

## AzureVM:

- **Azure VM** is an Infrastructure-as-a-Service (IaaS) offering from Microsoft Azure.
- It allows users to deploy and manage virtualized servers on-demand.
- You can run **Windows, Linux, or custom images**.
- Supports scaling vertically (more resources) and horizontally (scale sets).

## Security options

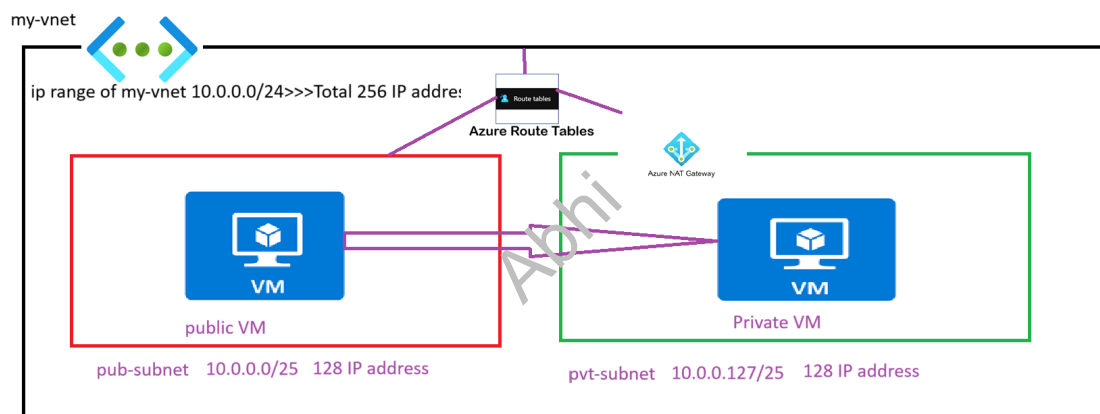
### Security Features

- **Azure Defender for Servers:** Advanced threat protection.
- **Azure Key Vault:** Secure management of credentials and keys.
- **Just-in-Time VM Access:** Minimize exposure to brute-force attacks.
- **NSGs (Network Security Groups):** Control inbound/outbound traffic.

## Task:

- Create a Virtual Network with a public subnet and private subnet (with NAT)
- Create a public server with a public ip
- Create a private server with no public ip
- Use public server as a jump server to connect with the private server.

## Architecture:



## Click on create virtual machine

Home > Compute infrastructure | Virtual machines >

### Create a virtual machine

Help me create a low cost VM | Help me create a VM optimized for high availability | Help me choose the right VM size for my workload

Subscription \* ⓘ P5-Real Hands-On Labs

Resource group \* ⓘ (New) Resource group  
[Create new](#)

#### Instance details

Virtual machine name \* ⓘ

Region \* ⓘ (US) East US

Availability options ⓘ Availability zone

Zone options ⓘ

☒ Self-selected zone  
Choose up to 3 availability zones, one VM per zone

☐ Azure-selected zone (Preview)  
Let Azure assign the best zone for your needs

< Previous | Next : Disks > | **Review + create**

[Give feedback](#)

## Select resource group and enter VM name

Help me create a low cost VM | Help me create a VM optimized for high availability | Help me choose the right VM size for my workload

Subscription \* ⓘ P5-Real Hands-On Labs

Resource group \* ⓘ 1-a558e646-playground-sandbox  
[Create new](#)

#### Instance details

Virtual machine name \* ⓘ Pub-server ✓

Region \* ⓘ (US) East US

Availability options ⓘ Availability zone

Zone options ⓘ

☒ Self-selected zone  
Choose up to 3 availability zones, one VM per zone

☐ Azure-selected zone (Preview)  
Let Azure assign the best zone for your needs

## Select security type as standard

## OS as Ubuntu OS

Help me create a low cost VM   Help me create a VM optimized for high availability   Help me choose the right VM size for my workload

Security type ⓘ Standard

Image \* ⓘ Ubuntu Server 24.04 LTS - x64 Gen2  
[See all images](#) | [Configure VM generation](#)  
 This image is compatible with additional security features. [Click here to swap to the Trusted launch security type.](#)

VM architecture ⓘ ☐ Arm64 ☒ x64

Run with Azure Spot discount ⓘ ☐

Size \* ⓘ Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (US\$70.08/month)  
[See all sizes](#)  
 Item(s) availability based on policy assignment(s) for the selected scope. [vadergen2labs/Microsoft.Authorization/8ab9bdb77b304947a1347e88 \(Policy details\)](#)

Enable Hibernation ⓘ ☐  
 Hibernation is not supported by the size that you have selected. Choose a size that is compatible with Hibernation to enable this feature. [Learn more](#)

Administrator account SSH public key

Leave default size and we can use any mode of authentication:

-Key

-Password

If you select key as option i.e ssh public key two keys will be generated

private key and public key

private key>>In local computer

public key>>In azure VM/Cloud

If password you will be prompted to choose password

Username: azureuser

For this task we will select key

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

❗ Hibernation is not supported by the size that you have selected. Choose a size that is compatible with Hibernation to enable this feature. [Learn more](#)

**Administrator account**

Authentication type

☒ SSH public key  
☐ Password

❗ Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

Username \* azureuser ✓

SSH public key source Generate new key pair ✓

SSH Key Type

☒ RSA SSH Format  
☐ Ed25519 SSH Format

❗ Ed25519 provides a fixed security level of no more than 128 bits for 256-bit key, while RSA could offer better security with keys longer than 3072 bits.

Key pair name \* azure\_demo\_key ✓

Inbound port rules

Select HTTP for inbound ports so that any user can access your server via browser

Click next disk

Leave as default

## Create a virtual machine ...

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host ☐

❗ Encryption at host is not registered for the selected subscription. [Learn more](#)

**OS disk**

OS disk size Image default (30 GiB) ✓

OS disk type \* Premium SSD (locally-redundant storage) ✓

Delete with VM ☒

Key management Platform-managed key ✓

Enable Ultra Disk compatibility ☐

**Data disks for Pub-server**

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
-----	------	------------	-----------	--------------	----------------

Click on networking

## Select pub subnet and add public ip

[Help me create a low cost VM](#) [Help me create a VM optimized for high availability](#) [Help me choose the right VM size for my workload](#)

### Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network \* ⓘ  [Create new](#)

Subnet \* ⓘ  [Manage subnet configuration](#)

Public IP ⓘ  [Create new](#)

NIC network security group ⓘ ☐ None ☒ Basic ☐ Advanced

Public inbound ports \* ⓘ ☐ None ☒ Allow selected ports

Select inbound ports \*

**⚠ This will allow all IP addresses to access your virtual machine.** This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

[Back](#) [Cancel](#) [Review and create](#)

Click on review and create

And once validation passed click on create

[Home](#) >

## Create a virtual machine ...

Validation passed

[Help me create a low cost VM](#)
[Help me create a VM optimized for high availability](#)
[Help me choose the right VM size for my workload](#)

[Basics](#)
[Disks](#)
[Networking](#)
[Management](#)
[Monitoring](#)
[Advanced](#)
[Tags](#)
[Review + create](#)

Price

1 X Standard D2s v3  
by Microsoft  
[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ  
**0.0960 USD/hr**  
[Pricing for other VM sizes](#)

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name

Preferred e-mail address

Preferred phone number

[< Previous](#)
[Next >](#)
[Create](#)

A pop up will come with Download private key and click plus save on that

Same way create private server ,don't add any public up in and select subnet as private subnet

Use stored key in azure ,same key which we used for public server

## Create a virtual machine

[Help me create a low cost VM](#)
[Help me create a VM optimized for high availability](#)
[Help me choose the right VM size for my workload](#)

☐ Password

**i** Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

Username \* ⓘ  ✓

SSH public key source  ▼

**i** Ed25519 and RSA SSH formats are supported for the selected VM image. Ed25519 provides a fixed security level of no more than 128 bits for 256-bit key, while RSA could offer better security with keys longer than 3072 bits.

Stored Keys  ▼

**Inbound port rules**  
 Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \* ⓘ
 ☐ None
 ☒ Allow selected ports

## Select HTTP

could offer better security with keys longer than 3072 bits.

Stored Keys  ▼

**Inbound port rules**  
 Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \* ⓘ
 ☐ None
 ☒ Allow selected ports

Select inbound ports \*  ▼

**⚠ This will allow all IP addresses to access your virtual machine.** This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

[< Previous](#)
[Next : Disks >](#)
[Review + create](#)

## Go to networking



## Create a virtual machine ...

Help me create a low cost VM    Help me create a VM optimized for high availability    Help me choose the right VM size for my workload

### Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * ⓘ	my-vnet <a href="#">Create new</a>
Subnet * ⓘ	pvt-subnet (10.0.0.128/25) <a href="#">Manage subnet configuration</a>
Public IP ⓘ	None <a href="#">Create new</a>
NIC network security group ⓘ	<input type="radio"/> None <input checked="" type="radio"/> Basic <input type="radio"/> Advanced
Public inbound ports * ⓘ	<input type="radio"/> None <input checked="" type="radio"/> Allow selected ports
Select inbound ports *	HTTP (80), SSH (22)

**⚠ This will allow all IP addresses to access your virtual machine.** This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Click on create

Download mobaxterm from internet

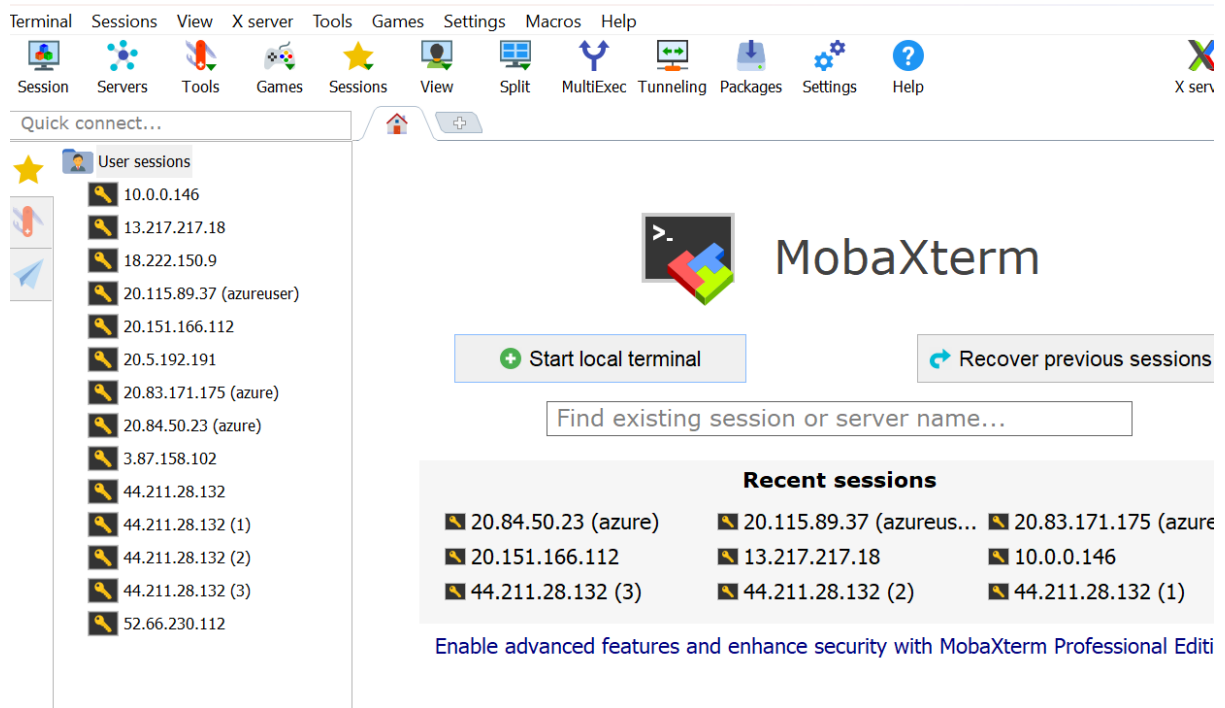
<https://mobaxterm.mobatek.net/download-home-edition.html>

click on installer edition

open mobaxterm

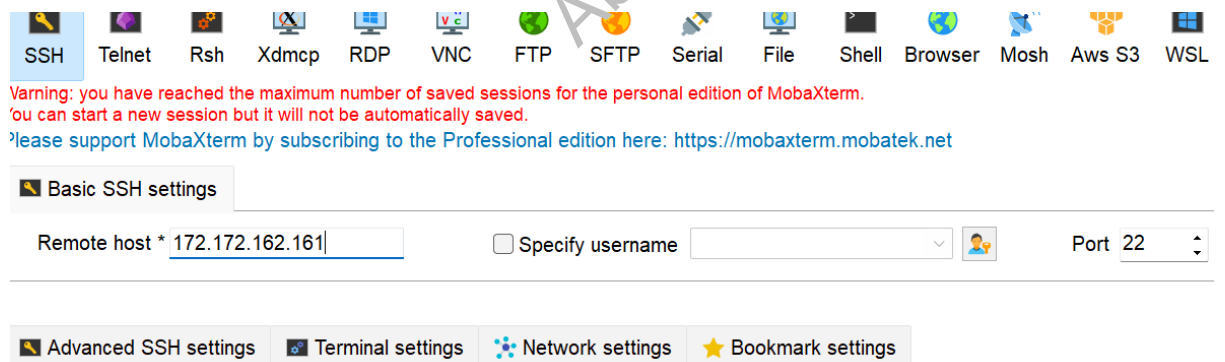
get the public ip of pub server

click on Session



Click on SSH

In remote host enter the public IP



Secure Shell (SSH) session




Click on use private key

## And select the private key downloaded earlier

Warning: you have reached the maximum number of saved sessions for the personal edition of MobaXterm. You can start a new session but it will not be automatically saved.

Please support MobaXterm by subscribing to the Professional edition here: <https://mobaxterm.mobatek.net>

**Basic SSH settings**

Remote host \*  ☐ Specify username   Port


---

**Advanced SSH settings** **Terminal settings** **Network settings** **Bookmark settings**

☒ X11-Forwarding ☒ Compression Remote environment:

Execute command:  ☐ Do not exit after command ends

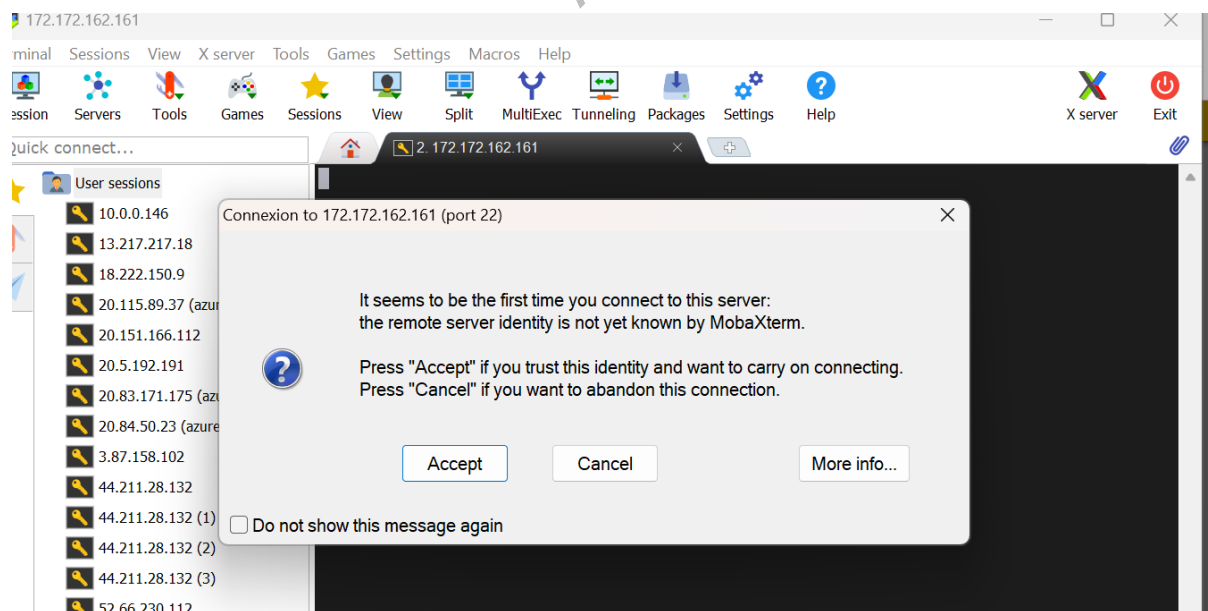
SSH-browser type:  ☐ Follow SSH path (experimental)

☒ Use private key  

Execute macro at session start:

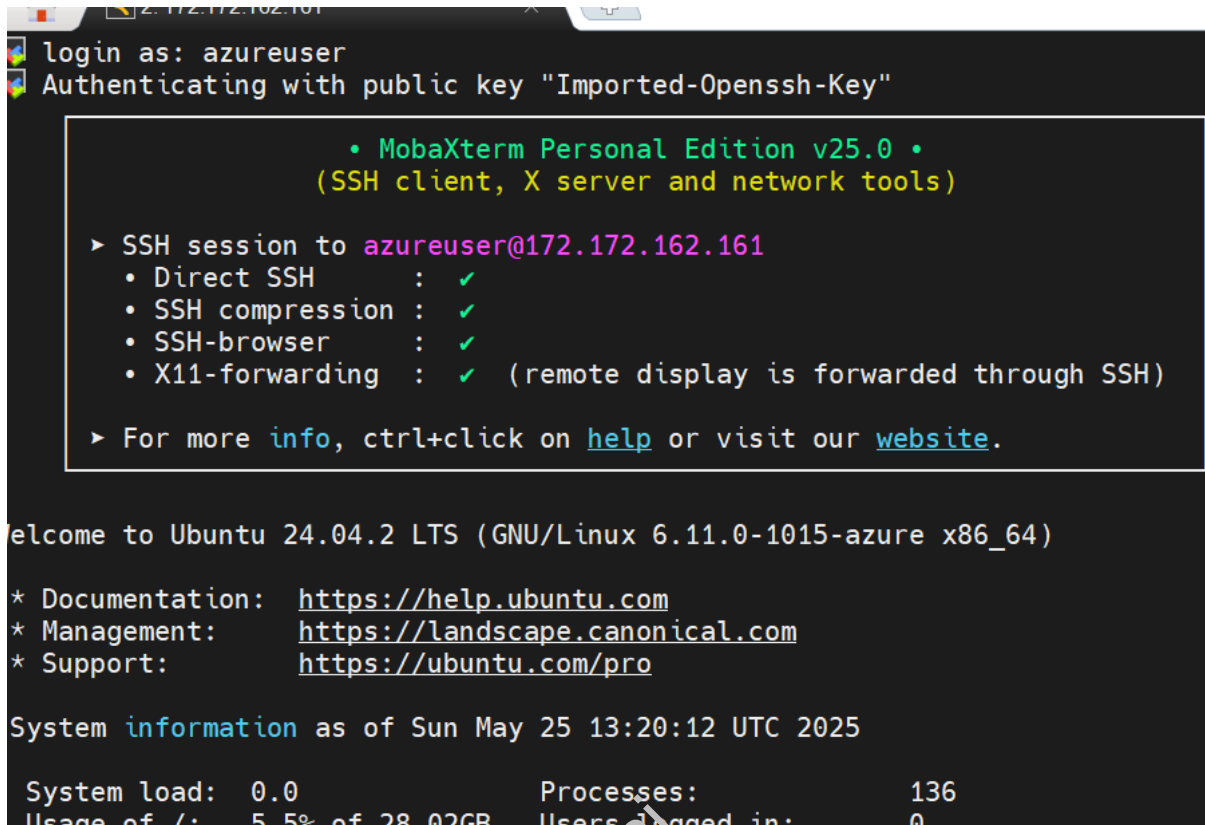
Click OK

A Pop up will open



Click on Accept

Enter user as **azureuser** and press enter



The screenshot shows a MobaXterm terminal window. At the top, it says 'login as: azureuser' and 'Authenticating with public key "Imported-Openssh-Key"'. Below this, a box displays the MobaXterm version and session details: 'MobaXterm Personal Edition v25.0 (SSH client, X server and network tools)', 'SSH session to azureuser@172.172.162.161', and a list of enabled features: Direct SSH, SSH compression, SSH-browser, and X11-forwarding. Below the box, it says 'Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-1015-azure x86\_64)' and provides links for documentation, management, and support. At the bottom, it shows system information as of Sun May 25 13:20:12 UTC 2025, including system load, processes, and usage.

```
login as: azureuser
Authenticating with public key "Imported-Openssh-Key"

• MobaXterm Personal Edition v25.0 •
  (SSH client, X server and network tools)

▶ SSH session to azureuser@172.172.162.161
  • Direct SSH      : ✓
  • SSH compression : ✓
  • SSH-browser     : ✓
  • X11-forwarding  : ✓ (remote display is forwarded through SSH)

▶ For more info, ctrl+click on help or visit our website.

Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-1015-azure x86_64)

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

System information as of Sun May 25 13:20:12 UTC 2025

System load:  0.0          Processes:           136
Usage of /:   5.5% of 28.02GB Users logged in:       0
```

**Successfully connected to public server**

**Now we need to connect to private server via this server**

**For that add private key in the public VM**

**But first switch to sudo user as admin user**

**sudo su –**

```
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
/usr/bin/xauth: file /home/azureuser/.Xauthority does not exist  
To run a command as administrator (user "root"), use "sudo <command>  
See "man sudo_root" for details.  
  
azureuser@my-vnet:~$ sudo su -  
root@my-vnet:~#
```

Enter

vi azure\_demo\_key.pem

open the key in your system and copy the private key and add it in  
the file

Enter chmod 400 azure\_demo\_key.pem

Now connect to pvt vm

ssh -i azure\_demo\_key.pem [azureuser@10.0.0.132](#)

instead of 10.0.0.132 use ur pvt ip address

A terminal window showing the process of setting up an SSH connection. The user 'azureuser' is at the prompt. The terminal output includes:

```

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

/usr/bin/xauth: file /home/azureuser/.Xauthority does not exist
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@my-vnet:~$ sudo su -
root@my-vnet:~# vi azure_demo_key.pem
root@my-vnet:~# chmod 400 azure_demo_key.pem
root@my-vnet:~# ssh -i azure_demo_key.pem azureuser@10.0.0.132
The authenticity of host '10.0.0.132 (10.0.0.132)' can't be established.
ED25519 key fingerprint is SHA256:p8dFgQmWfUJm7rQ6lcWnzsKQKE53TGg2KjWEesLhfU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes

```

## Successfully connected

A terminal window showing system status and update information. The user 'azureuser' is at the prompt. The terminal output includes:

```

System load: 0.00      Processes: 132
Usage of /: 5.5% of 28.02GB   Users logged in: 0
Memory usage: 3%           IPv4 address for eth0: 10.0.0.132
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 programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

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.

azureuser@Pvt-server:~$

```

Now move to sudo user

sudo su -

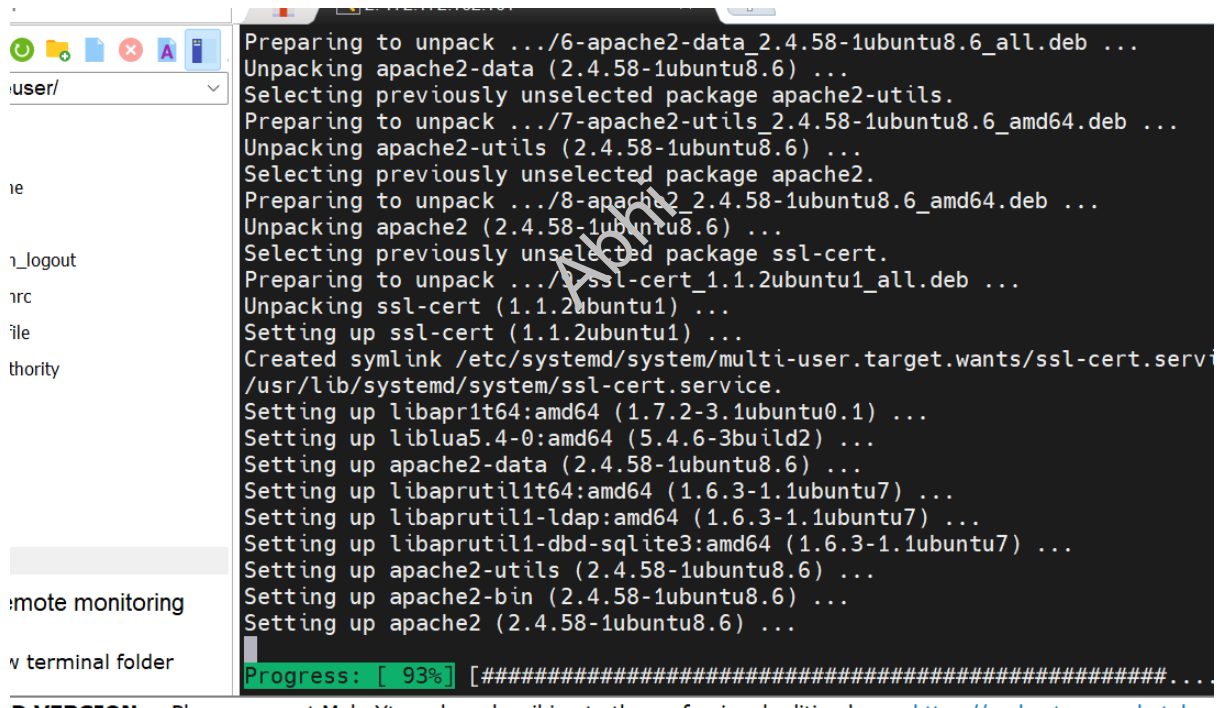
apt update

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

```
azureuser@Pvt-server:~$ sudo su -
root@Pvt-server:~# apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu noble-updates InRelease [126
Get:3 http://azure.archive.ubuntu.com/ubuntu noble-backports InRelease [11
Get:4 http://azure.archive.ubuntu.com/ubuntu noble-security InRelease [126
Get:5 http://azure.archive.ubuntu.com/ubuntu noble/universe amd64 Packages
0 MB]
Get:6 http://azure.archive.ubuntu.com/ubuntu noble/universe Translation-en
2 kB]
```

Now install webserver

apt install apache2 -y



```
Preparing to unpack .../6-apache2-data_2.4.58-1ubuntu8.6_all.deb ...
Unpacking apache2-data (2.4.58-1ubuntu8.6) ...
Selecting previously unselected package apache2-utils.
Preparing to unpack .../7-apache2-utils_2.4.58-1ubuntu8.6_amd64.deb ...
Unpacking apache2-utils (2.4.58-1ubuntu8.6) ...
Selecting previously unselected package apache2.
Preparing to unpack .../8-apache2_2.4.58-1ubuntu8.6_amd64.deb ...
Unpacking apache2 (2.4.58-1ubuntu8.6) ...
Selecting previously unselected package ssl-cert.
Preparing to unpack .../9-ssl-cert_1.1.2ubuntu1_all.deb ...
Unpacking ssl-cert (1.1.2ubuntu1) ...
Setting up ssl-cert (1.1.2ubuntu1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ssl-cert.service
/usr/lib/systemd/system/ssl-cert.service.
Setting up libapr1t64:amd64 (1.7.2-3.1ubuntu0.1) ...
Setting up liblua5.4-0:amd64 (5.4.6-3build2) ...
Setting up apache2-data (2.4.58-1ubuntu8.6) ...
Setting up libaprutil1t64:amd64 (1.6.3-1.1ubuntu7) ...
Setting up libaprutil1-ldap:amd64 (1.6.3-1.1ubuntu7) ...
Setting up libaprutil1-dbd-sqlite3:amd64 (1.6.3-1.1ubuntu7) ...
Setting up apache2-utils (2.4.58-1ubuntu8.6) ...
Setting up apache2-bin (2.4.58-1ubuntu8.6) ...
Setting up apache2 (2.4.58-1ubuntu8.6) ...
Progress: [ 93%] [#####]
```

Now use `cd /var/www/html`

Enter `ls`

You will find `index.html`

Start webserver

`systemctl start apache2`

how can we access private server as a user in the browser

we need Load balancer to access pvt server

Abhi