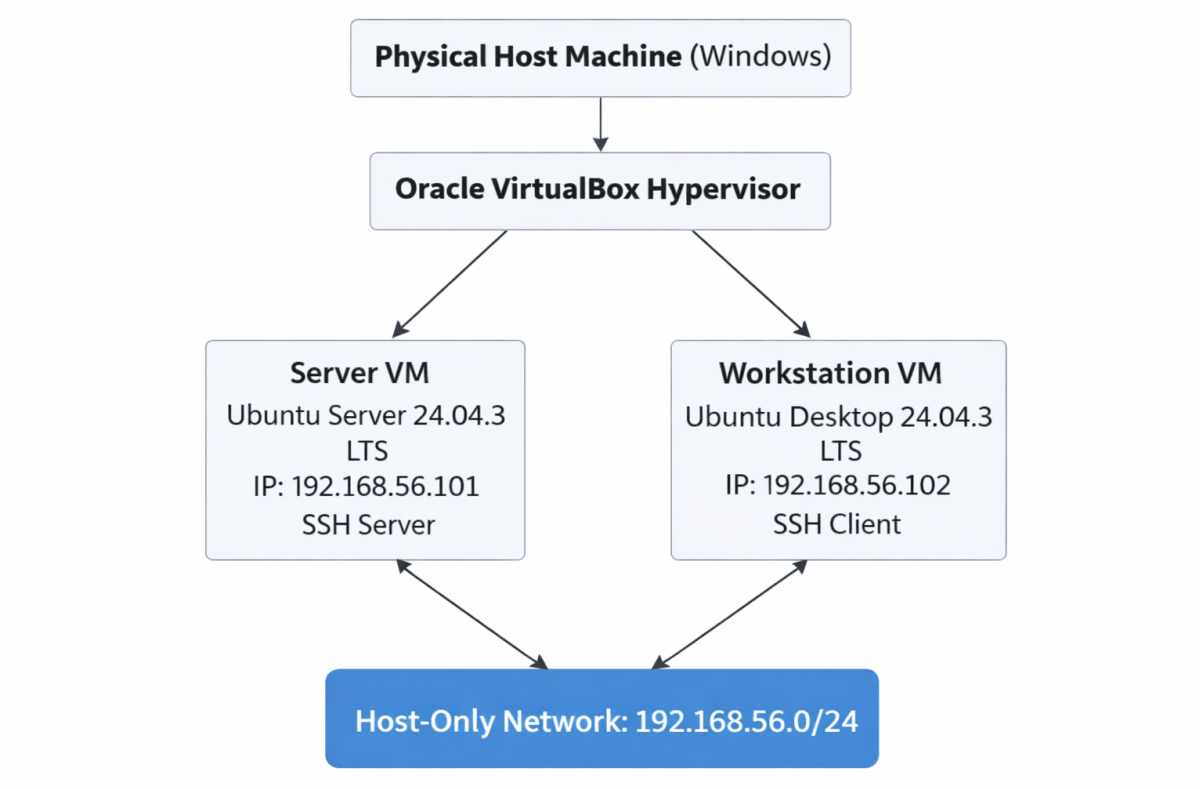
Assesment week 1
Week 4

Week 1

System Planning and Distribution Selection

Task 1



This diagram shows the system architecture used in the project. A Windows host machine runs Oracle VirtualBox, which hosts two virtual machines: an Ubuntu Server VM and an Ubuntu Desktop VM. Both VMs are connected using a Host-Only network (192.168.56.0/24). The workstation VM connects to the server VM using SSH for secure remote access.

Task 2

For this coursework, *Ubuntu Server 24.04.3 LTS* was chosen as the server operating system. Ubuntu Server is designed for server use and works well without a graphical interface. It is suitable for tasks such as SSH access, firewall setup, and secure system management [1].

Ubuntu Server is an LTS (Long-Term Support) release, which means it receives security updates and long-term support. This makes it stable and reliable for the full duration of the coursework [2]. Ubuntu Server is also widely used, so there is a large amount of documentation and community support available [1].

The system uses the APT package manager, which is simple to use for installing and updating software. Ubuntu Server also includes built-in security tools such as OpenSSH and UFW, which allow secure remote access and firewall configuration to be set up easily [3], [4]. These features meet the requirements of this coursework.

Comparison with Alternative Distributions

Feature	Ubuntu Server 24.04 LTS	CentOS / RHEL	Debian
Support	Long-term support	Enterprise / rolling	Community support
Ease of use	Easy to learn	More difficult	Medium
Package manager	apt	dnf / yum	apt
Software updates	Stable and current	Very stable	Very stable
Security tools	Easy (UFW, SSH)	Advanced (SELinux)	More manual
Suitability	Very suitable	Less suitable	Suitable
Cost	Free	RHEL paid	Free

Task 3

For this coursework, *Option A – Linux Desktop Virtual Machine* was chosen as the workstation system. The workstation uses Ubuntu Desktop 24.04.3 LTS and is used to connect to and manage the server system using SSH [3].

Using a Linux Desktop virtual machine keeps all administration work inside a virtual environment and separate from the host computer. This reduces risk and makes the system easier to manage.

Using the same Linux distribution on both the workstation and the server improves compatibility. Commands, tools, and package management behave in the same way on both systems, which makes learning and troubleshooting easier.

Ubuntu Desktop includes a terminal for SSH access and a web browser for documentation and coursework tasks, making it suitable as an administrative workstation.

Option A was chosen instead of using the host machine or a hybrid setup because it provides a simple and consistent environment, which is easier to understand and manage for coursework purposes.

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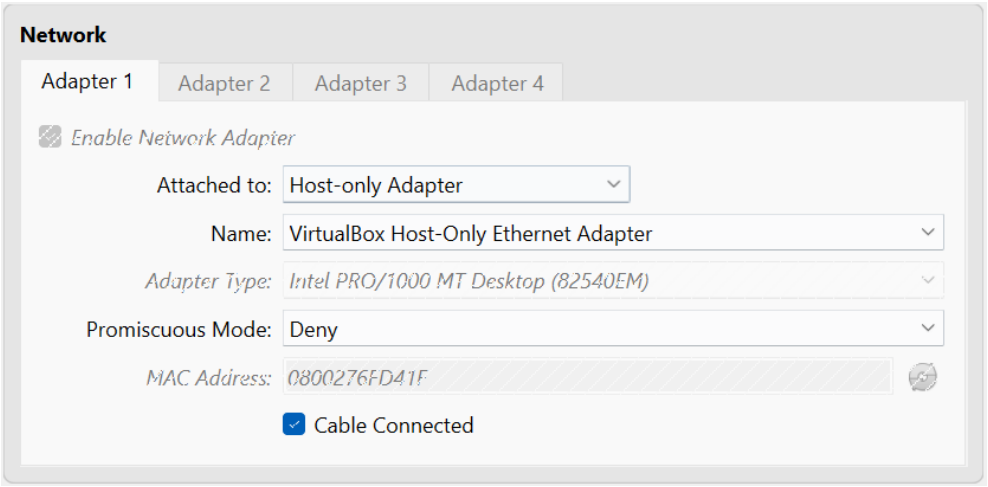
Task 4

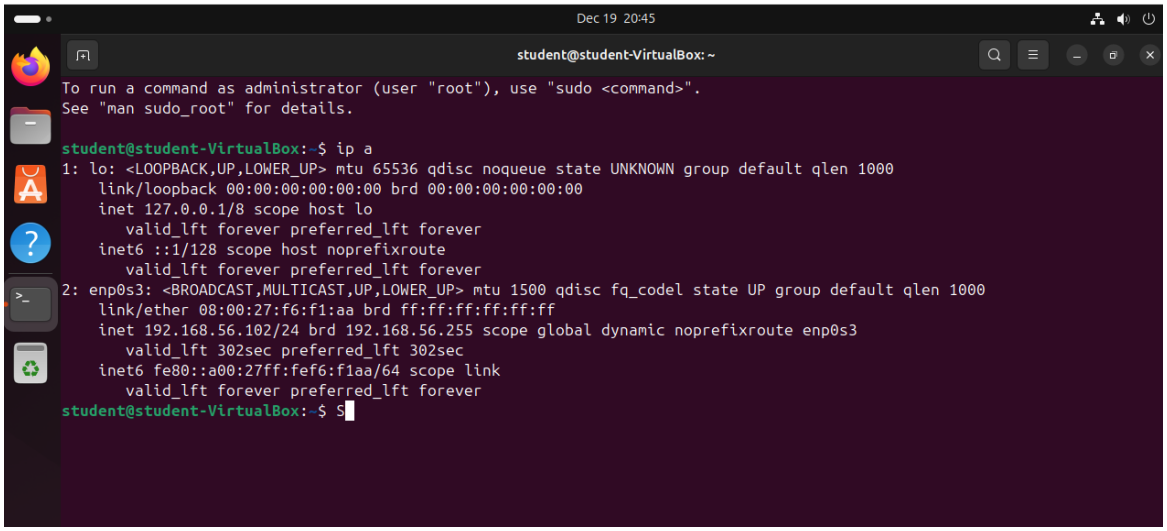
The network was configured using Oracle VirtualBox Host-Only Networking to allow secure communication between the server and workstation virtual machines while remaining isolated from external networks.

In VirtualBox, both the Server VM and Workstation VM were configured with Adapter 1 set to Host-Only Adapter using the *VirtualBox Host-Only Ethernet Adapter*. This ensures that both virtual machines can communicate with each other and with the host system.



IP addressing is provided automatically using DHCP within the Host-Only network:

Device	IP Address	Network
Host-only adapter	192.168.56.1	192.168.56.0/24
Server VM	192.168.56.101	192.168.56.0/24
Workstation VM	192.168.56.102	192.168.56.0/24



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IP address of Workstation VM

```
student@servervm:~$ 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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:6f:d4:1f brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.101/24 metric 100 brd 192.168.56.255 scope global dynamic enp0s3
       valid_lft 398sec preferred_lft 398sec
    inet6 fe80::a00:27ff:fe6f:d41f/64 scope link
       valid_lft forever preferred_lft forever
student@servervm:~$
```

IP address of Server VM

This configuration enables reliable SSH communication between the workstation and server while maintaining network isolation and security, meeting the assessment of networking requirements.

```
Warning: Permanently added '192.168.56.101' (ED25519) to the list of known hosts.
student@192.168.56.101's 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 Fri 19 Dec 21:30:12 UTC 2025

  System load: 0.04               Memory usage: 3%   Processes:       117
  Usage of /:  19.8% of 12.36GB   Swap usage:   0%   Users logged in: 1
```

SSH connection demonstrated functioning

```
student@servervm:~$ sudo ufw status verbose
Status: active
Logging: on (low)
```

The Ubuntu Server firewall is enabled and active

Task 5

```
student@servervm:~$ uname -a
Linux servervm 6.8.0-71-generic #71-Ubuntu SMP PREEMPT_DYNAMIC Tue Jul 22 16:52:38 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
student@servervm:~$
```

Kernel and system information (uname –a)

```
student@servervm:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:           6.2Gi       421Mi       5.5Gi       1.1Mi       542Mi       5.8Gi
Swap:             0B          0B          0B
```

Memoty usage (free –h)

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```
student@servervm:~$ df -h
Filesystem                         Size  Used Avail Use% Mounted on
tmpfs                              639M  1.1M  638M   1% /run
/dev/mapper/ubuntu--vg-ubuntu--lv   13G  2.5G  9.3G  21% /
tmpfs                              3.2G     0  3.2G   0% /dev/shm
tmpfs                              5.0M     0  5.0M   0% /run/lock
/dev/sda2                          2.0G  100M  1.7G   6% /boot
tmpfs                              639M   12K  639M   1% /run/user/1000
```

Disk usage (df –h)

```
student@servervm:~$ ip addr
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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:6f:d4:1f brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.101/24 metric 100 brd 192.168.56.255 scope global dynamic enp0s3
       valid_lft 556sec preferred_lft 556sec
    inet6 fe80::a00:27ff:fe6f:d41f/64 scope link
       valid_lft forever preferred_lft forever
```

Network interfaces and IP addressing (ip addr)

```
student@servervm:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04.3 LTS
Release:        24.04
Codename:       noble
student@servervm:~$
```

Linux distribution version (lsb_release –a)

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Reference List

[1] Canonical Ltd., “Ubuntu Server,” *Ubuntu Official Documentation*, 2024.
Available: https://ubuntu.com/server
[Accessed: 17 Dec 2025].

[2] Canonical Ltd., “Ubuntu release cycle and Long Term Support (LTS),” *Ubuntu*, 2024.
Available: https://ubuntu.com/about/release-cycle
[Accessed: 17 Dec 2025].

[3] Ubuntu Documentation Team, “OpenSSH Server,” *Ubuntu Documentation*, 2024.
Available: https://help.ubuntu.com/lts/serverguide/openssh-server.html
[Accessed: 17 Dec 2025].

[4] Ubuntu Documentation Team, “Uncomplicated Firewall (UFW),” *Ubuntu Documentation*, 2024.
Available: https://help.ubuntu.com/community/UFW
[Accessed: 17 Dec 2025].