CLOUD COMPUTING LAB

SUBMITTED TO

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SUBMITTED BY

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2023-BSE-025

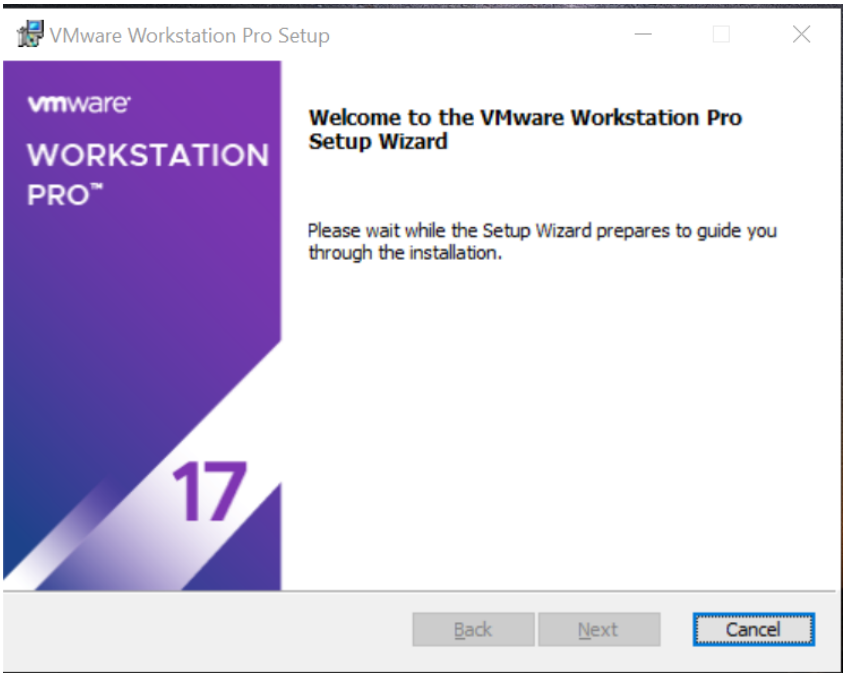
BSE V-A

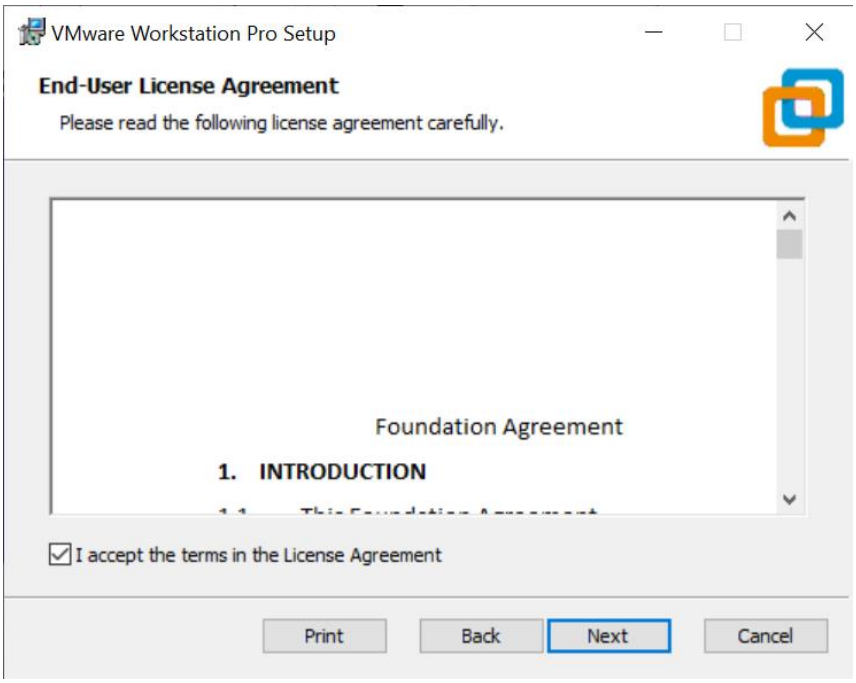
Lab 01

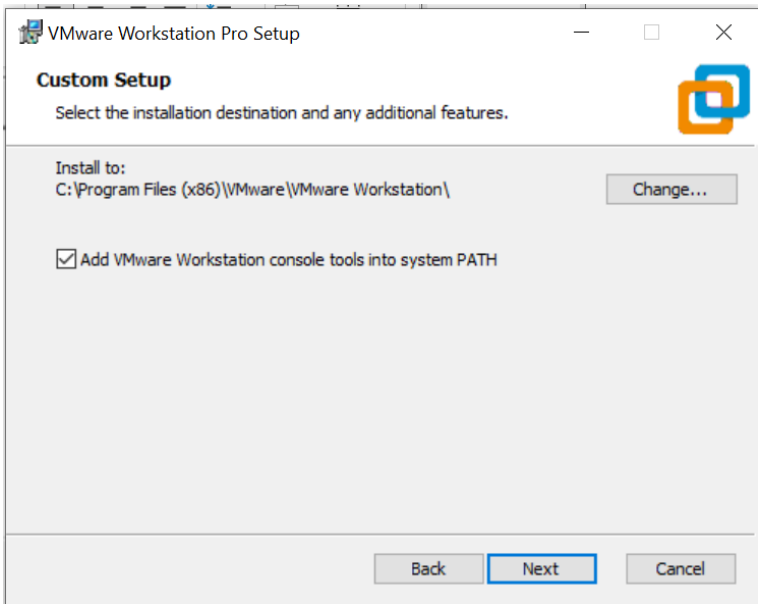
Lab title

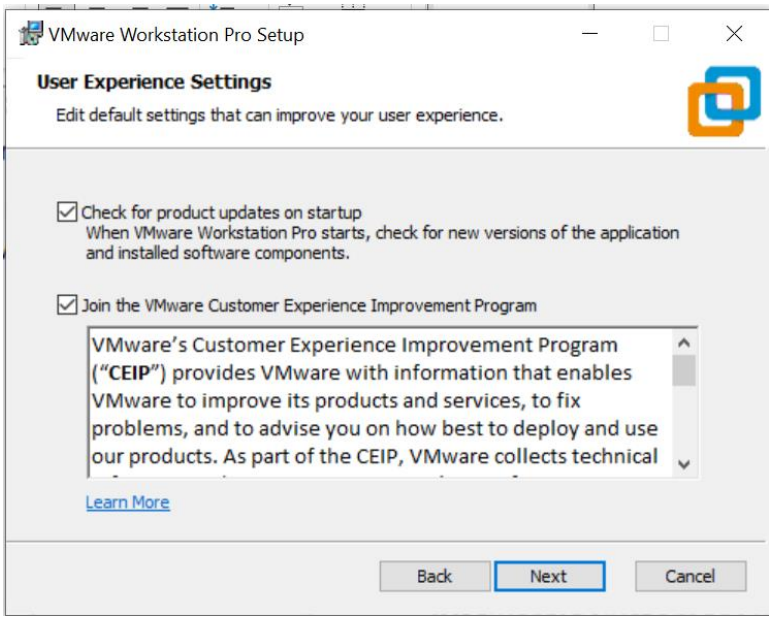
Install Ubuntu Server

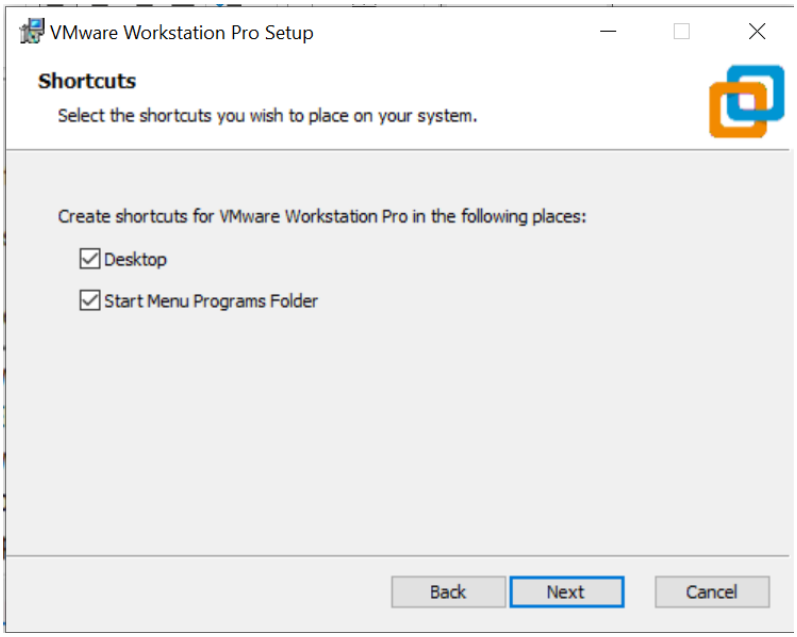
First of all, we'll download VMware Workstation Pro,

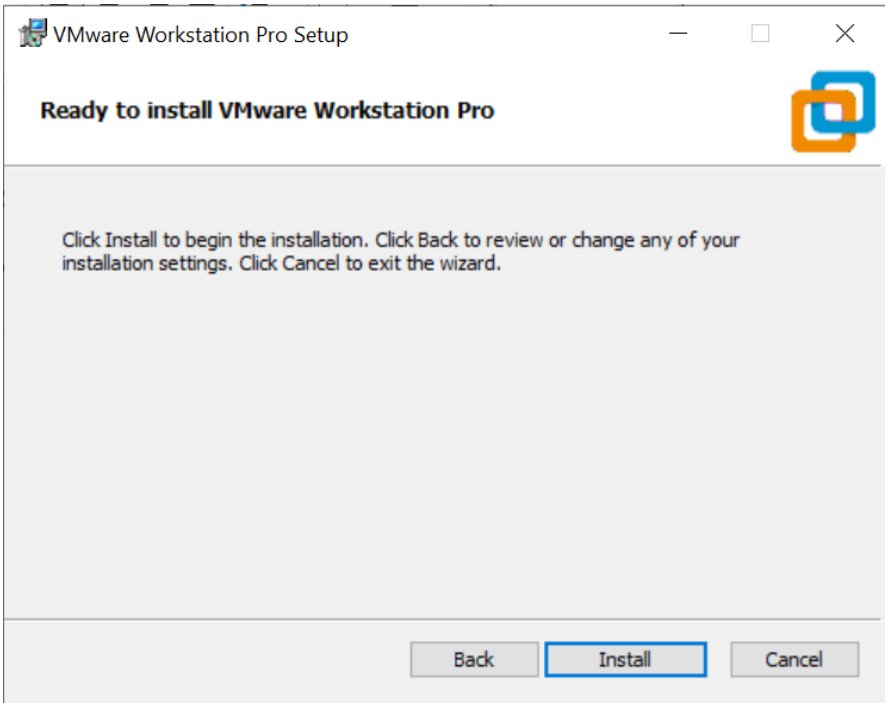


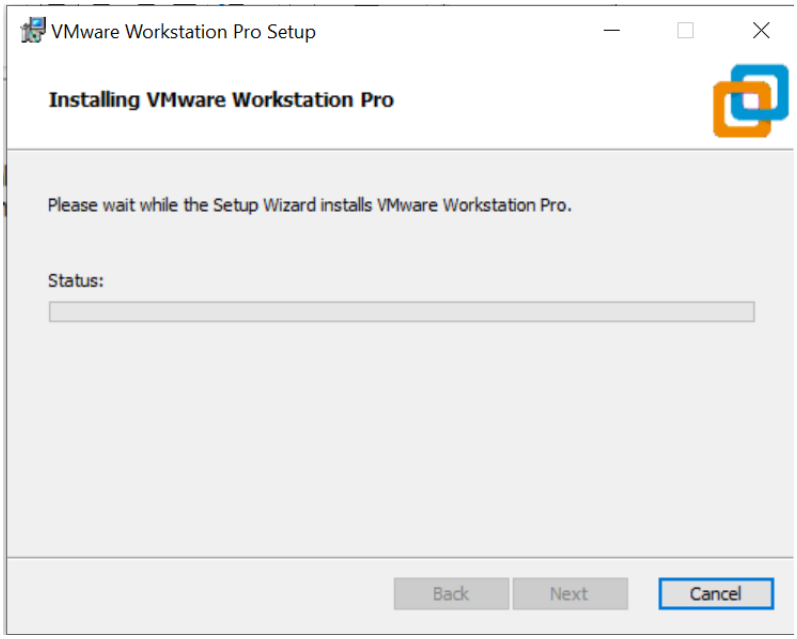


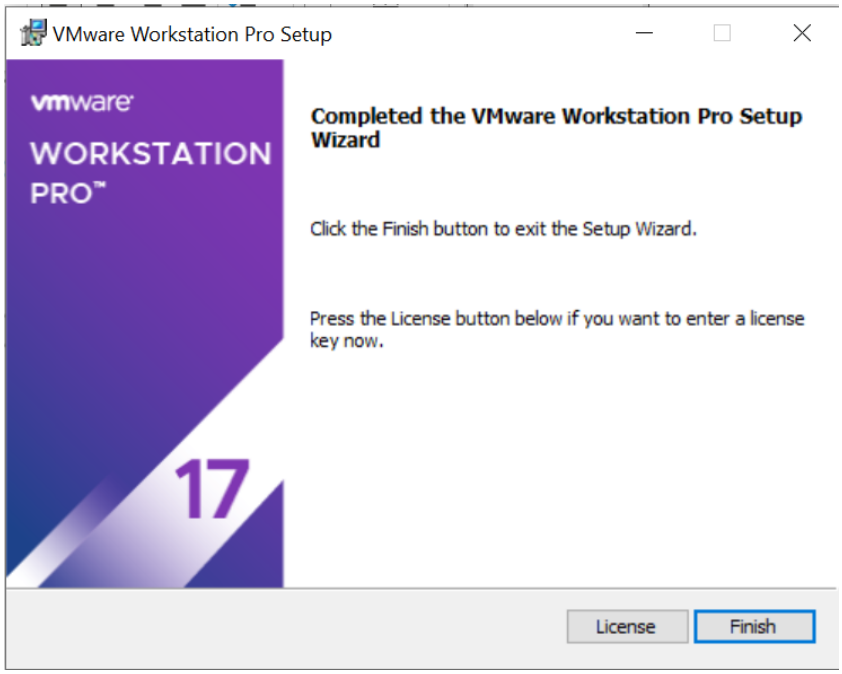

VMware Workstation Pro Setup
Custom Setup
Select the installation destination and any additional features.
Install to:
C:\Program Files (x86)\VMware\VMware Workstation\
Change...
Add VMware Workstation console tools into system PATH
Back
Next
Cancel

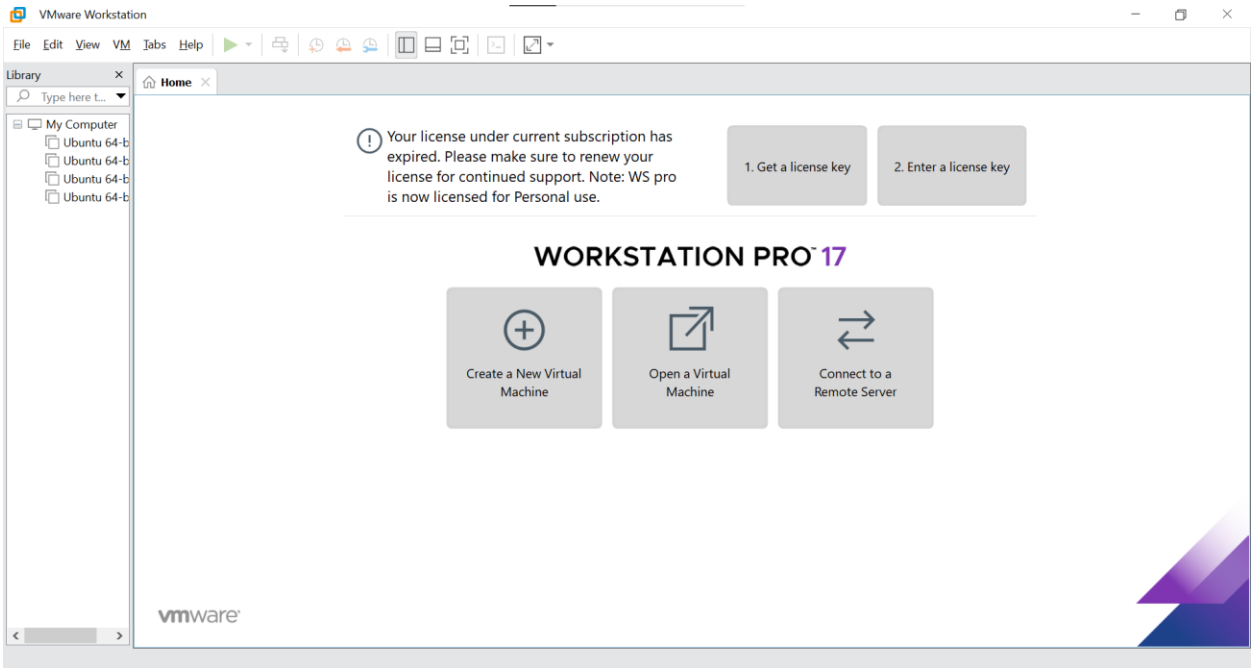

VMware Workstation Pro Setup
User Experience Settings
Edit default settings that can improve your user experience.
Check for product updates on startup
When VMware Workstation Pro starts, check for new versions of the application and installed software components.
Join the VMware Customer Experience Improvement Program
VMware's Customer Experience Improvement Program ("CEIP") provides VMware with information that enables VMware to improve its products and services, to fix problems, and to advise you on how best to deploy and use our products. As part of the CEIP, VMware collects technical
Learn More
Back
Next
Cancel


VMware Workstation Pro Setup
Shortcuts
Select the shortcuts you wish to place on your system.
Create shortcuts for VMware Workstation Pro in the following places:
Desktop
Start Menu Programs Folder
Back
Next
Cancel

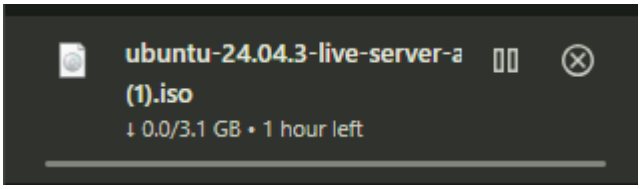

VMware Workstation Pro Setup
Ready to install VMware Workstation Pro
Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back
Install
Cancel


VMware Workstation Pro Setup
Installing VMware Workstation Pro
Please wait while the Setup Wizard installs VMware Workstation Pro.
Status:
Back
Next
Cancel

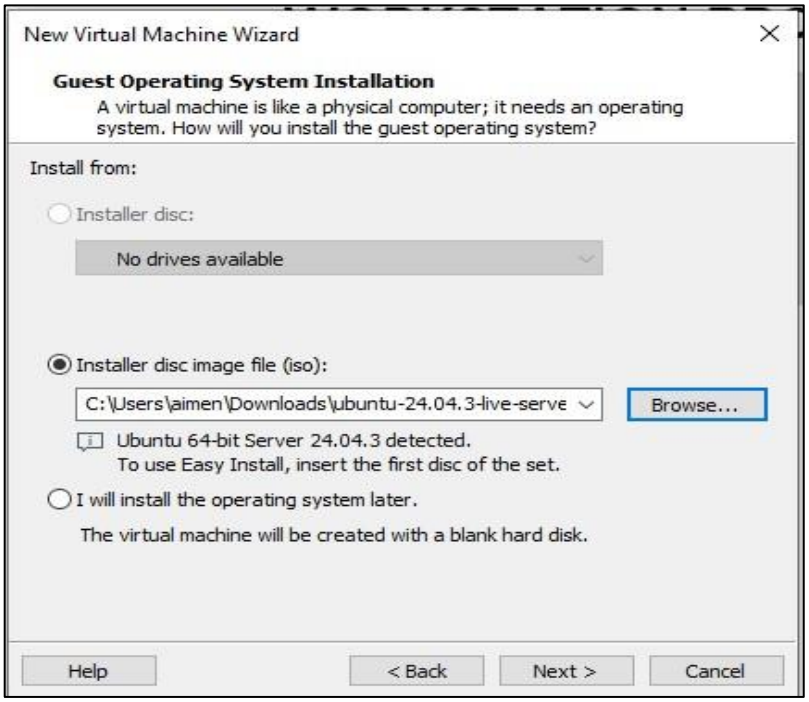

VMware Workstation Pro Setup
vmware
WORKSTATION
PRO™
17
Completed the VMware Workstation Pro Setup Wizard
Click the Finish button to exit the Setup Wizard.
Press the License button below if you want to enter a license key now.
License
Finish



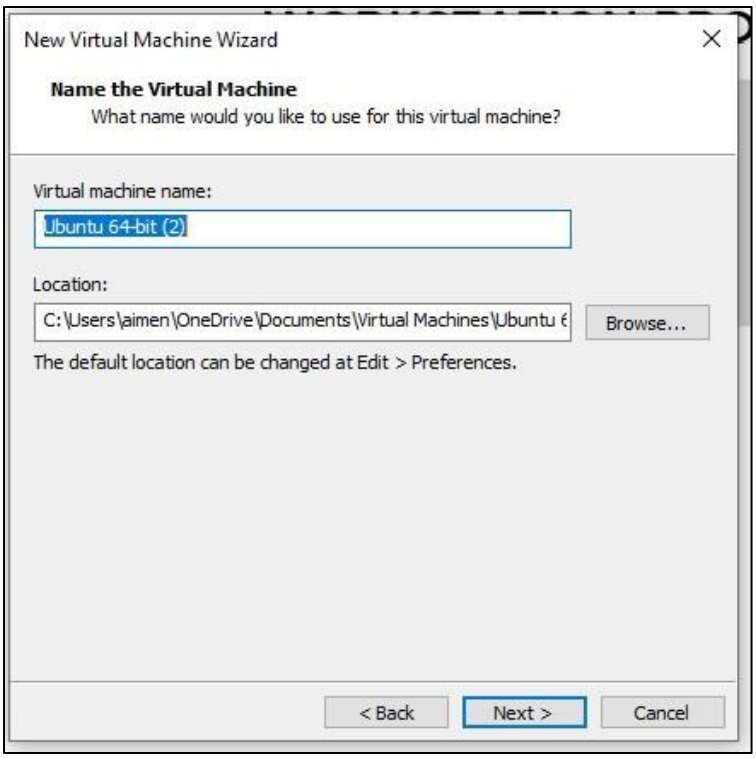
Now, we'll download Ubuntu Server 24.04 LTS version,

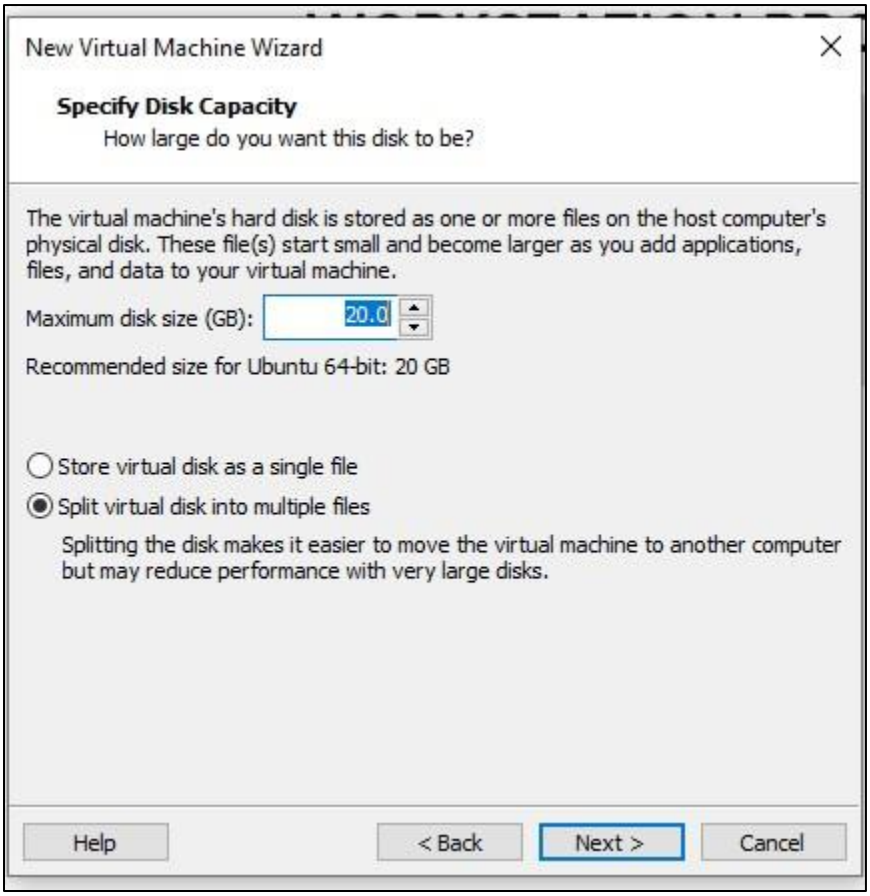


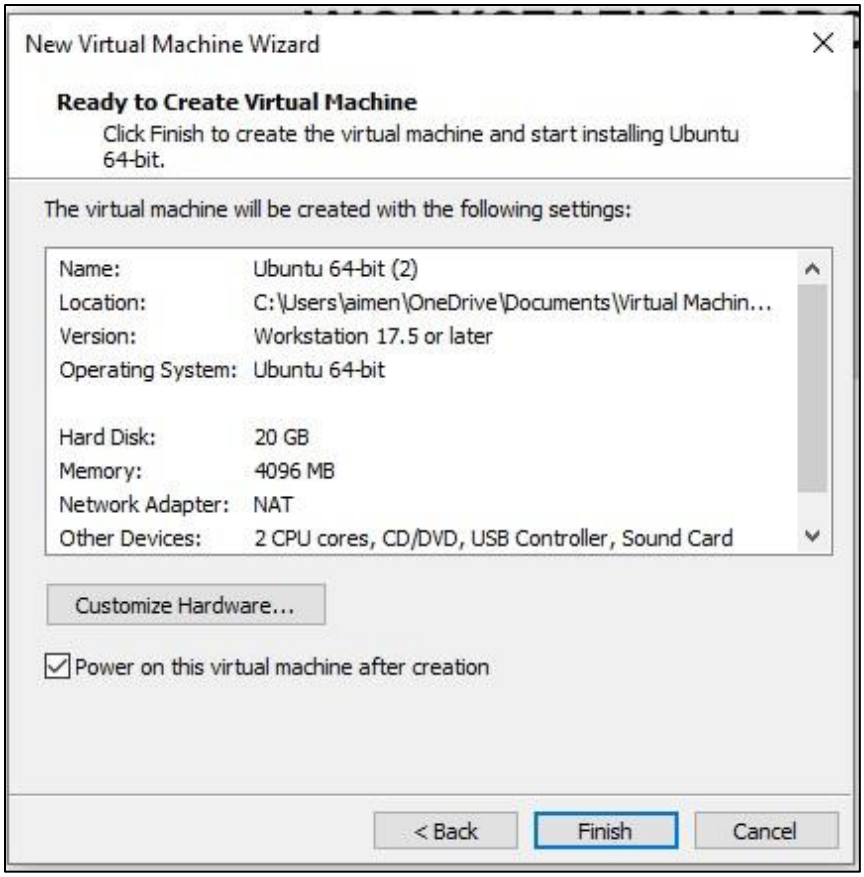
Going back to VMware, we'll click on 'Create a new machine',

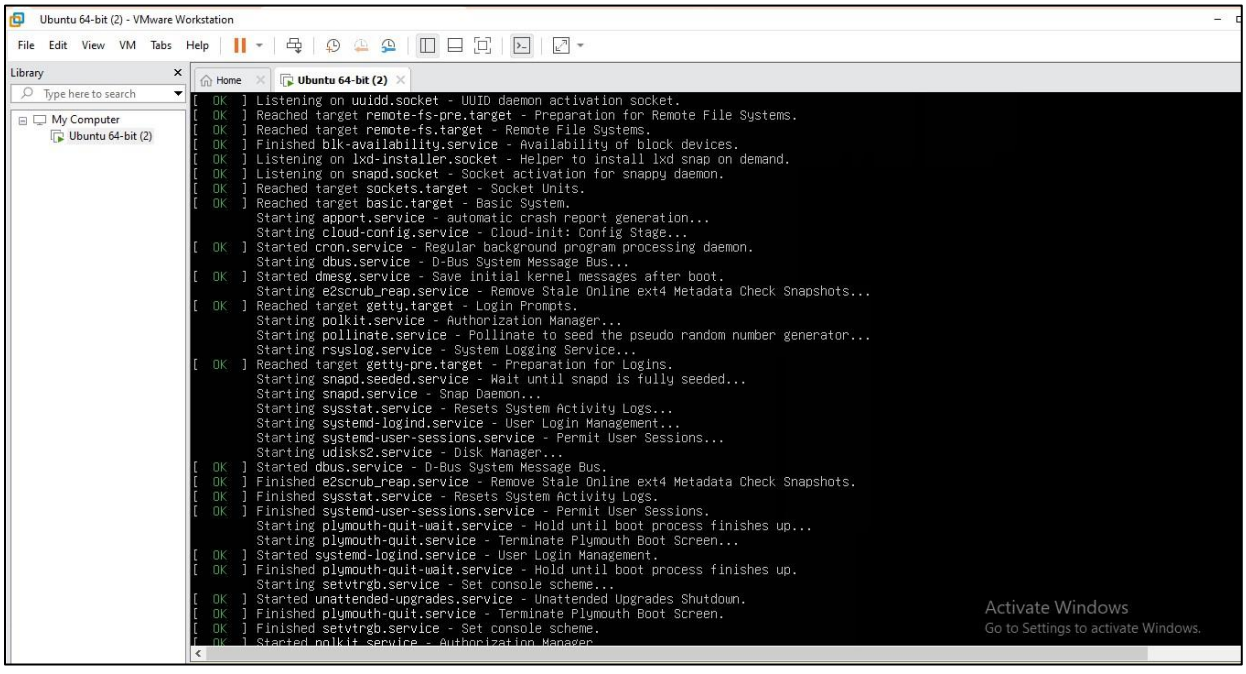


Choosing location of where all files will be stored,

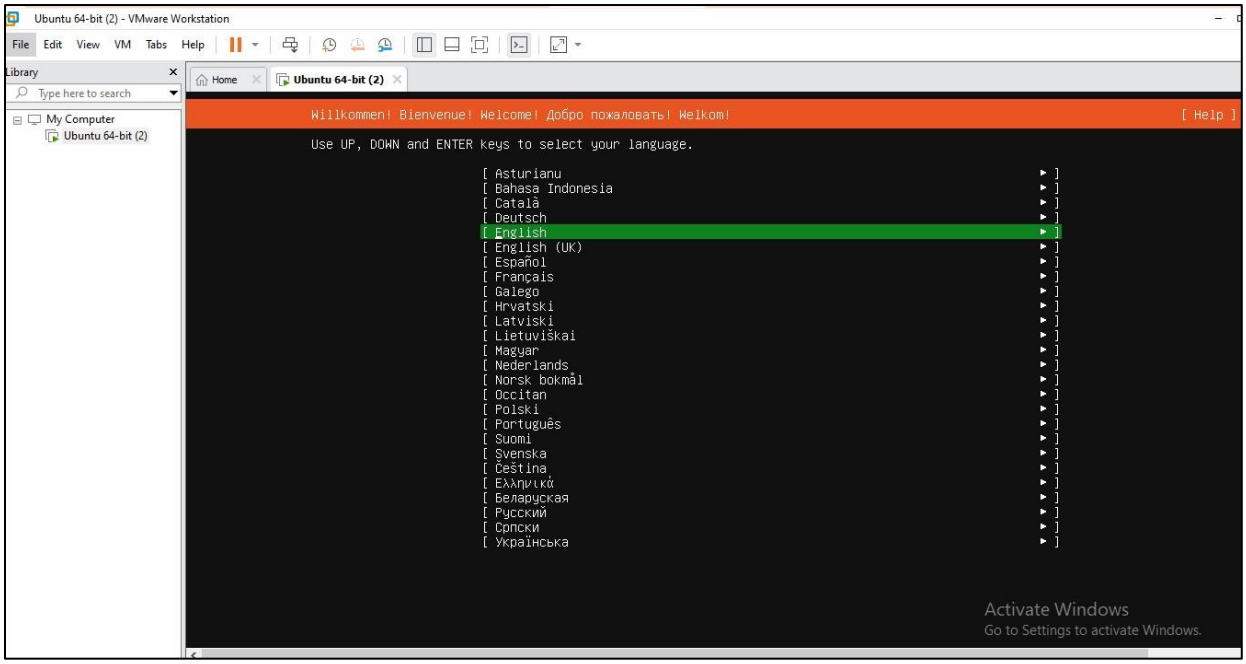

New Virtual Machine Wizard
Name the Virtual Machine
What name would you like to use for this virtual machine?
Virtual machine name:
Ubuntu 64-bit (2)
Location:
C:\Users\aimen\OneDrive\Documents\Virtual Machines\Ubuntu 6
Browse...
The default location can be changed at Edit > Preferences.
< Back
Next >
Cancel

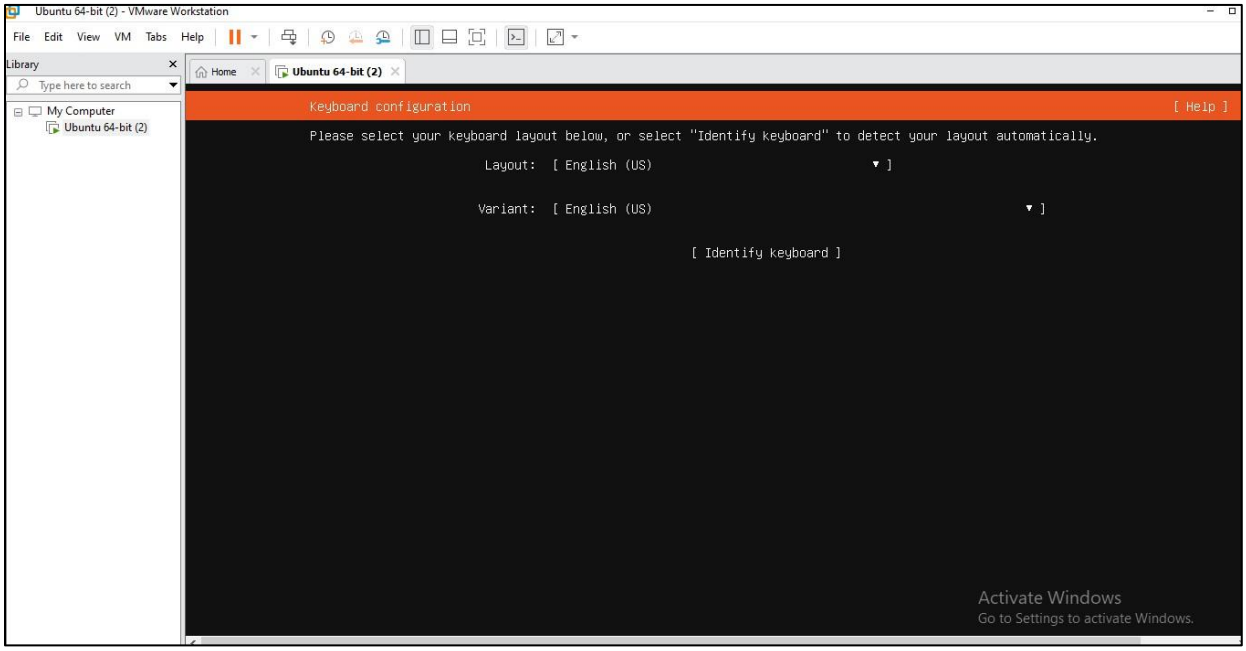

New Virtual Machine Wizard
Specify Disk Capacity
How large do you want this disk to be?
The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.
Maximum disk size (GB):
20.0
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

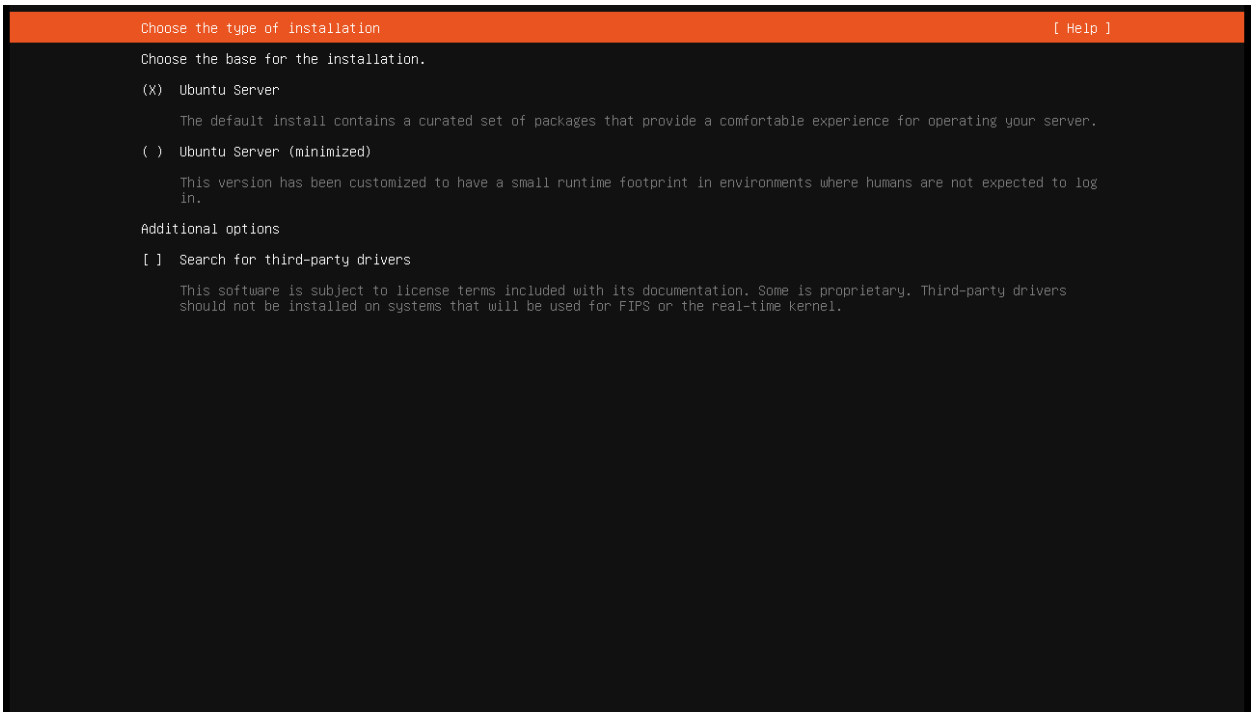

New Virtual Machine Wizard
Ready to Create Virtual Machine
Click Finish to create the virtual machine and start installing Ubuntu 64-bit.
The virtual machine will be created with the following settings:
Name: Ubuntu 64-bit (2)
Location: C:\Users\aimen\OneDrive\Documents\Virtual Machin...
Version: Workstation 17.5 or later
Operating System: Ubuntu 64-bit
Hard Disk: 20 GB
Memory: 4096 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

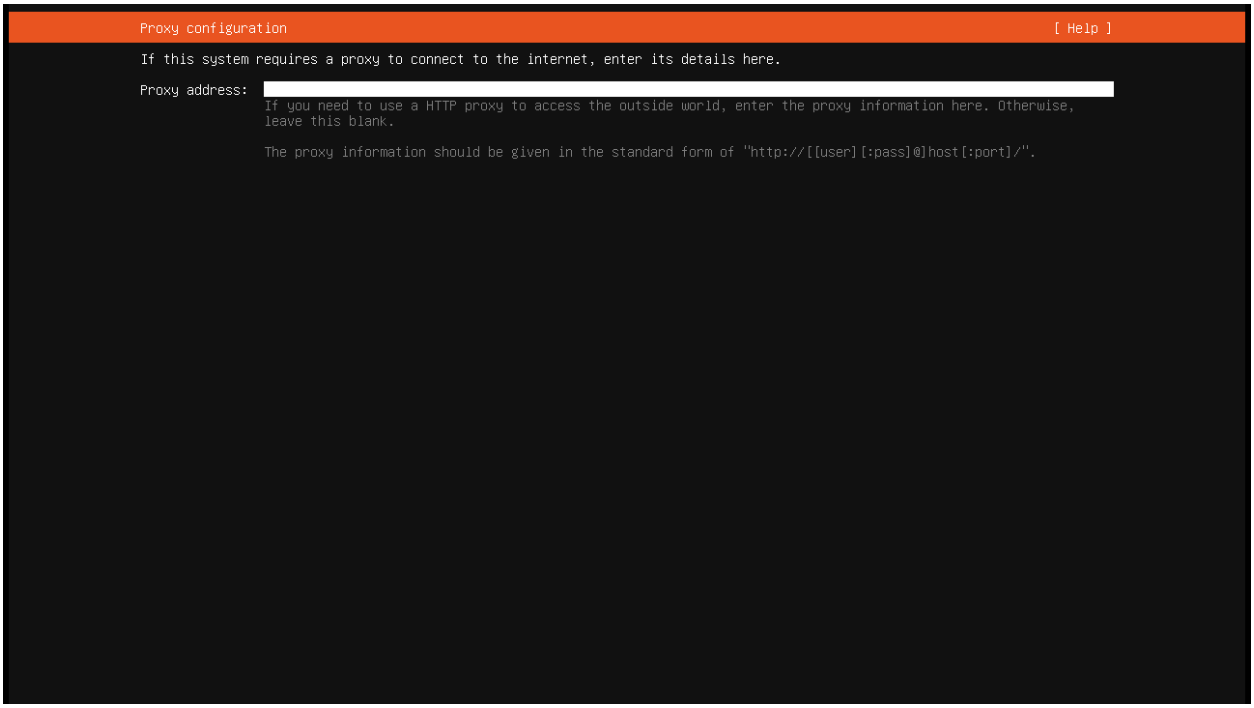

Ubuntu 64-bit (2) - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Home
Ubuntu 64-bit (2)
[OK] Listening on uuidd.socket - UUID daemon activation socket.
[OK] Reached target remote-fs-pre.target - Preparation for Remote File Systems.
[OK] Reached target remote-fs.target - Remote File Systems.
[OK] Finished blk-availability.service - Availability of block devices.
[OK] Listening on lxd-installer.socket - Helper to install lxd snap on demand.
[OK] Listening on snapd.socket - Socket activation for snappy daemon.
[OK] Reached target sockets.target - Socket Units.
[OK] Reached target basic.target - Basic System.
Starting apport.service - automatic crash report generation...
Starting cloud-config.service - Cloud-init: Config Stage...
[OK] Started cron.service - Regular background program processing daemon.
Starting dbus.service - D-Bus System Message Bus...
[OK] Started dmesg.service - Save initial kernel messages after boot.
Starting e2scrub_reap.service - Remove Stale Online ext4 Metadata Check Snapshots...
[OK] Reached target getty.target - Login Prompts.
Starting polkit.service - Authorization Manager...
Starting pollinate.service - Pollinate to seed the pseudo random number generator...
Starting rsyslog.service - System Logging Service...
[OK] Reached target getty-pre.target - Preparation for Logins.
Starting snapd.seeded.service - Wait until snapd is fully seeded...
Starting snapd.service - Snap Daemon...
Starting sysstat.service - Resets System Activity Logs...
Starting systemd-logind.service - User Login Management...
Starting systemd-user-sessions.service - Permit User Sessions...
Starting udisks2.service - Disk Manager...
[OK] Started dbus.service - D-Bus System Message Bus.
[OK] Finished e2scrub_reap.service - Remove Stale Online ext4 Metadata Check Snapshots.
[OK] Finished sysstat.service - Resets System Activity Logs.
[OK] Finished systemd-user-sessions.service - Permit User Sessions.
Starting plymouth-quit-wait.service - Hold until boot process finishes up...
Starting plymouth-quit.service - Terminate Plymouth Boot Screen...
[OK] Started systemd-logind.service - User Login Management.
[OK] Finished plymouth-quit-wait.service - Hold until boot process finishes up.
Starting setvtrgb.service - Set console scheme...
[OK] Started unattended-upgrades.service - Unattended Upgrades Shutdown.
[OK] Finished plymouth-quit.service - Terminate Plymouth Boot Screen.
[OK] Finished setvtrgb.service - Set console scheme.
[OK] Started polkit.service - Authorization Manager
Activate Windows
Go to Settings to activate Windows.

Selecting language and keyboard,

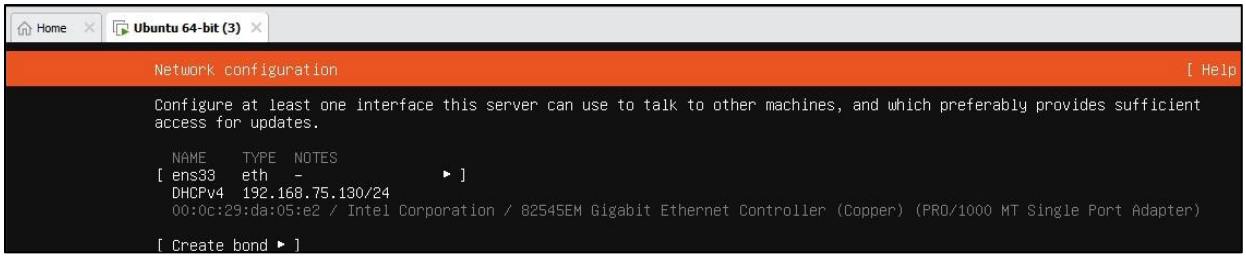


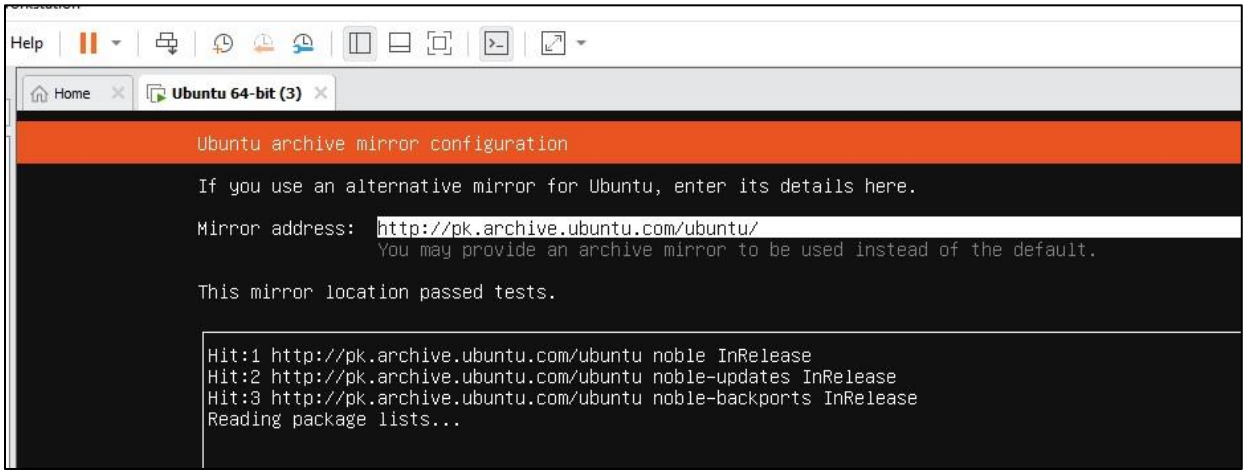


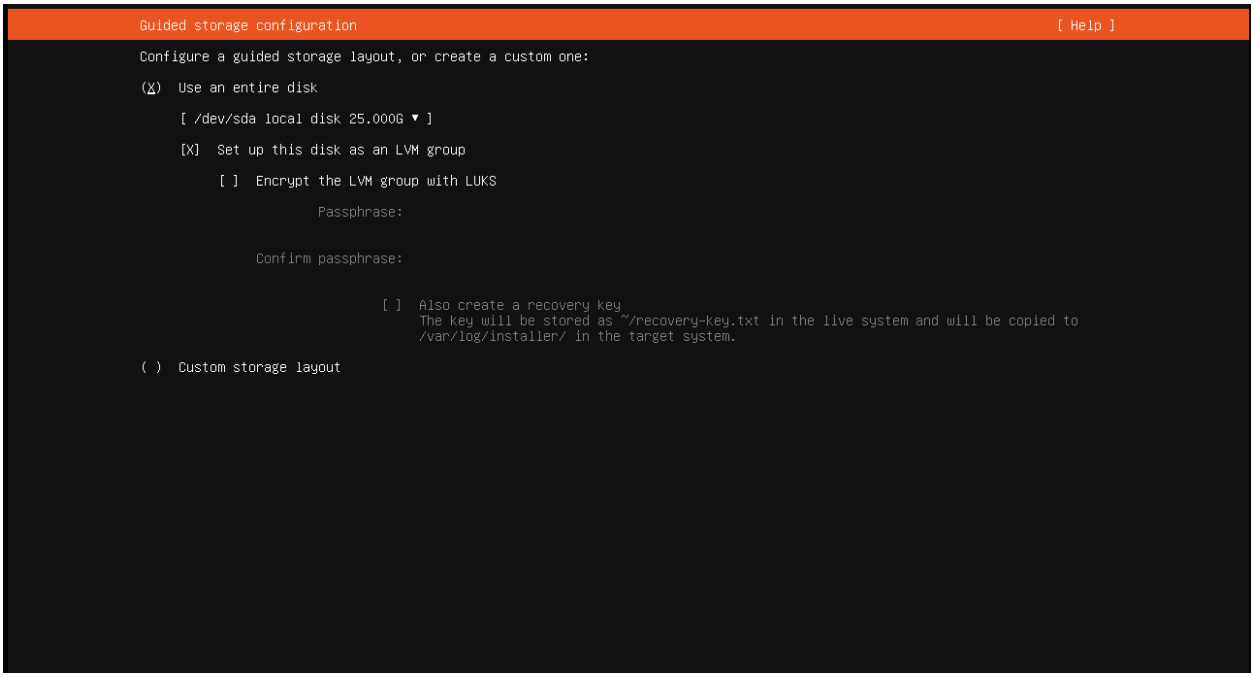

Choose the type of installation
[Help]
Choose the base for the installation.
(X) Ubuntu Server
The default install contains a curated set of packages that provide a comfortable experience for operating your server.
( ) Ubuntu Server (minimized)
This version has been customized to have a small runtime footprint in environments where humans are not expected to log in.
Additional options
[ ] Search for third-party drivers
This software is subject to license terms included with its documentation. Some is proprietary. Third-party drivers should not be installed on systems that will be used for FIPS or the real-time kernel.

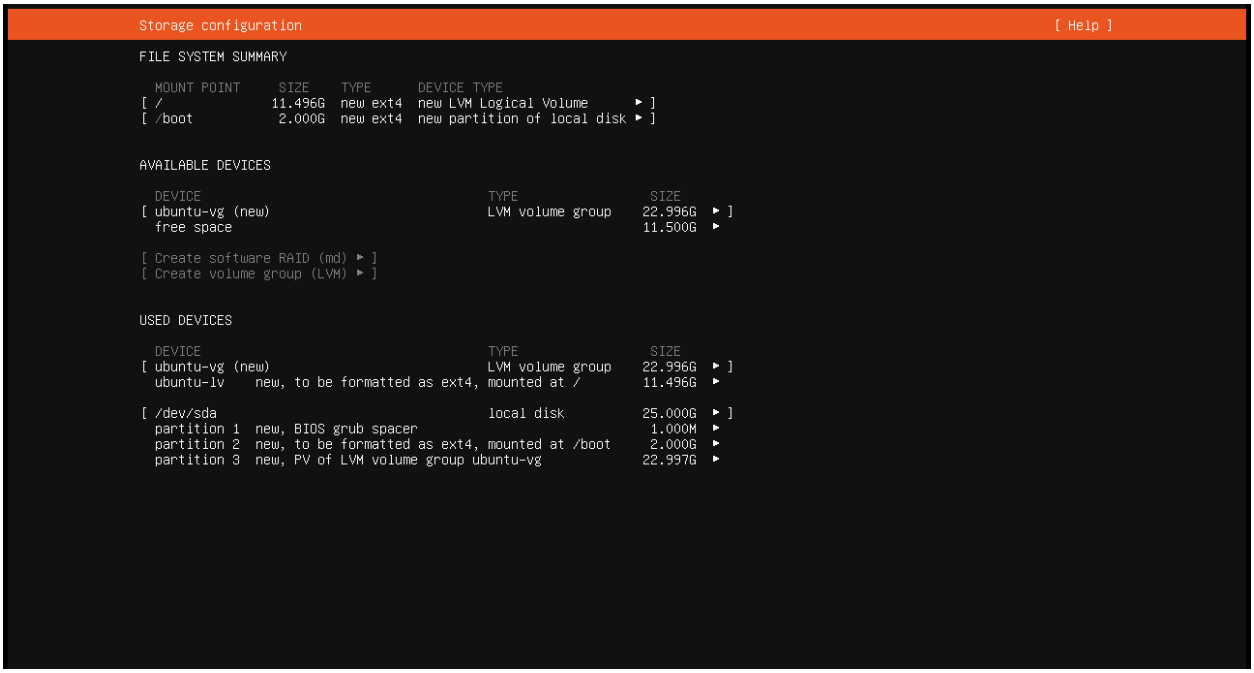

Proxy configuration
[Help]
If this system requires a proxy to connect to the internet, enter its details here.
Proxy address:
If you need to use a HTTP proxy to access the outside world, enter the proxy information here. Otherwise, leave this blank.
The proxy information should be given in the standard form of "http://[[user][:pass]@]host[:port]/".

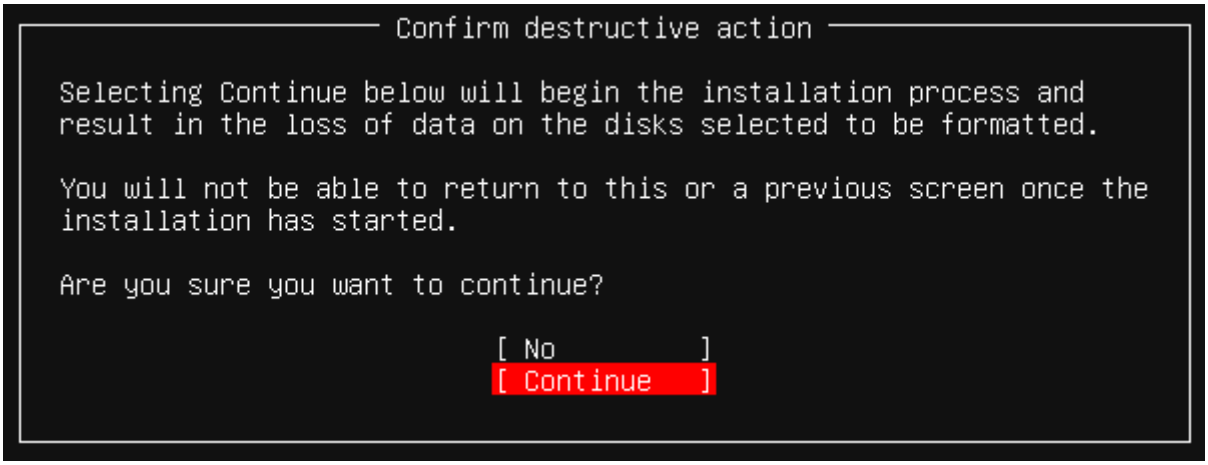
The installation continues as follows,

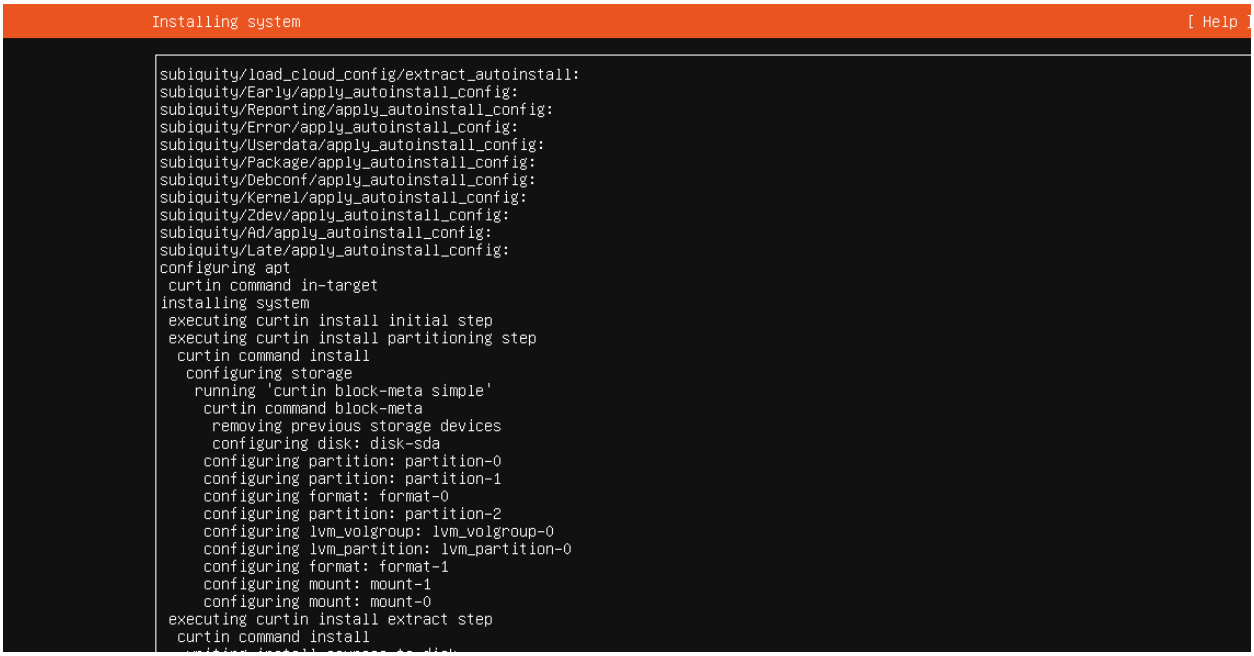


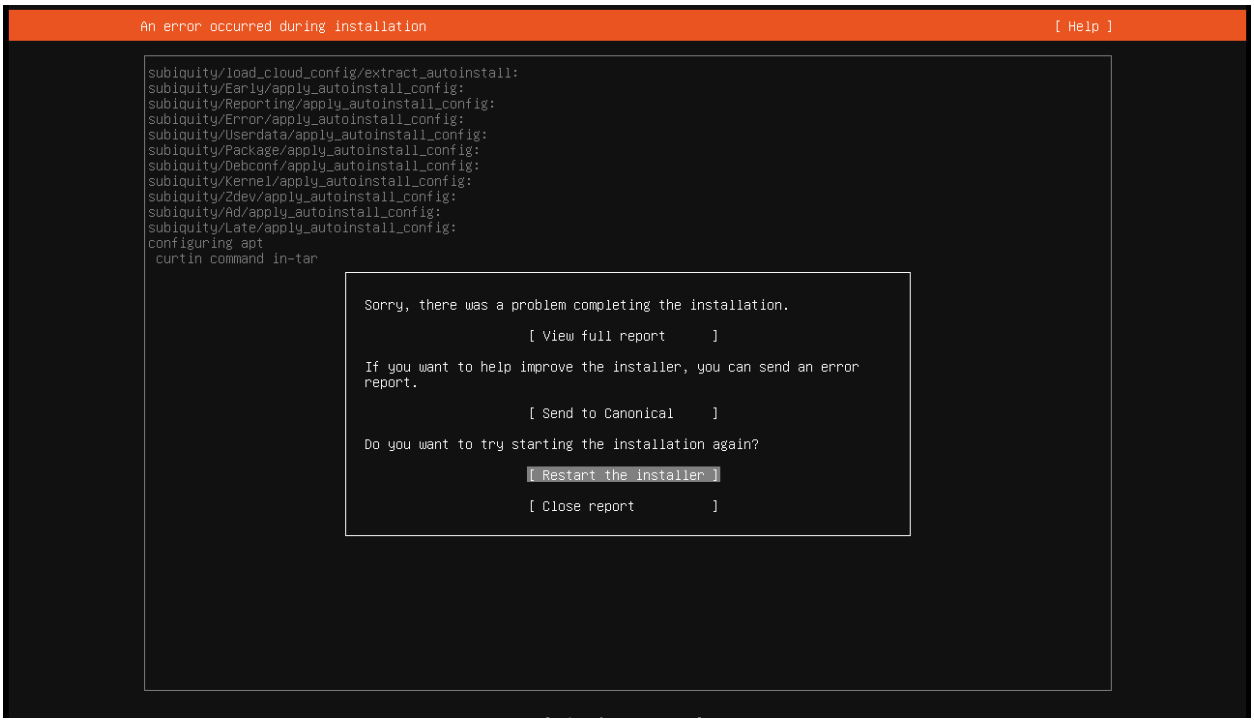





Storage configuration
[Help]
FILE SYSTEM SUMMARY
MOUNT POINT SIZE TYPE DEVICE TYPE
[/ 11.496G new ext4 new LVM Logical Volume ▸]
[/boot 2.000G new ext4 new partition of local disk ▸]
AVAILABLE DEVICES
DEVICE TYPE SIZE
[ubuntu-vg (new) LVM volume group 22.996G ▸]
free space 11.500G ▸
[Create software 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 ▸


Confirm destructive action
Selecting Continue below will begin the installation process and result in the loss of data on the disks selected to be formatted.
You will not be able to return to this or a previous screen once the installation has started.
Are you sure you want to continue?
[No]
[Continue]





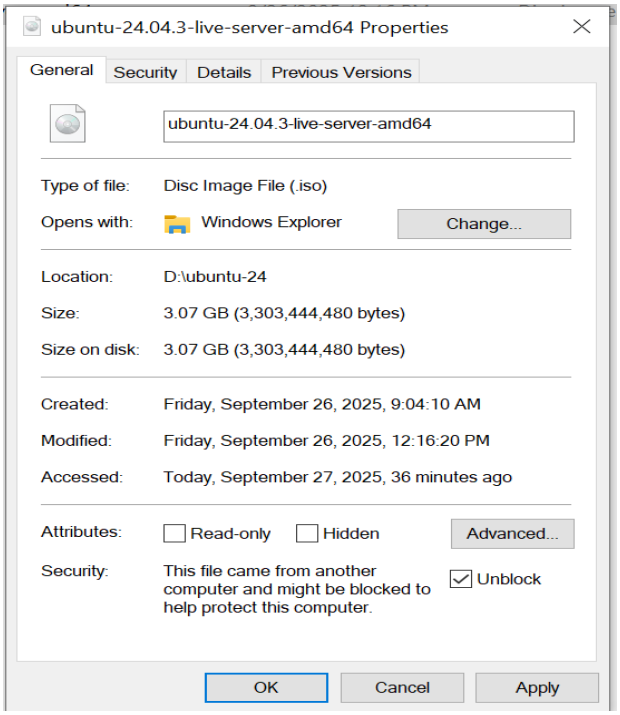
This error occurred.

- The solution is to press Alt+F3 on error screen.
- Now in the ubuntu terminal, enter ‘ip a’, we will look for any interface such as ens32, ens33 etc. along with an IP (192.168….).
- We will try pinging to 8.8.8.8 to ensure stable network connection.
- We will also try pinging to archive.ubuntu.com. This will test DNS.

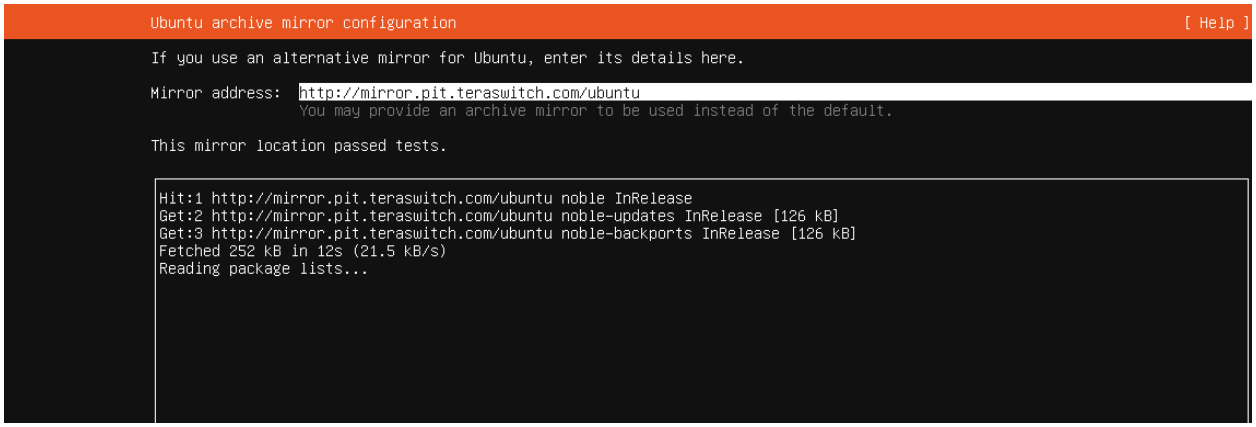
```
hamna_25@ubuntu:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:9f:12:75 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.100.124/24 metric 100 brd 192.168.100.255 scope global dynamic ens33
       valid_lft 85718sec preferred_lft 85718sec
    inet6 fe80::20c:29ff:fe9f:1275/64 scope link
       valid_lft forever preferred_lft forever
```

```
hamna_25@ubuntu:~$ ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=46.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=45.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=46.4 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3008ms
rtt min/avg/max/mdev = 44.425/45.586/46.368/0.767 ms
hamna_25@ubuntu:~$ ping -c 4 archive.ubuntu.com
PING archive.ubuntu.com (185.125.190.36) 56(84) bytes of data.
64 bytes from actiontoad.canonical.com (185.125.190.36): icmp_seq=1 ttl=52 time=342 ms
64 bytes from actiontoad.canonical.com (185.125.190.36): icmp_seq=2 ttl=52 time=366 ms
64 bytes from actiontoad.canonical.com (185.125.190.36): icmp_seq=3 ttl=52 time=284 ms
64 bytes from actiontoad.canonical.com (185.125.190.36): icmp_seq=4 ttl=52 time=305 ms

--- archive.ubuntu.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3007ms
rtt min/avg/max/mdev = 283.829/324.206/365.784/31.834 ms
```

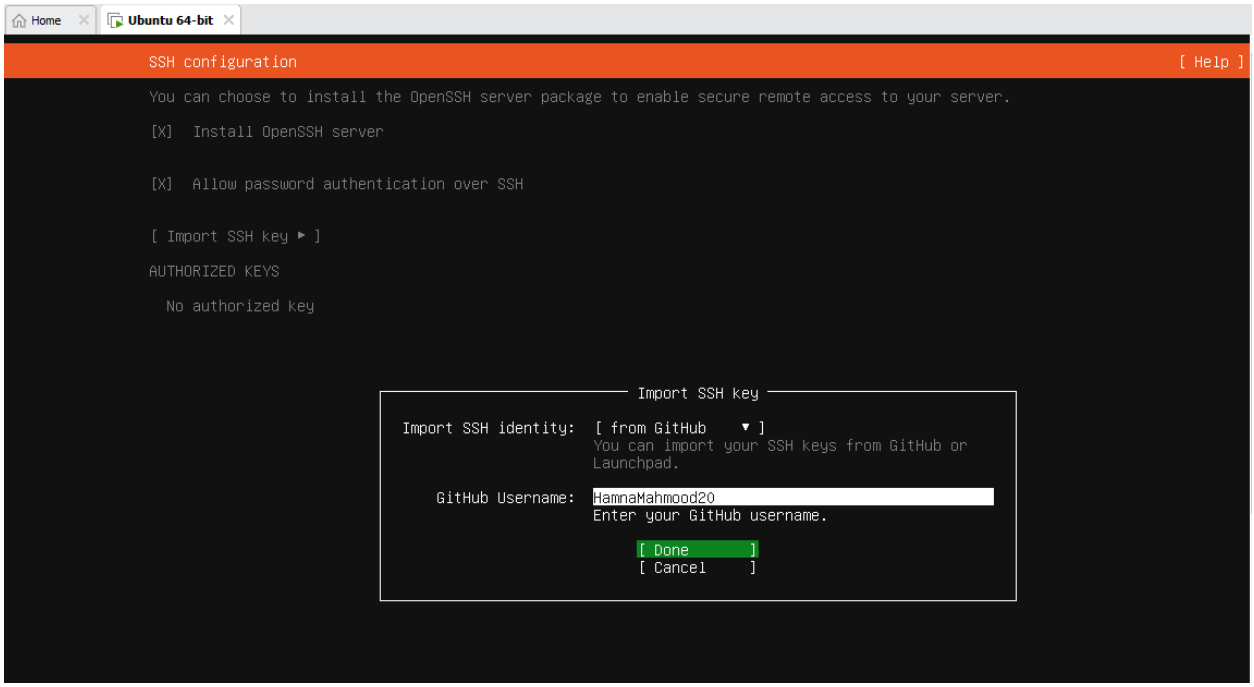
We will also need to check the unblock checkbox in properties of ubuntu ISO file.

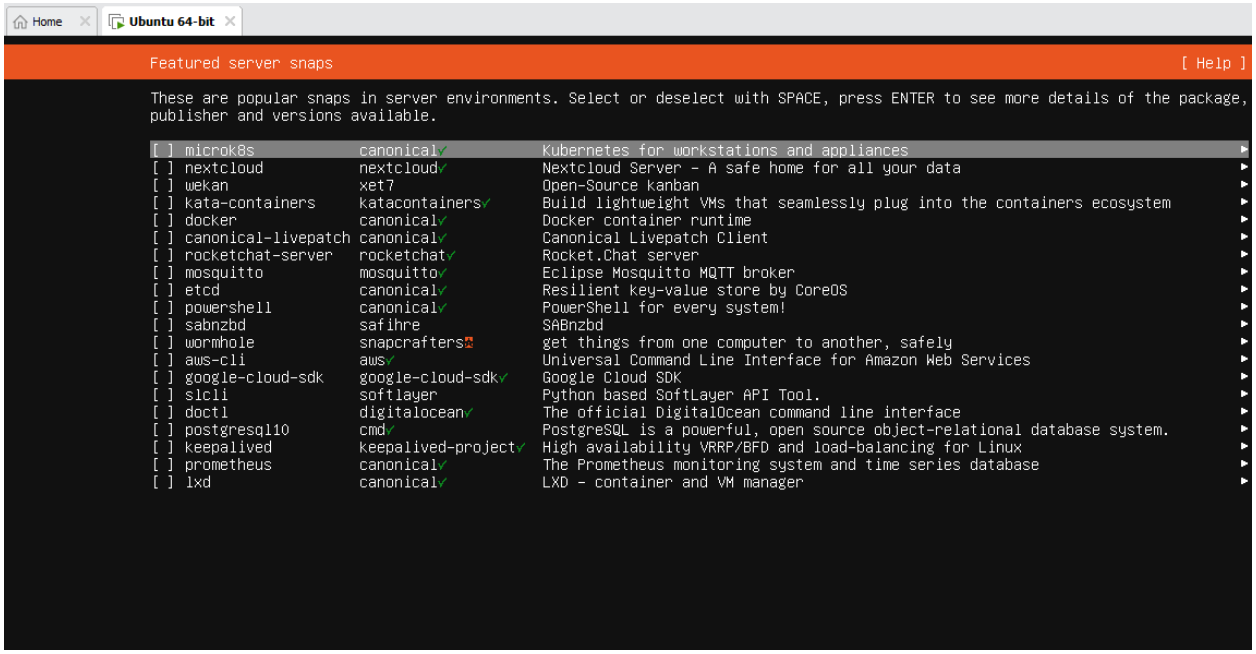


Restarting vm again, giving alternate mirror location,

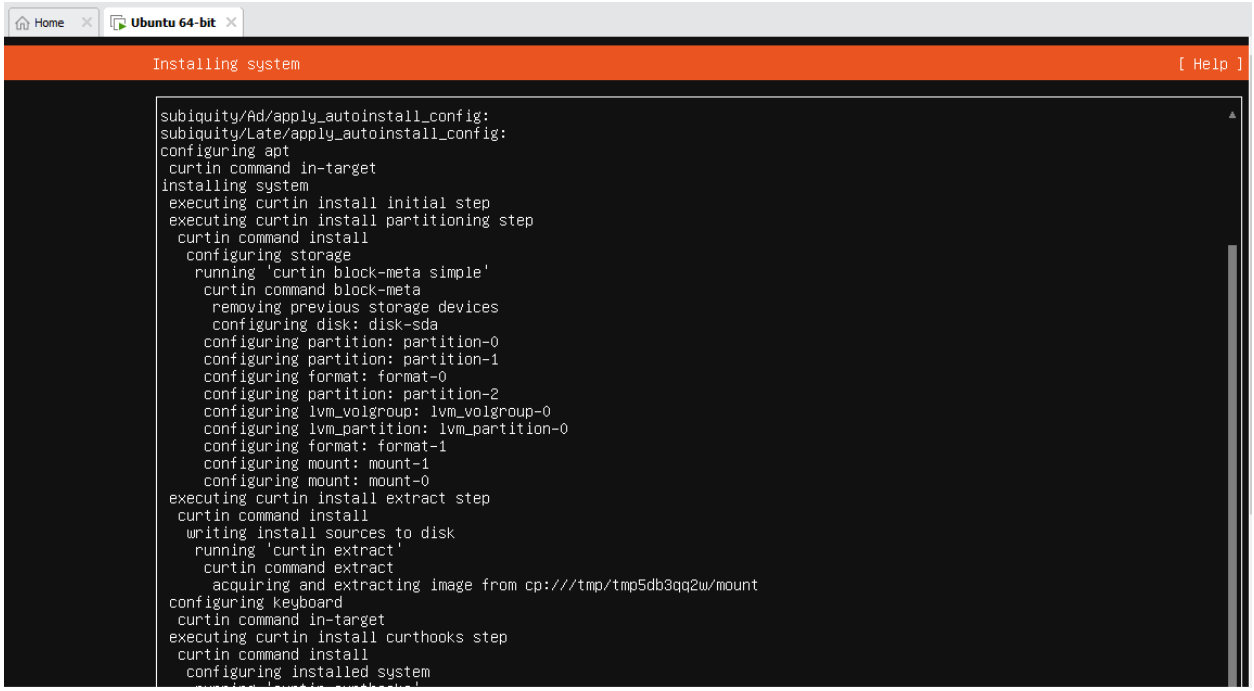


SSH Configuration





Installing Ubuntu,



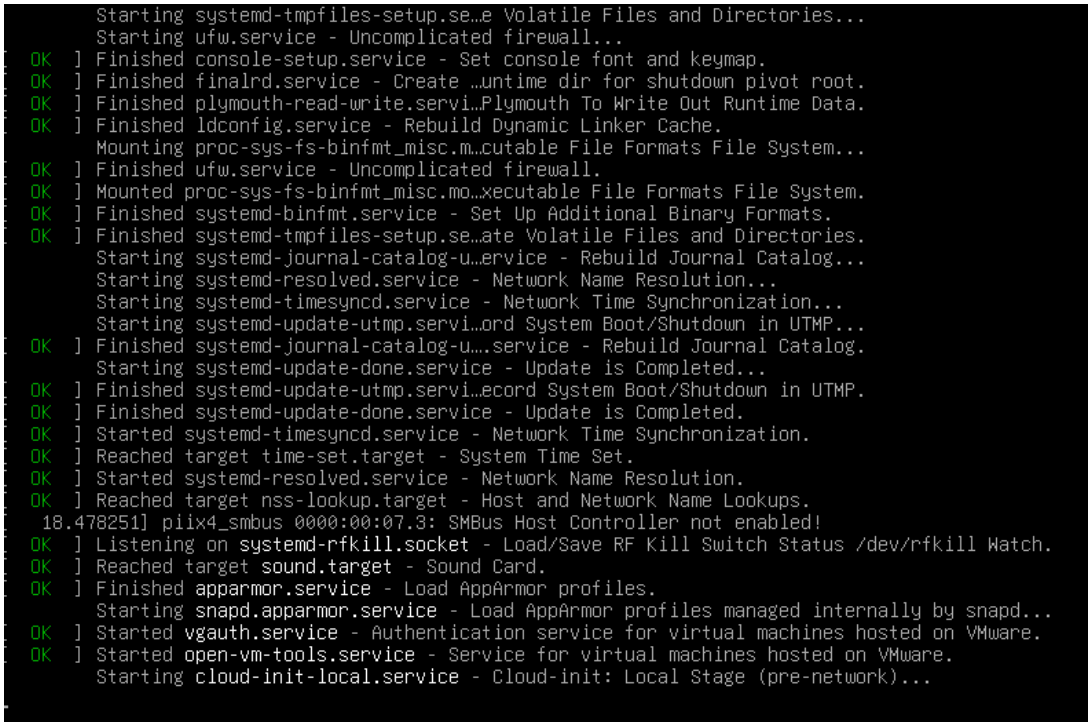
In shell, typing in commands to generate key,

```
PS C:\Users\ABC> ssh-keygen -t ed25519 -C "test-key"
>>
Generating public/private ed25519 key pair.
Enter file in which to save the key (C:\Users\ABC/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in C:\Users\ABC/.ssh/id_ed25519
Your public key has been saved in C:\Users\ABC/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:dMz2H85tcxD0AV9j+OFWweP4X7iW67VTa7hVX8htr34 test-key
The key's randomart image is:
+--[ED25519 256]--+
|              .==o|
|          o   oo==|
|         . =   *.=|
|        . o . o O |
|         S   . B.=|
|             +.*B|
|              ==%|
|             .=BE|
|             =B+.|
+----[SHA256]-----+
```

Getting public key,

```
+----[SHA256]----cat ~/.ssh/id_ed25519.pub
>> C:\Users\ABC>
ssh-ed25519 AAAAC3NzaC11ZDI1NTE5AAAAIG7bevFQIu4VxIk0qaPIeUVsAs9POg73GSB0FU3FNiAH test-key
```

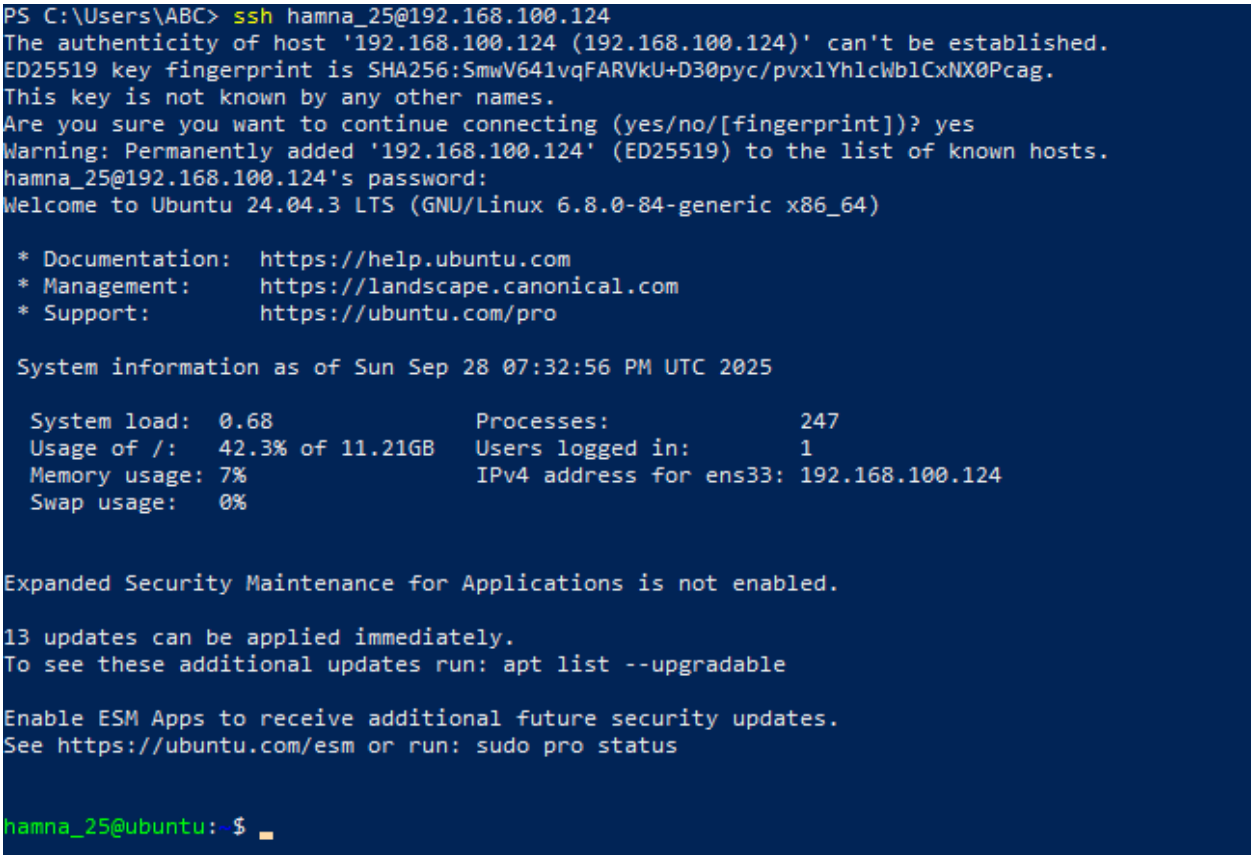
Opening vm again and copying the last line and pasting into Ubuntu Vm by first making a directory,



After a few minutes of installation, we are prompted to enter login and password which we set during installation,

```
ubuntu1804 login: hamna_25
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

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

 System information as of Sun Sep 28 12:43:40 AM UTC 2025

  System load: 0.14               Memory usage: 7%   Processes:       209
  Usage of /:  38.2% of 13.67GB   Swap usage:   0%   Users logged in: 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
```

Setting up SSH,



Now, we are remotely logged into our vm using SSH from shell successfully.