System Planning and Distribution Selection (Week 1)

Module: Operating Systems (CMPN202)
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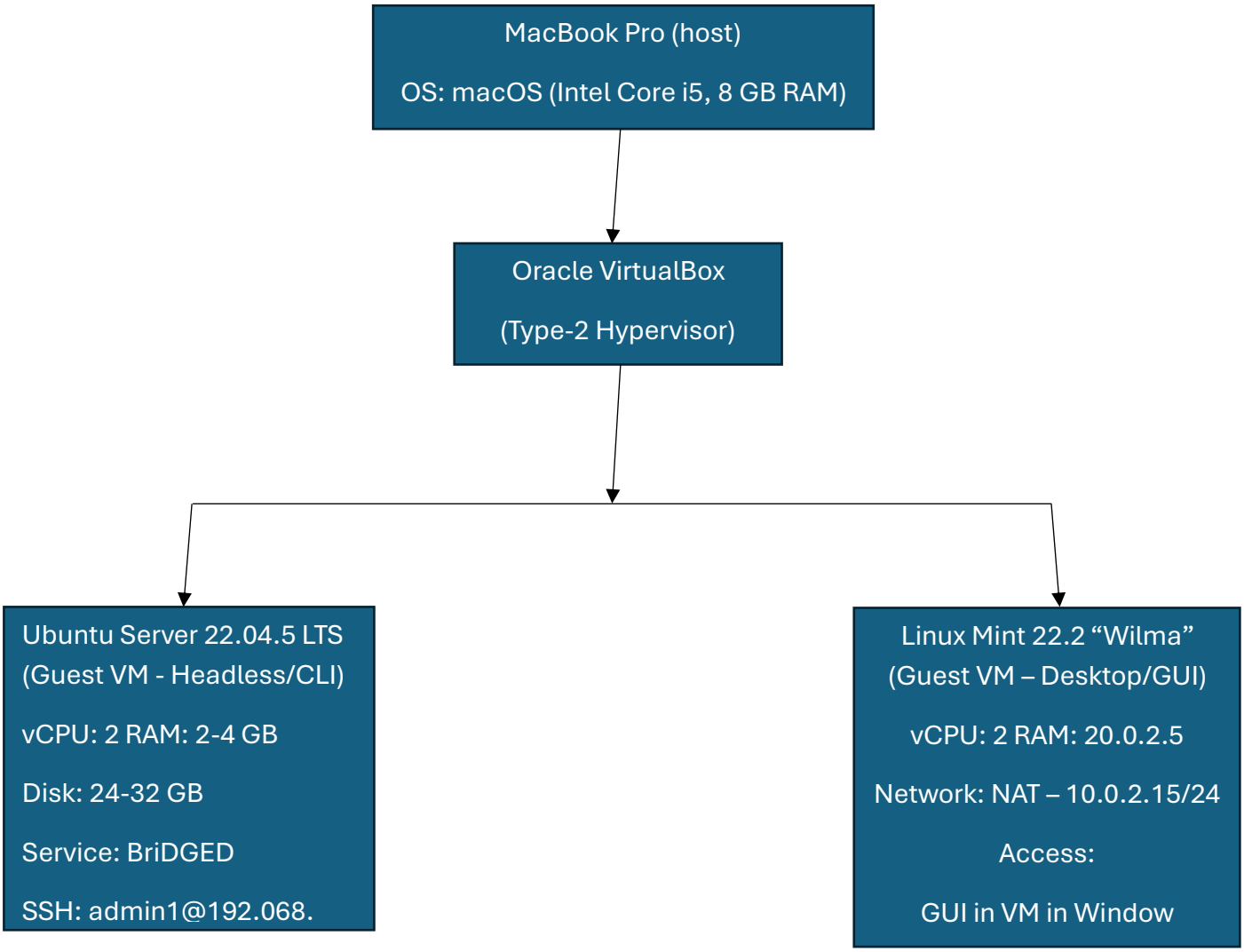
1. System Architecture Diagram



2. Distribution Selection Justification

My setup comprises a MacBook Pro (Intel Core i5) running macOS as the host operating system. Using Oracle VirtualBox, I created two virtual machines: Ubuntu Server 22.04.5 LTS and Linux Mint 22.2 (“Wilma”). I chose to work with two distributions — Ubuntu Server 22.04.5 LTS and Linux Mint 22.2 (“Wilma”) — because they are both Debian-based, share the same package manager (apt). Yet, each offers unique strengths that make them valuable for comparison.

Ubuntu Server 22.04.5 LTS

- Ubuntu Server is stable, secure, and lightweight, designed for command-line use.

- It is widely adopted in enterprise environments and ideal for learning terminal-based system management.

- The installation process is quick and straightforward, with guided setup options that help beginners learn basic server configurations.

- It supports SSH for remote connections, making it suitable for testing real-world server scenarios.

Linux Mint 22.2 (“Wilma”)

- Linux Mint is built on Ubuntu but tailored for desktop usability with a smooth graphical user interface (GUI).

- The installation procedure is simple and user-friendly — perfect for newcomers to Linux.

- It offers software management through both the terminal and the built-in Software Manager.

- I personally found Mint easier and more comfortable to use due to its familiar desktop layout and straightforward navigation.

Conclusion

In conclusion, I found Linux Mint more accessible and practical for my coursework due to its GUI, while Ubuntu Server helped improve my understanding of CLI-based system management. Both complement each other well for learning about different Linux environments.

3. Comparison with Alternatives

- Fedora: Modern but updates too frequently, which can cause instability during coursework. •Debian: Extremely stable but demands more manual configuration; slower release updates.
- CentOS Stream: More advanced, requiring greater Linux knowledge, not suitable for beginners.

4. Network Configuration

- **Ubuntu Server (Bridged Adapter):**

The Ubuntu VM is configured with the Bridged Adapter setting.
This configuration allows it to appear as a separate device on the local network and acquire its own LAN IP address (e.g., 192.168.x.x).
This enables SSH connections from the Mac host.

- **Linux Mint (NAT):**

The Linux Mint VM uses NAT (Network Address Translation) mode, which automatically shares the host's internet connection.
The VM receives an internal IP address (e.g., 10.0.2.15) for software updates and web access.

5. System Specifications and Command Outputs

Linux Mint 22.2 (Main Work Environment)

uname -a

This command provides details about the system's kernel (such as the Linux version, architecture, and machine name).

free -h

This command reports the system's memory, including total RAM, current usage, and remaining free memory.

lsb_release -a

The lsb_release command shows the Linux distribution name, version number, and codename (for example, Linux Mint 22.2 Zara).

df -h

This command shows disk space usage and availability on the virtual machine.

ip addr

This command lists all network interfaces on the VM and their respective IP addresses.

Conclusion

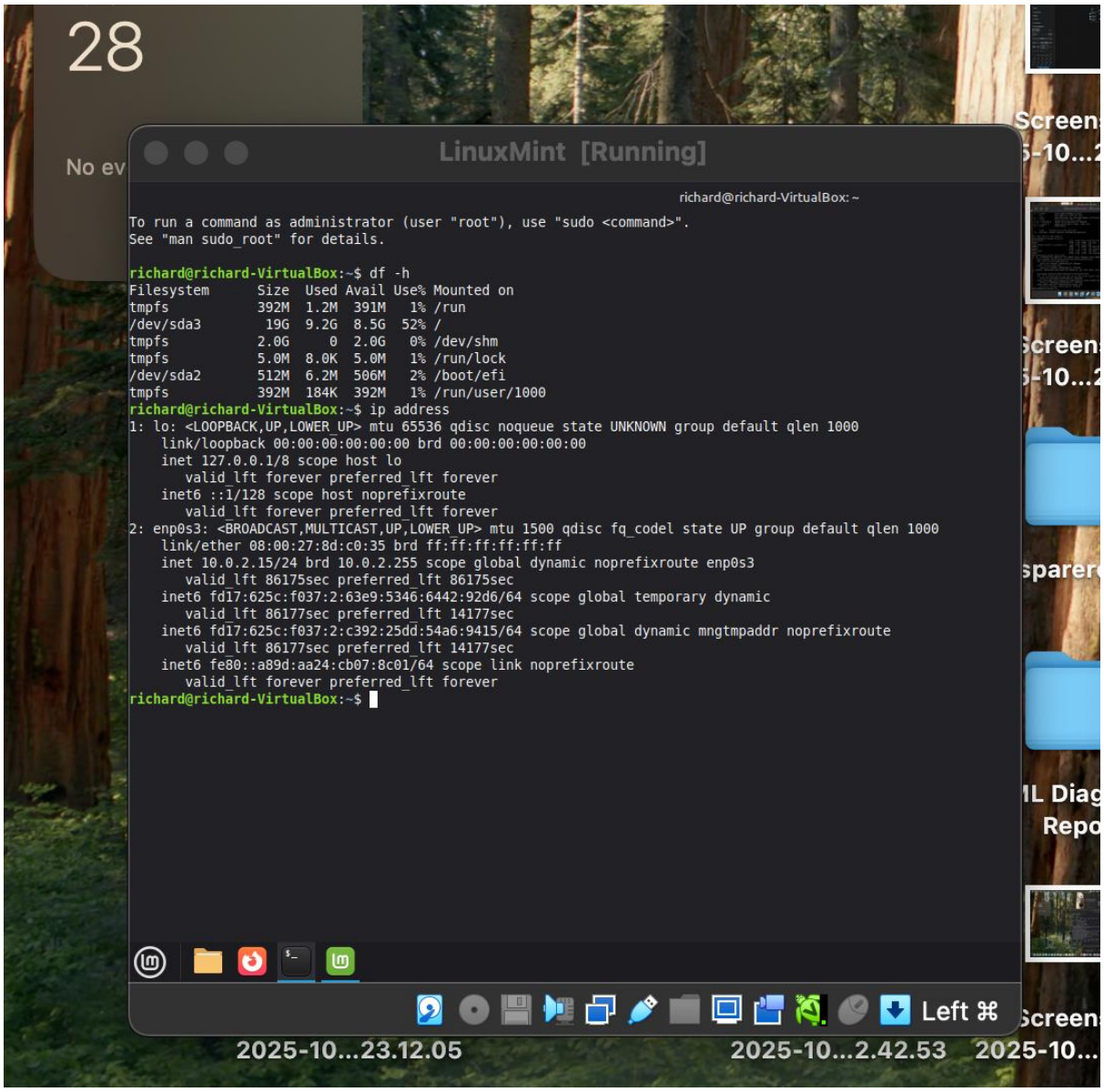
I found Linux Mint more accessible and practical for my coursework because of its GUI, while Ubuntu Server enhanced my understanding of CLI-based system management. Both complement each other well for learning about different Linux environments.

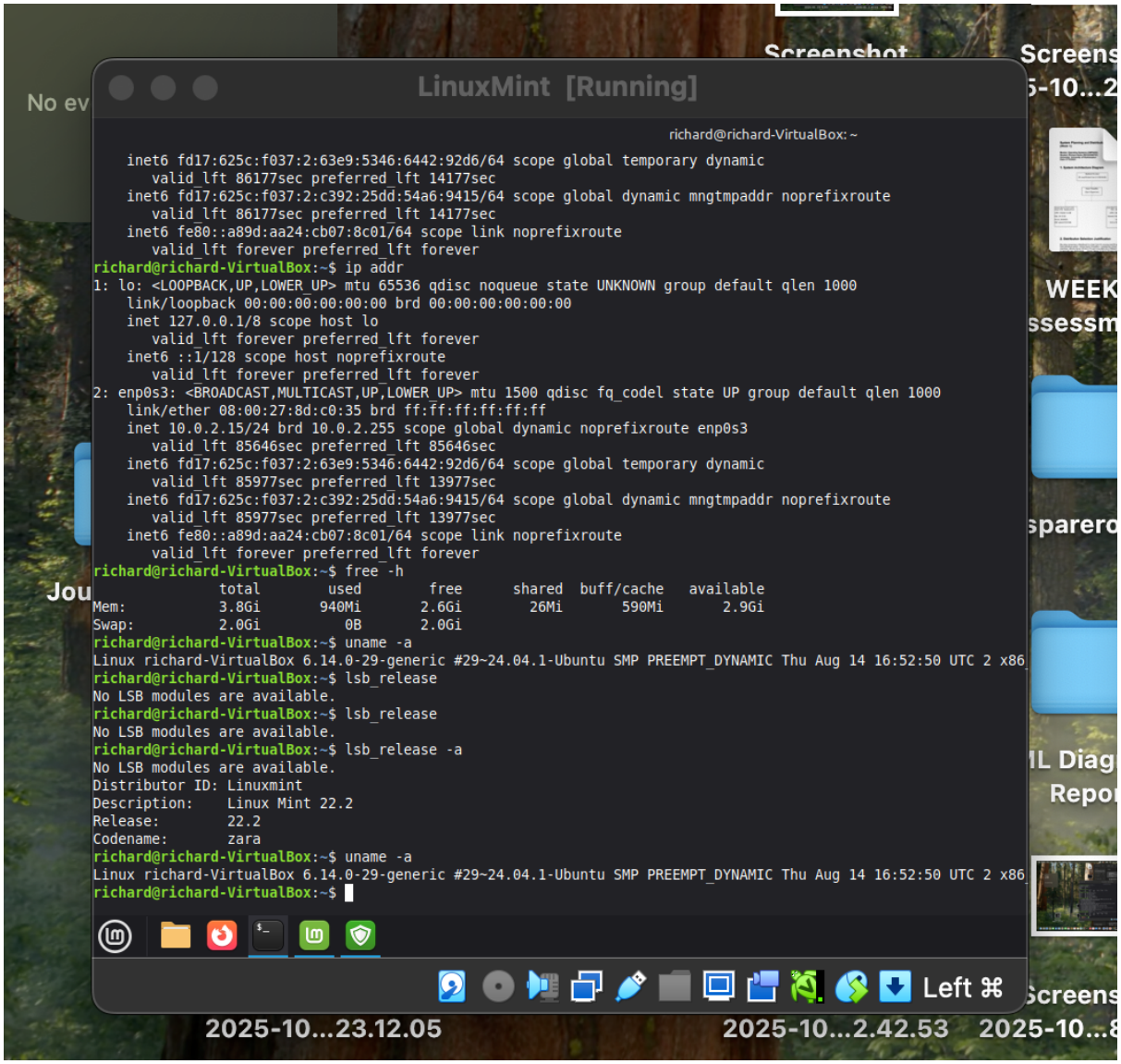
Reflection

From this week's work, I have learnt how to:

- Install and configure two different Linux distributions (Mint & Ubuntu).
- Use VirtualBox to create and network virtual machines.
- Execute key Linux commands to retrieve system information.
- Understand the differences between GUI-based (Mint) and CLI-based (Ubuntu) operating systems.

Overall, I found Linux Mint easier and faster to install and use for everyday tasks, while Ubuntu Server helped me develop confidence with the Linux terminal and commands.


28
No ev
LinuxMint [Running]
richard@richard-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
richard@richard-VirtualBox:~$ df -h
Filesystem Size Used Avail Use% Mounted on
tmpfs 392M 1.2M 391M 1% /run
/dev/sda3 19G 9.2G 8.5G 52% /
tmpfs 2.0G 0 2.0G 0% /dev/shm
tmpfs 5.0M 8.0K 5.0M 1% /run/lock
/dev/sda2 512M 6.2M 506M 2% /boot/efi
tmpfs 392M 184K 392M 1% /run/user/1000
richard@richard-VirtualBox:~$ ip address
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 08:00:27:8d:c0:35 brd ff:ff:ff:ff:ff:ff
inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
valid_lft 86175sec preferred_lft 86175sec
inet6 fd17:625c:f037:2:63e9:5346:6442:92d6/64 scope global temporary dynamic
valid_lft 86177sec preferred_lft 14177sec
inet6 fd17:625c:f037:2:c392:25dd:54a6:9415/64 scope global dynamic mngtmpaddr noprefixroute
valid_lft 86177sec preferred_lft 14177sec
inet6 fe80::a89d:aa24:cb07:8c01/64 scope link noprefixroute
valid_lft forever preferred_lft forever
richard@richard-VirtualBox:~$
Left ⌘
2025-10...23.12.05
2025-10...2.42.53
2025-10...


LinuxMint [Running]
richard@richard-VirtualBox: ~
inet6 fd17:625c:f037:2:63e9:5346:6442:92d6/64 scope global temporary dynamic
valid_lft 86177sec preferred_lft 14177sec
inet6 fd17:625c:f037:2:c392:25dd:54a6:9415/64 scope global dynamic mngtmpaddr noprefixroute
valid_lft 86177sec preferred_lft 14177sec
inet6 fe80::a89d:aa24:cb07:8c01/64 scope link noprefixroute
valid_lft forever preferred_lft forever
richard@richard-VirtualBox:~$ 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 08:00:27:8d:c0:35 brd ff:ff:ff:ff:ff:ff
inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
valid_lft 85646sec preferred_lft 85646sec
inet6 fd17:625c:f037:2:63e9:5346:6442:92d6/64 scope global temporary dynamic
valid_lft 85977sec preferred_lft 13977sec
inet6 fd17:625c:f037:2:c392:25dd:54a6:9415/64 scope global dynamic mngtmpaddr noprefixroute
valid_lft 85977sec preferred_lft 13977sec
inet6 fe80::a89d:aa24:cb07:8c01/64 scope link noprefixroute
valid_lft forever preferred_lft forever
richard@richard-VirtualBox:~$ free -h
total used free shared buff/cache available
Mem: 3.8Gi 940Mi 2.6Gi 26Mi 590Mi 2.9Gi
Swap: 2.0Gi 0B 2.0Gi
richard@richard-VirtualBox:~$ uname -a
Linux richard-VirtualBox 6.14.0-29-generic #29~24.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu Aug 14 16:52:50 UTC 2 x86
richard@richard-VirtualBox:~$ lsb_release
No LSB modules are available.
richard@richard-VirtualBox:~$ lsb_release
No LSB modules are available.
richard@richard-VirtualBox:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Linuxmint
Description: Linux Mint 22.2
Release: 22.2
Codename: zara
richard@richard-VirtualBox:~$ uname -a
Linux richard-VirtualBox 6.14.0-29-generic #29~24.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu Aug 14 16:52:50 UTC 2 x86
richard@richard-VirtualBox:~$
Left ⌘
2025-10...23.12.05
2025-10...2.42.53