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

### **Writeup:-**

#### ➤ **Cloud Computing architecture**

Cloud architecture consists of a front end and back end. The front end is the client-side interface. The back end consists of the cloud service provider's data centers, servers, storage and applications.

A central server administers the system, monitoring traffic and client demands to ensure quality of service. The underlying hardware infrastructure is distributed across various servers and locations.

#### ➤ **IAAS**

Infrastructure as a Service (IaaS) provides access to fundamental computing resources such as servers, storage, networks and operating systems over the internet. The cloud provider owns and maintains the physical infrastructure and delivers these resources to customers on-demand.

#### **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 offers a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security, and enterprise applications: on-demand, available in seconds, with pay-as-you-go pricing. From data warehousing to deployment tools, directories to content delivery, over 200 AWS services are available

#### ➤ **EC2**

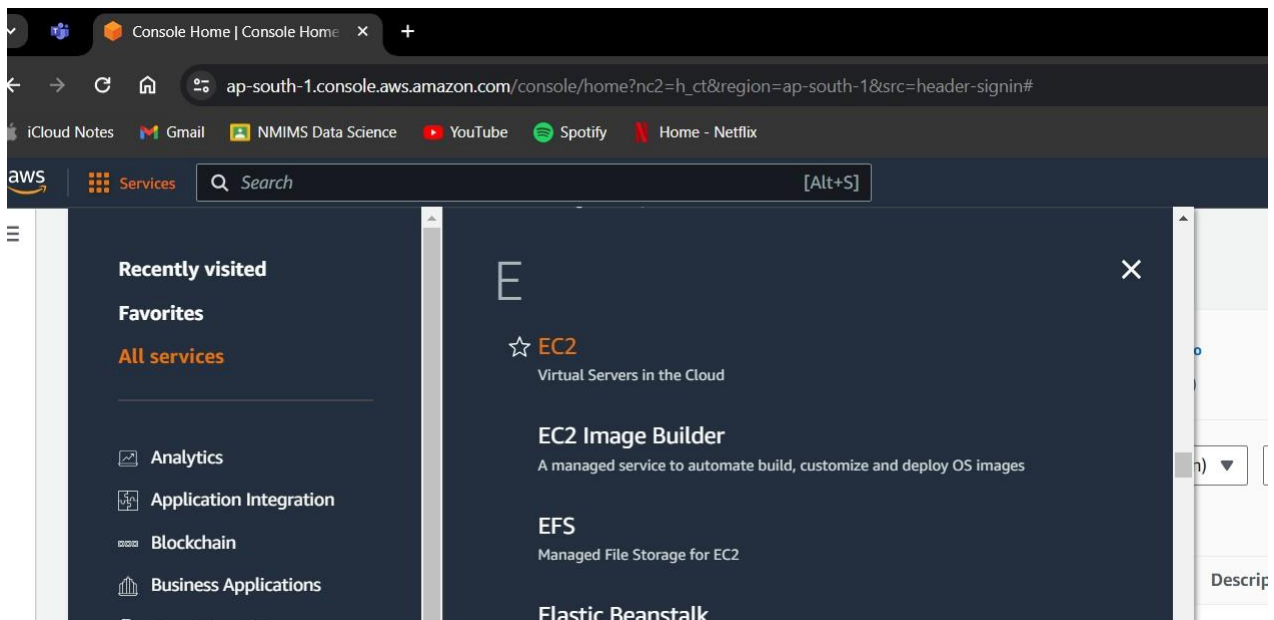
Amazon Elastic Compute Cloud (EC2) provides scalable virtual servers that can be launched and terminated on-demand. Key features include:

1. Multiple instance types for varying compute, memory and storage needs

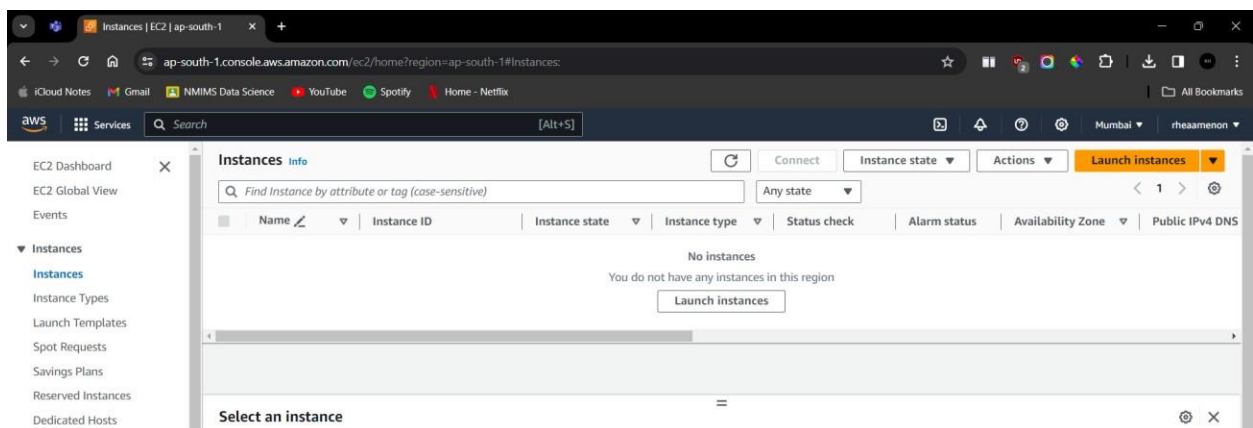
2. Auto scaling and load balancing
3. High availability within and across data centers
4. Secure network connectivity options and access controls
5. Integrated with other AWS services
6. Pay as you go pricing based on instance hours used

## Implementing the windows machine using AWS EC2

Go to the AWS console home, select All Services and select EC2.



Go to Instances and launch an instance.



Give a name to the instance and choose Windows as the OS Image.

## 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


[Add additional tags](#)

### ▼ 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




macOS




Ubuntu




Windows




Red Hat



SUSE Linux



  
Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

#### Amazon Machine Image (AMI)

Microsoft Windows Server 2022 Base

ami-00d59001b2335bdea (64-bit (x86))

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

Free tier eligible ▼

Create a new key pair and save the .pem file in your local device.

▼ **Key pair (login)** [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

 [Create new key pair](#)

For Windows instances, you use a key pair to decrypt the administrator password. You then use the decrypted password to connect to your instance.

## Create key pair



### Key pair name

Key pairs allow you to connect to your instance securely.

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

Leave all other default settings and launch the instance.

1x  GiB  Root volume (Not encrypted)

*Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage*

Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

Click refresh to view backup information

The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.

0 x File systems

Edit

Advanced details Info

Software Image (AMI)  
Microsoft Windows Server 2022 ...read more  
ami-00d59001b2335bdea

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

Storage (volumes)  
1 volume(s) - 30 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which

Cancel

Launch instance

Review commands

[EC2](#) > [Instances](#) > Launch an instance

Success

Successfully initiated launch of instance ([i-00bf94df158a3441d](#))

Launch log

Go to the Instances menu, tick the created instance and click the Connect button.

EC2 Dashboard
EC2 Global View
Events
Instances
Instances
Instance Types
Launch Template

Instances (1) Info

Refresh
Connect
Instance state
Actions
Launch instances

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

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input type="checkbox"/>	WindowsInstance	i-00bf94df158a3441d	Pending	t2.micro	-	View alarms	ap-south-1a	ec2-43-2

Instances (1/1) Info

Refresh
Connect

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

<input checked="" type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status
<input checked="" type="checkbox"/>	WindowsInstance	i-00bf94df158a3441d	Running	t2.micro	-

Click on the RDP Client tab and select 'get password'.

## Connect to instance [Info](#)


Connect to your instance i-00bf94df158a3441d (WindowsInstance) using any of these options

Session Manager

**RDP client**


EC2 serial console

Instance ID


 i-00bf94df158a3441d (WindowsInstance)

Connection Type

☒ **Connect using RDP client**  
Download a file to use with your RDP client and retrieve your password.

☐ **Connect using Fleet Manager**  
To connect to the instance using Fleet Manager Remote 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:

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


Public DNS

 ec2-43-205-115-125.ap-south-1.compute.amazonaws.com

Username

 Administrator

Password   **Get password**

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

Upload the previously saved .pem file and decrypt the password.

## Get Windows password [Info](#)

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

Instance ID

 i-00bf94df158a3441d (WindowsInstance)

Key pair associated with this instance

 WindowsKeyPair

Private key

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

 Upload private key file

Private key contents - *optional*

Private key contents

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

Instance ID

 i-00bf94df158a3441d (WindowsInstance)

Key pair associated with this instance

 WindowsKeyPair

Private key

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

 Upload private key file

 WindowsKeyPair.pem  
1.674KB

Private key contents - *optional*

```
-----BEGIN RSA PRIVATE KEY-----
MIIeOwIBAAKCAQEAzQhciHw4h82pZsDmTbL/DA+e97MwjGbCNUTtIlbUIRfO+O0
++gtOq1TT20gge94J7KU63OJeo1wx5wx/3OSqFQoVOU7lz5yy/77x7B4WdmcvNBX
2kpsM3R3DZrHaaeVXXKR8LUF3gj93stghPKDq/oPnNo9u1Ptp+r+s+HYtw3Iwka30
+foQyvEVSrGrvR5N6Cl0rqCWk9BWPXzo3uxRgYJpkxDV8hRBsvy3VKyrwliV8yO
QtNG5HCYQLMlcJstH4tuYUv2bZmYLptSYY80KZgUVkCBj/GWl6wL45JKfMIA5H1+
/j9ESdSoLDOn7fnk/OW4NoHPgfrZL+EXPlqLZQIDAQABAolBAGF2VQ4oBnM/pwQK
NC/BI43nKwj7AUBn9XUhr4e8mR95r5cZp7MShu3Yn/B/w7k93ffYvzdaf+Qloi8
```

Copy the decrypted password.



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

Public DNS

ec2-43-205-115-125.ap-south-  
com

Username

Administrator

✓ Password copied

89f18Xw.fYjVCGGXzy6Bhoxgtk&Z?vqR

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

Cancel

*Password: 89f18Xw.fYjVCGGXzy6Bhoxgtk&Z?vqR*

Now download the RDP File and open it.

Instance ID

i-00bf94df158a3441d (WindowsInstance)

Connection Type

☒ Connect using RDP client

Download a file to use with your RDP client and retrieve your password.

☐ Connect using Fleet Manager

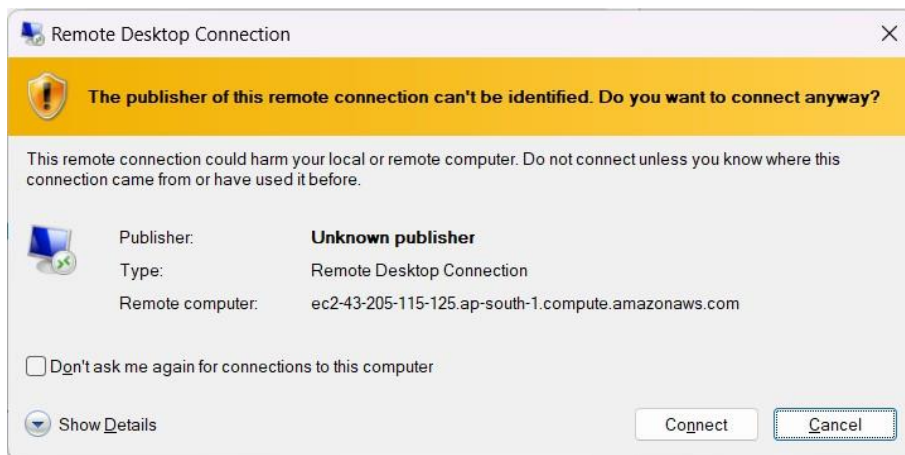
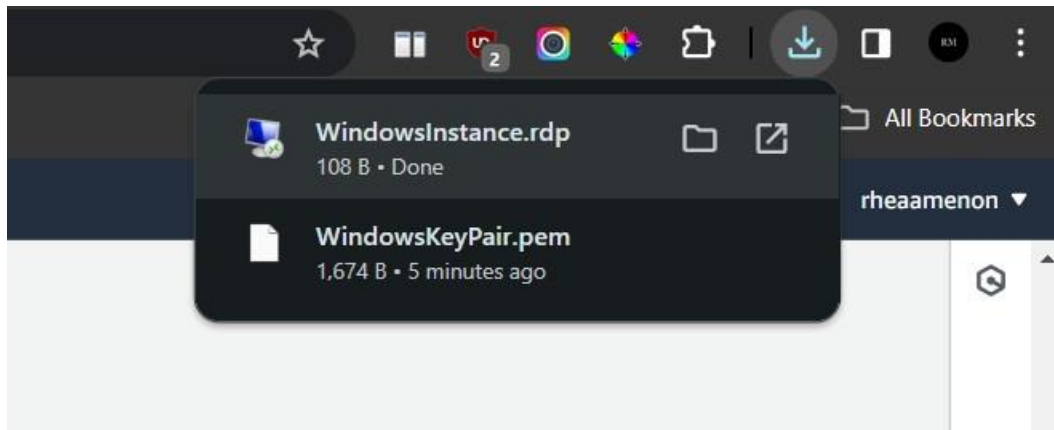
To connect to the instance using Fleet Manager Remote Desktop, the SSM Agent must be installed and running on the instance. For more information, see [Working with SSM Agent](#)

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:

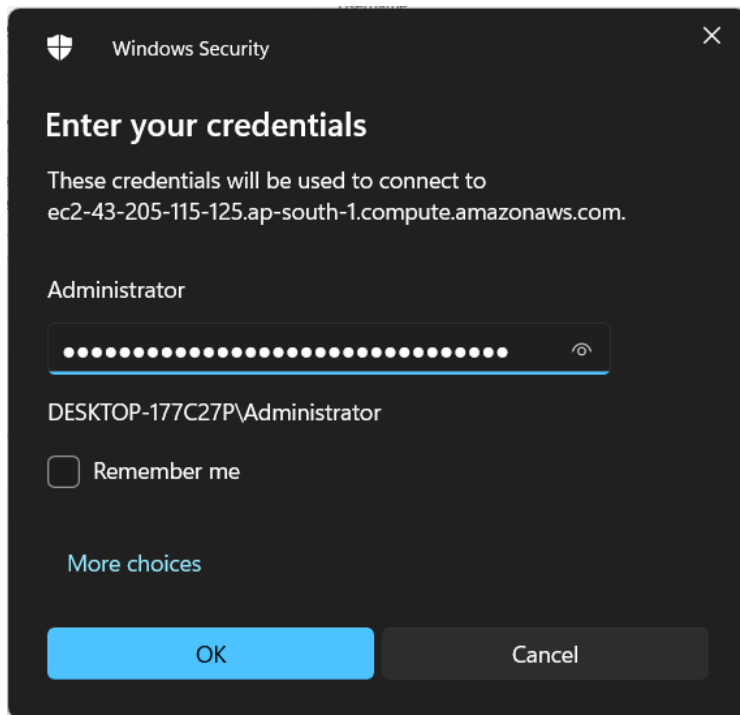
Download remote desktop file

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

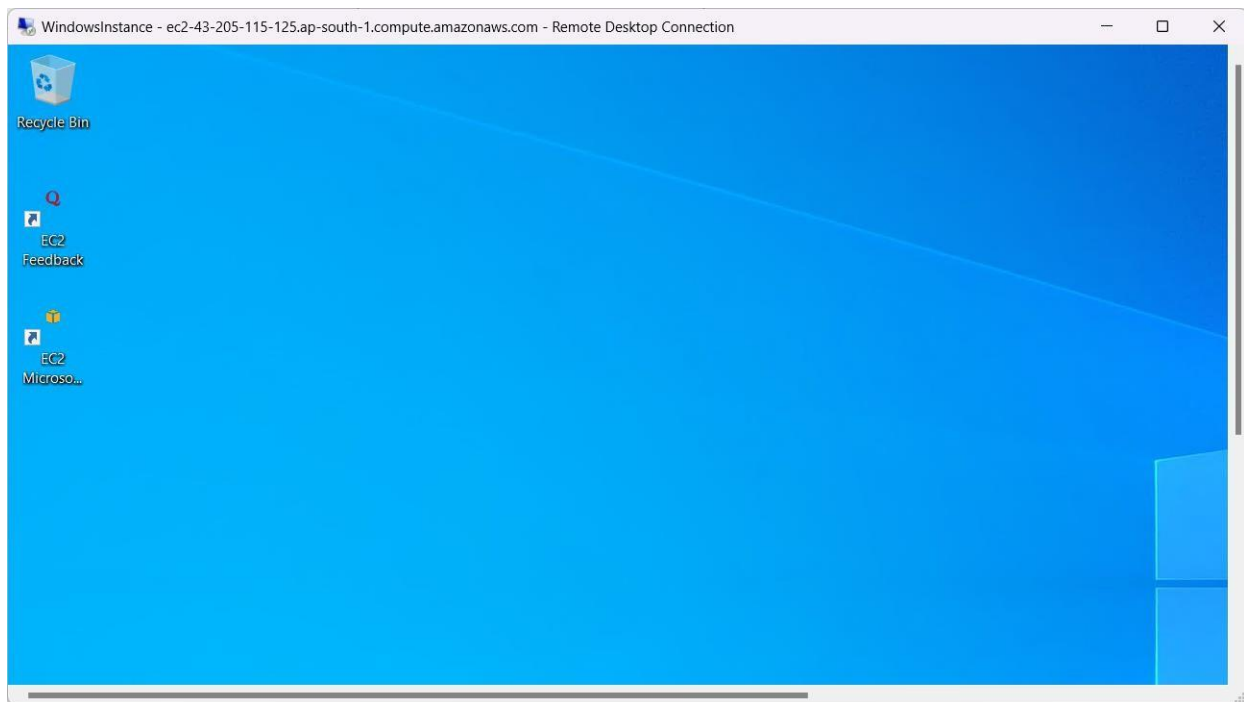




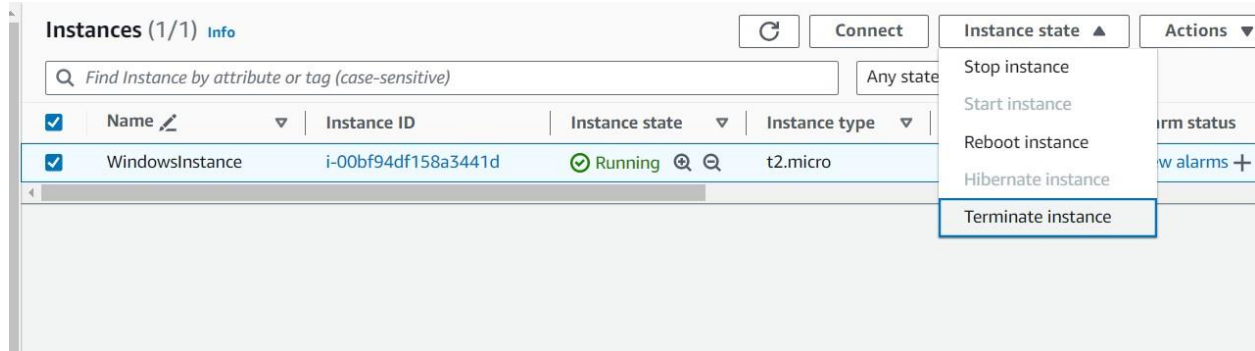
A dialog box will appear to add the password, paste the previously copied password.



The RDP Connection tab will now open with a virtual instance of the Windows OS.

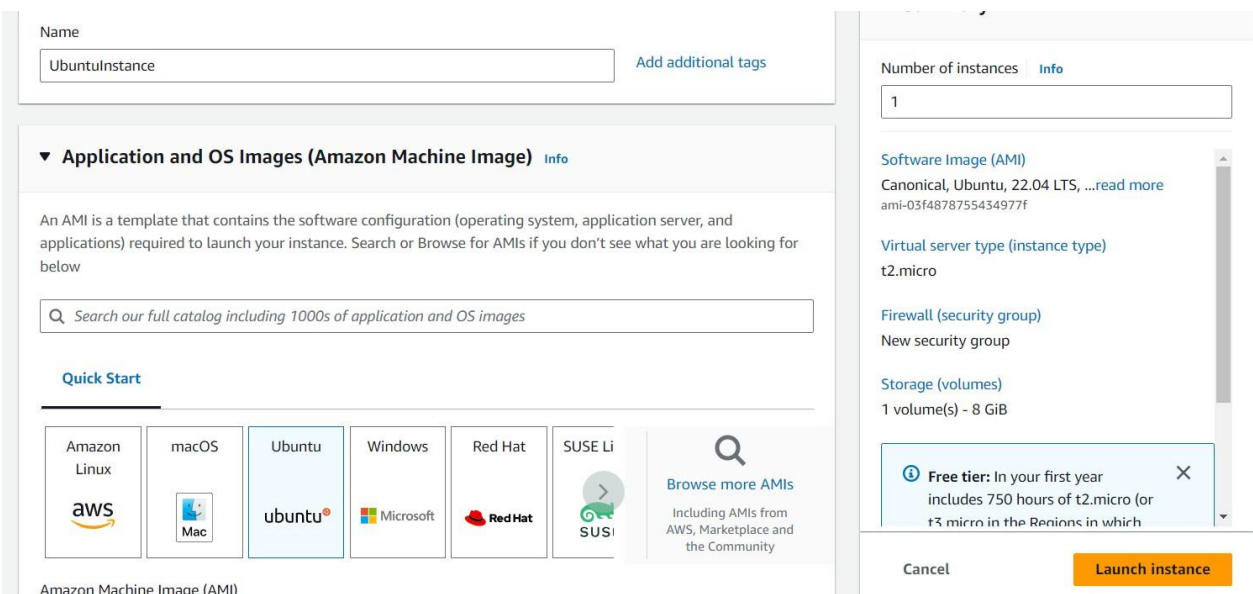


Now terminate the instance by clicking on it > Instance State > Terminate Instance.

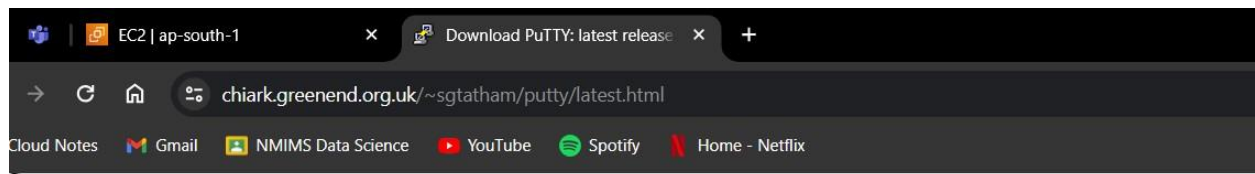


## Linux OS

Repeat the same steps as for Windows but this time, choose Ubuntu as the OS Image.



Download putty.exe from the link below.



## Alternative binary files

The installer packages above will provide versions of all of these (except PuTTYtel and pterm), but you can download standalone binaries (Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

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

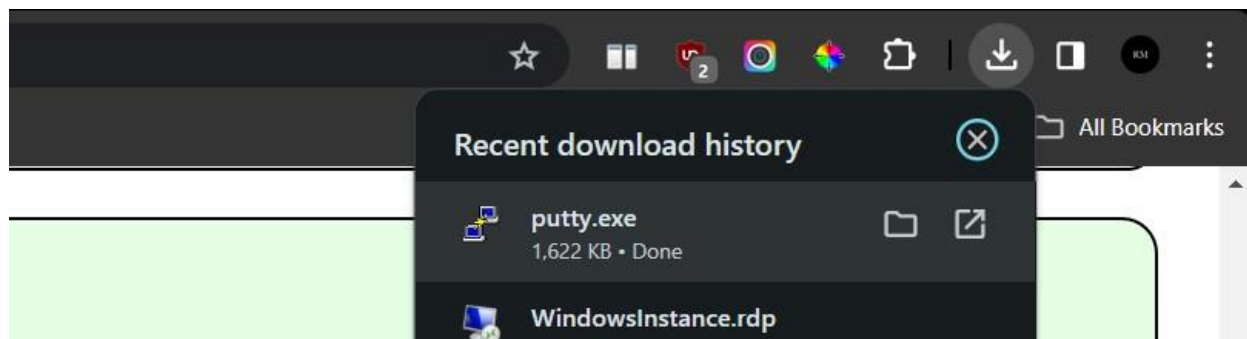
64-bit x86:	<a href="#">putty.exe</a>	<a href="#">(signature)</a>
64-bit Arm:	<a href="#">putty.exe</a>	<a href="#">(signature)</a>
32-bit x86:	<a href="#">putty.exe</a>	<a href="#">(signature)</a>

### **pscp.exe (an SCP client, i.e. command-line secure file copy)**

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

### **psftp.exe (an SFTP client, i.e. general file transfer sessions much like FTP)**

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



Create a new key pair for this instance and download the .ppk file.

~installed software

ct to your instance.

ailability zone)

## Create key pair

Key pair name

Key pairs allow you to connect to your instance securely.

LinuxKeyPair

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

Launch instance

Review commands

Tick all the boxes for the traffic permissions in network settings.

▼ Network settings Info

Edit

Network Info

vpc-01cbdd6d2e35b52c0

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-2' 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

▼ Summary

Number of instances Info

1

Software Image (AMI)

Canonical, Ubuntu, 22.04 LTS, ...read more  
ami-03f4878755434977f

Virtual server type (instance type)

t2.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3 micro in the Regions in which

Cancel

Launch instance

Launch the instance and in the instance summary, copy the public IPv4 address.

Instance: i-0f78f6b4231a898a3 (UbuntuInstance)

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

▼ Instance summary [Info](#)

Instance ID  
i-0f78f6b4231a898a3 (UbuntuInstance)

IPv6 address  
-

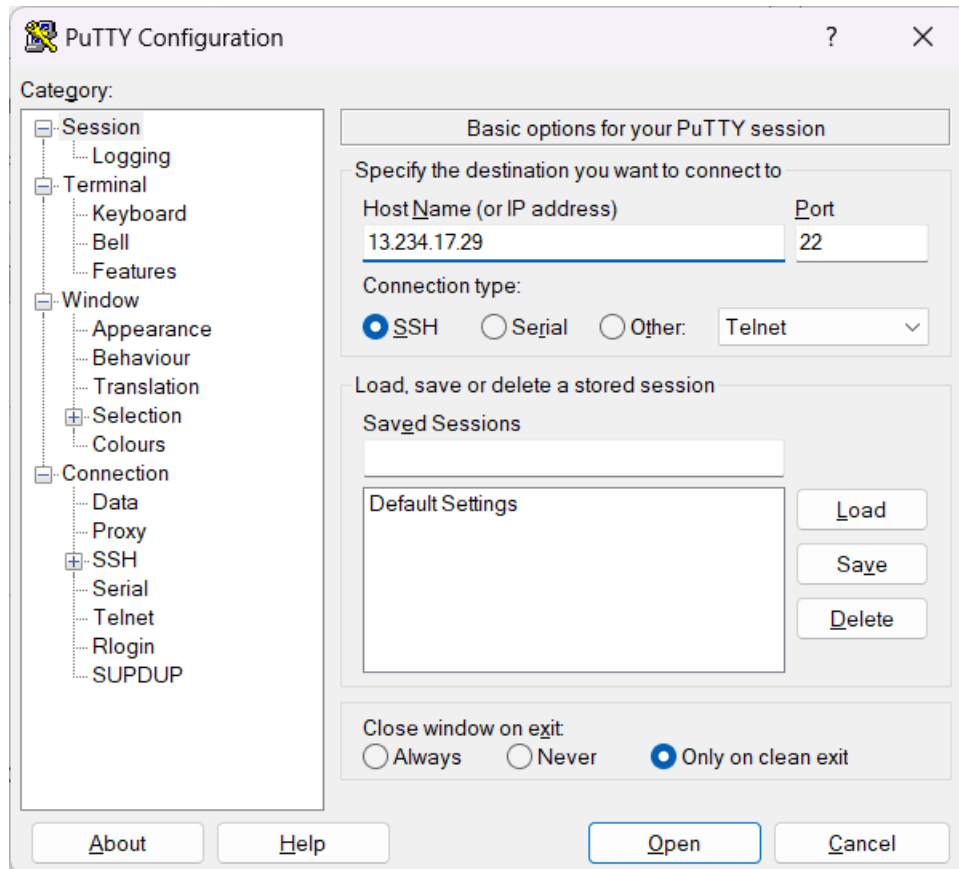
Public IPv4 address copied

13.234.17.29 [open address](#)

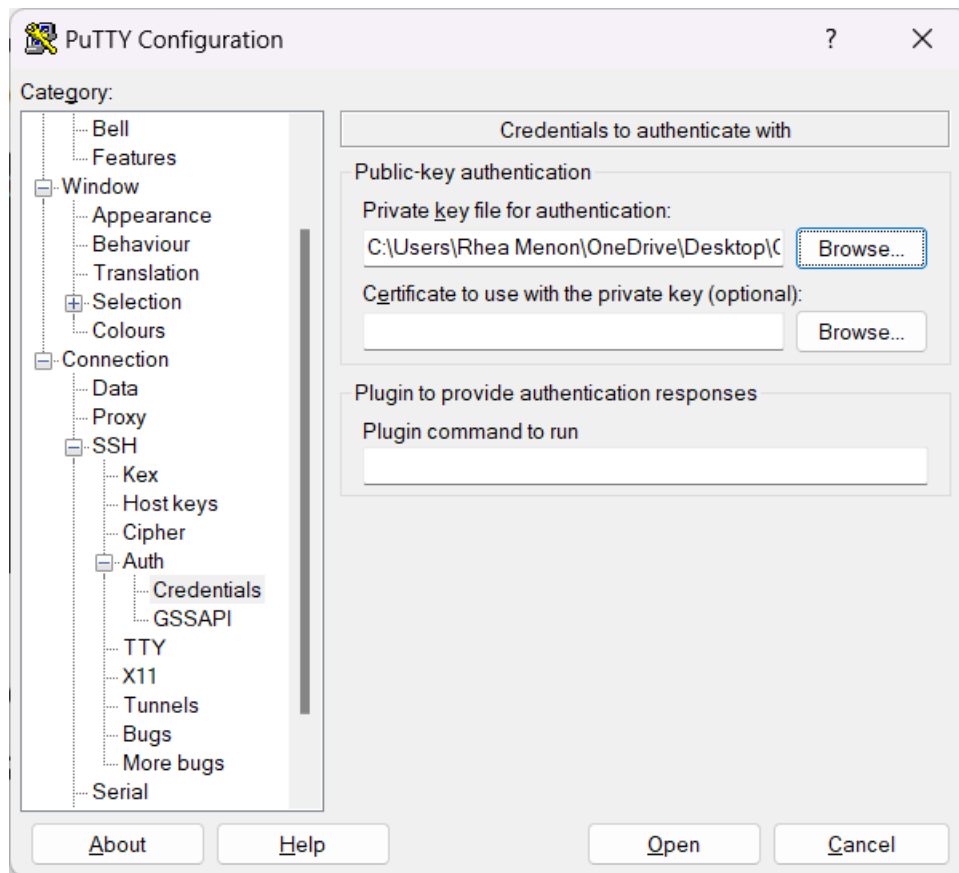
Instance state  
Running

Priv  
Pub  
1.cc

Open PuTTY and add the copied IP address to the Host IP address text box.



Go to Connection > SSH > Auth > Credentials and upload the .ppk key pair file for the private key.



Click open and ubuntu console will be launched. Login as *ubuntu*.

```
ubuntu@ip-172-31-32-198: ~  
login as: ubuntu  
Authenticating with public key "LinuxKeyPair"  
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.2.0-1017-aws x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
System information as of Mon Jan 29 16:20:22 UTC 2024  
  
System load:  0.30908203125    Processes:            102  
Usage of /:   20.6% of 7.57GB   Users logged in:     0  
Memory usage: 21%             IPv4 address for eth0: 172.31.32.198  
Swap usage:   0%  
  
Expanded Security Maintenance for Applications is not enabled.  
  
0 updates can be applied immediately.  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
The list of available updates is more than a week old.
```

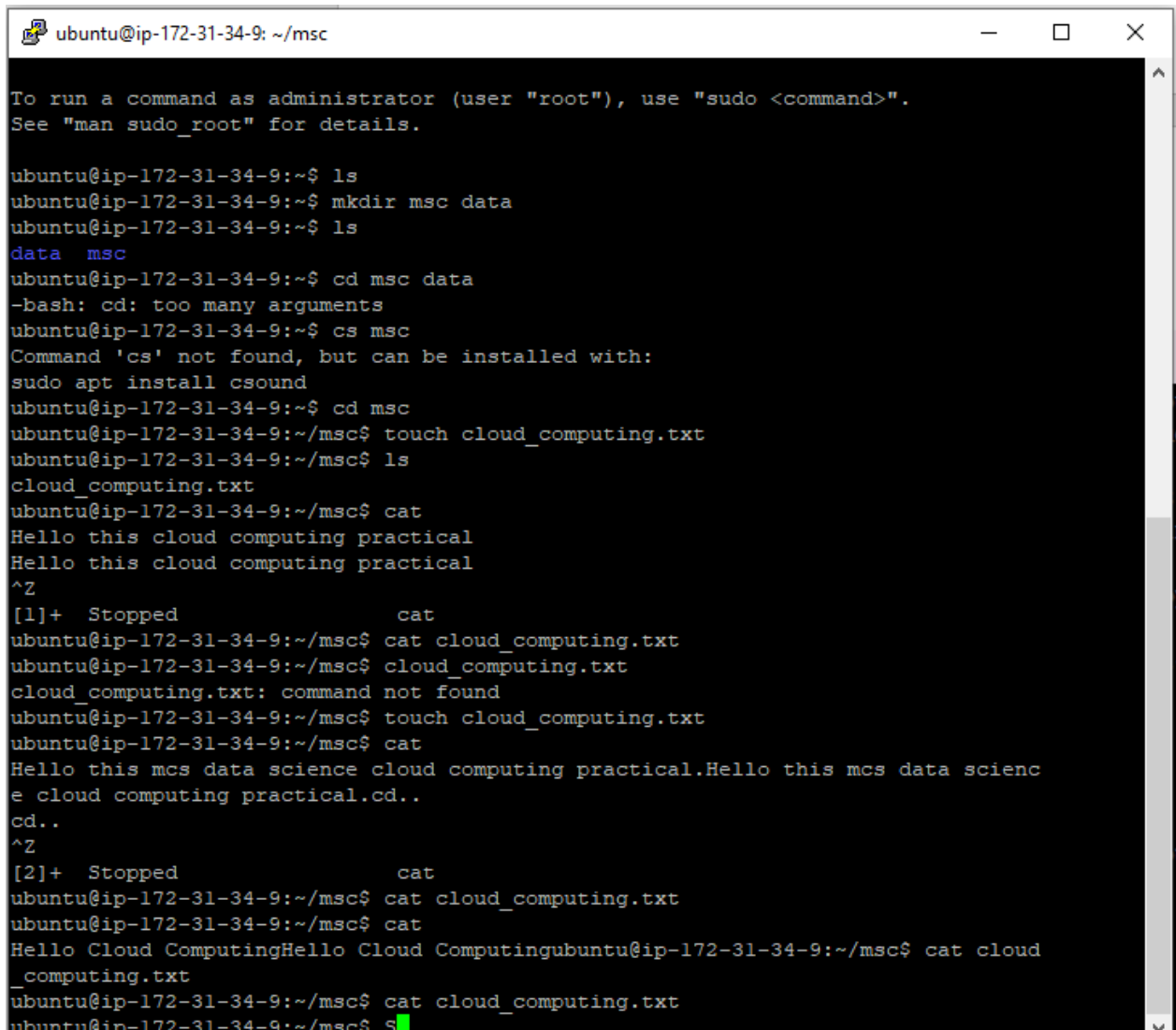


## Commands:

mkdir [directory name]: makes a directory of the same name.

ls: lists all the files and directories in the current working directory.

```
ubuntu@ip-172-31-34-9:~$ ls
ubuntu@ip-172-31-34-9:~$ mkdir msc data
ubuntu@ip-172-31-34-9:~$ ls
data  msc
ubuntu@ip-172-31-34-9:~$ cd msc data
```



```
ubuntu@ip-172-31-34-9: ~/msc

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-34-9:~$ ls
ubuntu@ip-172-31-34-9:~$ mkdir msc data
ubuntu@ip-172-31-34-9:~$ ls
data  msc
ubuntu@ip-172-31-34-9:~$ cd msc data
-bash: cd: too many arguments
ubuntu@ip-172-31-34-9:~$ cs msc
Command 'cs' not found, but can be installed with:
sudo apt install csound
ubuntu@ip-172-31-34-9:~$ cd msc
ubuntu@ip-172-31-34-9:~/msc$ touch cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ ls
cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ cat
Hello this cloud computing practical
Hello this cloud computing practical
^Z
[1]+  Stopped                  cat
ubuntu@ip-172-31-34-9:~/msc$ cat cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ cloud_computing.txt
cloud_computing.txt: command not found
ubuntu@ip-172-31-34-9:~/msc$ touch cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ cat
Hello this mcs data science cloud computing practical.Hello this mcs data scienc
e cloud computing practical.cd..
cd..
^Z
[2]+  Stopped                  cat
ubuntu@ip-172-31-34-9:~/msc$ cat cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ cat
Hello Cloud ComputingHello Cloud Computingubuntu@ip-172-31-34-9:~/msc$ cat cloud
_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ cat cloud_computing.txt
ubuntu@ip-172-31-34-9:~/msc$ S
```

cat > [file name]: append text to a file.

cat [file name]: view the contents of a text file.

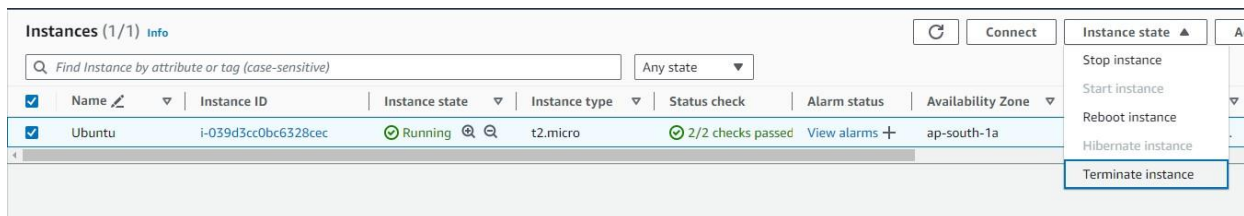
`sudo apt install [program name]`: installs the named program.

```
ubuntu@ip-172-31-32-198:~$ sudo apt install python3
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3 is already the newest version (3.10.6-1~22.04).
python3 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-32-198:~$
```

```
ubuntu@ip-172-31-32-198:~$ sudo apt install firefox
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontent. It is held by process 1315 (apt)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontent. It is held by process 1315 (apt)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
firefox is already the newest version (1:1snap1-0ubuntu2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-32-198:~$
```

`exit`: closes the console.

Terminate this instance as well using the same steps as before.



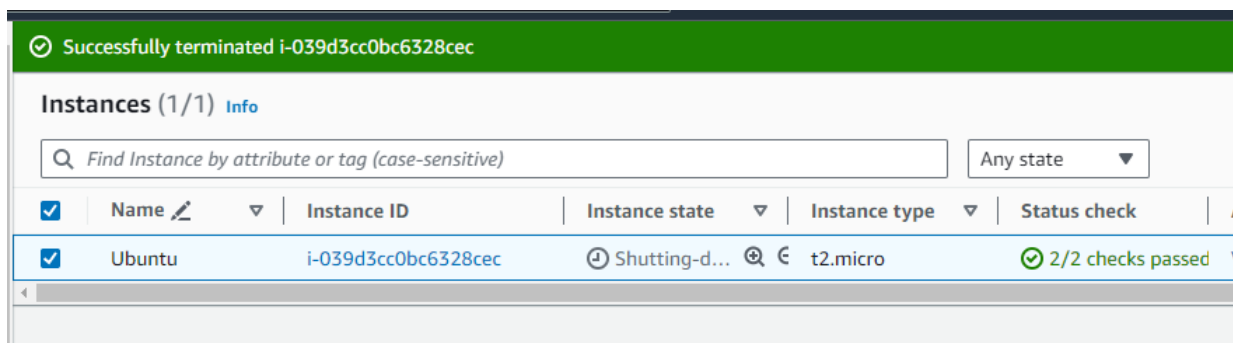
Instances (1/1) Info

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

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
Ubuntu	i-039d3cc0bc6328cec	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1a

Instance state dropdown menu:

- Stop instance
- Start instance
- Reboot instance
- Hibernate instance
- Terminate instance**



Successfully terminated i-039d3cc0bc6328cec

Instances (1/1) Info

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

Name	Instance ID	Instance state	Instance type	Status check
Ubuntu	i-039d3cc0bc6328cec	Shutting-down	t2.micro	2/2 checks passed