SVKM'S NMIMS Nilkamal School of Mathematics, Applied Statistics & Analytics Master of Science (Data Science)

Practical-1 Infrastructure as a service using AWS

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Writeup:-

- **Cloud Computing Architecture**

Cloud computing architecture refers to the components and subcomponents required for cloud computing. These components typically consist of a front end platform (fat client, thin client, mobile device), back end platforms (servers, storage), a cloud-based delivery, and a network (Internet, Intranet, Intercloud). Combined, these components make up cloud computing architecture. Cloud services are delivered through this architecture via three primary models: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). Each model represents a different part of the cloud computing stack: applications, runtime, data, middleware, O/S, virtualization, servers, storage, and networking.

- **IAAS**

Infrastructure as a Service (IaaS) is a cloud computing model where a third-party provider hosts and maintains core infrastructure, including hardware, software, servers, and storage on behalf of a customer. This typically includes the hosting of applications in a highly scalable environment, where customers can pay on a pay-per-use basis. Typically, IaaS services offer additional resources such as a virtual-machine disk image library, raw block storage, and load balancers. IaaS is a comprehensive solution that handles all the infrastructure, allowing businesses to focus on their core operations. It is an ideal solution for small businesses and startups that don't have the budget for hardware and IT staff. It's also a good option for larger organizations that want to be able to scale quickly.

Why IAAS??

Flexibility - IaaS provides highly scalable and flexible computing resources that can be provisioned and decommissioned on-demand based on workload needs. This is useful for spiky or unpredictable workloads.

Lower costs - With IaaS, organizations pay only for the infrastructure resources they use without having to purchase and maintain their own hardware. This eliminates capital expenditures and reduces costs.

- **AWS**

Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over 200 fully featured services from data centres globally. AWS provides a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security, and enterprise applications. These services are available on-demand and come with a pay-as-you-go pricing model.

AWS is known for its flexibility, security, cost-effectiveness, and innovation. It provides the opportunity to replace upfront capital infrastructure expenses with low variable costs that scale with your business. AWS is used by millions of customers—including startups, enterprises, and public sector organizations—to lower costs, become more agile, and innovate faster.

- **EC2**

Amazon Elastic Compute Cloud (Amazon EC2) is a part of the AWS cloud platform that provides on-demand, scalable computing capacity. It allows users to launch as many or as few virtual servers as needed, manage storage, and configure security and networking. EC2 instances can be scaled up to handle compute-heavy tasks or scaled down when usage decreases.

EC2 supports the processing, storage, and transmission of credit card data by a merchant or service provider and has been validated as being compliant with Payment Card Industry (PCI) Data Security Standard (DSS). It offers various features like instances (virtual servers), Amazon Machine Images (AMIs), instance types, key pairs, instance store volumes, and Amazon EBS volumes.

EC2 instances eliminate the up-front investment for hardware, and there is no need to maintain any rented hardware. It enables you to build and run applications faster. EC2 is secure, resizable, and scalable. These virtual machines are pre-configured with the operating systems and some of the required software. Instead of managing the infrastructure, AWS will do that so you can just launch and terminate the EC2 instance whenever you want. You can scale up and down the EC2 instance depending on the incoming traffic. The other advantage of AWS EC2 is that you need to pay only for how much you use it is like the pay-as-you-go model.

Implementing the windows machine using AWS EC2

Step 1- Under AWS Dashboard select EC2
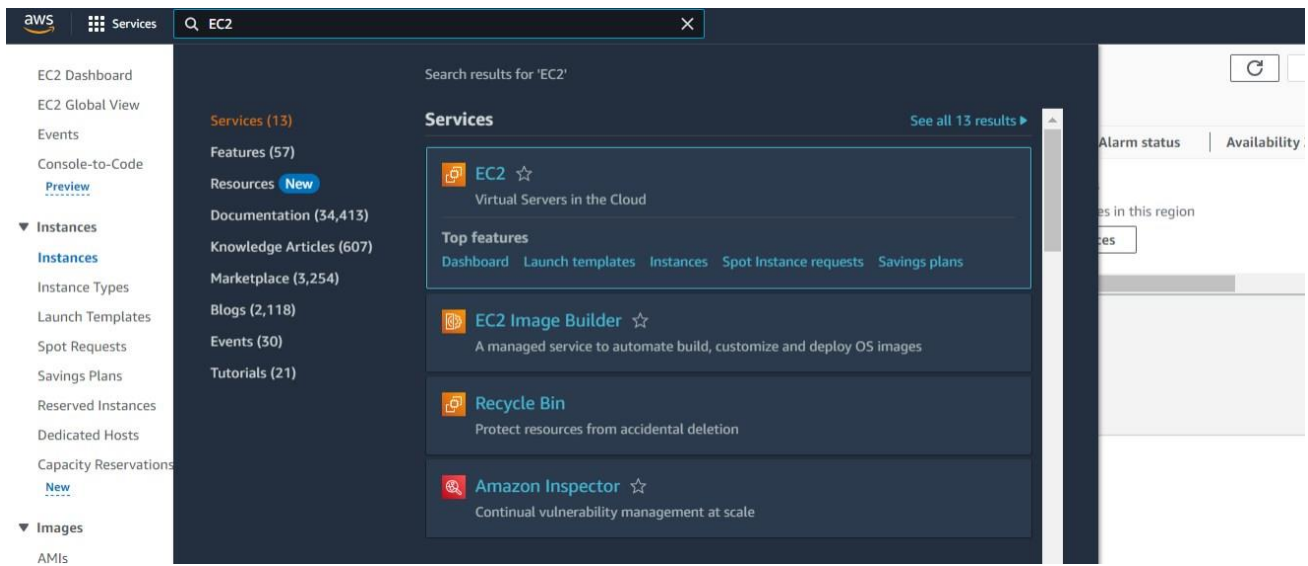
Step 2- Select Instance under EC2 and click on launch Instance
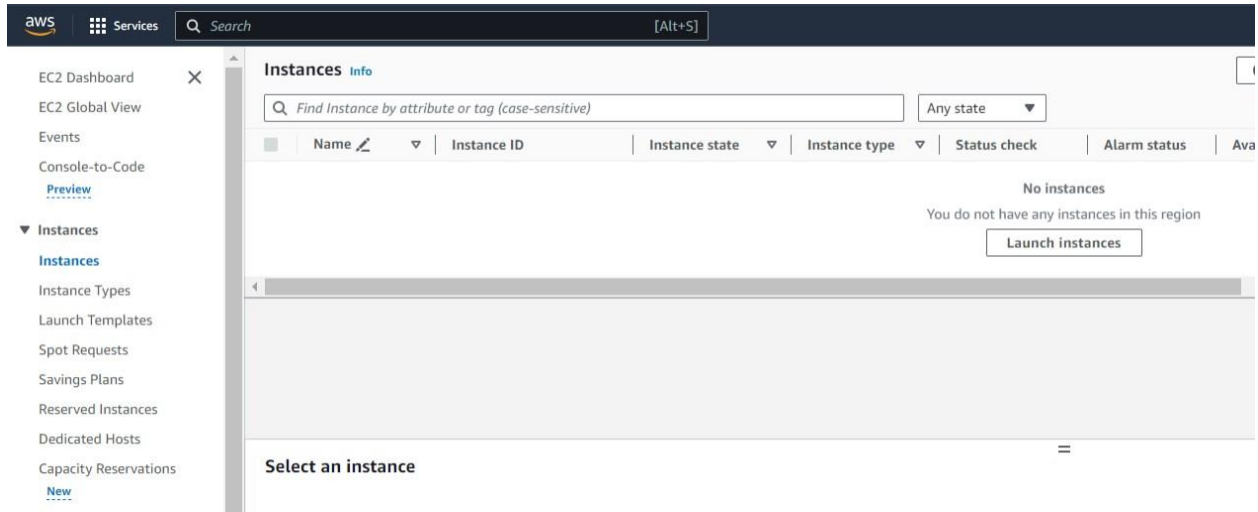
Step 3- Provide the name of the Instance and select Windows under Application and OS
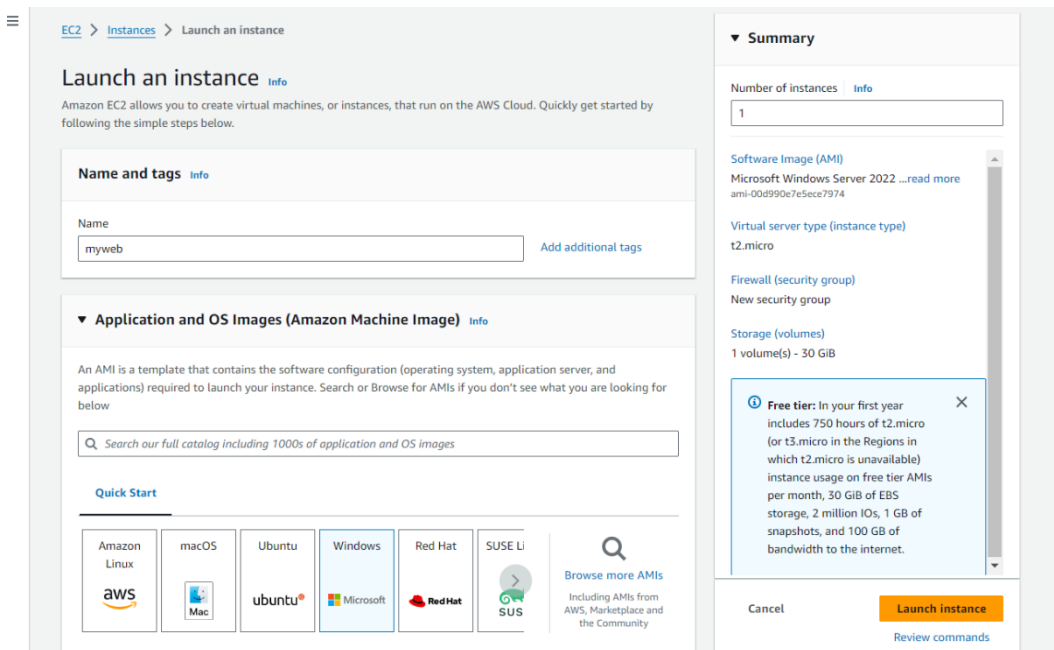
Step 4- For key pair click on Create a new key pair and select perm and click on Create key pair
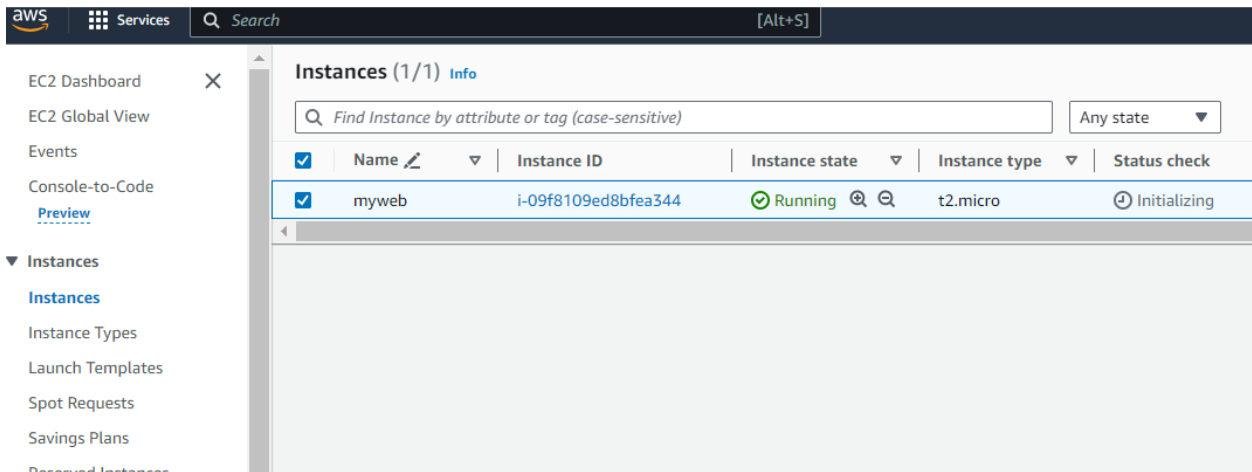

Step 5 – Launch the Instance Successfully

Step 6- Instance Successfully Launched
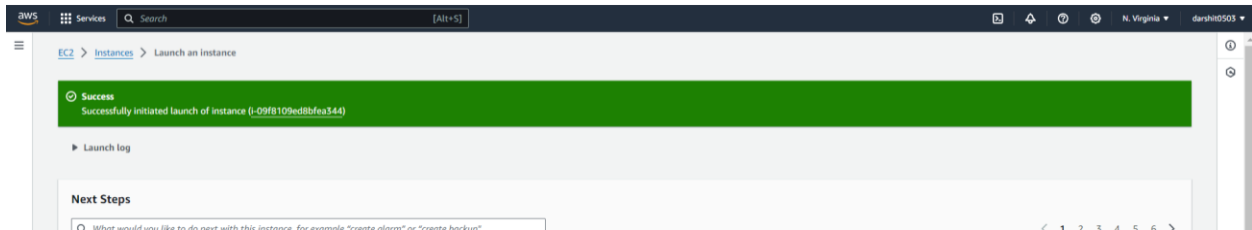
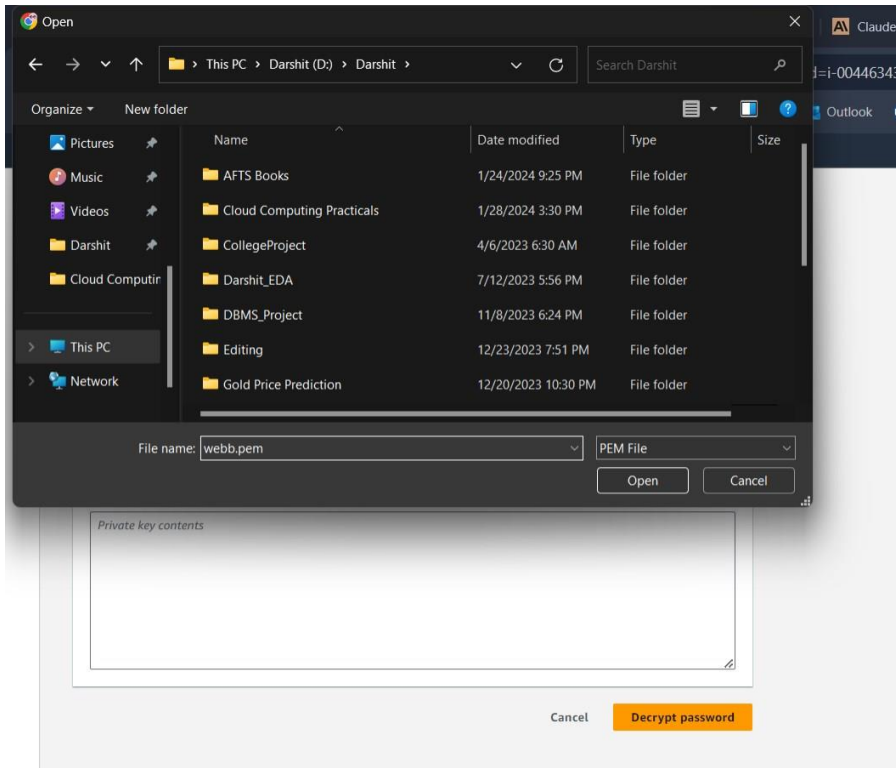Step 7- Go to Instance, Refresh it and you see the launched instance
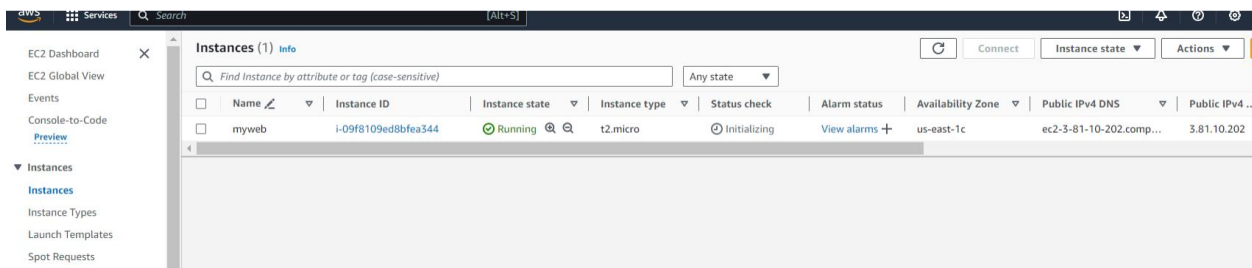
Step 8- Select the Instance

Step 9- Click on Connect and select RDP Client

Step 10- Click on GET PASSWORD

Step 11- Upload the key value File which got downloaded while creating a instance

Step 12- Decrypt the Password
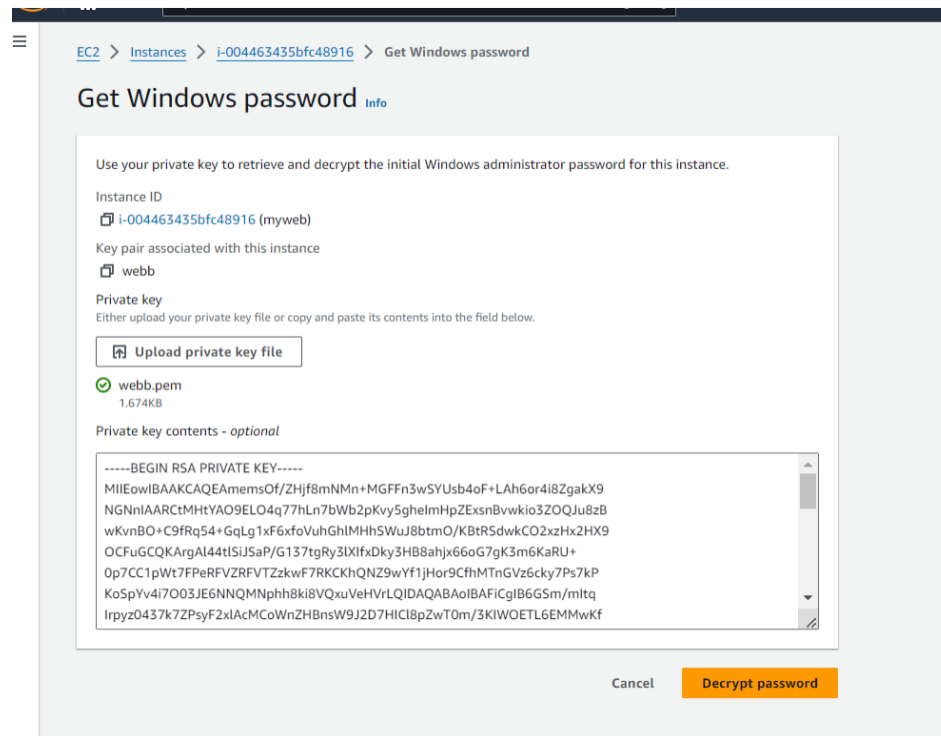
Step 13- Save the password

xPmF7whmrQDULJETY?V)Ys*WQ8.OJ9?s

Public DNS   Username
                    60.compute-1.amazonaws.com   Administrator
⊘ Password copied
    sword
       xPmF7whmrQDULJETY?V)Ys*WQ8.OJ9?s

ⓘ If you've joined your instance to a directory, you can use your directory credentials to connect to your
   instance.

Cancel

Step 14- Click on Download the Remote Desktop File .

Connect to your instance i-004463435bfc48916 (myweb) using any of these options

Session Manager   RDP client   EC2 serial console

Instance ID
   i-004463435bfc48916 (myweb)

Connection Type

   ● Connect using RDP client   ○ Connect using Fleet Manager
      Download a file to use with your RDP client and retrieve   To connect to the instance using Fleet Manager Remote
      your password.   Desktop, the SSM Agent must be installed and running
                                                        on the instance. For more information, see Working
                                                        with SSM Agent [↗]

You can connect to your Windows instance using a remote desktop client of your choice, and by downloading and
running the RDP shortcut file below:

   [⤓ Download remote desktop file]

When prompted, connect to your instance using the following details:

Public DNS   Username
   ec2-18-209-106-160.compute-1.amazonaws.com   Administrator

Step 15- Open the RDP File
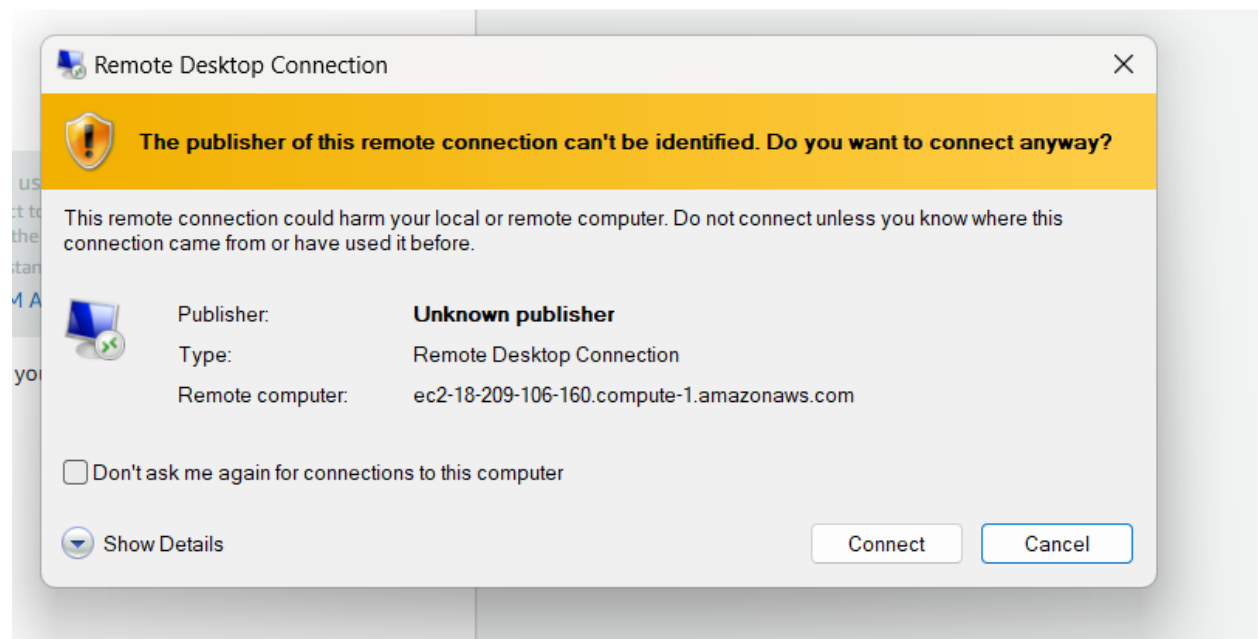
Step 16- Connect to the RDP
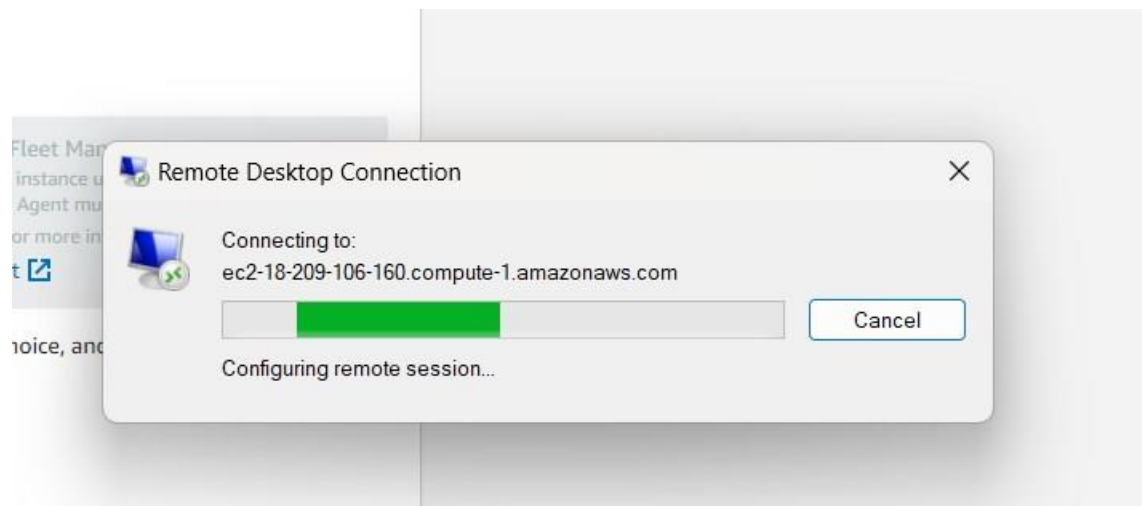
Step 17- Enter the password

Step 18- The Following Instance will popup
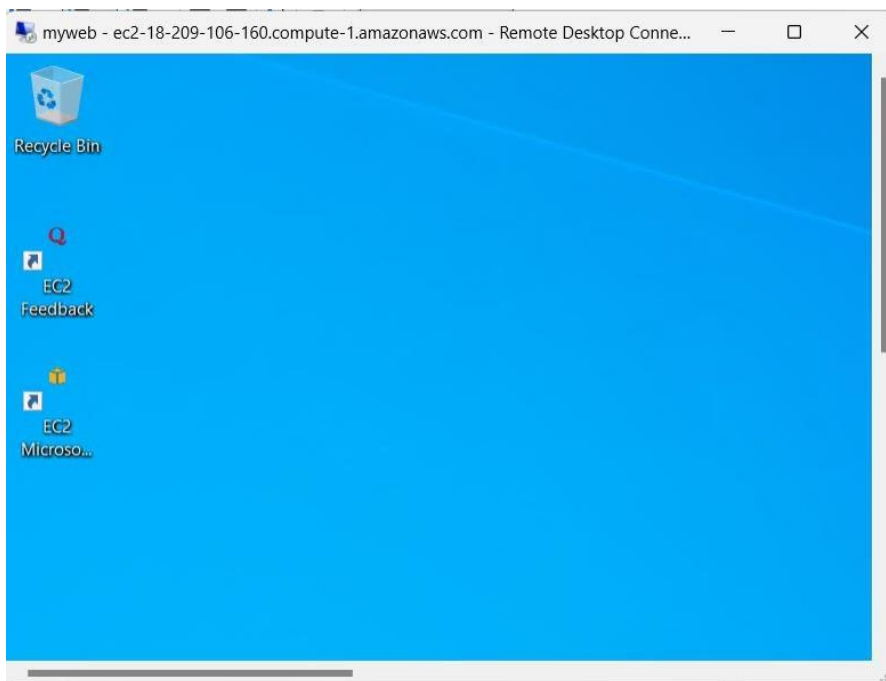
Step 19- Close the RDP and Go to Instances and Terminate the Instance
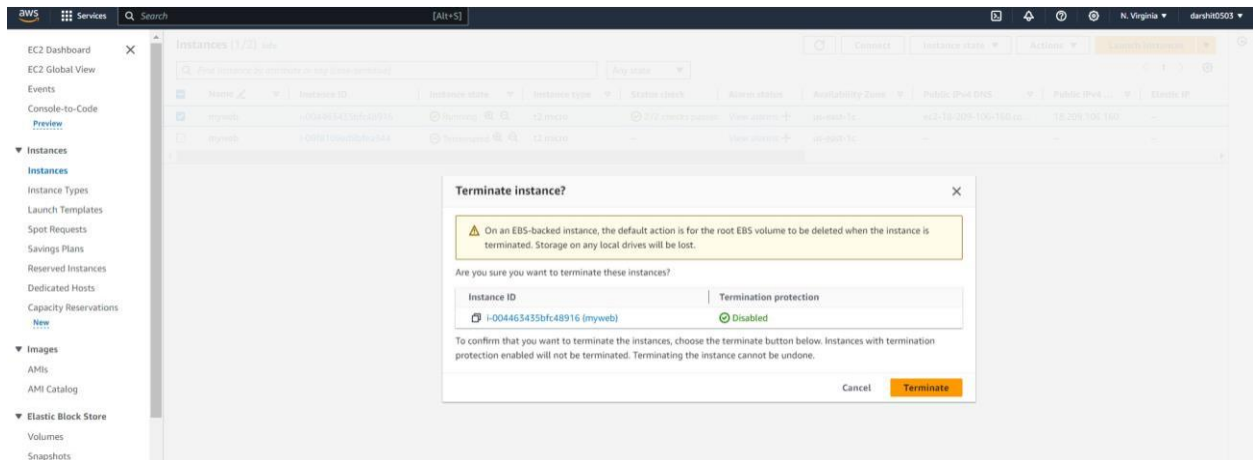
Implementing Ubuntu machine using AWS ec2 and execute the Linux commands.

Step 20- Launch a New Instance for Linux and select Application and OS as Ubuntu
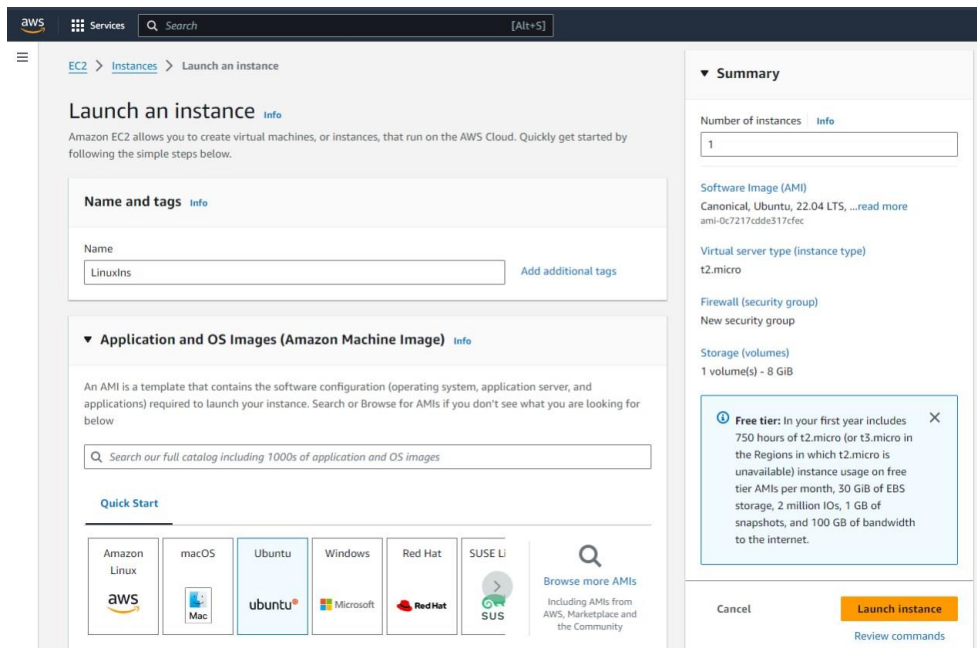
Step 21- Create a key pair and select ppk under the following

Step 22- Download Putty.exe from Google and select Alternative Binary Files (SSH and Talent Client Itself) and select <u>64 bit x 86</u>

Step 22- Allow all the trafic under the Linux Instance and Launch it

Step 23- After the Instance is successfully Launched Select the particular Linux

Step 24- Copy the Public IPV4 Address by selecting the Instance

Step 25- Go to Putty and Paste the IP Address Copied
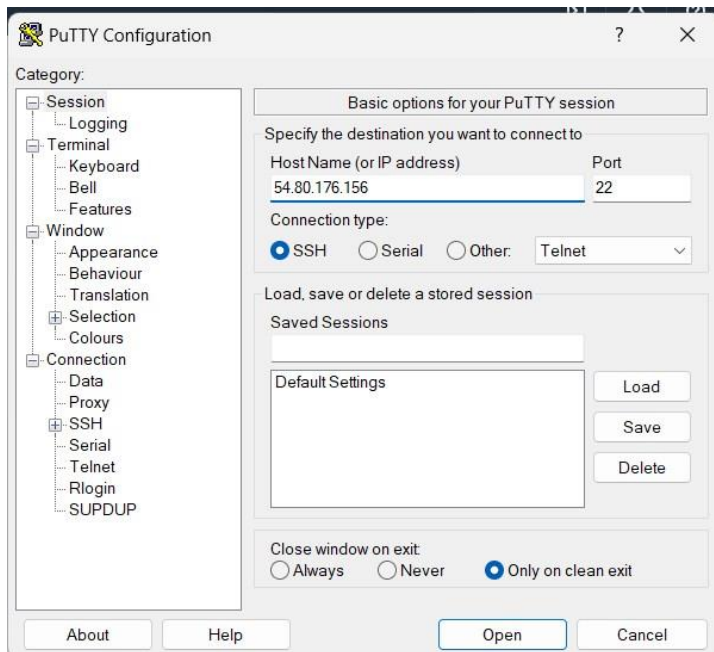
Step 26- Under the Putty Select Category -> SSH -> Auth -> Credentials -> Browse and select ppk file
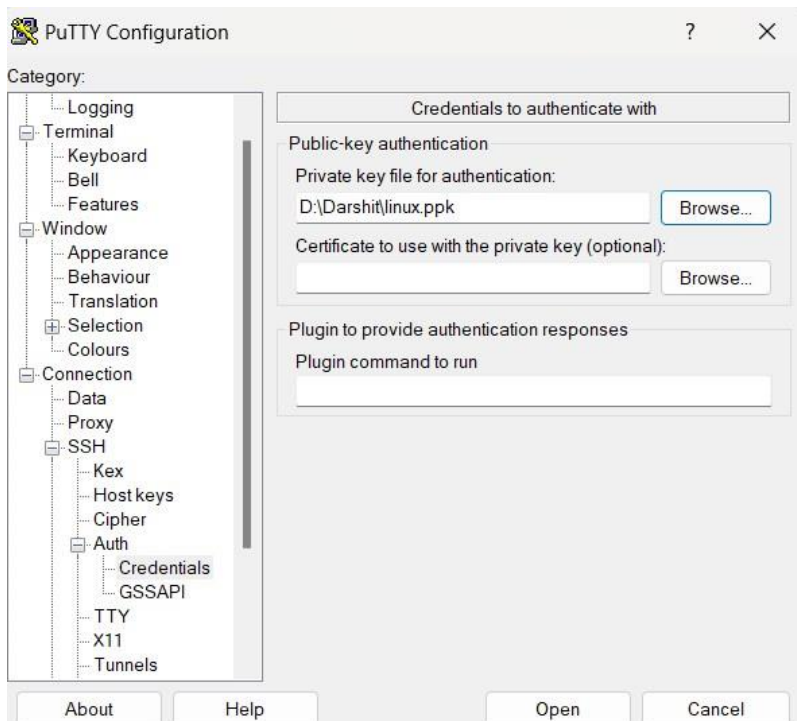
Step 27- Click on open and "ACCEPT" and the following popup will appear as Ubuntu Name

Step 28- Run the Following Commands in Putty

Step 29- Run the Following Python Code in Ubuntu

```
ubuntu@ip-172-31-40-196:~$ mkdir test
ubuntu@ip-172-31-40-196:~$ cd test
ubuntu@ip-172-31-40-196:~/test$ cat > hello.py
Hello World
^Z
[2]+  Stopped                 cat > hello.py
ubuntu@ip-172-31-40-196:~/test$ python3 hello.py
  File "/home/ubuntu/test/hello.py", line 1
    Hello World
          ^^^^^
SyntaxError: invalid syntax
ubuntu@ip-172-31-40-196:~/test$ cat > hello.py
print("Hello World")
^Z
[3]+  Stopped                 cat > hello.py
ubuntu@ip-172-31-40-196:~/test$ python3 hello.py
Hello World
ubuntu@ip-172-31-40-196:~/test$
```

Step 30- Terminate the Instance and Close Putty