

# **Sancia Fernandes (A012)**

## **Practical-1 Infrastructure as a service using AWS.**

### **Writeup:-**

- **Cloud Computing architecture**

Cloud computing architecture is a framework that revolutionizes the way computing resources are delivered and consumed. It is a model that allows users to access and utilize a variety of computing services over the internet. This architecture is composed of three main service models: Infrastructure as a Service (IAAS), Platform as a Service (PAAS), and Software as a Service (SAAS).

In an IaaS model, users have the ability to rent virtualized computing resources over the internet. This includes virtual machines, storage, and networking. Unlike traditional infrastructure setups, IaaS provides a flexible and scalable solution without requiring organizations to invest heavily in physical hardware. This flexibility is particularly valuable in dynamic business environments where computing needs can vary over time.

The primary advantage of cloud computing architecture, and IAAS in particular, is the ability to access computing resources on-demand. This allows organizations to scale their infrastructure up or down based on workload requirements, optimizing resource utilization and cost efficiency. Additionally, cloud architecture promotes accessibility and collaboration, as users can access computing resources from any location with internet connectivity.

As cloud computing continues to evolve, the architecture is becoming increasingly sophisticated, incorporating advanced technologies such as serverless computing, containerization, and edge computing. These innovations enhance the agility, scalability, and overall efficiency of cloud-based solutions.

- **IAAS**

Infrastructure as a Service (IAAS) is a foundational component of cloud computing that provides users with virtualized computing resources over the internet. In an IAAS model, organizations can rent infrastructure components such as virtual machines, storage, and networking, rather than investing in and maintaining physical hardware.

One of the key benefits of IAAS is its flexibility. Users have the ability to scale computing resources up or down based on demand, allowing for efficient resource utilization and cost optimization. This flexibility is particularly valuable for businesses with fluctuating

computing needs, as it eliminates the need for over-provisioning or under-provisioning hardware.

Amazon Web Services (AWS), a leading cloud services provider, offers a comprehensive IAAS solution known as Amazon Elastic Compute Cloud (EC2). EC2 allows users to launch virtual servers, known as instances, and configure them with various operating systems and applications. This service is designed to be scalable, reliable, and secure.

Security is a critical consideration in IAAS, and providers like AWS implement robust measures to ensure the protection of virtualized resources. Users can deploy their infrastructure within a Virtual Private Cloud (VPC), creating a network-isolated environment with customizable security settings.

- **AWS**

Amazon Web Services (AWS) stands as a global leader in cloud services, offering a comprehensive suite of solutions that span Infrastructure as a Service (IAAS), Platform as a Service (PAAS), and Software as a Service (SAAS). AWS provides users with on-demand access to a vast array of computing resources, eliminating the need for physical hardware and enabling businesses to run applications, store data, and perform various computing tasks in a flexible and scalable manner.

Key to the success of AWS is its commitment to providing a reliable, secure, and cost-effective cloud computing environment. The AWS global infrastructure spans multiple regions and availability zones, allowing users to deploy resources in geographically distributed data centers for enhanced reliability and redundancy.

AWS services cover a wide range of domains, including computing power, storage, databases, machine learning, analytics, security, and more. These services are designed to cater to the diverse needs of businesses and individuals, allowing them to build, deploy, and manage applications with ease.

As a pioneer in the cloud computing industry, AWS has played a significant role in shaping the digital landscape. Its pay-as-you-go pricing model, coupled with a vast selection of services, has democratized access to advanced computing capabilities, making it an attractive choice for startups, enterprises, and government organizations alike.

- **AWS services**

Amazon Web Services (AWS) offers a rich and diverse set of services, each designed to address specific computing needs and requirements. These services span multiple

domains, providing solutions for computing power, storage, databases, machine learning, analytics, security, and more. AWS services are foundational to the cloud computing experience, enabling users to build, deploy, and manage applications with ease.

#### *Key AWS Services:*

**Amazon EC2 (Elastic Compute Cloud):** A core Infrastructure as a Service (IAAS) offering, EC2 allows users to launch virtual servers known as instances. These instances can be configured with various operating systems and applications, providing scalable and flexible compute capacity in the cloud.

**Amazon S3 (Simple Storage Service):** An object storage service designed for scalable and secure storage of data. S3 allows users to store and retrieve any amount of data from anywhere on the web.

**Amazon RDS (Relational Database Service):** A managed database service that simplifies the setup, operation, and scaling of relational databases. RDS supports various database engines, including MySQL, PostgreSQL, and Oracle.

**AWS Lambda:** A serverless computing service that allows users to run code without provisioning or managing servers. It automatically scales based on the incoming request volume.

**Amazon SNS (Simple Notification Service):** A fully managed messaging service that enables the distribution of messages and notifications to a distributed set of recipients.

**Amazon CloudWatch:** A monitoring and observability service that provides data and actionable insights for AWS resources. It allows users to collect and track metrics, collect and monitor log files, and set alarms.

**Amazon IAM (Identity and Access Management):** A service that helps users securely control access to AWS resources. IAM allows the creation and management of AWS users and groups and helps define their permissions.

Each AWS service is designed to be scalable, reliable, and secure. The comprehensive nature of these services allows businesses to tailor their cloud infrastructure to specific needs, promoting agility and innovation in their digital endeavors.

- **EC2**

Amazon Elastic Compute Cloud (EC2) is a fundamental Infrastructure as a Service (IAAS) offering provided by Amazon Web Services (AWS). EC2 allows users to rent virtual servers, known as instances, in the cloud. These instances can be configured with various operating systems and applications, providing scalable and flexible compute capacity on-demand.

#### *Key Features of AWS EC2:*

Elasticity: EC2 instances can be easily scaled up or down based on demand. This elasticity allows users to respond dynamically to changes in computing requirements, ensuring optimal resource utilization.

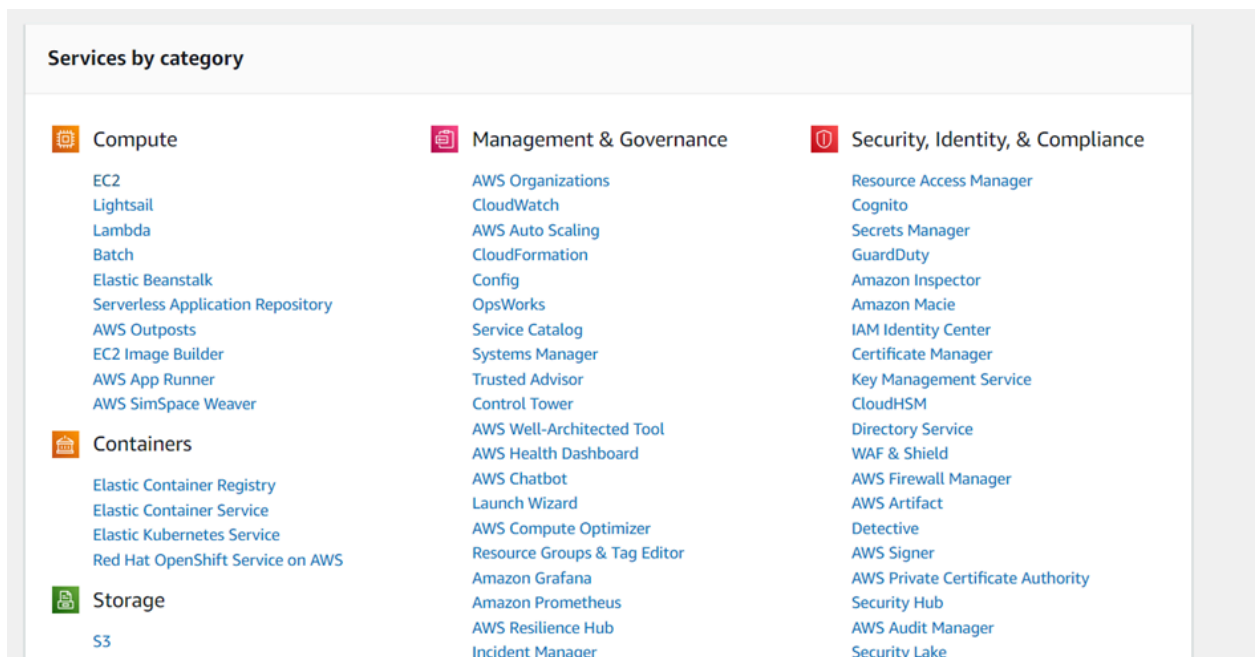
Variety of Instances: EC2 provides a wide range of instance types optimized for different use cases. This includes compute-optimized instances

## 1. Implement the windows machine using AWS ec2.

### STEPS:

Step 1: Sign into your AWS account

Step 2: Select All Services, Select EC2



Step 3: Launch Instance, create key value pair, pem and save

Step 4: Select Windows and launch the 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

Windows

[Add additional tags](#)

### Create key pair

Key pair name

Key pairs allow you to connect to your instance securely.

windows123

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA

RSA encrypted private and public key pair

☐ ED25519

ED25519 encrypted private and public key pair (Not supported for Windows instances)

Private key file format

☒ .pem

For use with OpenSSH

☐ .ppk

For use with PuTTY



When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#)

Cancel

Create key pair

Step 5: Go to instances and initialize and then start running

Instances (1/1) [Info](#)

Find Instance by attribute or tag (case-sensitive)  Any state

<input checked="" type="checkbox"/>	Name <a href="#">↗</a>	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
<input checked="" type="checkbox"/>	Windows	i-066ab71ecef7c9875	<span>Running</span>	t3.micro	<span>Initializing</span>	<a href="#">View alarms +</a>	eu-north-1a	ec2-13-51-174-170.eu-...	13.51.174.170

---

Instance: i-066ab71ecef7c9875 (Windows) [ⓘ](#) [✕](#)

[Details](#) | [Status and alarms New](#) | [Monitoring](#) | [Security](#) | [Networking](#) | [Storage](#) | [Tags](#)

▼ Instance summary [Info](#)

Instance ID i-066ab71ecef7c9875 (Windows)	Public IPv4 address 13.51.174.170 <a href="#">open address</a>	Private IPv4 addresses 172.31.16.123
IPv6 address -	Instance state <span>Running</span>	Public IPv4 DNS ec2-13-51-174-170.eu-north-1.compute.amazonaws.com <a href="#">open address</a>

Step 6: Select the instance, click on connect for connecting the RDP client

Use your private key to retrieve and decrypt the initial Windows administrator password for this instance.

Instance ID  
[i-066ab71ecef7c9875](#) (Windows)

Key pair associated with this instance  
[windows123](#)

Private key  
 Either upload your private key file or copy and paste its contents into the field below.

[Upload private key file](#)

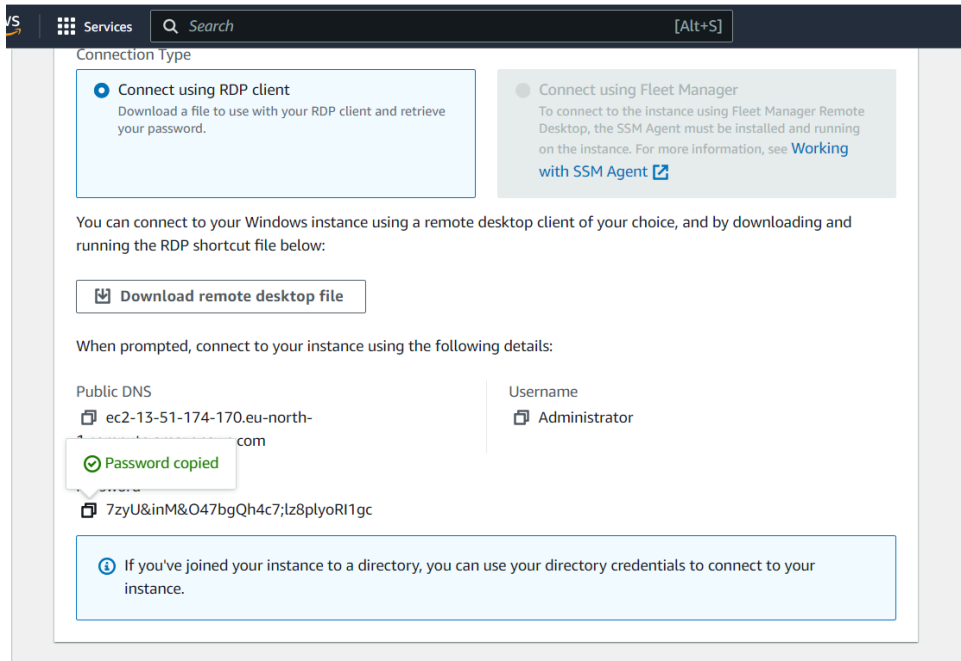
✓ windows123.pem  
 1.674KB

Private key contents - *optional*

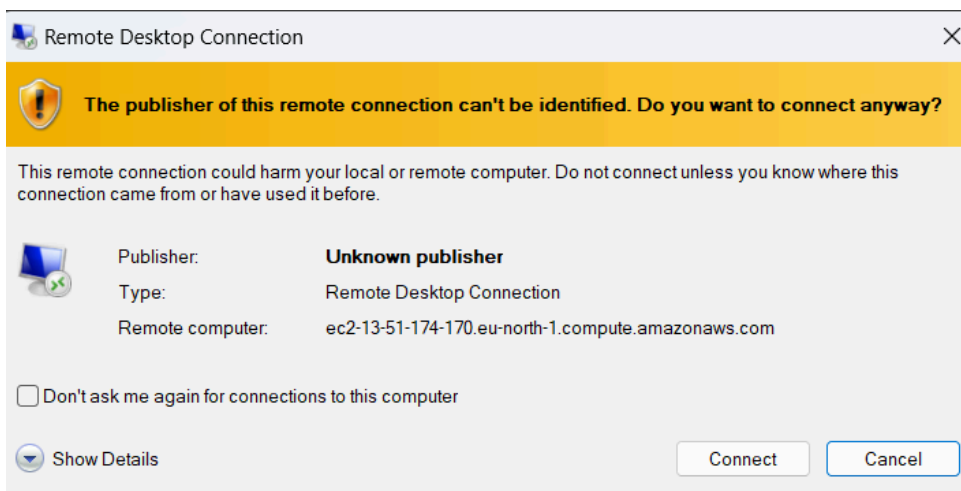
```

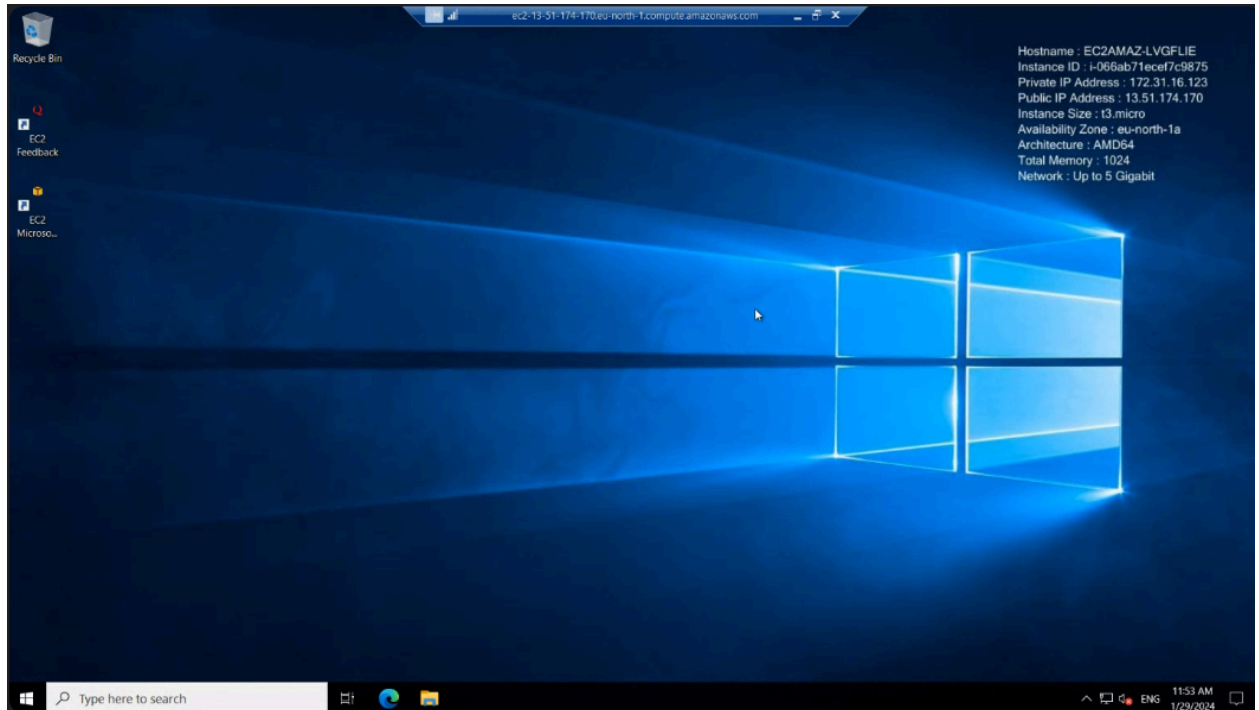
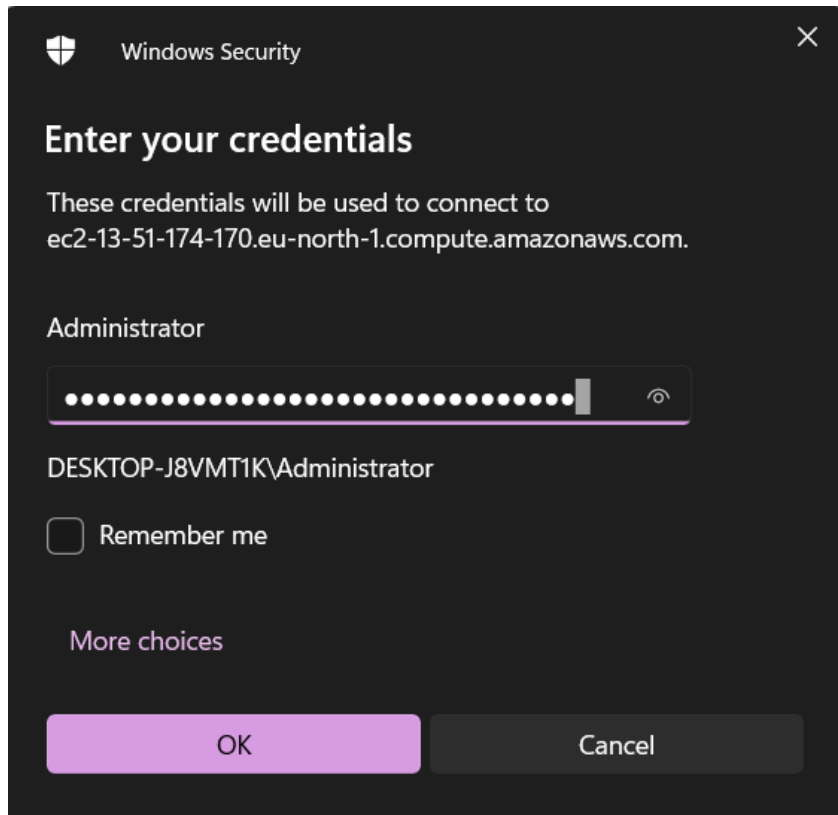
-----BEGIN RSA PRIVATE KEY-----
MIIIEowIBAACAQEA0rl7lOKPg6+2Lkxzl751/rPTlVFLyYHHeAnBqcOVQL9wefgX
MOZKIrH8Gr4rQqmtPCOfkYnkBXxv4TrwpUACrIdp56ogr+hgWxW0wXehGdc5crsV
V/jTzIGypTCmkwNT487PRAJKJpgbV622wyBxYmJzFbZKPxUohiMDbZw9Bh1lycRW
G7bu69Fto9mjDIBfMeg/IBVAhuybxxV1DSuG474x7av1oPq+4osXhXyYORrqZQs
SFXlsgdO4lPujJzUSPveolTUZamt5eaTKCr3Fy585rFjrOpwjQpam5GrmNbBrSSO
p0JU3UQb+GMhISYbbr6593rQKgTyEut19gkjTQIDAQABAoIBAFApSjMoiCpfag9g
T34DtIntRtIdKsn9qb0nGW6p7DErnY96Kp6YJzDF75Sa7LoPNqTvdAcS/rzkd2So
  
```

Step 7: Decrypt the password. Copy the password.



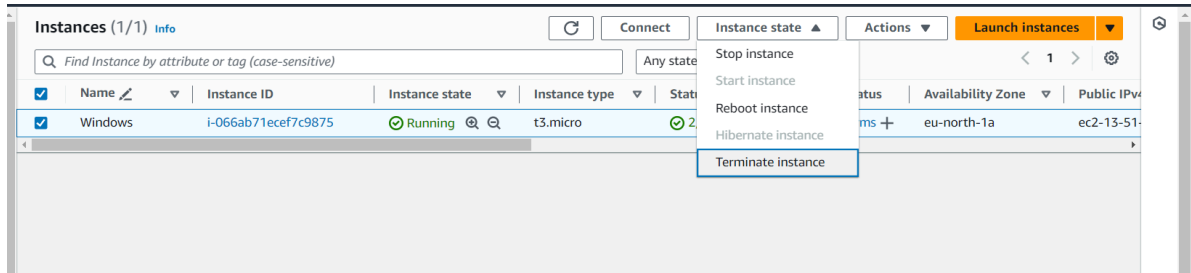
## Step 8: Open remote desktop connection





- Step 9: Close RDP and go back to instances
- Step 10: Terminate the instance





## 2. Implement Ubuntu machine using AWS ec2 and execute the Linux commands.

- Disk information in human readable format
- Create a folder with your name
- Create a file with your cityname and add your address in it
- Display the created file
- Copy the contents of the created file in other file and print it
- Install firefox/python 3

STEPS:

Step 1: Launch a new instance for Linux

Step 2: Write a new web server name and select Ubuntu server

**Application and OS Images (Amazon Machine Image)**
[Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

[Quick Start](#)

Amazon Linux

aws

macOS

Mac

Ubuntu

ubuntu

Windows

Microsoft

Red Hat

Red Hat

SUSE Linux

SUSE

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

**Amazon Machine Image (AMI)**

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type

Free tier eligible

ami-0014ce3e52359afb9 (64-bit (x86)) / ami-0c3d6a10a198d282d (64-bit (Arm))

Virtualization: hvm   ENA enabled: true   Root device type: ebs

**Description**

Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2023-12-07

### Step 3: Create a new key value pair and select ppk

## Create key pair

Key pair name

Key pairs allow you to connect to your instance securely.

tiger

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA

RSA encrypted private and public key pair

☐ ED25519

ED25519 encrypted private and public key pair



Private key file format

☐ .pem

For use with OpenSSH

☒ .ppk

For use with PuTTY

 When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#) 

Cancel

Create key pair

Network [Info](#)

vpc-0e60bd18c6915ece3

Subnet [Info](#)

No preference (Default subnet in any availability zone)

Auto-assign public IP [Info](#)

Enable

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

We'll create a new security group called 'launch-wizard-6' with the following rules:

- ☒ Allow SSH traffic from  
Helps you connect to your instance  
Anywhere  
0.0.0.0/0
- ☒ Allow HTTPS traffic from the internet  
To set up an endpoint, for example when creating a web server
- ☒ Allow HTTP traffic from the internet  
To set up an endpoint, for example when creating a web server

⚠ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Step 4: Download putty.exe file from Google

**putty.exe (the SSH and Telnet client itself)**

64-bit x86:	<a href="#">putty.exe</a>	( <a href="#">signature</a> )
64-bit Arm:	<a href="#">putty.exe</a>	( <a href="#">signature</a> )
32-bit x86:	<a href="#">putty.exe</a>	( <a href="#">signature</a> )

Step 5: Launch the instance

Step 6: Select and copy public IPV4 address

Instances (1/3) [Info](#)

Find Instance by attribute or tag (case-sensitive) Any state

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
<input checked="" type="checkbox"/>	linuxserver	i-0c821d05e97795436	Running	t3.micro	Initializing	View alarms	eu-north-1a	ec2-51-20-144-20.eu-n...	51.20.144.20
<input type="checkbox"/>	linuxserver	i-033737dc3070c6923	Terminated	t3.micro	-	View alarms	eu-north-1a	-	-
<input type="checkbox"/>	Windows	i-066ab71ecf7c9875	Terminated	t3.micro	-	View alarms	eu-north-1a	-	-

Instance: i-0c821d05e97795436 (linuxserver)

▼ Instance summary [Info](#)

Instance ID  
i-0c821d05e97795436 (linuxserver)

IPv6 address  
-

Hostname type  
IP name: ip-172-31-19-183.eu-north-1.compute.internal

Public IPv4 address copied

51.20.144.20 [open address](#)

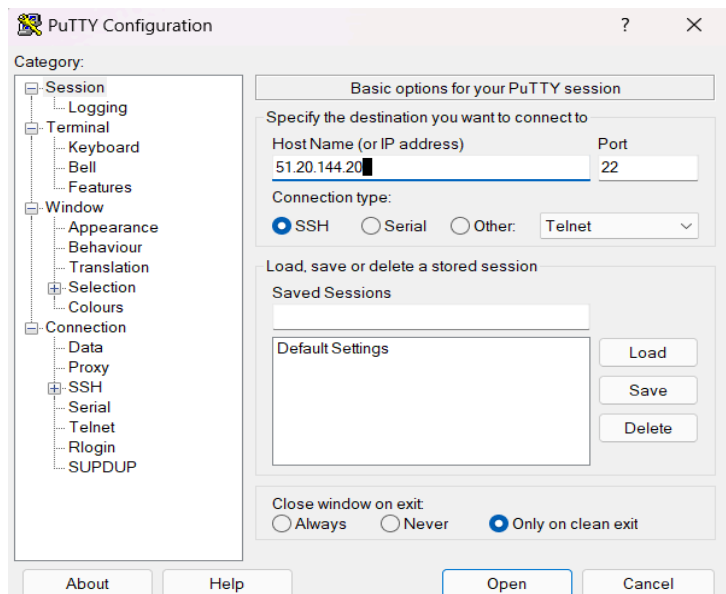
Instance state  
Running

Private IP DNS name (IPv4 only)  
ip-172-31-19-183.eu-north-1.compute.internal

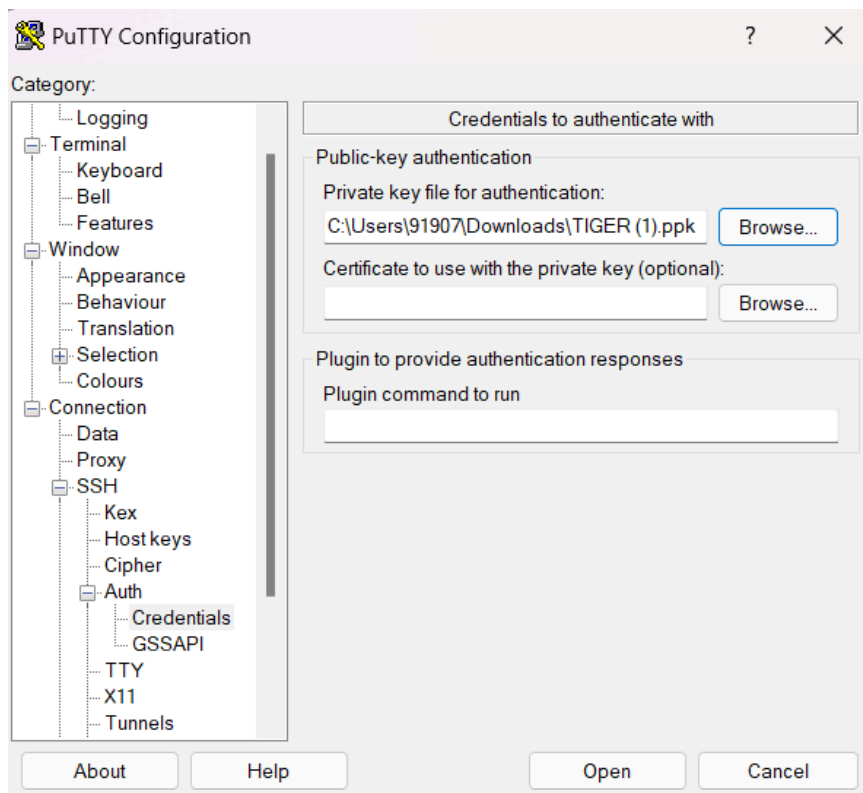
Private IPv4 addresses  
172.31.19.183

Public IPv4 DNS  
ec2-51-20-144-20.eu-north-1.compute.amazonaws.com [open address](#)

Step 5: Go to putty and paste the IP address

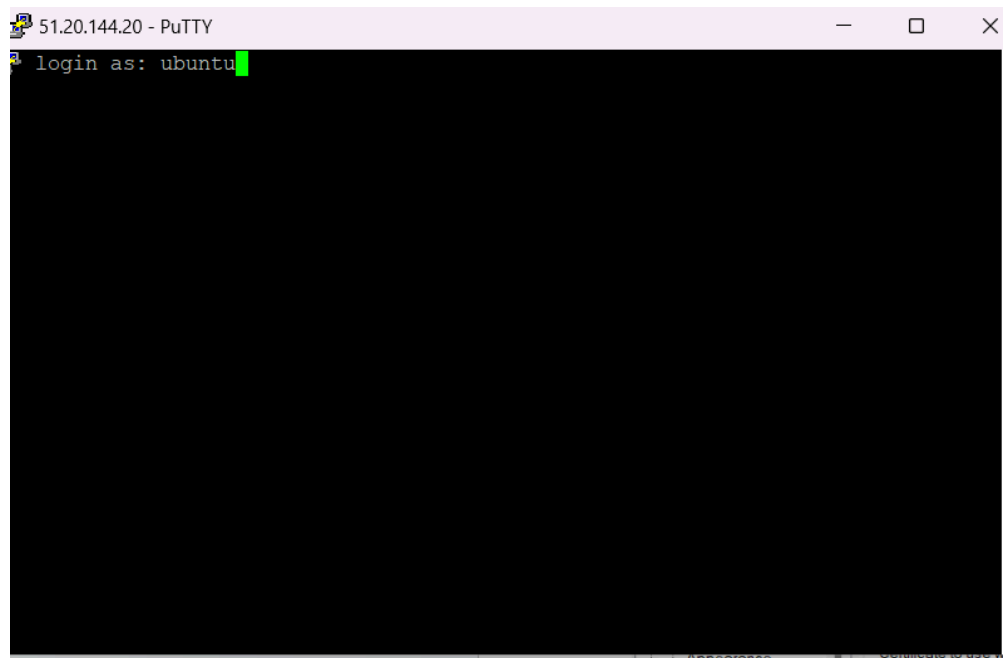


Step 6: Go to category → SSH → auth → credentials → select the pkp file



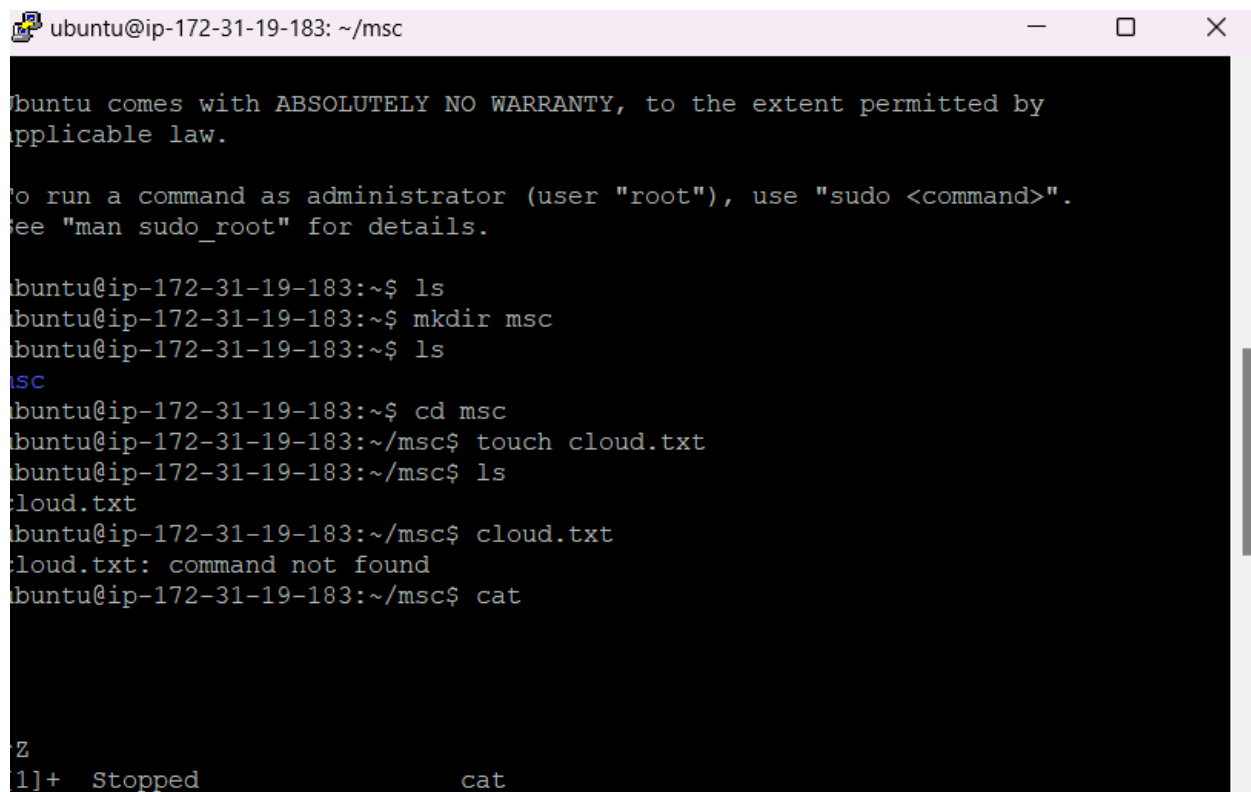
Step 7: Putty will launch

Step 8: Login as ubuntu

A terminal window titled "51.20.144.20 - PuTTY" with a black background and green text. The prompt "login as: ubuntu" is displayed with a green cursor at the end.

```
51.20.144.20 - PuTTY
login as: ubuntu
```

Step 9: Install python

A terminal window titled "ubuntu@ip-172-31-19-183: ~/msc" with a black background and white text. It shows a series of commands and their outputs, including directory creation, file creation, and a command not found error.

```
ubuntu@ip-172-31-19-183: ~/msc

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-172-31-19-183:~$ ls
ubuntu@ip-172-31-19-183:~$ mkdir msc
ubuntu@ip-172-31-19-183:~$ ls
msc
ubuntu@ip-172-31-19-183:~$ cd msc
ubuntu@ip-172-31-19-183:~/msc$ touch cloud.txt
ubuntu@ip-172-31-19-183:~/msc$ ls
cloud.txt
ubuntu@ip-172-31-19-183:~/msc$ cloud.txt
cloud.txt: command not found
ubuntu@ip-172-31-19-183:~/msc$ cat

Z
1]+ Stopped cat
```

```
ubuntu@ip-172-31-19-183: ~/msc
ubuntu@ip-172-31-19-183:~/msc$ cat > cloud.txt
I am working on linux
^Z
[2]+  Stopped                  cat > cloud.txt
ubuntu@ip-172-31-19-183:~/msc$ cat cloud.txt
I am working on linux
ubuntu@ip-172-31-19-183:~/msc$ nano cloud.txt
ubuntu@ip-172-31-19-183:~/msc$ cat cloud.txt
^T^I am working on linux
ubuntu@ip-172-31-19-183:~/msc$ python 3
Command 'python' not found, did you mean:
  command 'python3' from deb python3
  command 'python' from deb python-is-python3
ubuntu@ip-172-31-19-183:~/msc$ python3
Python 3.10.12 (main, Nov 20 2023, 15:14:05) [GCC 11.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print(Hello World)
File "<stdin>", line 1
    print(Hello World)
    ^^^^^^^^^^^^^^^
SyntaxError: invalid syntax. Perhaps you forgot a comma?
>>> print('Hello World')
Hello World
>>>
```

Step 10: Install Firefox

```
ubuntu@ip-172-31-19-183: ~/msc
ubuntu@ip-172-31-19-183:~/msc$ nano cloud.txt
ubuntu@ip-172-31-19-183:~/msc$ cat cloud.txt
^T^I am working on linux
ubuntu@ip-172-31-19-183:~/msc$ python 3
Command 'python' not found, did you mean:
  command 'python3' from deb python3
  command 'python' from deb python-is-python3
ubuntu@ip-172-31-19-183:~/msc$ python3
Python 3.10.12 (main, Nov 20 2023, 15:14:05) [GCC 11.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print(Hello World)
File "<stdin>", line 1
    print(Hello World)
    ^^^^^^^^^^^^^
SyntaxError: invalid syntax. Perhaps you forgot a comma?
>>> print('Hello World')
Hello World
>>>
>>>
>>>
[3]+  Stopped                  python3
ubuntu@ip-172-31-19-183:~/msc$ sudo snap install firefox
firefox 122.0-2.1 from Mozilla✓ installed
ubuntu@ip-172-31-19-183:~/msc$
```