

Practical-1 Infrastructure as a service using AWS.

- **Cloud Computing architecture**

Cloud computing architecture comprises the following key components:

1. Front End:

- User Interface (UI)
- Client (device)

2. Back End:

- Servers
- Storage
- Virtualization - Networking

3. Middleware:

- APIs

4. Cloud Services:

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS) - Software as a Service (SaaS)

5. Deployment Models:

- Public Cloud
- Private Cloud
- Hybrid Cloud

- **IAAS**

Infrastructure as a Service (IaaS) is a cloud computing model that provides virtualized computing resources over the internet. In an IaaS environment, users can rent virtual machines, storage, and networking components on a pay-as-you-go basis. This eliminates the need for organizations to invest in and maintain physical hardware, as they can scale their infrastructure up or down based on demand. IaaS offers flexibility, allowing users to deploy and manage their own operating systems, applications, and development frameworks. This model is particularly beneficial for businesses with dynamic or fluctuating workloads, as it provides a cost-effective and scalable solution without the burden of managing and maintaining physical infrastructure. Popular IaaS providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).

- **AWS**

Amazon Web Services (AWS) is a comprehensive and widely used cloud computing platform provided by Amazon. Launched in 2006, AWS offers a vast array of computing services, including computing power, storage options, and databases, delivered over the internet. AWS allows businesses and individuals to access scalable and cost-effective cloud solutions without the need for significant upfront investments in physical infrastructure. It provides a range of services, from Infrastructure as a Service (IaaS) with offerings like Amazon EC2 virtual servers, to Platform as a Service (PaaS) with tools like AWS Elastic Beanstalk for application deployment and management. AWS has a global presence with data centers in various regions, ensuring low-latency access to services. Its flexibility, reliability, and extensive service catalog make AWS a go-to choice for organizations of all sizes, from startups to large enterprises, seeking to leverage cloud computing for their diverse computing needs.

- **AWS services**

Amazon Web Services (AWS) offers a wide range of cloud computing services, covering computing power, storage, databases, machine learning, analytics, networking, security, and more. Here's an overview of some key AWS services:

1. Compute Services:

- Amazon EC2 (Elastic Compute Cloud): Provides resizable compute capacity in the cloud, allowing users to run virtual servers for various applications.
- AWS Lambda: Enables serverless computing, where you can run code without provisioning or managing servers.

2. Storage Services:

- Amazon S3 (Simple Storage Service): Offers scalable object storage for data backup, archiving, and content delivery.
- Amazon EBS (Elastic Block Store): Provides block-level storage volumes for use with EC2 instances.

3. Database Services:

- Amazon RDS (Relational Database Service): Manages relational databases such as MySQL, PostgreSQL, and Oracle.
- Amazon DynamoDB: A fully managed NoSQL database service for applications requiring low-latency and high-performance data access.

4. Networking:

- Amazon VPC (Virtual Private Cloud): Enables users to launch Amazon Web Services resources into a virtual network.

- Amazon Route 53: A scalable domain name system (DNS) web service.

5. Machine Learning and AI:

- Amazon SageMaker: A fully managed service that enables developers to build, train, and deploy machine learning models.

- Amazon Comprehend: A natural language processing service that extracts insights and relationships from text.

6. Analytics:

- Amazon Redshift: A fully managed data warehouse service for running complex queries on large datasets.

- Amazon EMR (Elastic MapReduce): A cloud-based big data platform for processing vast amounts of data quickly.

7. Management and Monitoring:

- Amazon CloudWatch: Monitors AWS resources and applications, collecting and tracking metrics.

- AWS CloudTrail: Records AWS API calls for account activity tracking and security analysis.

8. Security:

- AWS Identity and Access Management (IAM): Manages access to AWS services securely.

- AWS Key Management Service (KMS): Creates and controls encryption keys used to encrypt data.

9. Serverless Computing:

- AWS Step Functions: Coordinates the components of distributed applications using visual workflows.

- Amazon API Gateway: Creates, publishes, and manages APIs.

10. Internet of Things (IoT):

- AWS IoT Core: Connects devices to the cloud and enables secure communication between them.

- **EC2**

Amazon Elastic Compute Cloud (Amazon EC2) is a central component of Amazon Web Services (AWS), providing scalable and resizable compute capacity in the cloud. With EC2, users can easily launch virtual servers, known as instances, to run applications, host websites, and perform various computing tasks. Users have flexibility in choosing the instance type, operating system, storage, and network

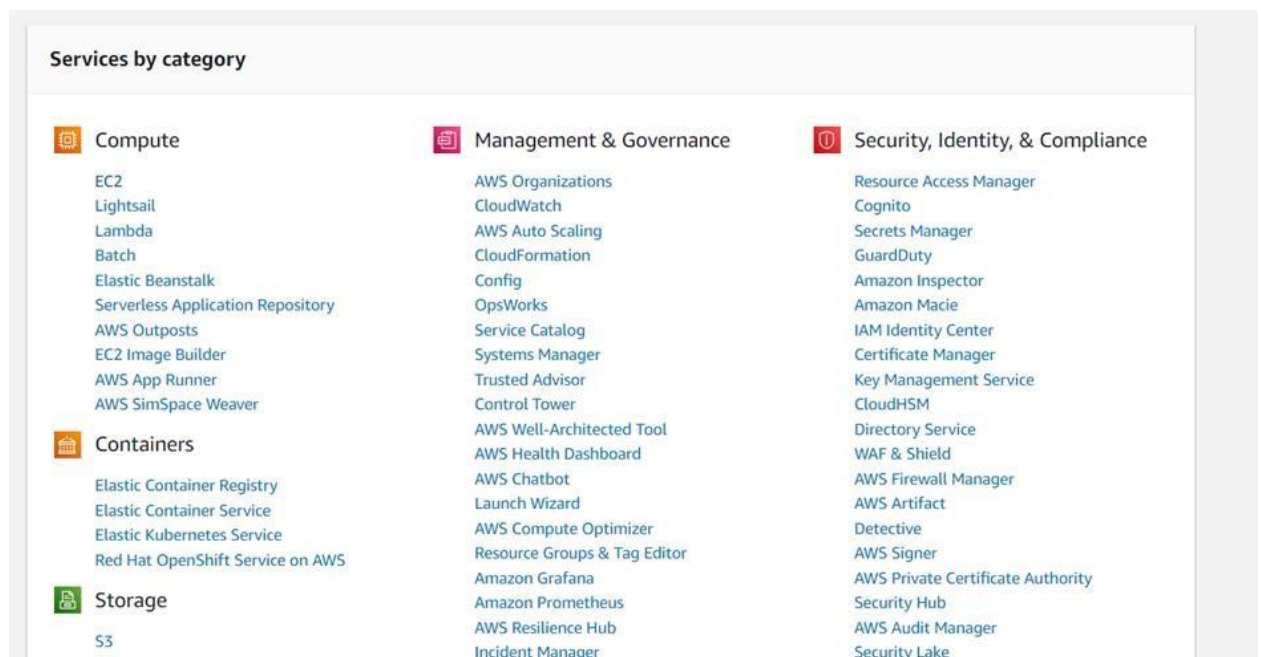
configurations, allowing for tailored computing environments. EC2 instances can be provisioned and scaled up or down based on demand, providing cost efficiency by paying only for the resources used. This on-demand nature makes EC2 suitable for a wide range of applications, from simple web hosting to complex, high-performance computing tasks. Additionally, EC2 instances can be integrated with other AWS services, offering a comprehensive and customizable cloud computing solution for businesses and developers.

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

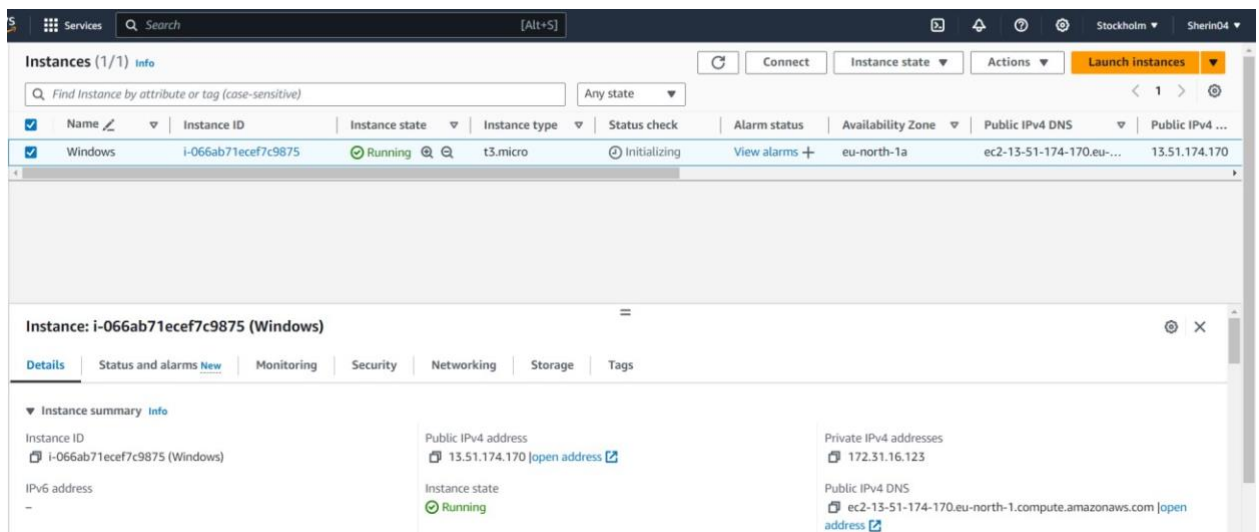


When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#)

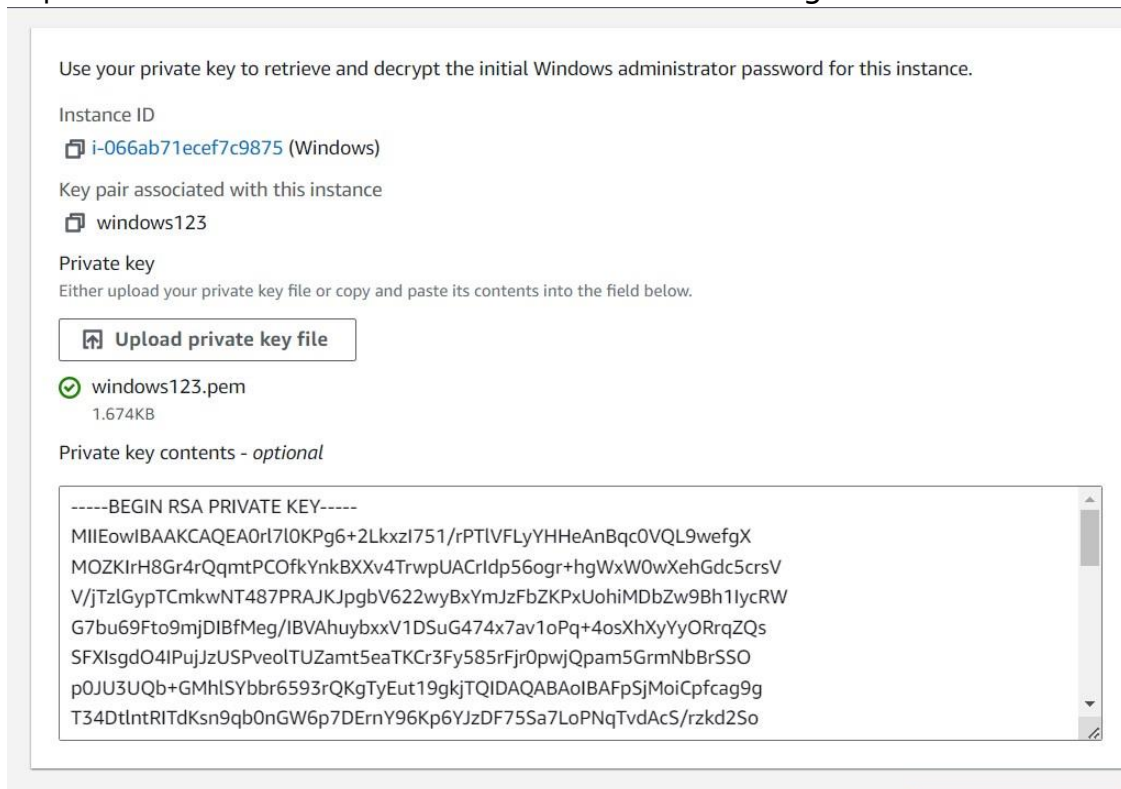
Cancel

Create key pair

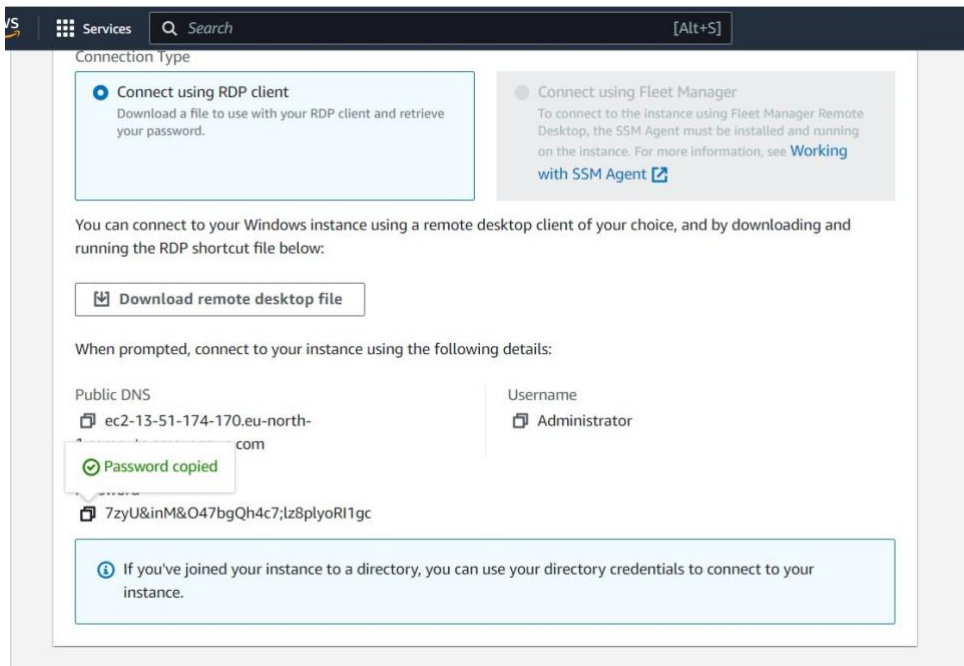
Step 5: Go to instances and initialize and then start running



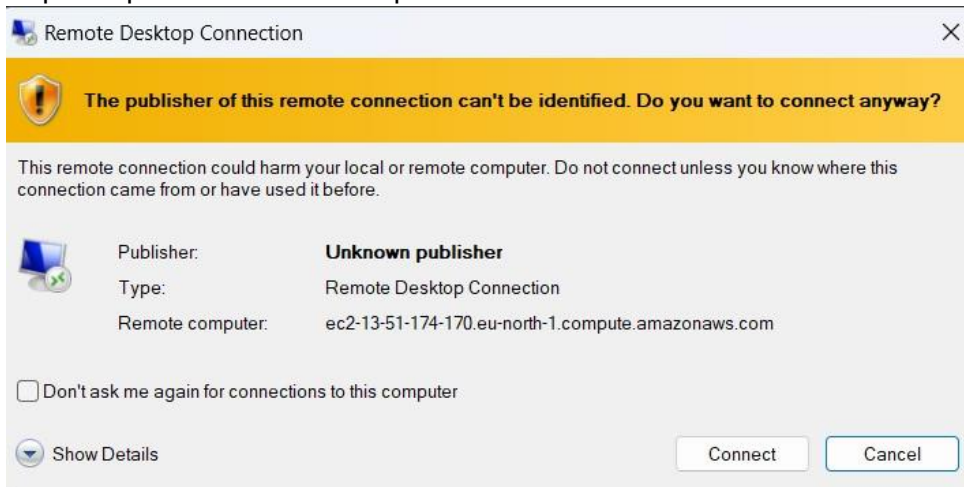
Step 6: Select the instance, click on connect for connecting the RDP client

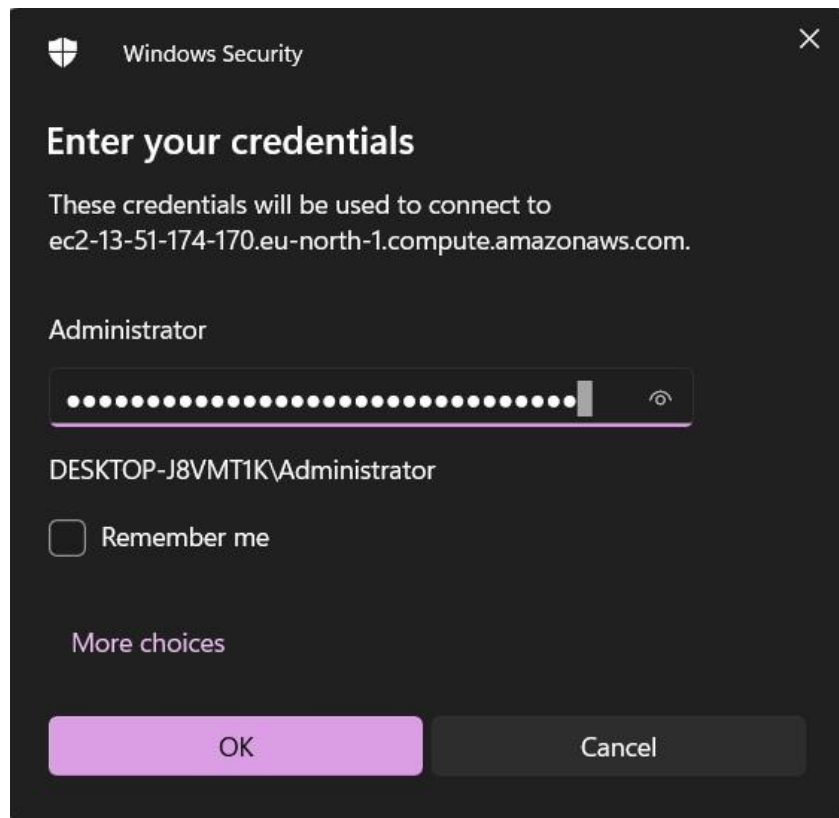


Step 7: Decrypt the password. Copy the password.



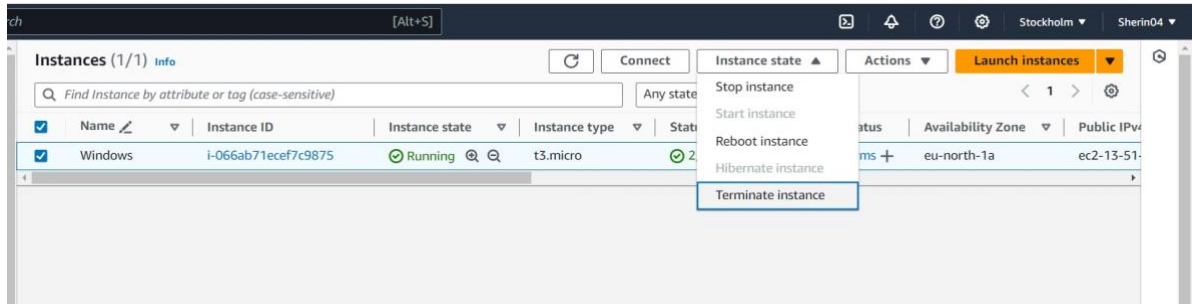
Step 8: Open remote desktop connection





Step 9: Close RDP and go back to instances

Step 10: Terminate the instance



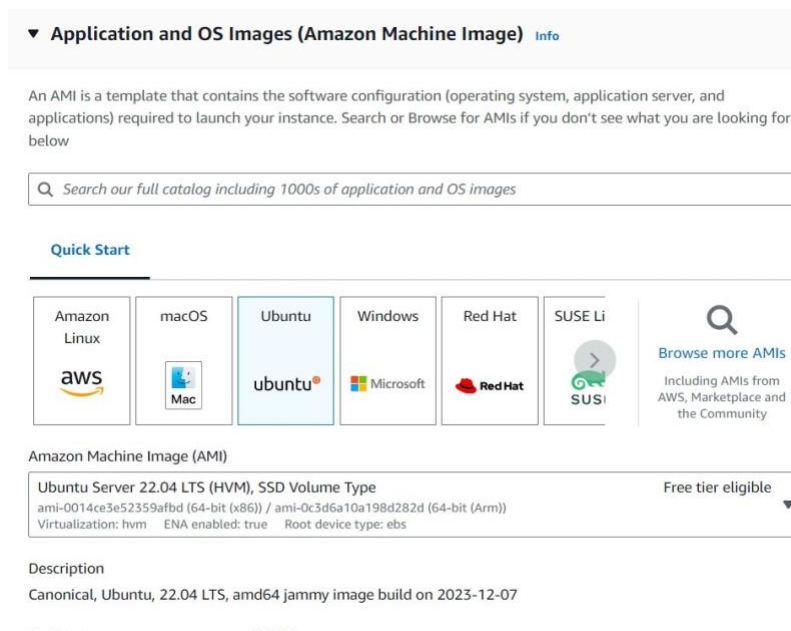
2. Implement Ubuntu machine using AWS ec2 and execute the Linux commands.

- 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



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: [putty.exe](#) ([signature](#))
64-bit Arm: [putty.exe](#) ([signature](#))
32-bit x86: [putty.exe](#) ([signature](#))

Step 5: Launch the instance

Step 6: Select and copy public IPV4 address

Instances (1/3) Info

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-066ab71ecef7c9875	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]

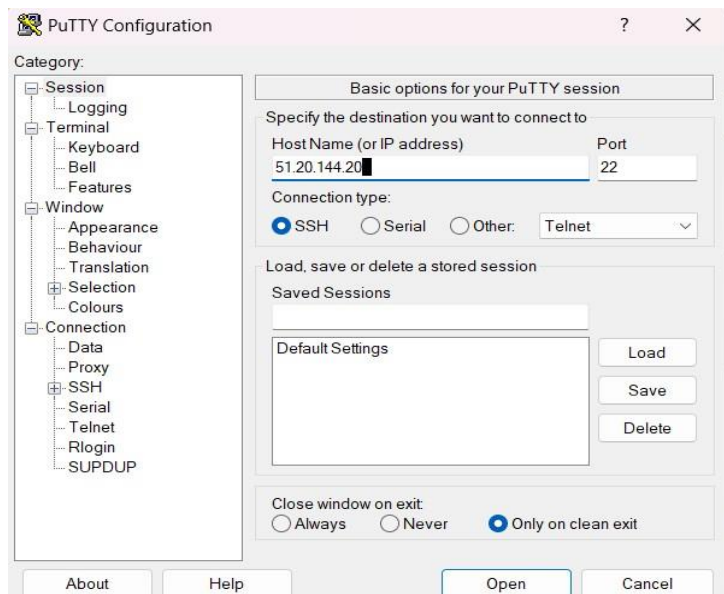
Instance state
Running

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

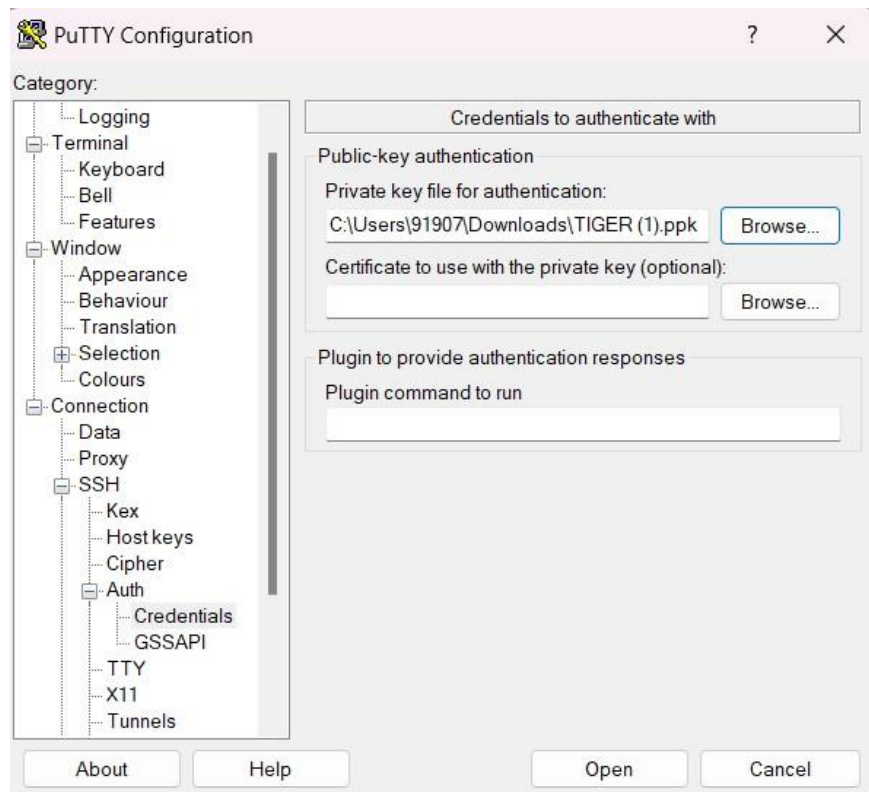
Private IPv4 addresses
172.31.19.183

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

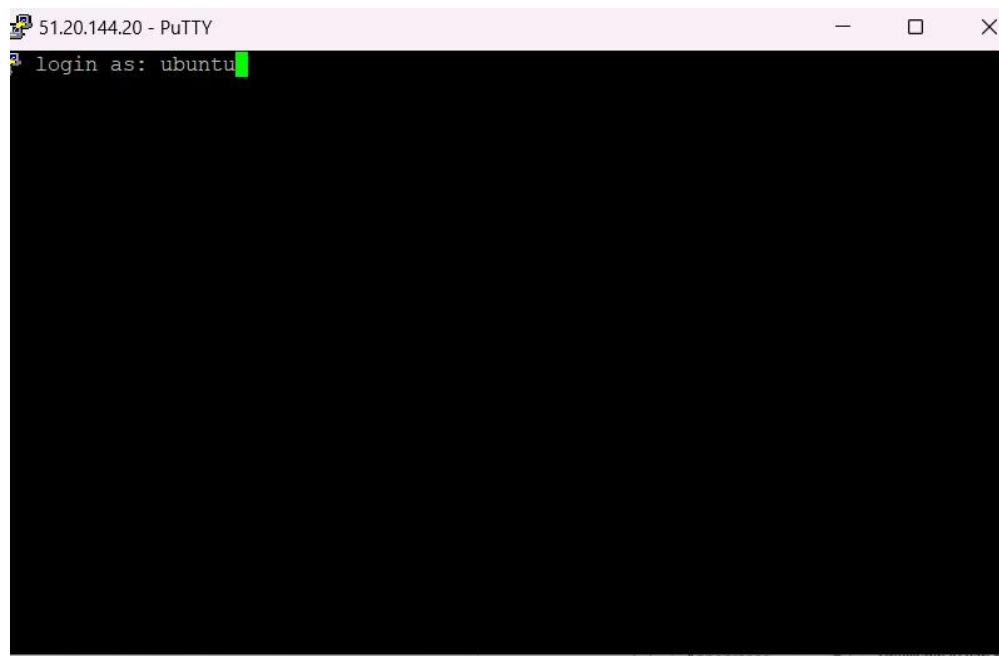


Step 6: Go to category → SSH → auth → credentials → select the ppk file



Step 7: Putty will launch

Step 8: Login as ubuntu



Step 9: Install python

```
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$ cat 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$
```