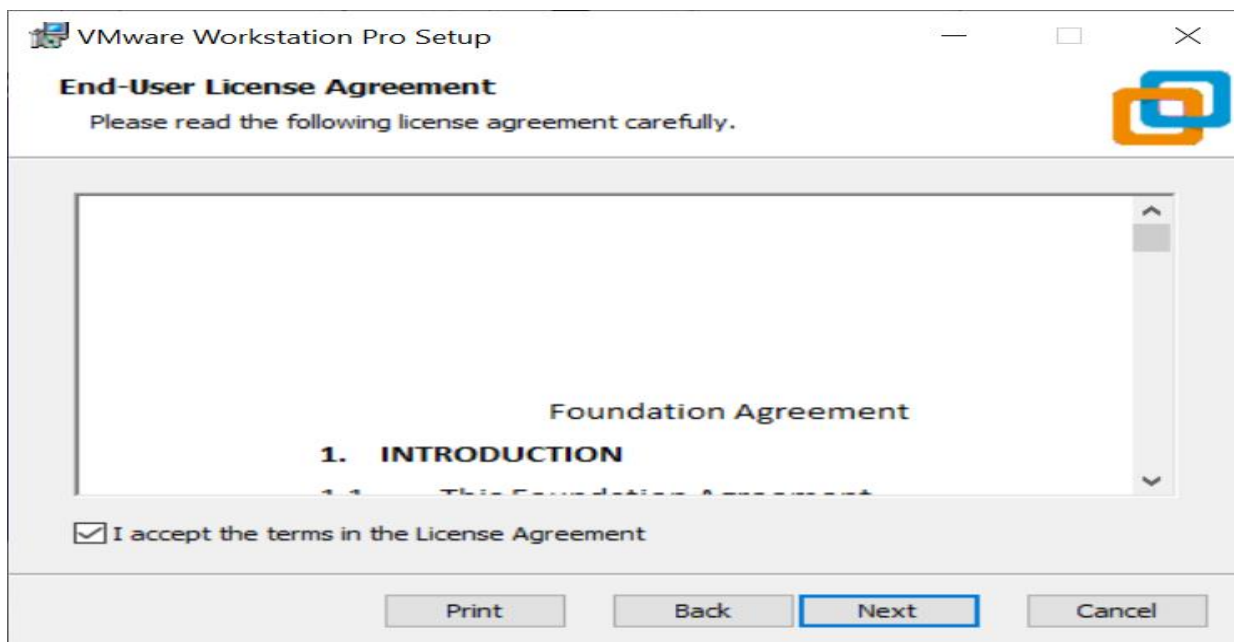
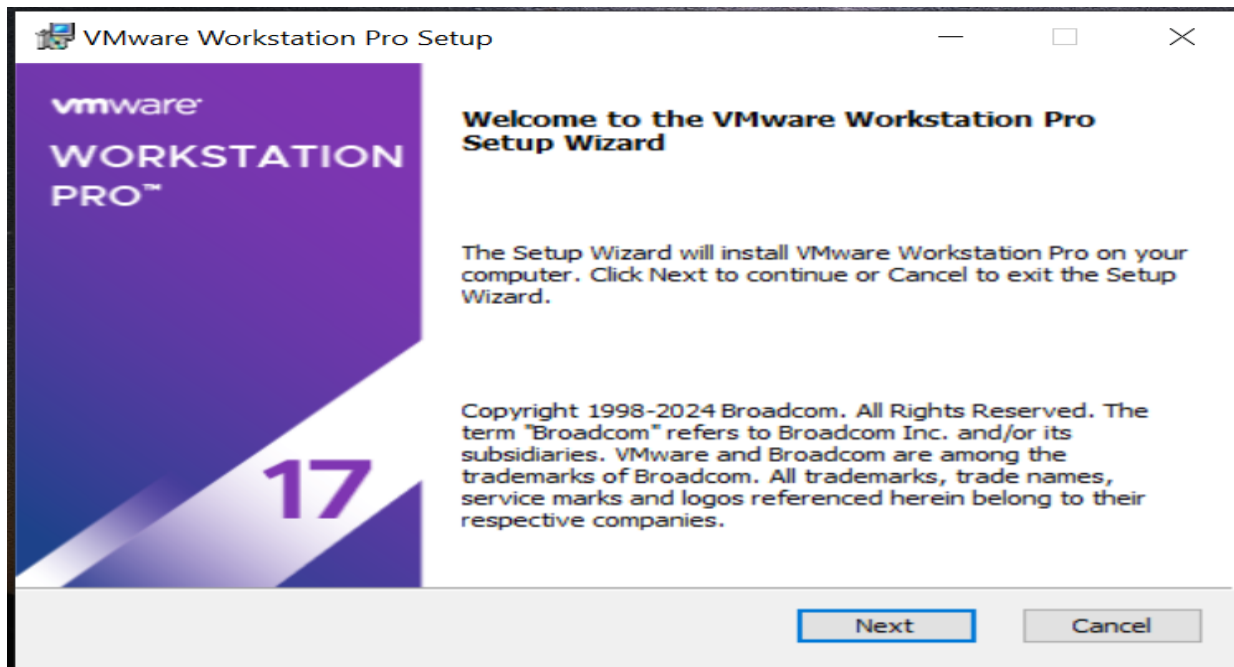
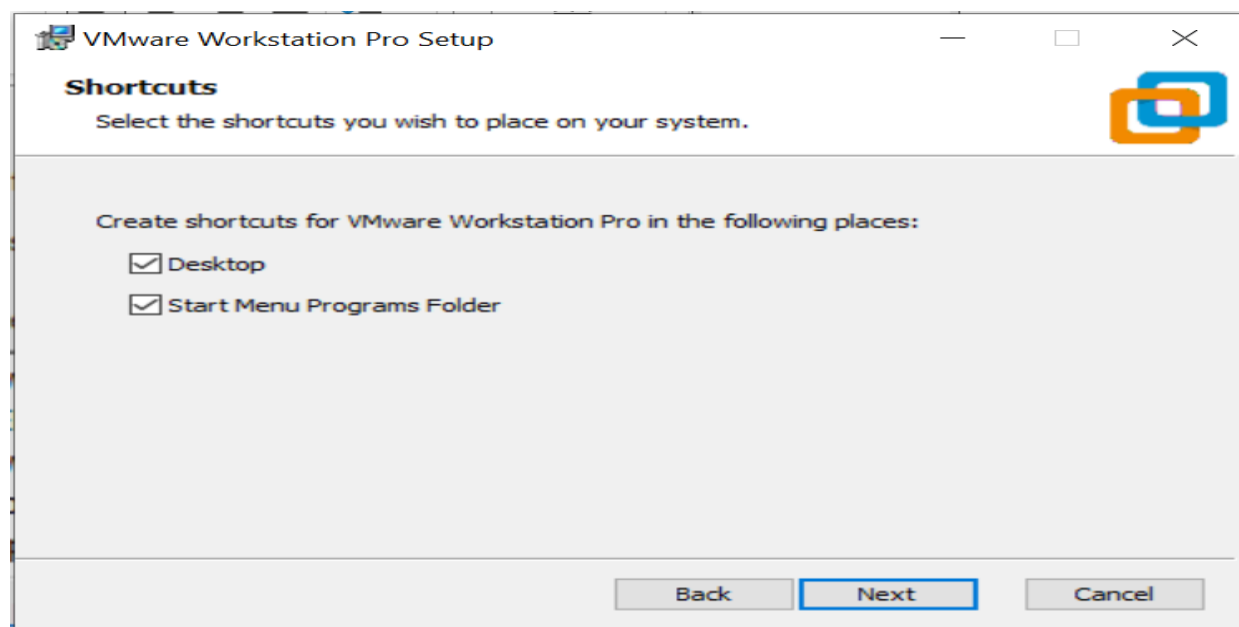
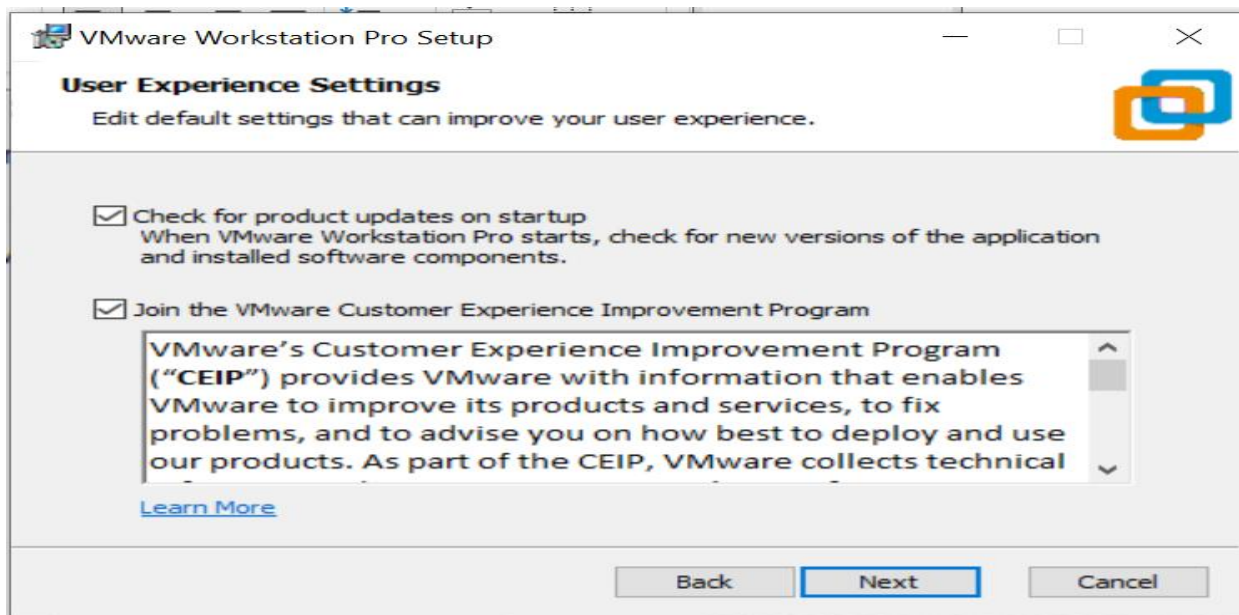
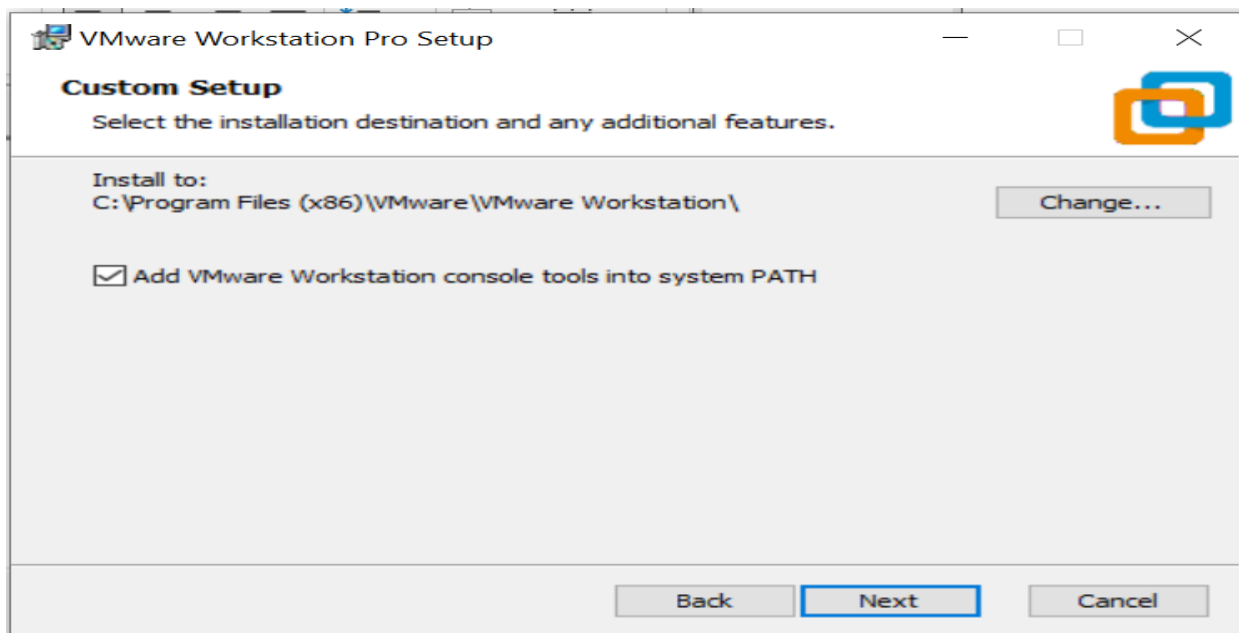


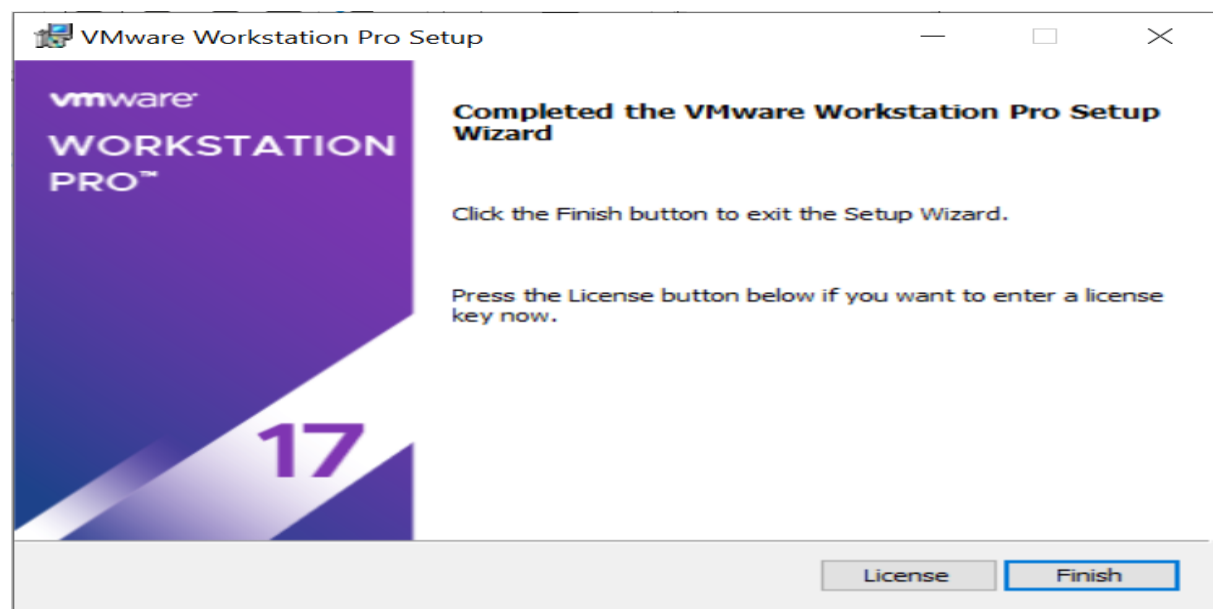
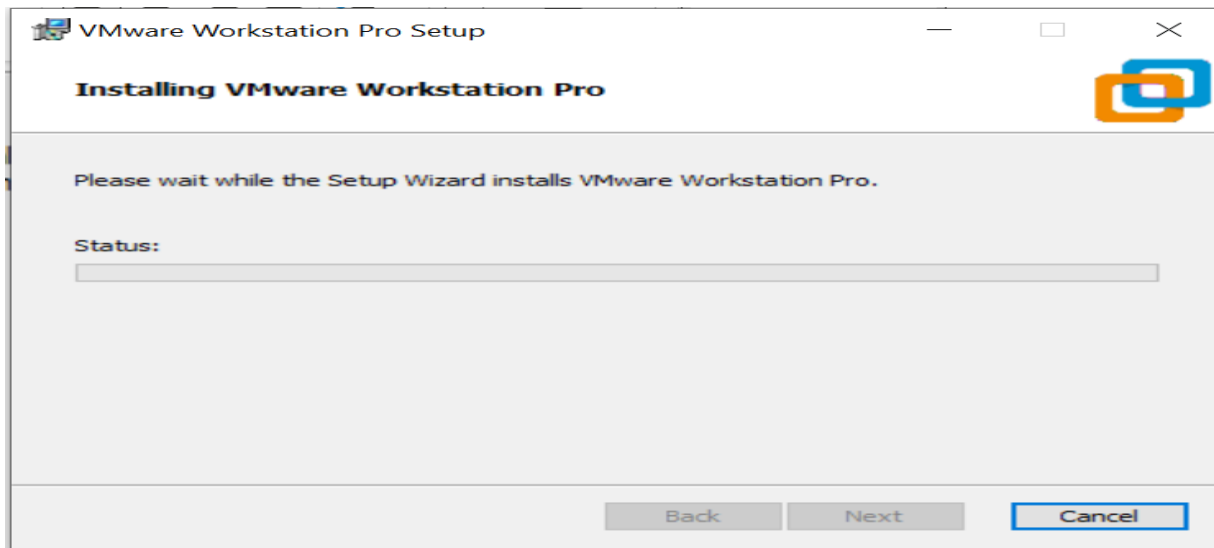
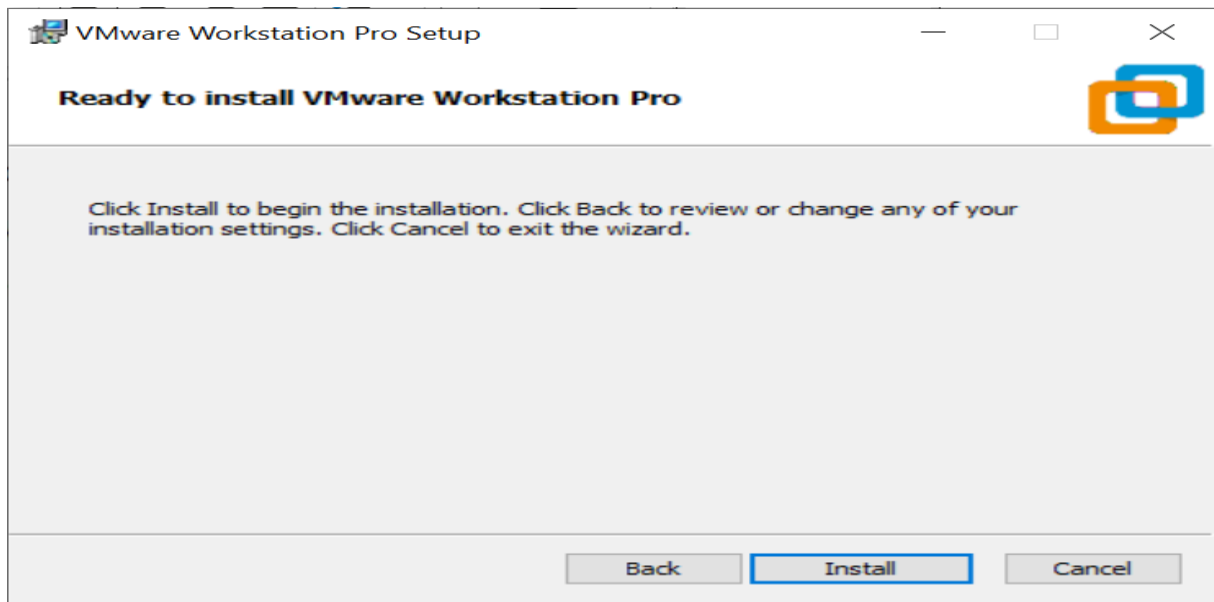
**NAME:** Zuha Irfan  
**REG NO:** 2023-BSE-073  
**CLASS:** BSE-5B  
**SUBJECT:** Cloud Computing  
**LAB NO:** 01

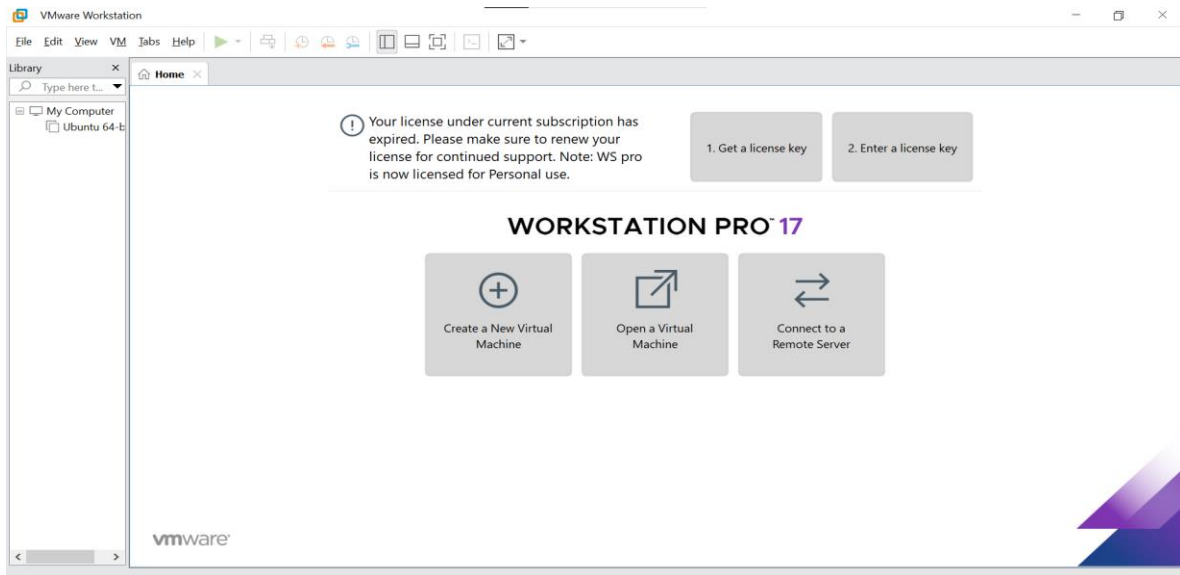
## **TASK:**

1. Install VMware Workstation Pro.

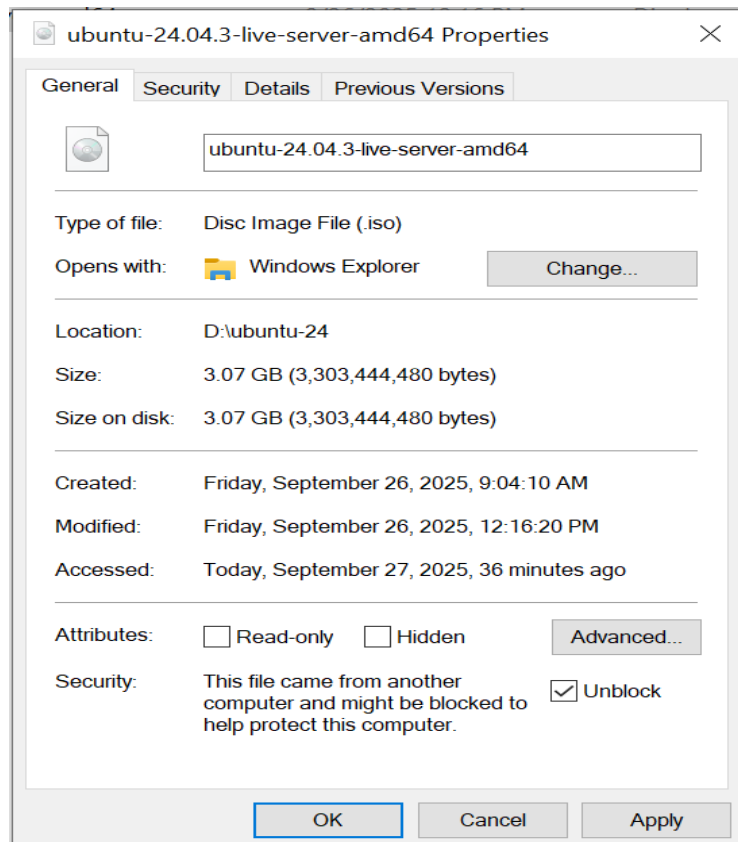
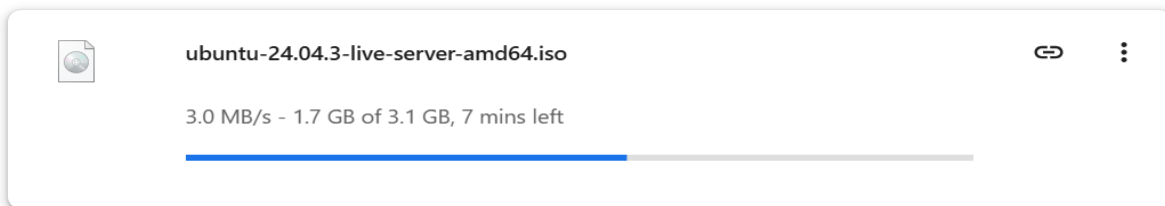








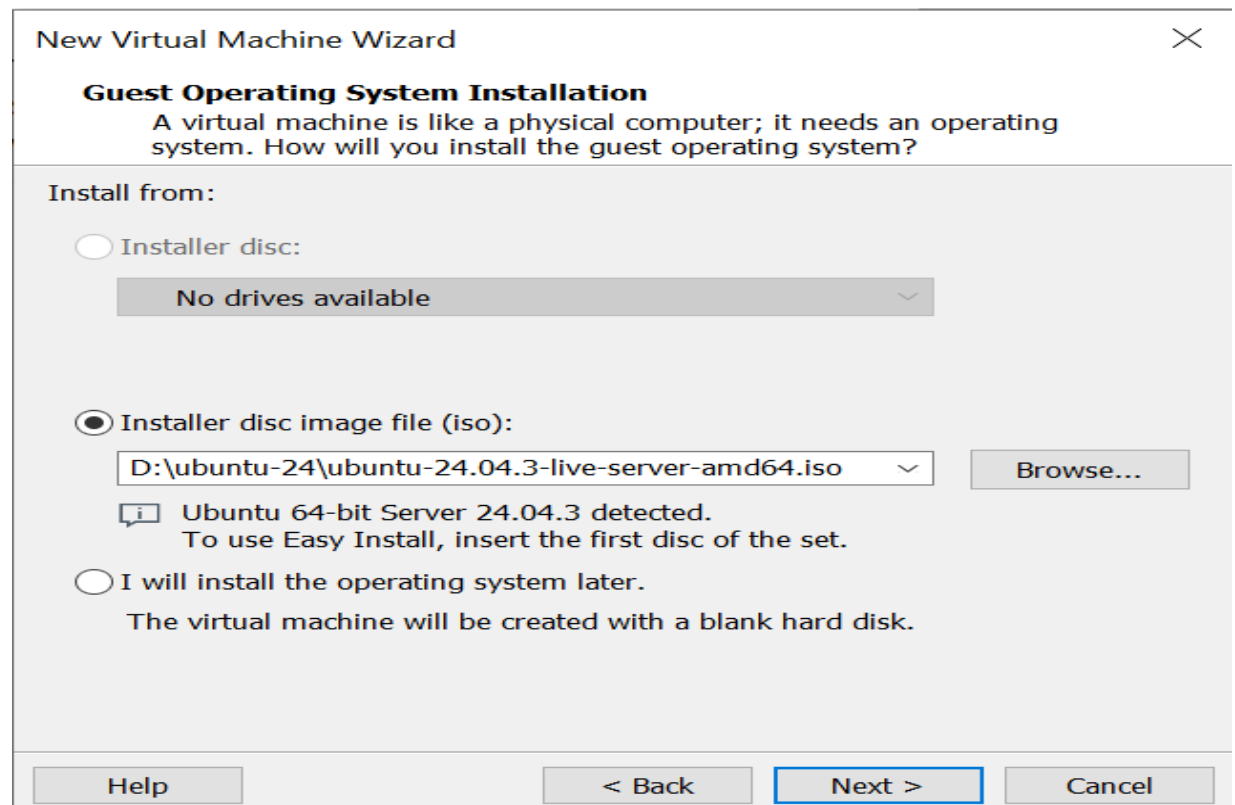
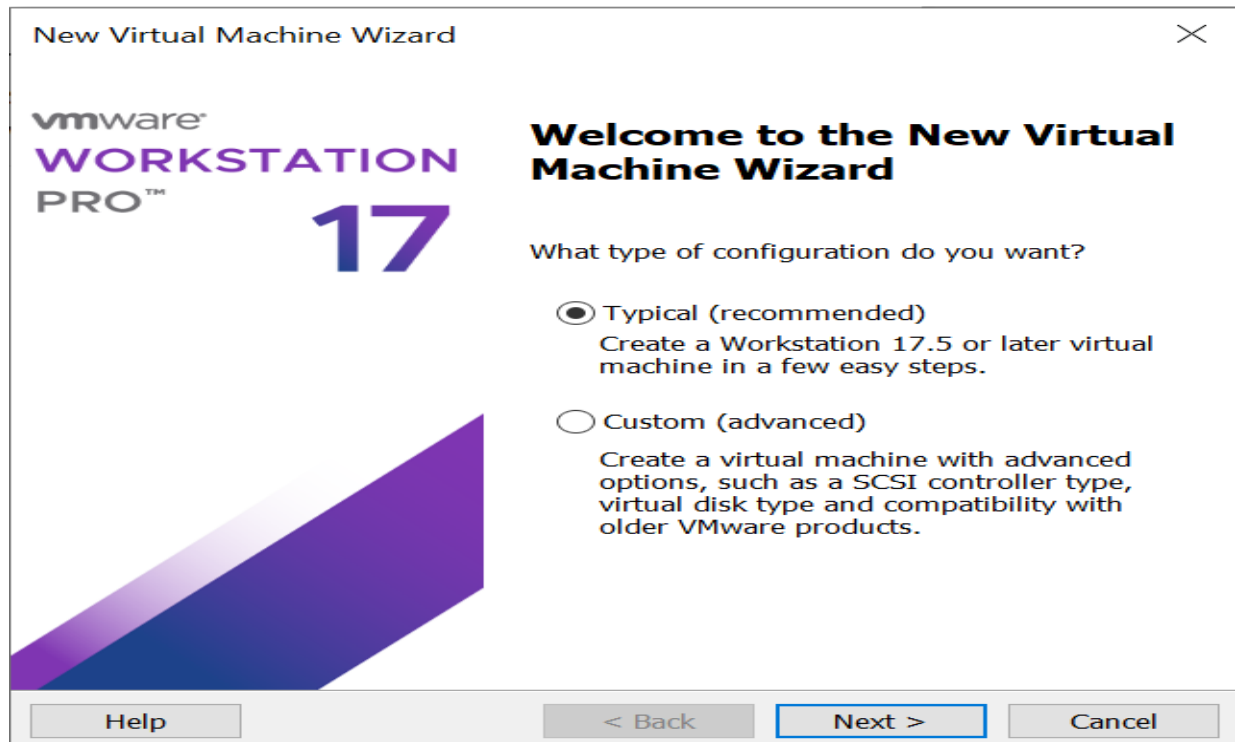
## 2. Download Ubuntu Server ISO



## 3. Create a new virtual machine in VMware

- Open VMware Workstation Pro.
- Click **Create a New Virtual Machine**.

- Select **Typical (recommended)**.
- When asked for installation media, choose **Installer disc image file (ISO)** and browse to the Ubuntu Server ISO you downloaded.
- Continue through the wizard, selecting the defaults unless otherwise instructed.



New Virtual Machine Wizard

**Name the Virtual Machine**  
What name would you like to use for this virtual machine?

Virtual machine name:

Ubuntu 64-bit (6)

Location:

C:\Users\HP\OneDrive\Documents\Virtual Machines\Ubuntu 64-bit

Browse...

The default location can be changed at Edit > Preferences.

< Back

Next >

Cancel

New Virtual Machine Wizard

**Specify Disk Capacity**  
How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB): 25.0

Recommended size for Ubuntu 64-bit: 20 GB

☒ Store virtual disk as a single file

☐ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help

< Back

Next >

Cancel

New Virtual Machine Wizard

**Ready to Create Virtual Machine**  
Click Finish to create the virtual machine and start installing Ubuntu 64-bit.

The virtual machine will be created with the following settings:

Name: Ubuntu 64-bit (6)

Location: C:\Users\HP\OneDrive\Documents\Virtual Machines\Ubuntu...

Version: Workstation 17.5 or later

Operating System: Ubuntu 64-bit

Hard Disk: 25 GB

Memory: 2048 MB

Network Adapter: NAT

Other Devices: 2 CPU cores, CD/DVD, USB Controller, Sound Card

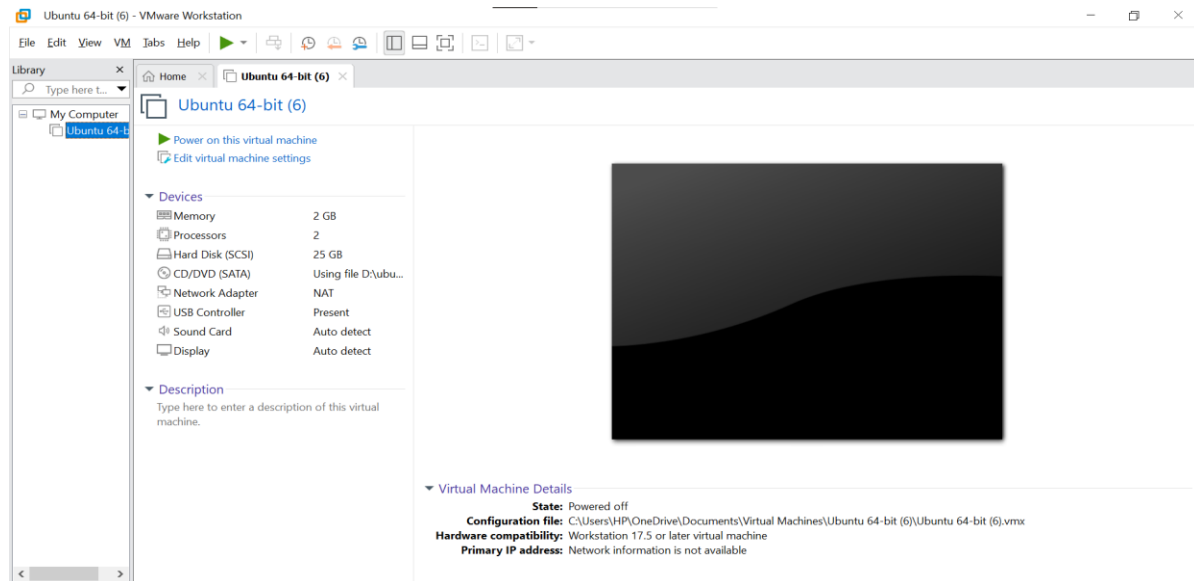
Customize Hardware...

☒ Power on this virtual machine after creation

< Back

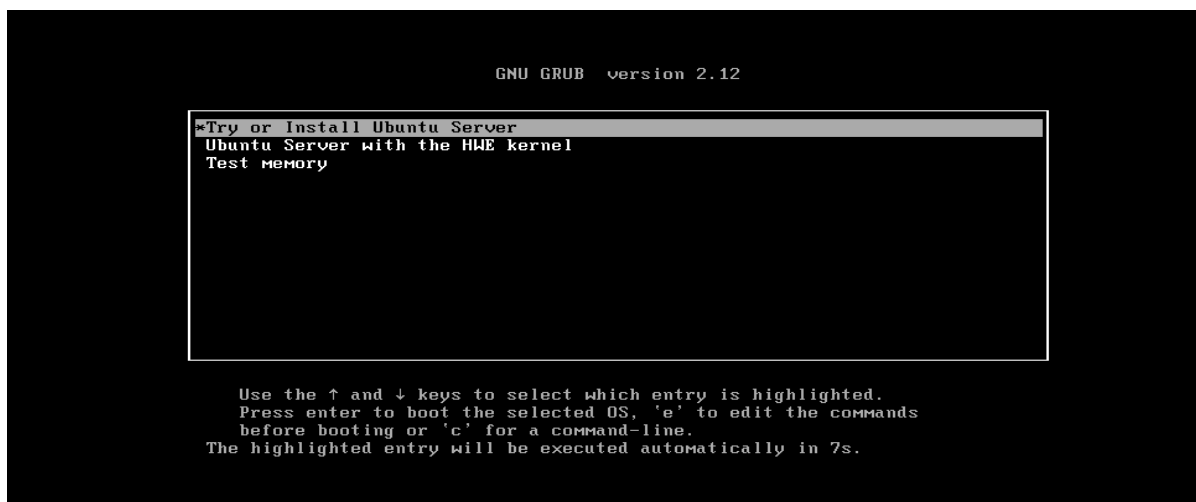
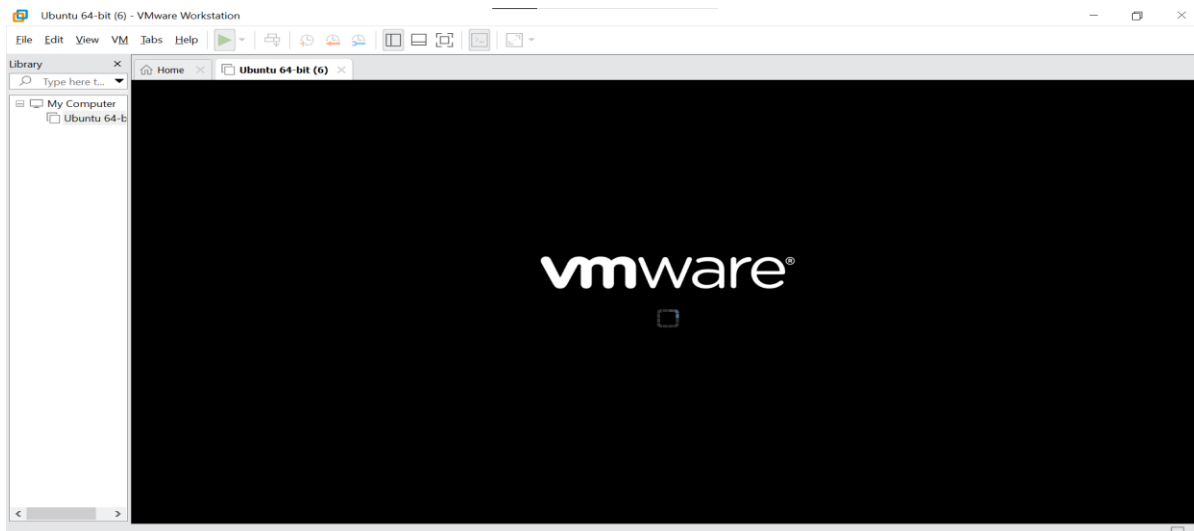
Finish

Cancel



#### 4. Start the virtual machine

- Once the VM is created, click Power on this virtual machine.
- The Ubuntu Server installer will boot using the ISO file.



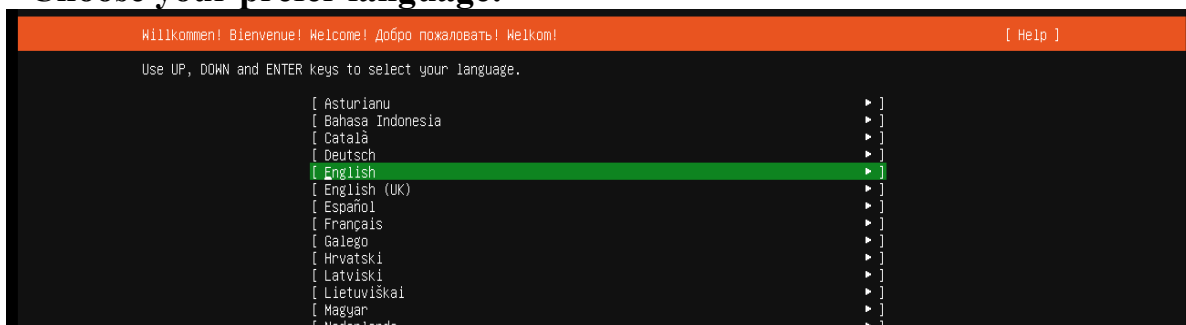
```

Repeat this process for the rest of the CDs in your set.
done.
Begin: Possibly disabling update-initramfs (useless on a live CD)... .. done.
Begin: Grant administrative PolicyKit privileges to default user... .. done.
Begin: Configuring Jackd2... .. done.
Begin: Disabling gnome-initial-setup... .. chown: warning: '.' should be ':' :
'ubuntu-server.ubuntu-server'
done.
Begin: Disabling security unattended-upgrades... .. done.
Begin: Disabling snap refresh... .. done.
Begin: Overriding 71-nvidia.rules... .. done.
Begin: Configuring pollinate... .. done.
Begin: Setting up networking for ubuntu-server... .. done.
Begin: Disabling ibus-mozc auto setup... .. chown: warning: '.' should be ':' :
'ubuntu-server.ubuntu-server'
done.
Begin: Set up the installer log directory for adm users... .. done.
Begin: Tweaks for the desktop image... .. done.
done.
Begin: Running /scripts/nfs-bottom ... done.
Begin: Running /scripts/init-bottom ... [ 14.700658] loop4: detected capacity
change from 0 to 319688
[ 14.710461] loop5: detected capacity change from 0 to 282768
[ 14.720000] overlayfs: "ntfs" feature enabled using 2 upper, lower, bits

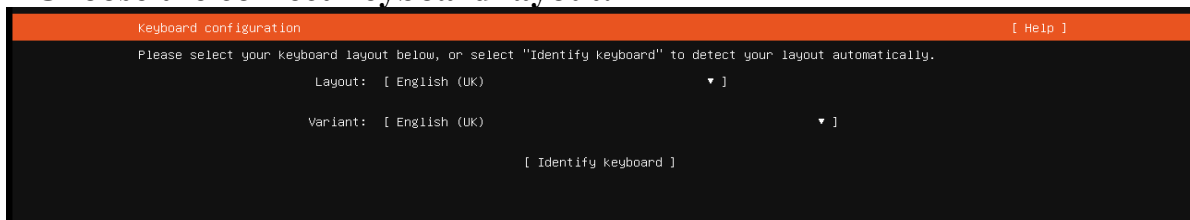
```

Scroll down using the arrow keys. When done, highlight **Done** at the bottom of the window and press Enter.

## Choose your prefer language:

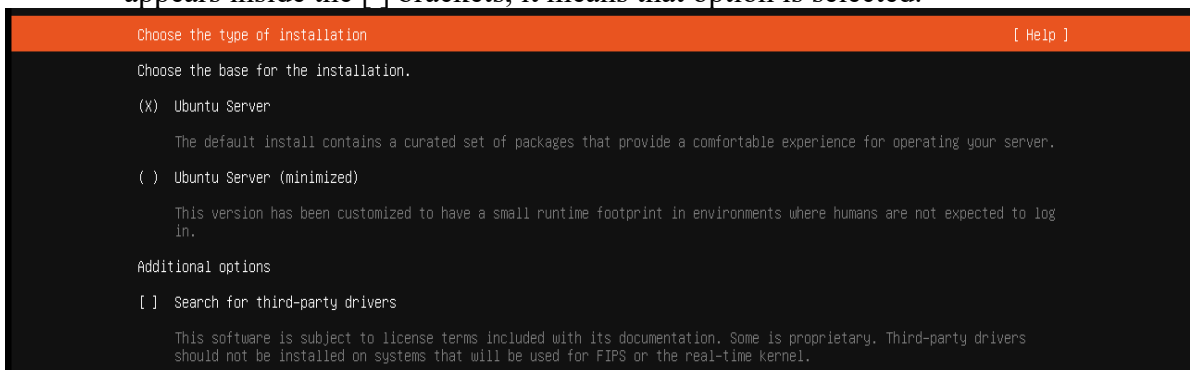


## Choose the correct keyboard layout:



## Choose your install:

- When choosing, scroll down using the arrow keys and select with the spacebar. When an (x) appears inside the [ ] brackets, it means that option is selected.



## Networking:



Network configuration
[ Help ]

Configure at least one interface this server can use to talk to other machines, and which preferably provides sufficient access for updates.

| NAME   | TYPE | NOTES |
|--|------|-------|
| [ ens33  | eth  | - ▶ ] |
| DHCPv4   | -    |       |
| 00:0c:29:6a:f6:87 / Intel Corporation / 82545EM Gigabit Ethernet Controller (Copper) (PRO/1000 MT Single Port Adapter) |      |       |

[ Create bond ▶ ]

Configure proxy:

Proxy configuration
[ Help ]

If this system requires a proxy to connect to the internet, enter its details here.

Proxy address:

If you need to use a HTTP proxy to access the outside world, enter the proxy information here. Otherwise, leave this blank.

The proxy information should be given in the standard form of "http://[[user][:pass]@]host[:port]/".

Configure ubuntu archive mirror:

Ubuntu archive mirror configuration
[ Help ]

If you use an alternative mirror for Ubuntu, enter its details here.

Mirror address:

You may provide an archive mirror to be used instead of the default.

This mirror location passed tests.

```
Hit:1 http://pk.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://pk.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://pk.archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists...
```

Configure storage guide:

Guided storage configuration
[ Help ]

Configure a guided storage layout, or create a custom one:

☒ Use an entire disk

[ /dev/sda local disk 25.000G ▼ ]

☒ Set up this disk as an LVM group

[ ] Encrypt the LVM group with LUKS

Passphrase:

Confirm passphrase:

[ ] Also create a recovery key  
The key will be stored as ~/recovery-key.txt in the live system and will be copied to /var/log/installer/ in the target system.

☐ Custom storage layout

Storage Configuration:

Storage configuration
[ Help ]

FILE SYSTEM SUMMARY

| MOUNT POINT | SIZE    | TYPE     | DEVICE TYPE                     |
|-------------|---------|----------|---------------------------------|
| [ /         | 11.496G | new ext4 | new LVM Logical Volume ▶ ]      |
| [ /boot     | 2.000G  | new ext4 | new partition of local disk ▶ ] |

AVAILABLE DEVICES

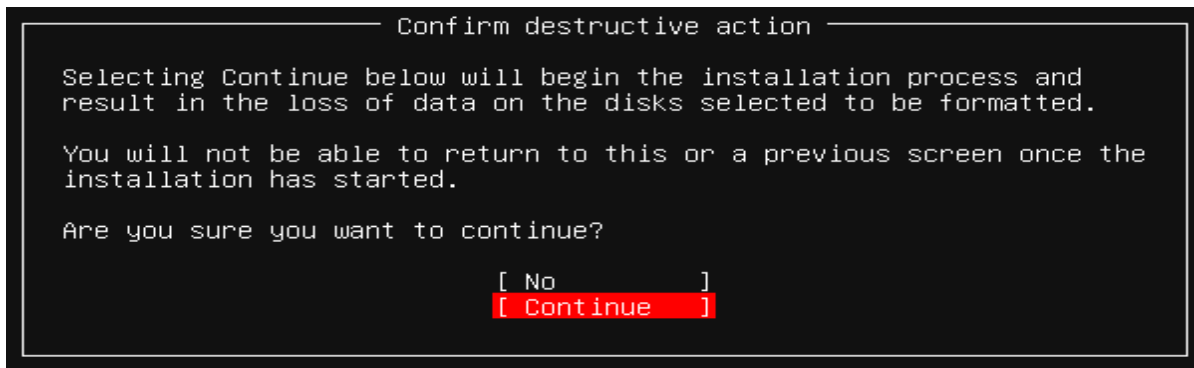
| DEVICE            | TYPE             | SIZE        |
|-------------------|------------------|-------------|
| [ ubuntu-vg (new) | LVM volume group | 22.996G ▶ ] |
| free space        |                  | 11.500G ▶   |

[ Create software RAID (md) ▶ ]

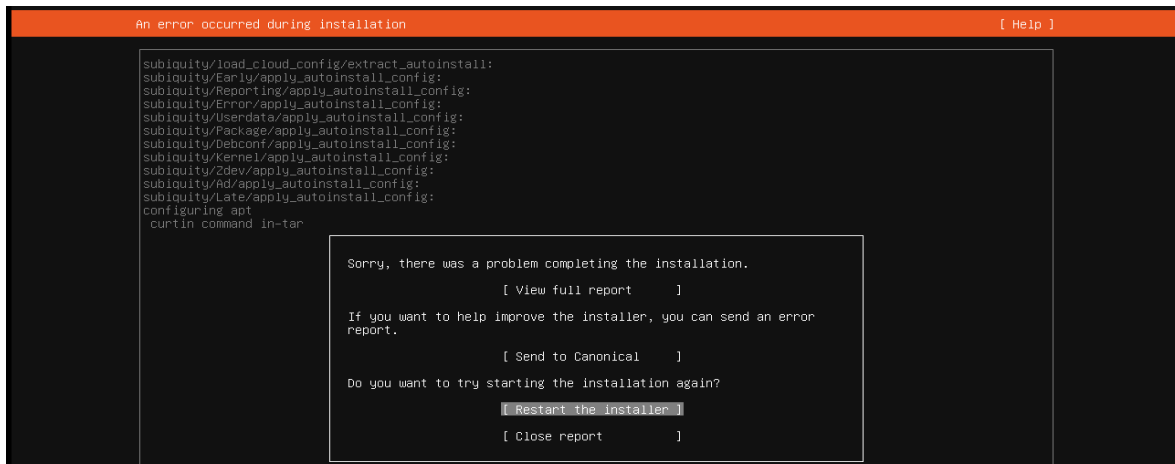
[ Create volume group (LVM) ▶ ]

USED DEVICES

| DEVICE            | TYPE   | SIZE        |
|-------------------|--|-------------|
| [ ubuntu-vg (new) | LVM volume group                               | 22.996G ▶ ] |
| ubuntu-lv         | new, to be formatted as ext4, mounted at /     | 11.496G ▶   |
| [ /dev/sda        | local disk                                     | 25.000G ▶ ] |
| partition 1       | new, BIOS grub spacer                          | 1.000M ▶    |
| partition 2       | new, to be formatted as ext4, mounted at /boot | 2.000G ▶    |
| partition 3       | new, PV of LVM volume group ubuntu-vg          | 22.997G ▶   |



## Set up a profile: Error



This usually means the installer (subiquity with curtin) had trouble during the **APT package configuration step**. Common causes are:

1. You did not check the '**Unblock**' security option in the properties of the Ubuntu Server file.
2. **No internet connection** (APT cannot fetch required packages).
3. **Bad mirror or repo unreachable** (network timeout or blocked domain).
4. **Corrupted ISO** (installer cannot unpack packages).
5. **Insufficient disk space or partitioning issue**.

**Virtual machine misconfiguration** (if using VMware, VirtualBox, Hyper-V, etc. – sometimes storage controllers cause problems).

Check these problems one by one, and after solving each problem, start again from Step 4 (Start the virtual machine).

## Set up a profile:

Profile configuration

[ Help ]

Enter the username and password you will use to log in to the system. You can configure SSH access on a later screen, but a password is still needed for sudo.

Your name:ubuntu

Your servers name:ubuntu-lab

The name it uses when it talks to other computers.

Pick a username:hajra

Choose a password:\*\*\*\*\*

Confirm your password:\*\*\*\*\*

## Upgrade to ubuntu Pro:

Upgrade to Ubuntu Pro

[ Help ]

Upgrade this machine to Ubuntu Pro for security updates on a much wider range of packages, until 2034. Assists with FedRAMP, FIPS, STIG, HIPAA and other compliance or hardening requirements.

[ About Ubuntu Pro ▶ ]

( ) Enable Ubuntu Pro

(X) Skip for now

You can always enable Ubuntu Pro later using the 'pro attach' command.

## SSH Configuration:

SSH configuration

[ Help ]

You can choose to install the OpenSSH server package to enable secure remote access to your server.

(X) Install OpenSSH server

(X) Allow password authentication over SSH

[ Import SSH key ▶ ]

AUTHORIZED KEYS

No authorized key

Import SSH key

Import SSH identity: [ from GitHub ▼ ]

You can import your SSH keys from GitHub or Launchpad.

GitHub Username: hajrasarwar11

Enter your GitHub username.

[ Done ]

[ Cancel ]

SSH configuration

[ Help ]

You can choose to install the OpenSSH server package to enable secure remote access to your server.

(X) Install OpenSSH server

(X) Allow password authentication over SSH

[ Import SSH key ▶ ]

AUTHORIZED KEYS

No authorized key

## Featured Server snaps:

Featured server snaps

[ Help ]

These are popular snaps in server environments. Select or deselect with SPACE, press ENTER to see more details of the package, publisher and versions available.

[\*] microk8s

canonical✓

Kubernetes for workstations and appliances

▶

[\*] nextcloud

nextcloud✓

Nextcloud Server - A safe home for all your data

▶

[ ] wekan

xet7

Open-Source Kanban

▶

[\*] kata-containers

katacontainers✓

Build lightweight VMs that seamlessly plug into the containers ecosystem

▶

[\*] docker

canonical✓

Docker container runtime

▶

[ ] canonical-livepatch

canonical✓

Canonical Livepatch Client

▶

[ ] rocketchat-server

rocketchat✓

Rocket.Chat server

▶

[\*] mosquito

mosquitto✓

Eclipse Mosquitto MQTT broker

▶

[ ] etcd

canonical✓

Resilient key-value store by CoreOS

▶

[\*] powershell

canonical✓

PowerShell for every system!

▶

[ ] sabnzbd

sabine

SABnzbd

▶

[\*] wormhole

snapcrafters?

get things from one computer to another, safely

▶

[\*] aws-cli

aws✓

Universal Command Line Interface for Amazon Web Services

▶

[\*] google-cloud-sdk

google-cloud-sdk✓

Google Cloud SDK

▶

[\*] s1cli

softlayer

Python based SoftLayer API Tool.

▶

[\*] doctl

digitalocean✓

The official DigitalOcean command line interface

▶

[ ] postgresql10

cmd

PostgreSQL is a powerful, open source object-relational database system.

▶

[\*] keepalived

keepalived-project✓

High availability VRRP/BFD and load-balancing for Linux

▶

[ ] prometheus

canonical✓

The Prometheus monitoring system and time series database

▶

[\*] lxd

canonical✓

LXD - container and VM manager

▶

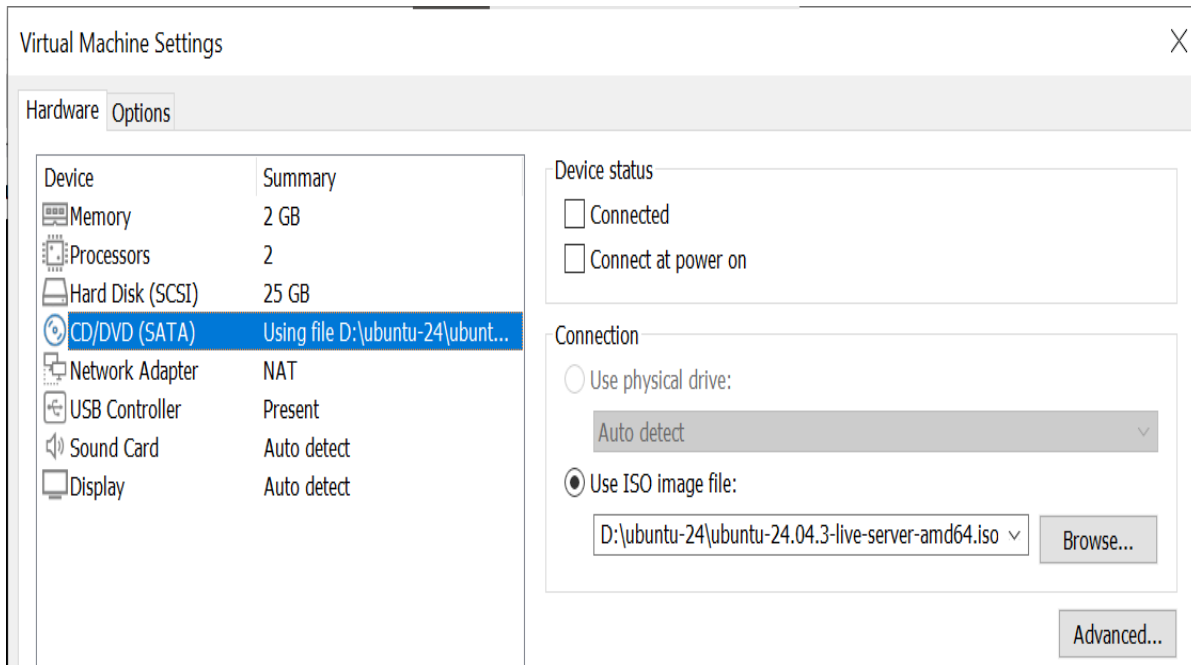
## Install Software:

```
Installing system [ Help ]
subiquity/ad/apply_autoinstall_config:
subiquity/Late/apply_autoinstall_config:
configuring apt
curtin command in-target
installing system
executing curtin install initial step
executing curtin install partitioning step
curtin command install
configuring storage
  running 'curtin block-meta simple'
  curtin command block-meta
  removing previous storage devices
  configuring disk: disk-sda
  configuring partition: partition-0
  configuring partition: partition-1
  configuring format: format-0
  configuring partition: partition-2
  configuring lvm_voigroup: lvm_voigroup-0
  configuring lvm_partition: lvm_partition-0
  configuring format: format-1
  configuring mount: mount-1
  configuring mount: mount-0
executing curtin install extract step
curtin command install
  writing install sources to disk
  running 'curtin extract'
  curtin command extract
    acquiring and extracting image from cp:///tmp/tmp7gaf22d1/mount
configuring keyboard
curtin command in-target
executing curtin install curthooks step
curtin command install
  configuring installed system
  running 'curtin curthooks'
  curtin command curthooks
    configuring apt configuring apt
    installing missing packages
    Installing packages on target system: ['grub-pc']
    configuring iscsi service
    configuring raid (mdadm) service
    configuring NWE over TCP
    installing kernel |
```

Error:

```
[FAILED] Failed unmounting cdrom.mount - /cdrom.
Please remove the installation medium, then press ENTER:
[FAILED] Failed unmounting cdrom.mount - /cdrom.
```

Go to Virtual Machine setting, click CD/DVD... → uncheck Connected and connect at power on Boxes → OK.



```

2236412K
[ 6.505289] systemd[1]: Starting multipathd.service - Device-Mapper Multipath
Device Controller...
Starting multipathd.service - Device-Mapper Multipath Device Controller...
[ 6.507272] systemd[1]: systemd-hwdb-update.service - Rebuild Hardware Databa
se was skipped because no trigger condition checks were met.
[ 6.507661] systemd[1]: systemd-pstore.service - Platform Persistent Storage
Archival was skipped because of an unmet condition check (ConditionDirectoryNotE
mpty=/sys/fs/pstore).
[ 6.556528] systemd[1]: Starting systemd-random-seed.service - Load/Save OS R
andom Seed...
Starting systemd-random-seed.service - Load/Save OS Random Seed...
[ 6.558384] systemd[1]: systemd-repart.service - Repartition Root Disk was sk
ipped because no trigger condition checks were met.
[ 6.580600] systemd[1]: Starting systemd-sysctl.service - Apply Kernel Variab
les...
Starting systemd-sysctl.service - Apply Kernel Variables...
[ 6.607339] systemd[1]: Starting systemd-tmpfiles-setup-dev-early.service - C
reate Static Device Nodes in /dev gracefully...
Starting systemd-tmpfiles-setup-dev-early.service - Create Static Device Nodes in /dev gracefully...
[ 6.608038] systemd[1]: systemd-tpm2-setup.service - TPM2 SRK Setup was skippe
d because of an unmet condition check (ConditionSecurity=measured-uki).
[ 6.608585] systemd[1]: Activated swap swap.img.swap - /swap.img.
[ OK ] Activated swap swap.img.swap - /swap.img.

```

Ubuntu 24.04.3 LTS ubuntu-lab tty1

ubuntu-lab login: \_

Ubuntu 24.04.3 LTS ubuntu-lab tty1

```

ubuntu-lab login:          Mounting snap-snapd-25202.mount - Mount unit for snapd, revision 25202...
[ OK ] Mounted snap-snapd-25202.mount - Mount unit for snapd, revision 25202.
Starting snapd.service - Snap Daemon...
[ OK ] Started snapd.service - Snap Daemon.

```

ubuntu-lab login: hajra

Password: \_

```

[ OK ] Created slice user-1000.slice - User Slice of UID 1000.
Starting user-runtime-dir@1000.service - User Runtime Directory /run/user/1000...
[ OK ] Finished user-runtime-dir@1000.service - User Runtime Directory /run/user/1000.
Starting user@1000.service - User Manager for UID 1000...
[ OK ] Started user@1000.service - User Manager for UID 1000.
[ OK ] Started session-1.scope - Session 1 of User hajra.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

hajra@ubuntu-lab:~$          Mounting snap-core22-2133.mount - Mount unit for core22, revision 2133...
[ OK ] Mounted snap-core22-2133.mount - Mount unit for core22, revision 2133.

hajra@ubuntu-lab:~$          Mounting snap-aws\x2dcli-1597.mount - Mount unit for aws-cli, revision 1597...
[ OK ] Mounted snap-aws\x2dcli-1597.mount - Mount unit for aws-cli, revision 1597.

hajra@ubuntu-lab:~$          Mounting snap-docker-3265.mount - Mount unit for docker, revision 3265...
[ OK ] Mounted snap-docker-3265.mount - Mount unit for docker, revision 3265.
[ OK ] Started snap.docker.hook.install-bb1f3125-37b5-4ed2-8d3a-6a6c117a275a.scope.
Starting snap.docker.nvidia-container-toolkit.service - Service for snap application docker.nvidia-container-toolkit...
[ OK ] Finished snap.docker.nvidia-container-toolkit.service - Service for snap application docker.nvidia-container-toolkit.
[ OK ] Started snap.docker.dockerd.service - Service for snap application docker.dockerd.
[ OK ] Started snap.docker.hook.configure-c5604d09-6da2-4749-9716-314a124a5a94.scope.
Starting snap.docker.nvidia-container-toolkit.service - Service for snap application docker.nvidia-container-toolkit...
[ OK ] Finished snap.docker.nvidia-container-toolkit.service - Service for snap application docker.nvidia-container-toolkit.
Mounting snap-dockt1-2242.mount - Mount unit for dockt1, revision 2242...
[ OK ] Mounted snap-dockt1-2242.mount - Mount unit for dockt1, revision 2242.
Starting update-notifier-download.service - Download data for packages that failed at package install time...
[ OK ] Finished update-notifier-download.service - Download data for packages that failed at package install time.

```

Ubuntu 64-bit (6) - VMware Workstation

File Edit View VM Tabs Help

Library

My Computer

Ubuntu 64-bit

Home

Ubuntu 64-bit (6)

```

Ubuntu 24.04.3 LTS ubuntu-lab tty1
ubuntu-lab login: hajra
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-84-generic x86_64)

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

System information as of Sat 27 Sep 10:28:45 UTC 2025

System load:  1.46           Processes:    276
Usage of /:   70.2% of 11.21GB Users logged in: 1
Memory usage: 57%           IPv4 address for ens33: 192.168.161.129
Swap usage:   9%

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

hajra@ubuntu-lab:~$

```

**Ubuntu Server Installed Successfully.**

## 5. Accessing your Ubuntu Server from Windows

```
ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
link/ether 00:0c:29:6a:f6:87 brd ff:ff:ff:ff:ff:ff
altname enp2s1
inet 192.168.161.129/24 metric 100 brd 192.168.161.255 scope global dynamic ens33
    valid_lft 1082sec preferred_lft 1082sec
inet6 fe80::20c:29ff:fe6a:f687/64 scope link
    valid_lft forever preferred_lft forever
```

1. Find the IP address of your Ubuntu Server using “ip addr”

```
PS C:\Users\HP> ping 192.168.161.129

Pinging 192.168.161.129 with 32 bytes of data:
Reply from 192.168.161.129: bytes=32 time=1ms TTL=64
Reply from 192.168.161.129: bytes=32 time<1ms TTL=64
Reply from 192.168.161.129: bytes=32 time<1ms TTL=64
Reply from 192.168.161.129: bytes=32 time=3ms TTL=64

Ping statistics for 192.168.161.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

2. Connect via SSH from Windows
3. **Accept the fingerprint** (first time only)

Type yes when prompted.

```
PS C:\Users\HP> ssh hajra@192.168.161.129
The authenticity of host '192.168.161.129 (192.168.161.129)' can't be established.
ED25519 key fingerprint is SHA256:M5unwK7+jxUhr6KM3bbMPRkghlGd+Kq5uspTQZ5Up3w.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

4. **Enter your password**

Use the same password you set up during the Ubuntu Server installation.

```
Warning: Permanently added '192.168.161.129' (ED25519) to the list of known hosts.
hajra@192.168.161.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-84-generic x86_64)

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

System information as of Sat 27 Sep 10:28:45 UTC 2025

System load:  1.46           Processes:    276
Usage of /:   70.2% of 11.21GB Users logged in: 1
Memory usage: 57%           IPv4 address for ens33: 192.168.161.129
Swap usage:   9%

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

hajra@ubuntu-lab: $
```

