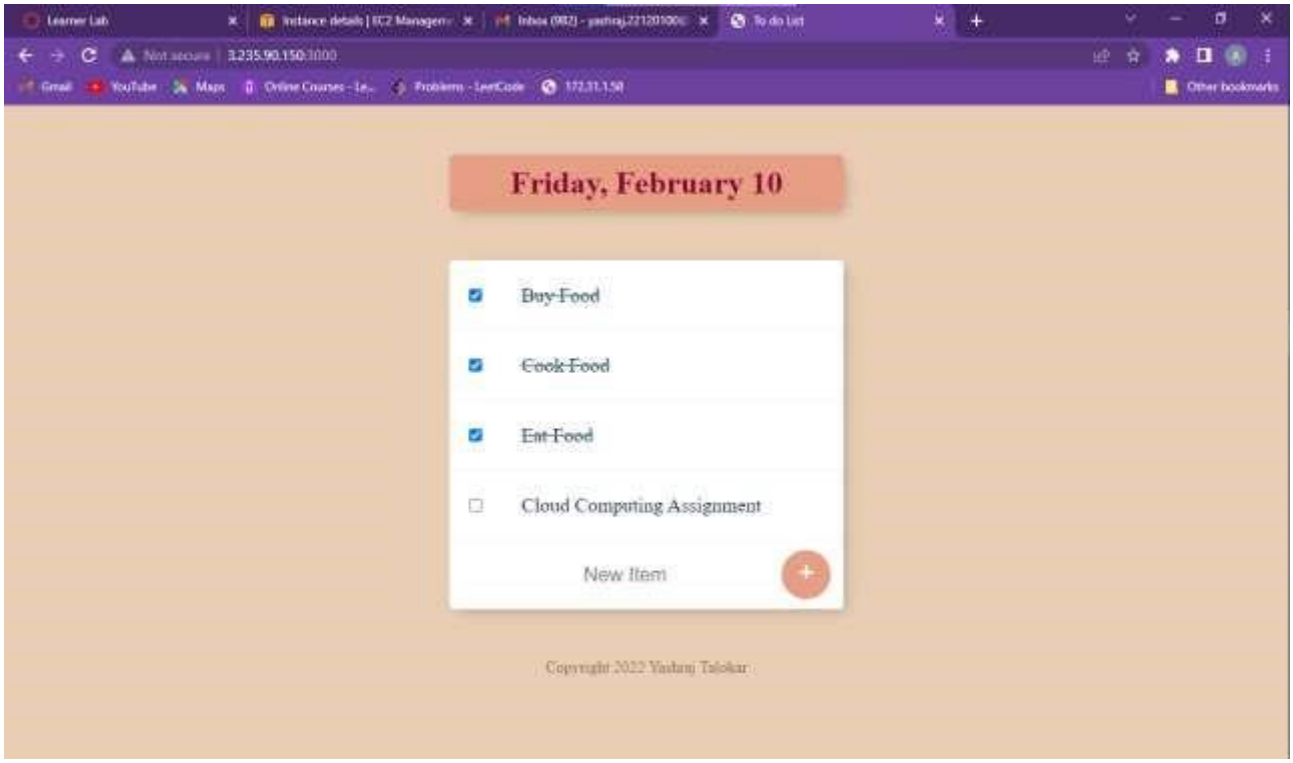
3]Install the required dependencies depending on your project and run web application

```
Last login: Fri Feb 10 15:18:35 2023 from 49.36.49.24
ubuntu@ip-172-31-1-58:~$ cd workspace
ubuntu@ip-172-31-1-58:~/workspace$ cd ToDo
ubuntu@ip-172-31-1-58:~/workspace/ToDo$ ls
README.md  date.js     node_modules       package.json  views
app.js     index.html  package-lock.json  public
ubuntu@ip-172-31-1-58:~/workspace/ToDo$ node app.js
```

```
ubuntu@ip-172-31-1-58:~/workspace/ToDo$ node app.js
Server is running on port 3000
```

6] Run 3.235.90.150:3000 this public IPv4 address with port number in browser and see the deployed website.




Learner Lab
Instance details | EC2 Managem
To do List
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Gmail
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Maps
Online Courses - Le...
Problems - LeetCode
172.31.1.58
Other bookmarks
Friday, February 10
Buy Food
Cook Food
Eat Food
Cloud Computing Assignment
New Item
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