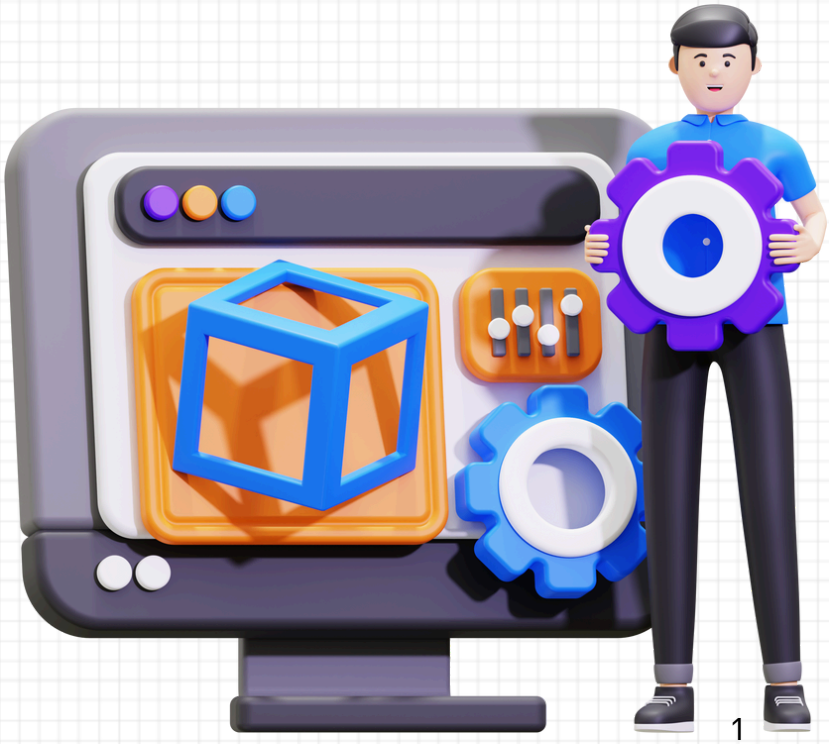
Bicol University Polangui
Polangui, Albay
Computer Studies Department

IT-123

System Administration and Maintenance

FINAL LABORATORY REQUIREMENT



Submitted by:
Jeremy O. Rellama
Marc Elijah N. Riofrio
BSIT 4A Student

Submitted to:
Guillermo V. Red, Jr. DIT
PROFFESOR

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System Administration and Maintenance

Laboratory Week1 - Installing Essential Tools for System Administration

Submitted by:
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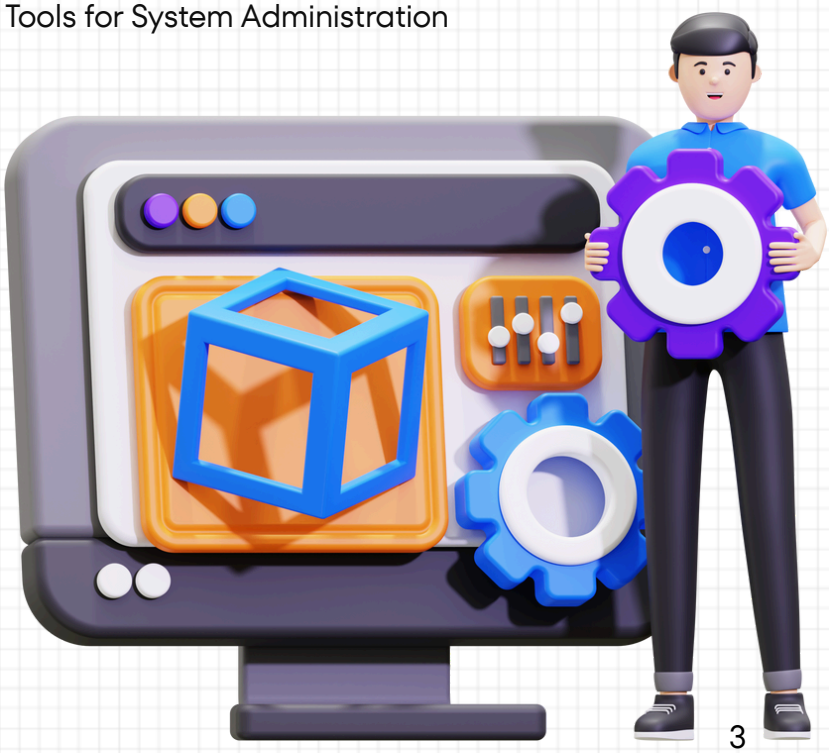
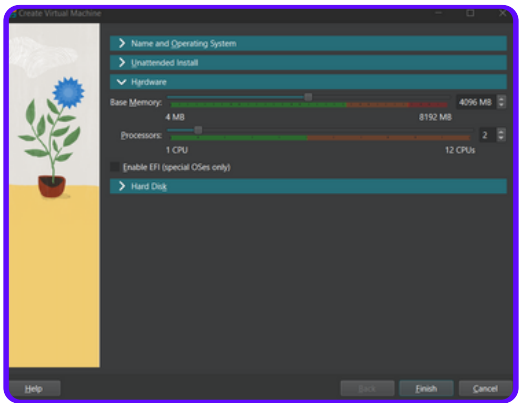
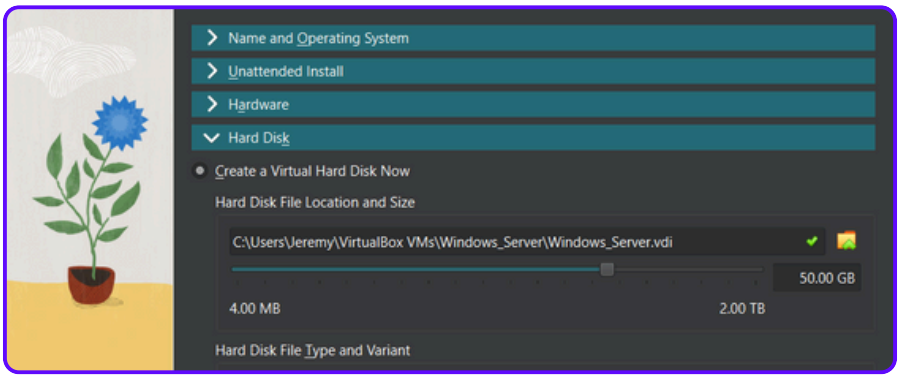


Windows Server



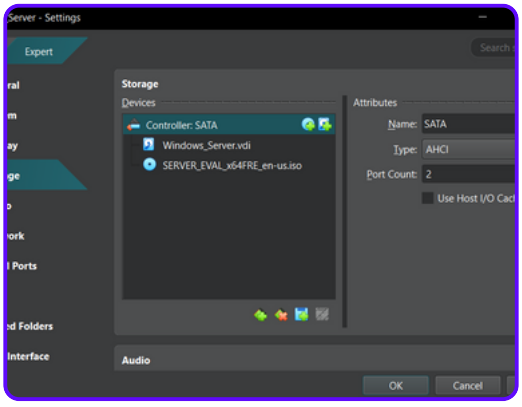
Step 1. Create the VM shell

We create a new VM by clicking New. In the setup window, we type the name Windows_Server, set the type to Microsoft Windows, and select either Windows 2019 (64-bit) or Windows 2022 (64-bit) as the version. We then allocate resources by setting the memory size to 4096 MB (4 GB) and assigning 2 CPU cores if available.



Step 2. Setting Up Virtual Hard Disk

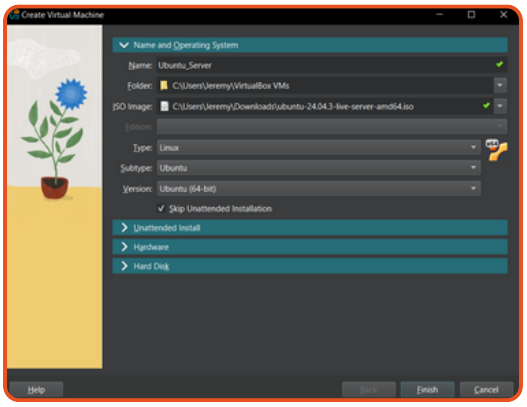
We create a new virtual hard disk in VDI format, select Dynamically allocated so it only uses space as needed, and set the size to 50 GB.



Step 3: Attaching ISO File

After the VM is created, we go to Settings → Storage, select the empty optical drive, and load the Windows Server ISO file.

Ubuntu Server



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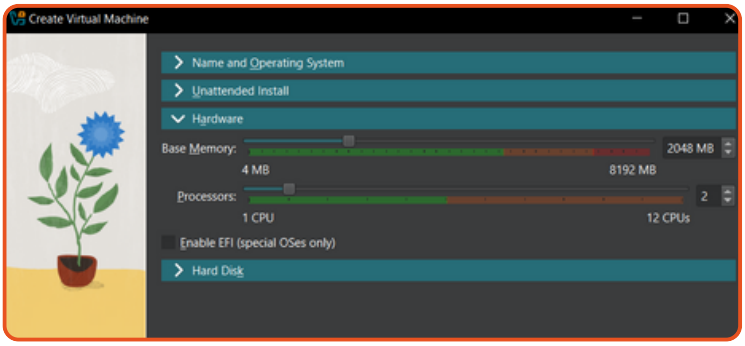

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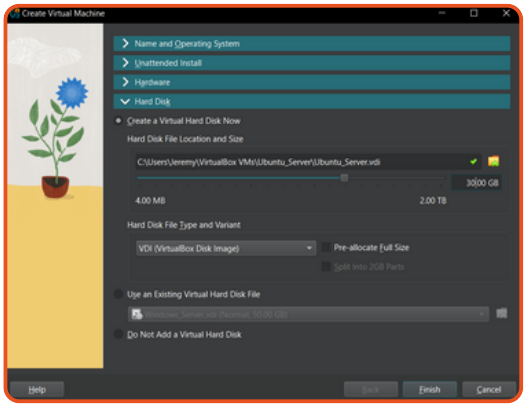

Step 3: Creating the Virtual Hard Disk

We create a virtual hard disk by choosing VDI (VirtualBox Disk Image) as the file type, selecting Dynamically allocated so it grows only as needed, and setting the disk size to 30 GB. This gives the server enough space for the operating system and additional tools.

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System Administration and Maintenance

Laboratory Week2 - Installing and Configuring Windows & Linux Virtual Machines in VirtualBox

Submitted by:
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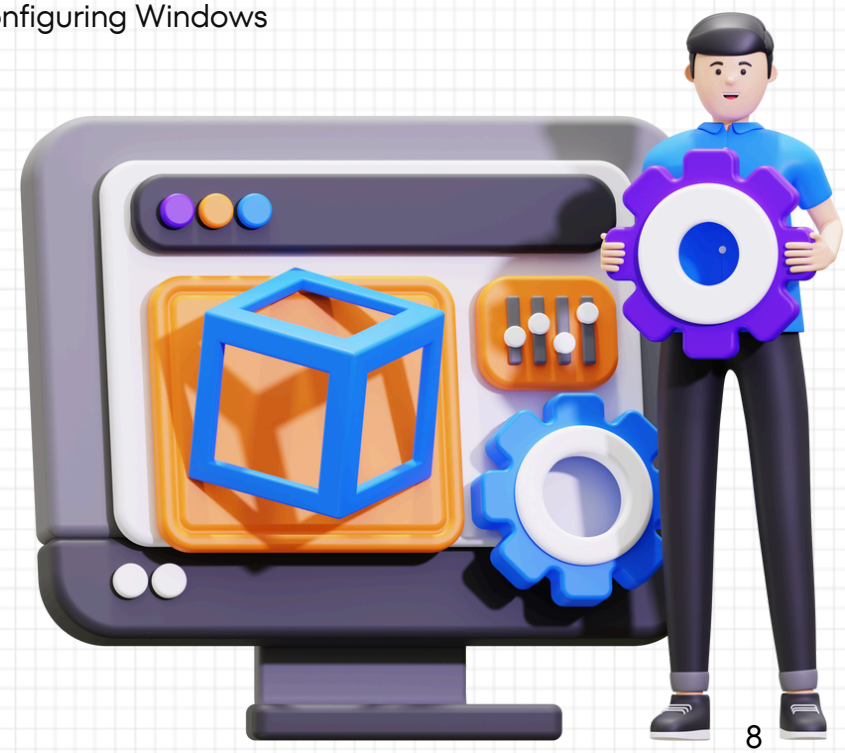
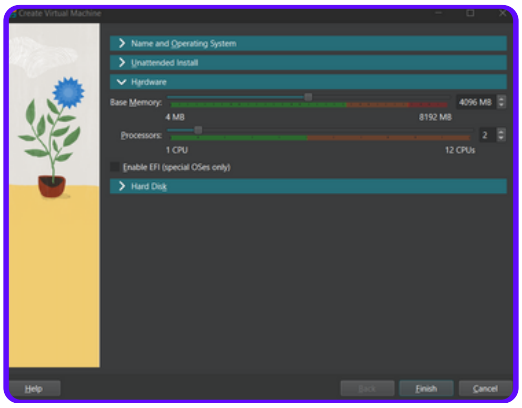


Windows Server



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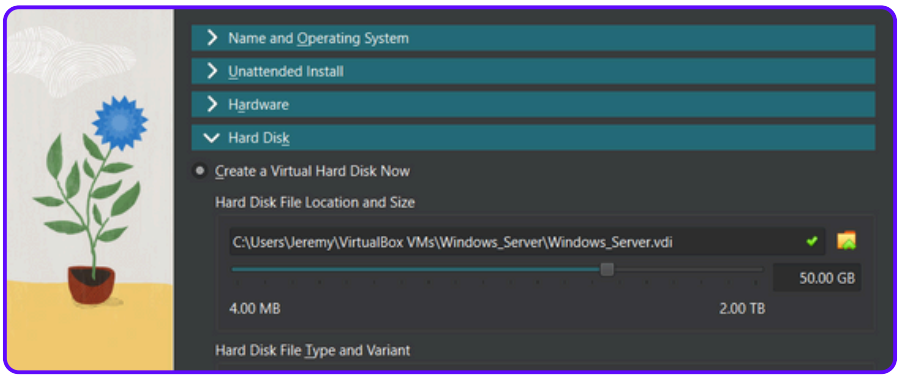

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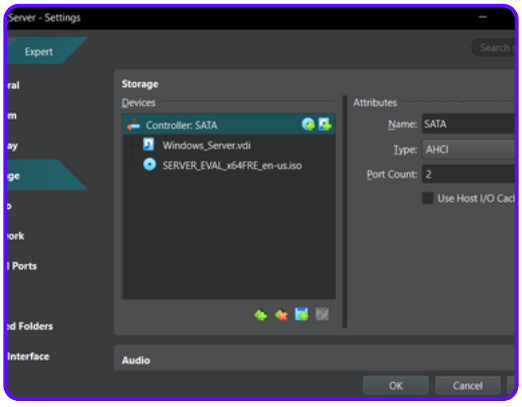

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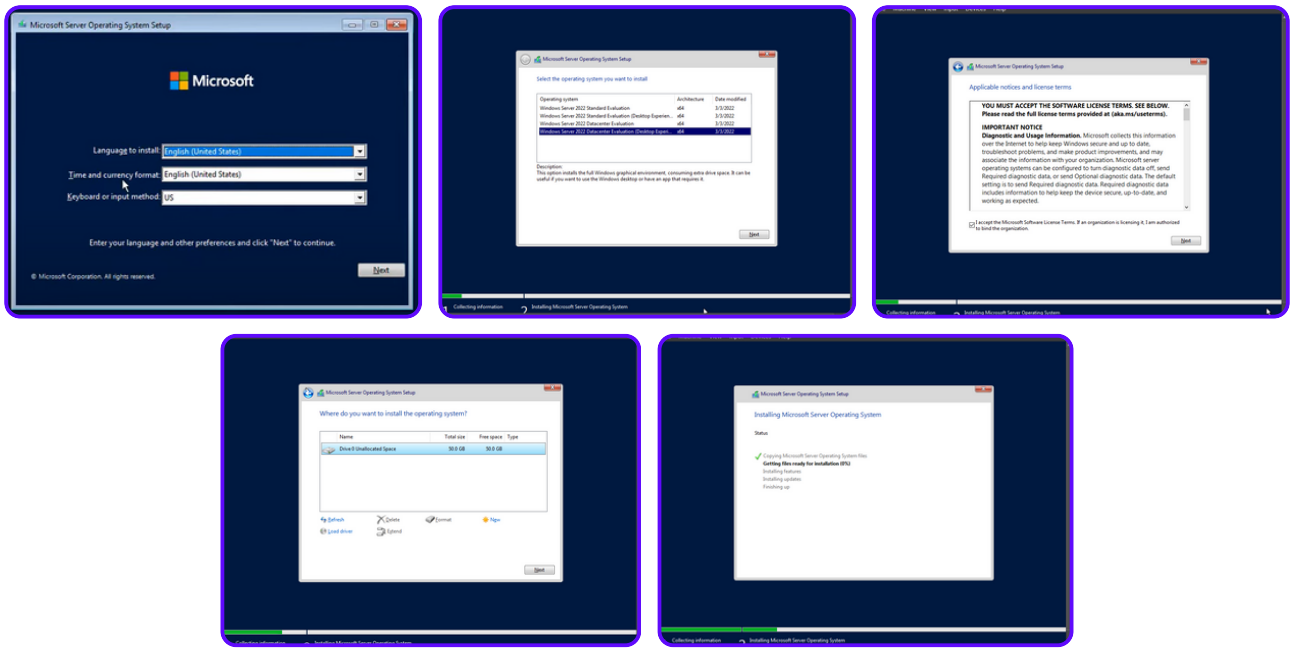
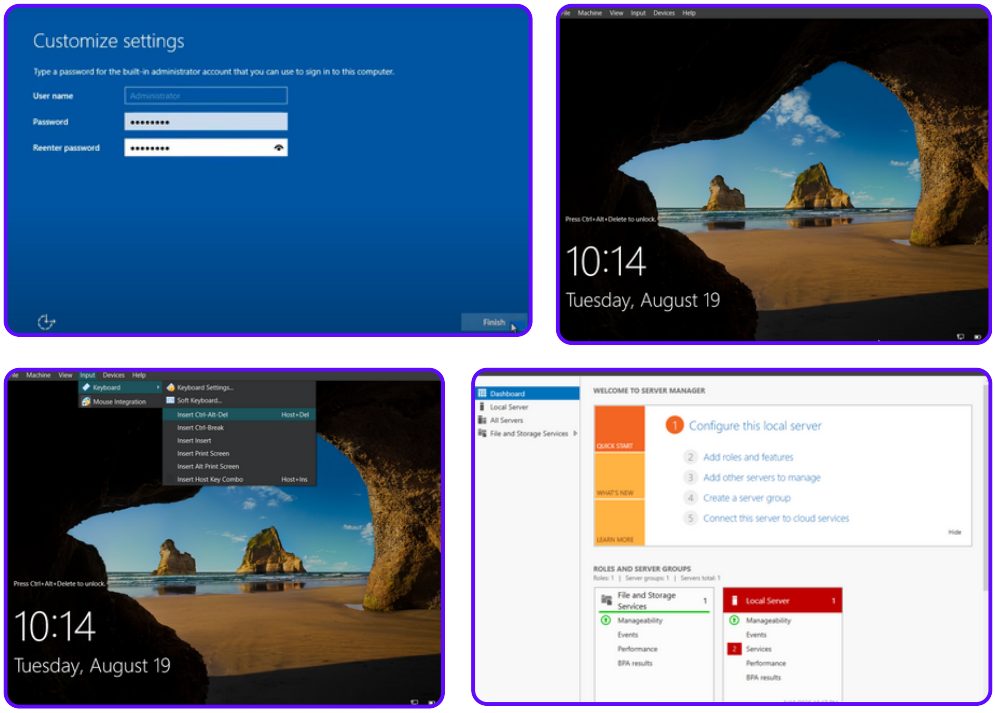


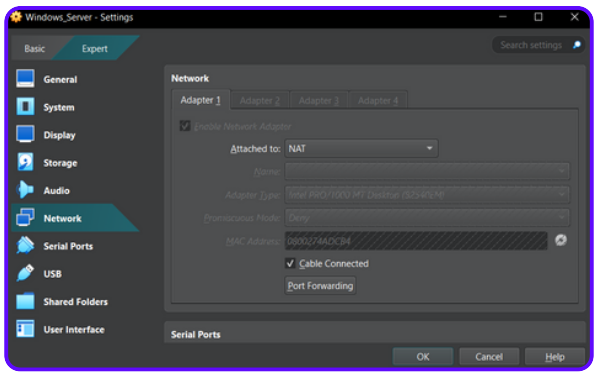
Step 4: Installing Windows Server

We start the VM, and it boots from the ISO. We follow the Windows Server installation wizard by selecting language and region, clicking install. We accept the license, choose custom installation, and install the OS on the 50 GB virtual hard disk.



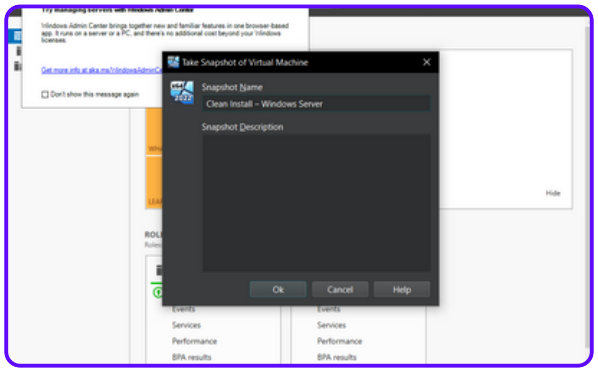
Step 5: Setting Administrator Account

Once installation is complete, we set the Administrator password to P@ssw0rd123. To log in, we use Input → Keyboard → Insert Ctrl+Alt+Del in VirtualBox, then enter the password to access the Windows Server desktop.



Step 6: Enabling Network

We also configure networking under Settings → Network, choosing either NAT for basic internet or Bridged Adapter to make the VM act like a real computer on the network.



Step 7: Taking a Snapshot

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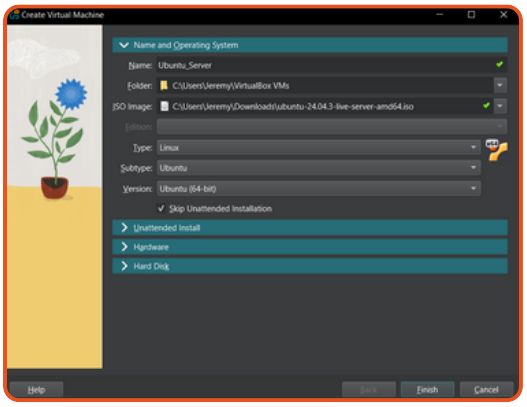
Ubuntu Server



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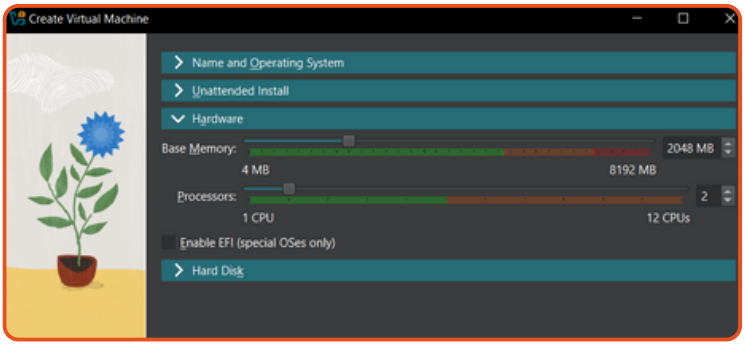

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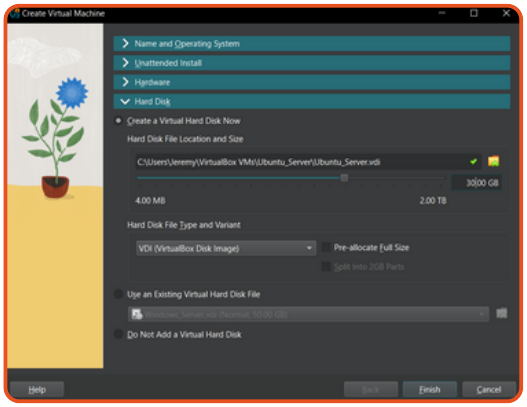

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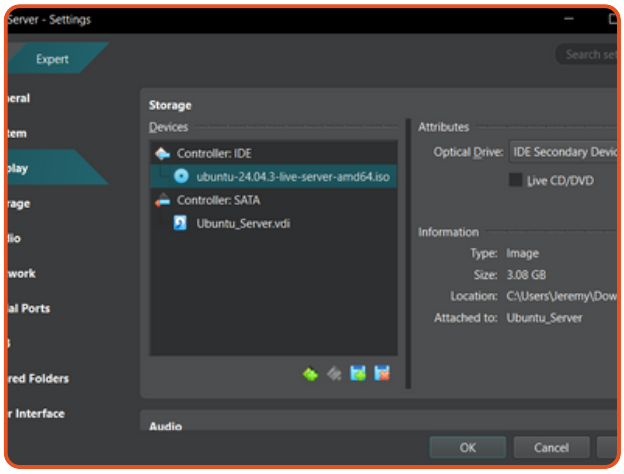
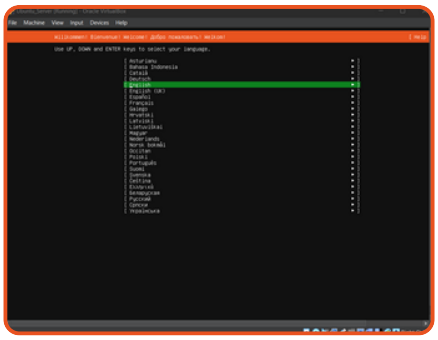
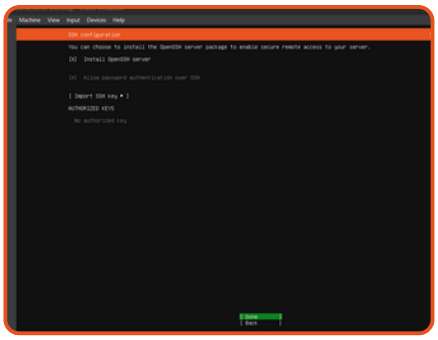
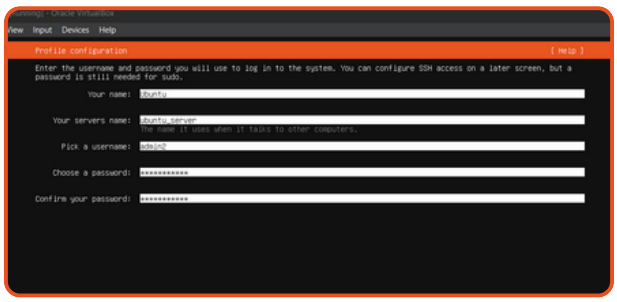


Step 4: Attaching the Ubuntu ISO

Once the VM is created, we open its Settings, go to the Storage section, and select the empty optical drive. We then choose our downloaded ISO file (ubuntu-22.04-live-server-amd64.iso) so that the VM can boot from it during startup.



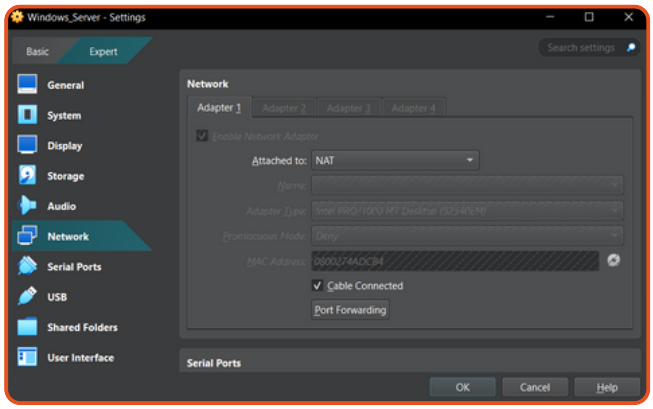




Step 5: Starting the VM and Installing Ubuntu Server

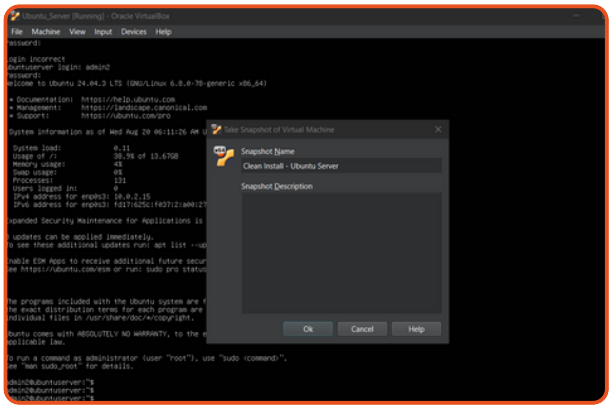
We now start the VM, and it boots into the Ubuntu Server installer. We select English as the language and proceed with the guided installation. During the process, we make sure to select the option to Install OpenSSH Server, which will allow us to connect to the VM remotely in later labs. When prompted, we create a user account with the following credentials:

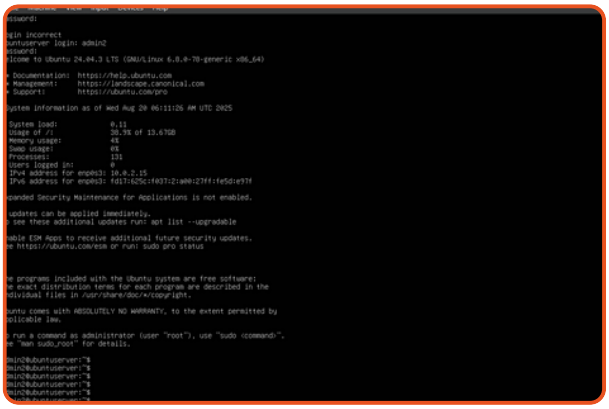
- Username: admin
- Password: P@ssw0rd123



Step 6: Starting the VM and Installing Ubuntu Server

The network configuration is handled the same way as in our Windows Server VM. In VirtualBox, we can either leave the adapter on NAT for basic internet access.





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System Administration and Maintenance

Laboratory Week3 - User and Group Management in Windows & Linux

Submitted by:
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Submitted to:
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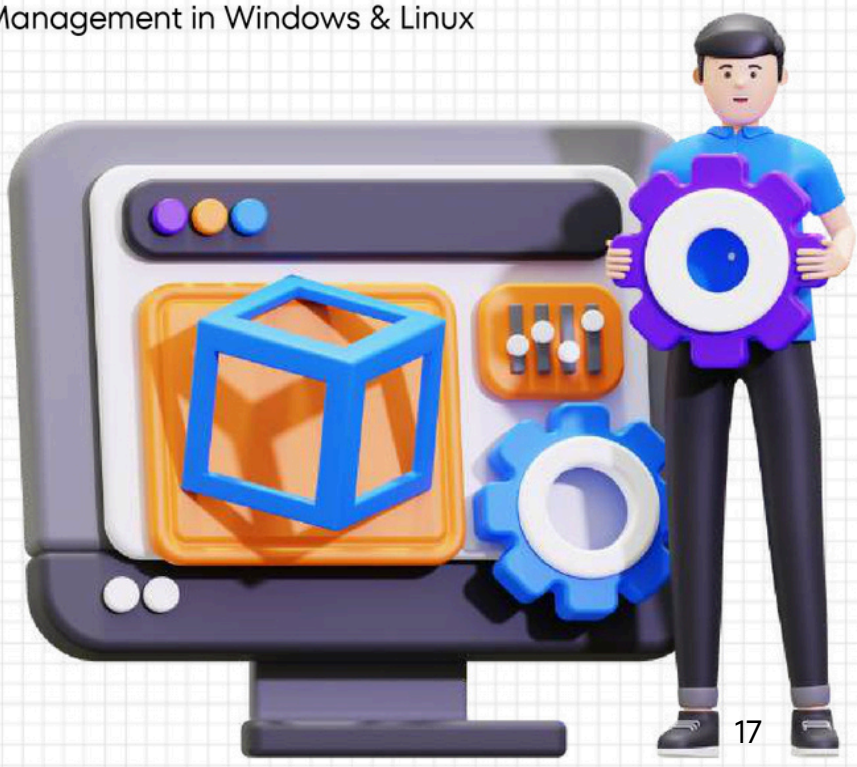
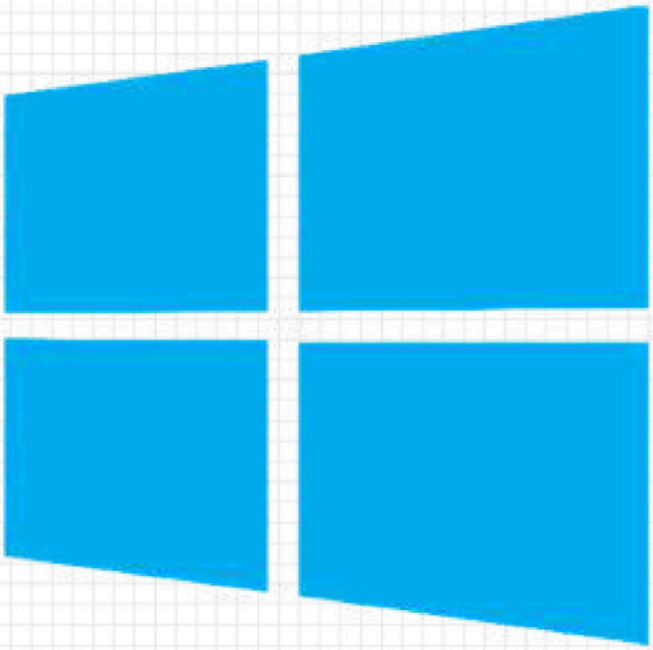
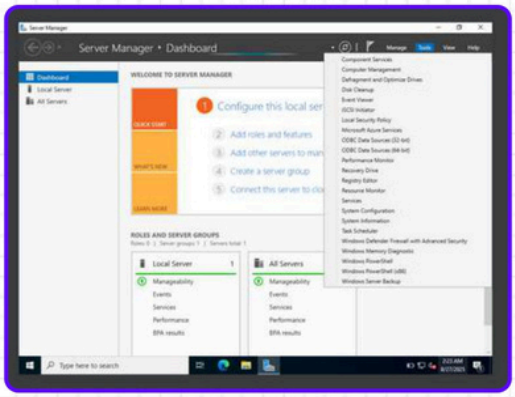
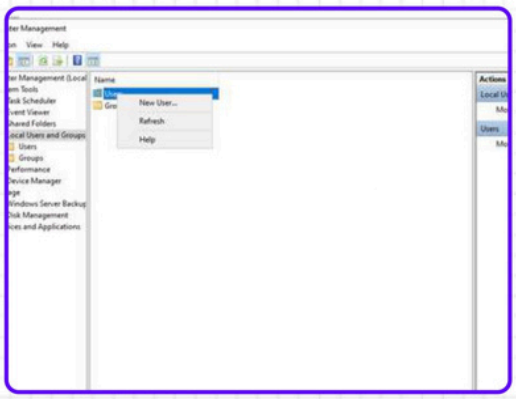
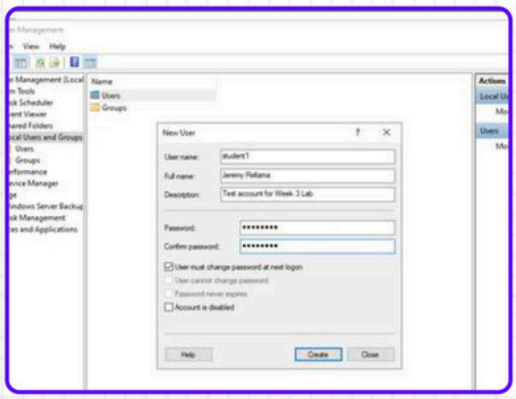




Windows Server

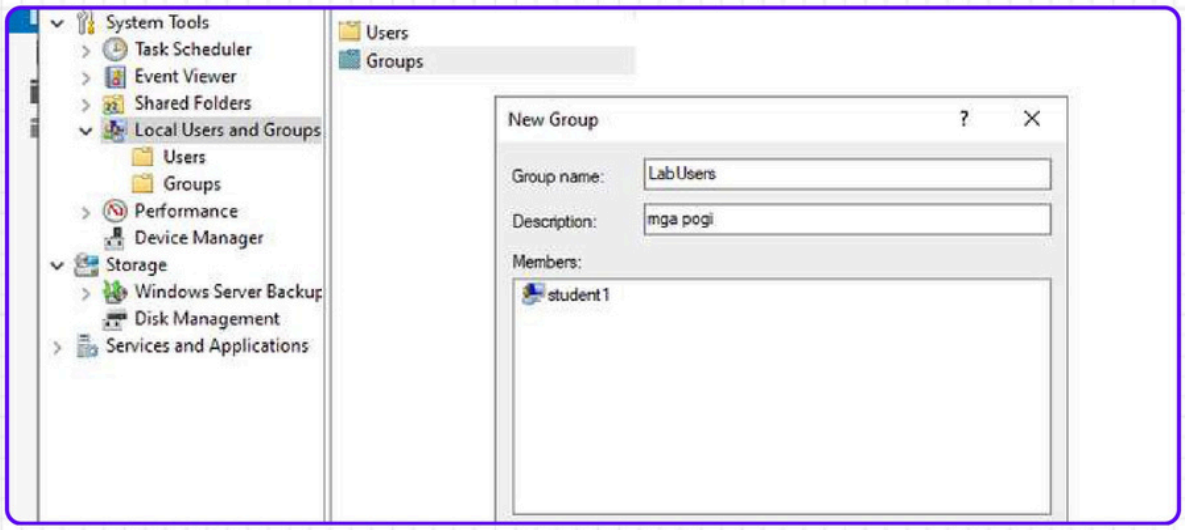






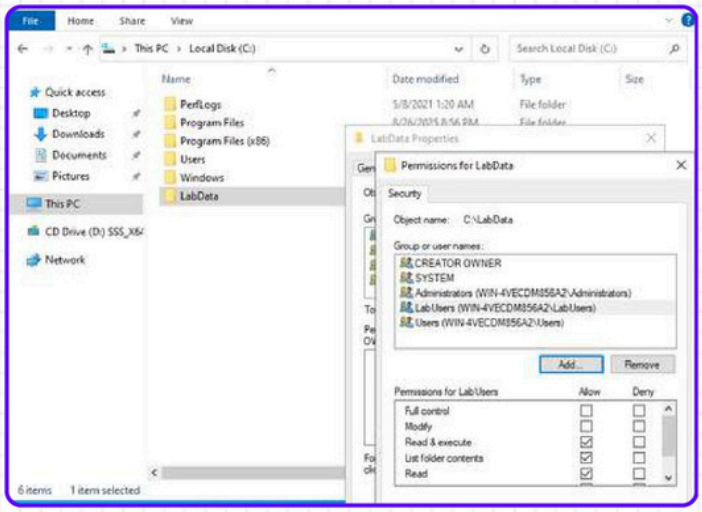
Step 1: Creating & Modifying a New User

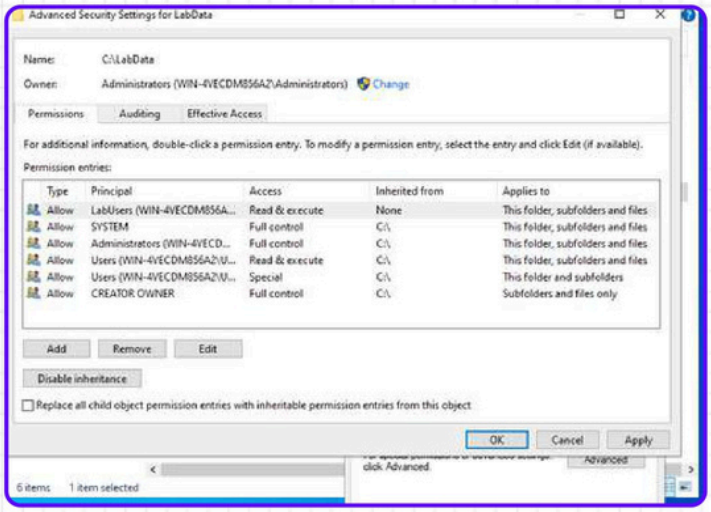
We begin by opening Server Manager → Tools → Computer Management. Inside the Computer Management console, we expand Local Users and Groups → Users. From there, we right-click on the Users folder and select New User. We create a new account with Username: student1 and Password: User@123. In the description field, we add: "Test account for Week 3 Lab". We also enable the option User must change password at next logon.



Step 2: Creating a Group and Adding the User

Next, we move to Local Users and Groups → Groups. We right-click the Groups folder and create a new group named LabUsers. Once the group is created, we add student1 as a member.

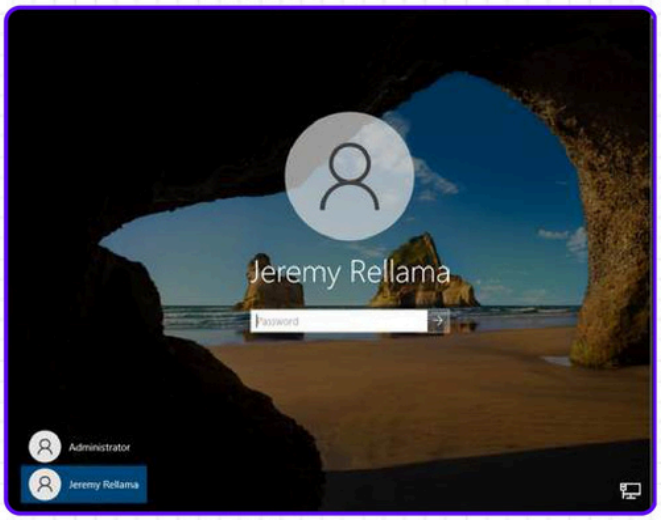


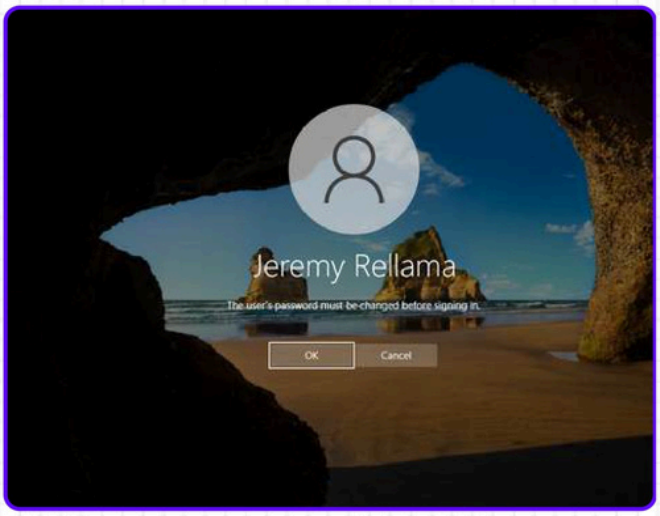


Step 4: Applying Permissions to a Folder

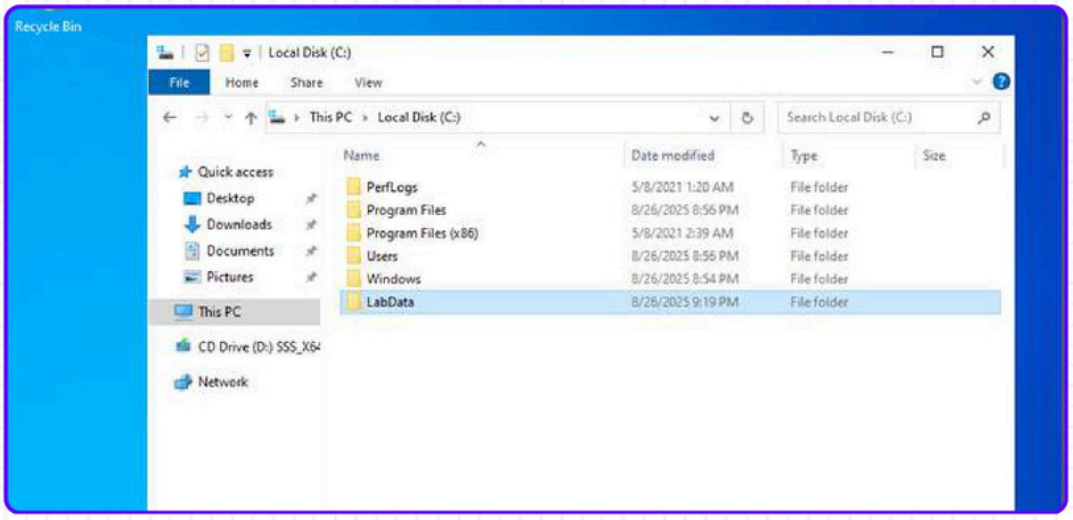
We now create a folder called C:\LabData on the system drive. Right-click the folder, choose Properties → Security → Edit, and add the LabUsers group. We grant this group Read & Execute permissions only, which allows members to open and view files but prevents them from modifying content.

VERIFICATION & TROUBLESHOOTING



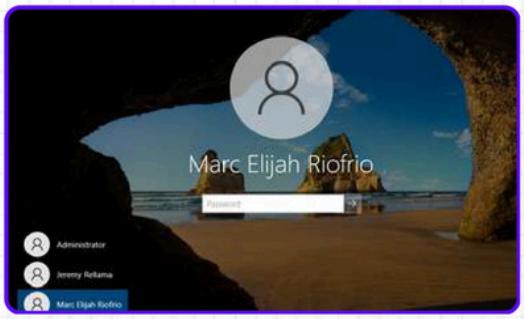


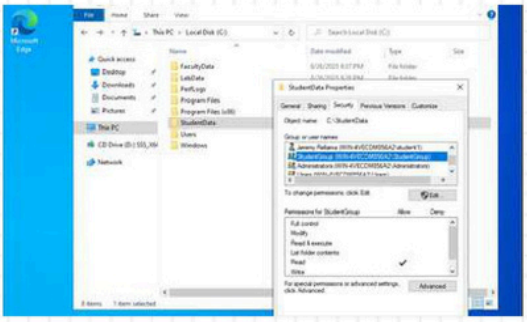
To verify our configuration, we first log out of the administrator account and log in as student1. Since we required a password change at first logon, the system will prompt us to enter a new password. This confirms that the account policy was applied correctly.



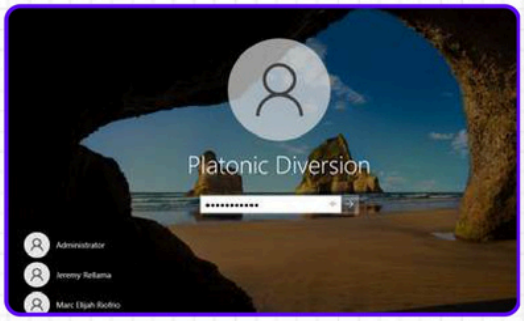
After logging in as student1, we navigate to the C:\LabData folder. The user should be able to open the folder and view its contents because the LabUsers group was granted Read & Execute permissions.

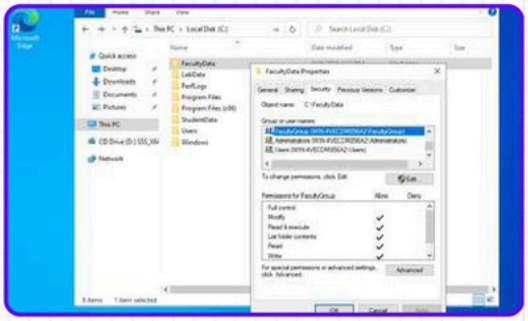
student3



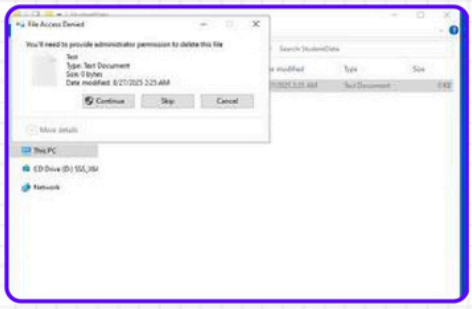


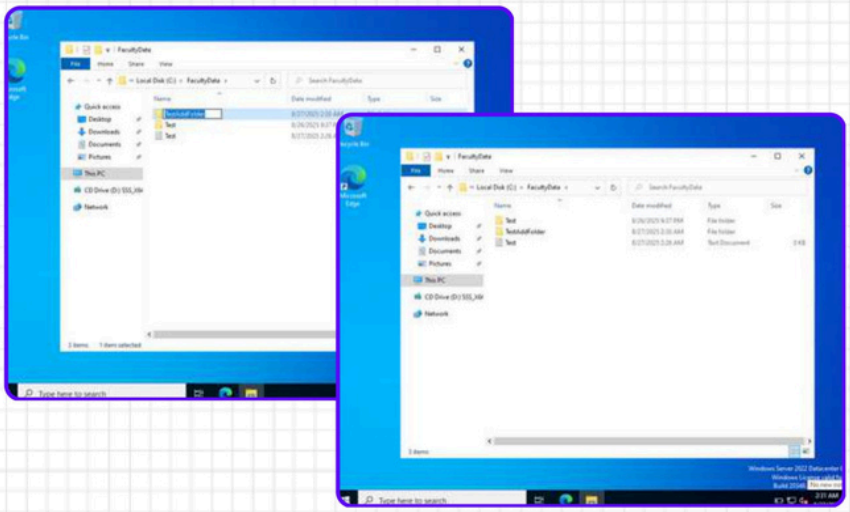
faculty1





After configuring the accounts, we create two folders in the system drive: C:\FacultyData and C:\StudentData. Using the Security tab in folder properties, we grant Modify rights only to FacultyGroup for C:\FacultyData, allowing faculty members to create and edit files. For C:\StudentData, we assign Read rights only to StudentGroup, ensuring students can view the contents but cannot make changes.

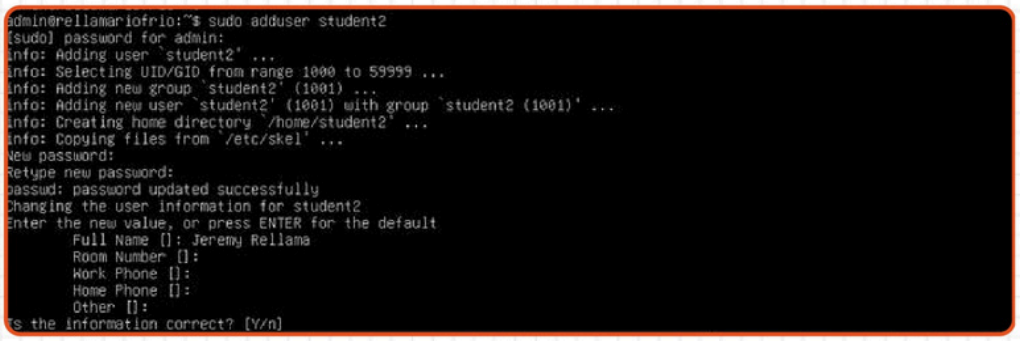




student3 faculty1

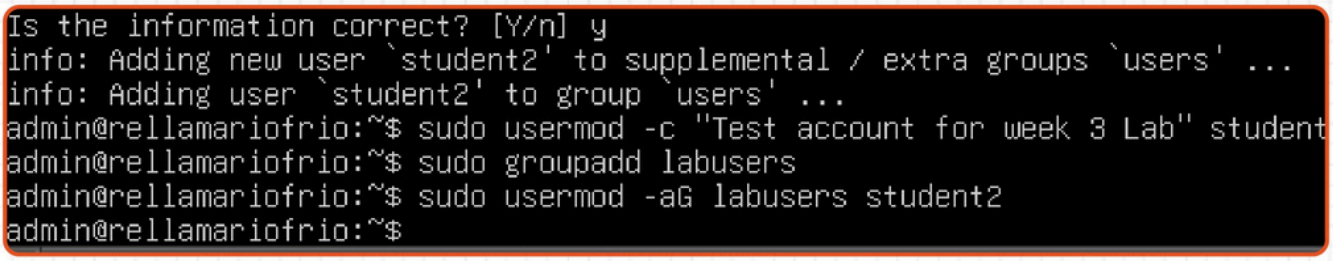
Finally, we test the configuration by logging in as each user. Faculty1 should be able to create and edit files in C:\FacultyData, but will be restricted to read-only access in C:\StudentData. Meanwhile, student3 should only be able to view files in C:\StudentData and will be denied when trying to create or modify files. These tests confirm that permissions are applied correctly.

Ubuntu Server



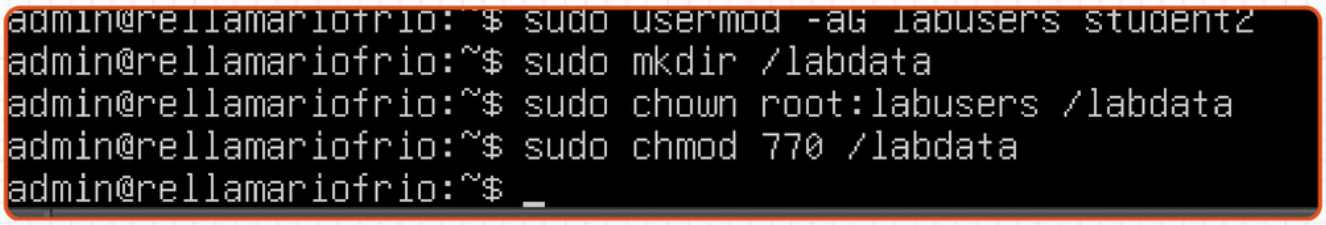
Step 1: Creating a New User

We log into Ubuntu Server and create a new user with: ***sudo adduser student2.*** We then set the password to **User@123** .



Step 2: Modifying the User and Creating a Group

After creating the user student2, we add a description to the account using: ***sudo usermod -c "Test account for Week 3 Lab" student2.*** Next, we create a new group named labusers with: ***sudo groupadd labusers*** and then assign student2 to this group using: ***sudo usermod -aG labusers student2***



Step 3: Set Permissions

We create the /labdata directory with ***sudo mkdir /labdata***, set its ownership to root:labusers using ***sudo chown root:labusers /labdata***, and assign permissions 770 with ***sudo chmod 770 /labdata***. This allows only root and members of labusers to access the folder.

VERIFICATION & TROUBLESHOOTING

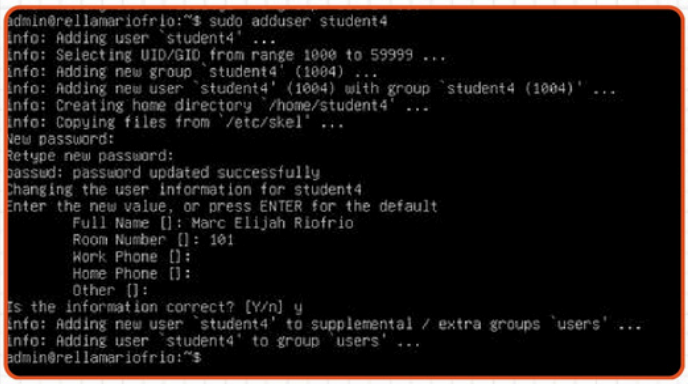
```
student2@rellamariofrio:/labdata$ ls /labdata
student2@rellamariofrio:/labdata$ touch testfile.txt
student2@rellamariofrio:/labdata$ ls /labdata
testfile.txt
student2@rellamariofrio:/labdata$
```

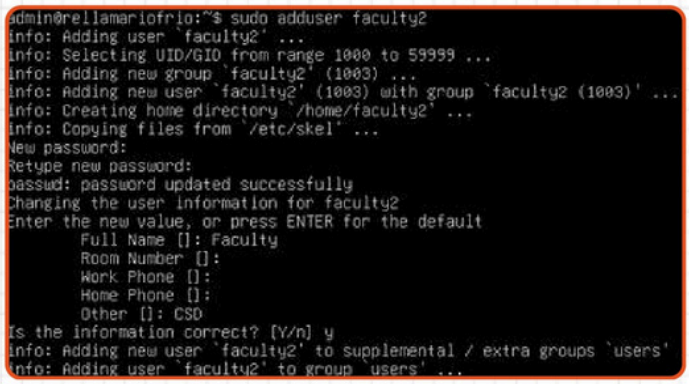
On Linux, we switch to the student2 account using: ***su - student2.*** From this account, the user should be able to access /labdata and create files inside, confirming that group permissions are working.

```
admin@rellamariofrio:~$ sudo chmod 750 /labdata
admin@rellamariofrio:~$ su - student2
Password:
student2@rellamariofrio:~$ cd /labdata
student2@rellamariofrio:/labdata$ touch newtextfile.txt
touch: cannot touch 'newtextfile.txt': Permission denied
student2@rellamariofrio:/labdata$ _
```

Next, we adjust the directory's permissions with: ***sudo chmod 750 /labdata***. After this change, student2 should still be able to view the folder but no longer write new files inside it.

EXERCISE






```
admin@rellamariofrio:~$ sudo usermod -aG facultygrp faculty2
admin@rellamariofrio:~$ sudo usermod -aG studentgrp student4
```

On the Ubuntu Server, we start by creating two new users, faculty2 and student4, using the adduser command. We then create two groups: **facultygrp** and **studentgrp**, assigning faculty2 to facultygrp and student4 to studentgrp.

```
admin@rellamariofrio:~$ sudo mkdir /facultydata
admin@rellamariofrio:~$ sudo mkdir /studentdata
admin@rellamariofrio:~$ sudo chown :facultygrp /facultydata
admin@rellamariofrio:~$ sudo chown :studentgrp /studentdata
```

```
admin@rellamariofrio:~$ sudo chmod 770 /facultydata
admin@rellamariofrio:~$ sudo chmod 750 /studentdata
```

Next, we create two directories: /facultydata and /studentdata. For /facultydata, we assign ownership to root:facultygrp and set permissions to **770**, which grants full read/write/execute access to faculty members while restricting others. For /studentdata, we assign ownership to root:studentgrp and set permissions to **750**, allowing studentgrp members read-only access while preventing them from modifying files.

```
admin@rellamariofrio:~$ su - faculty2
Password:
faculty2@rellamariofrio:~$ cd /facultydata
faculty2@rellamariofrio:/facultydata$ touch testfile.txt
faculty2@rellamariofrio:/facultydata$ ls /facultydata
testfile.txt
```

```
faculty2@rellamariofrio:/facultydata$ su - student4
Password:
student4@rellamariofrio:~$ cd /studentdata
student4@rellamariofrio:/studentdata$ ls
student4@rellamariofrio:/studentdata$ touch testfile.txt
touch: cannot touch 'testfile.txt': Permission denied
student4@rellamariofrio:/studentdata$
```

Finally, we test the configuration by switching to each user. When logged in as faculty2, the user should be able to access /facultydata and create or edit files, but only read files in /studentdata. Conversely, when logged in as student4, the user should be able to access /studentdata in read-only mode, but will be denied if trying to create or modify files. These tests confirm that permissions are correctly enforced.

Bicol University Polangui
Polangui, Albay
Computer Studies Department

IT-123

System Administration and Maintenance

Laboratory Week4 - File Systems and Storage Management

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Submitted to:
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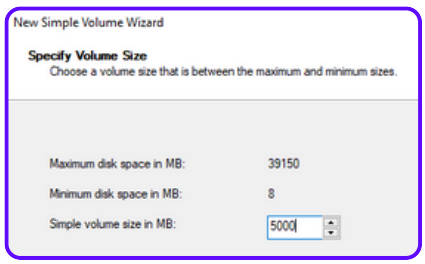
PROFFESOR

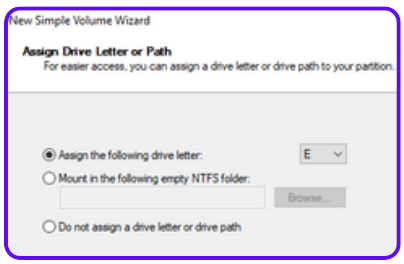
Date Submitted: 09/ 11/ 2025

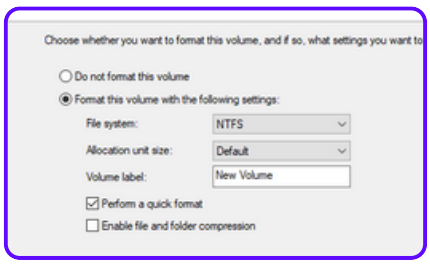
Windows Server

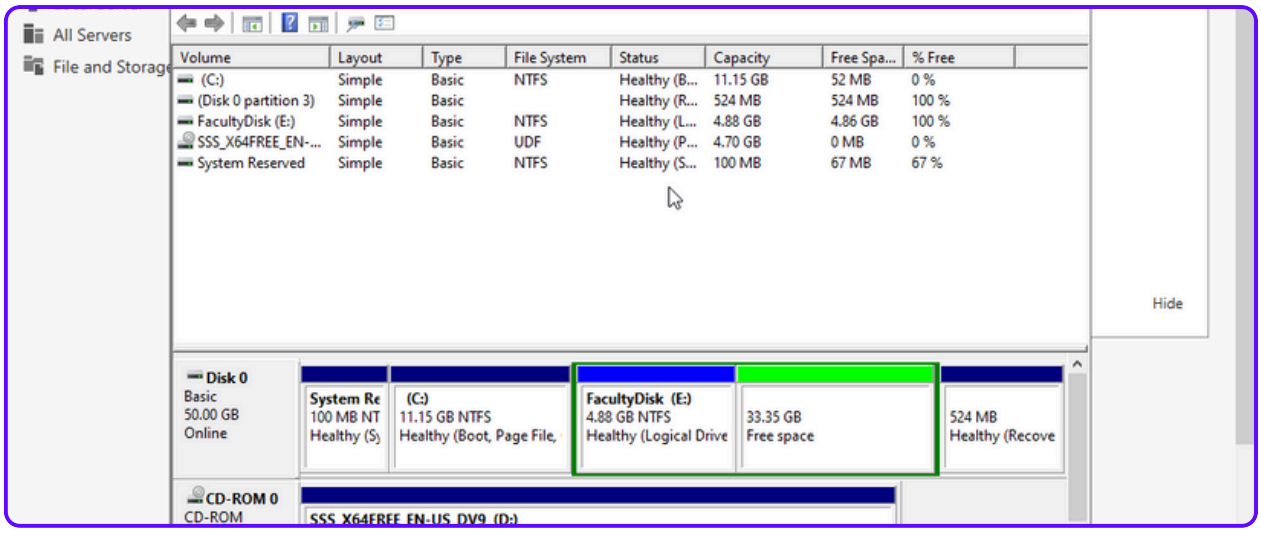
A. Partition Creation

Drive Letter: E:
File System: NTFS
Size: 5000 mb or 5gb



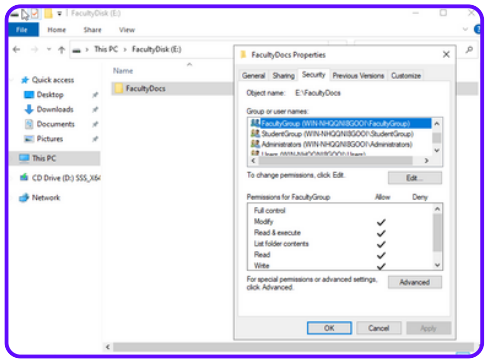




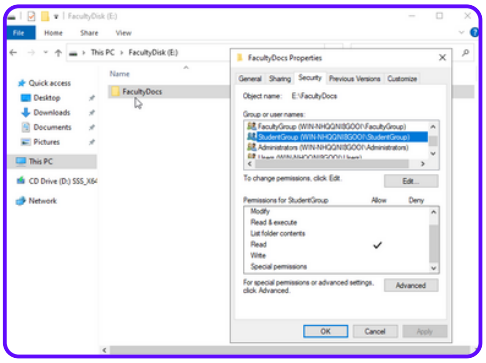


B. Folder Setup & Permissions

Folder Name: E:\FacultyDocs
Group Assigned: FacultyGroup & StudentGroup
Permission Level: Modify only for faculty & Read only for student



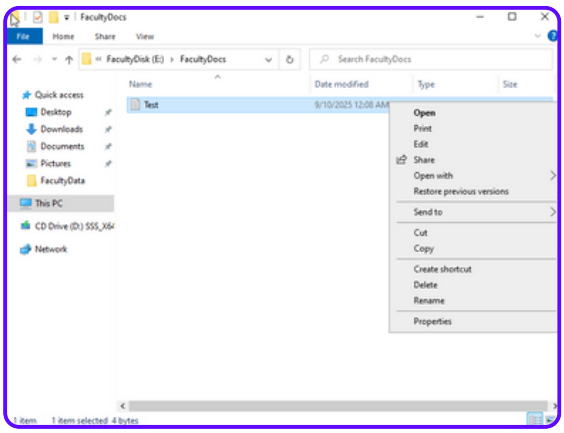
FacultyGroup



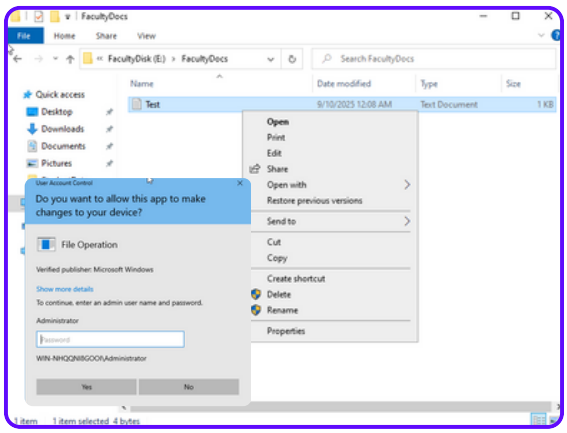
StudentGroup

C. Verification

Tested User Account: faculty1
Access Allowed: [✓] Yes [ ] No
Tested User Account: student3
Access Denied: [ ] Yes [✓] No



FacultyGroup

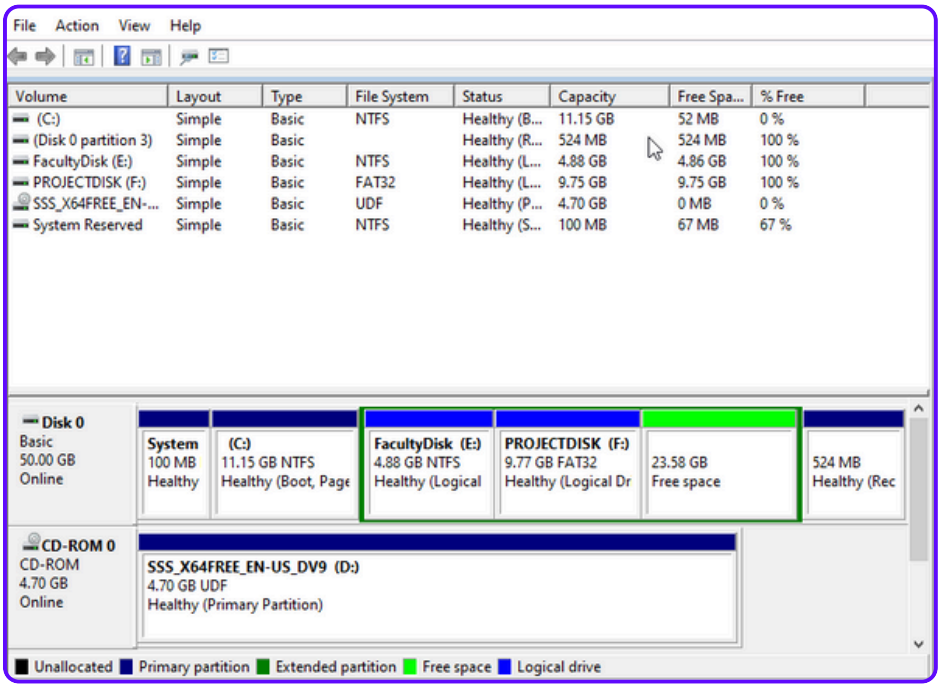


StudentGroup

Student Exercise

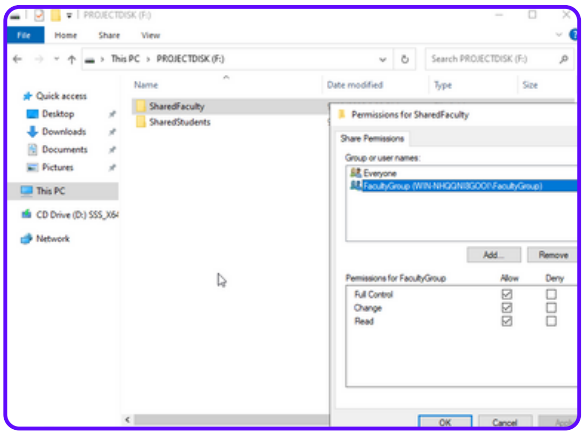
A. Partition Creation

Drive Letter: F:
File System: FAT32
Size: 10000 mb or 10gb

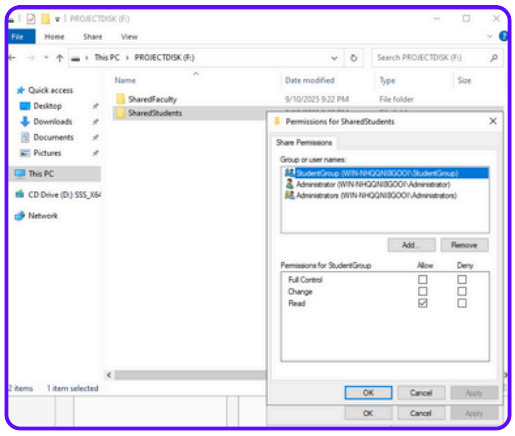


B. Folder Setup & Permissions

Folder Name: F:\SharedFaculty
Group Assigned: FacultyGroup
Permission Level: Full Control
Folder Name: F:\SharedStudents
Group Assigned: StudentGroup
Permission Level: Read & Execute only



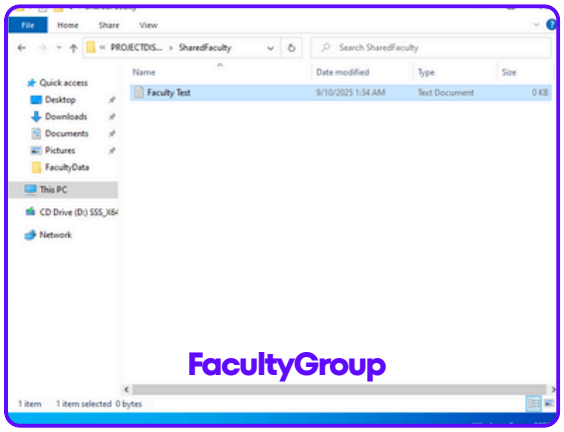
FacultyGroup



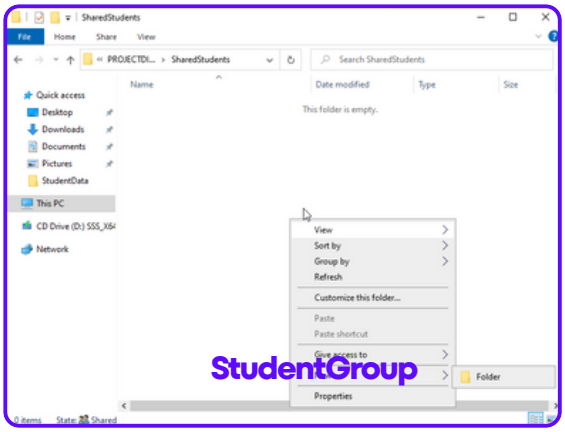
StudentGroup

C. Verification

Tested User Account: faculty1
Access Allowed: [✓] Yes [ ] No
Tested User Account: student3
Access Denied: [ ] Yes [✓] No



FacultyGroup



StudentGroup

Ubuntu Server

A. Partition Creation

- Device Name: /dev/sdc1
- File System Type: ext4
- Mount Point: /projectdata

```
admin@rellamariofrio:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda      8:0    0   50G  0 disk
├─sda1   8:1    0    1M  0 part
└─sda2   8:2    0   50G  0 part /
sdb      8:16   0    5G  0 disk
sr0     11:0    1 1024M  0 rom
admin@rellamariofrio:~$
```

```
admin@rellamariofrio:~$ sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.39.3).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help):
```

```
Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-10485759, default 10485759):

Created a new partition 1 of type 'Linux' and of size 5 GiB.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

```
admin@rellamariofrio:~$ sudo mkfs.ext4 /dev/sdb1
mke2fs 1.47.0 (5-Feb-2023)
Creating filesystem with 1310464 4k blocks and 327680 inodes
Filesystem UUID: 9a825db6-dc6f-4ec9-a6c3-b60f4f058354
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

admin@rellamariofrio:~$ sudo mkdir /mnt/data
admin@rellamariofrio:~$ sudo mount /dev/sdb1 /mnt/data
```

```
admin@rellamariofrio:~$ sudo mkdir /mnt/data
admin@rellamariofrio:~$ sudo mount /dev/sdb1 /mnt/data
```

B. Directory Setup & Permissions

- Directory Path: /mnt/data
- Group Assigned: facultygrp
- Permission Level: 770 (root + facultygrp full access, others none)

```
admin@rellamariofrio:~$ sudo chown root:facultygrp /mnt/data
admin@rellamariofrio:~$ sudo chmod 770 /mnt/data
admin@rellamariofrio:~$
```

C. Verification

- Tested User Account: faculty2 and student4

```
admin@rellamariofrio:~$ su - faculty2
Password:
faculty2@rellamariofrio:~$ cd /projectdata
faculty2@rellamariofrio:/projectdata$ touch faculty_test.txt
faculty2@rellamariofrio:/projectdata$ ls
faculty_test.txt  lost+found
faculty2@rellamariofrio:/projectdata$ touch new_
faculty2@rellamariofrio:/projectdata$ ls
faculty_test.txt  lost+found  new_
faculty2@rellamariofrio:/projectdata$
```

Faculty User (**faculty2**) Can write inside /mnt/data

```
faculty2@rellamariofrio:/projectdata$ su - student4
Password:
student4@rellamariofrio:~$ cd /projectdata
student4@rellamariofrio:/projectdata$ ls
faculty_test.txt  lost+found  new_
student4@rellamariofrio:/projectdata$ cat faculty_test.txt
student4@rellamariofrio:/projectdata$ touch student_text.txt
touch: cannot touch 'student_text.txt': Permission denied
student4@rellamariofrio:/projectdata$ _
```

Student User (**student4**) denied write access

Reflection

What challenges did you encounter in creating partitions and managing permissions?
When we worked on Windows Server, one of the challenges we faced was making sure we selected the correct disk when creating a partition because choosing the wrong one could lead to data loss. We also found it tricky to assign the right permissions since it was easy to give either too much or too little access to a group. On Ubuntu Server, the challenge was using command-line tools like fdisk, mkfs.ext4, and lsblk, where a small mistake could affect the whole setup. We also needed to use ACLs along with chmod and chown to properly separate read/write access for faculty and read-only access for students.

How can these skills be applied in real-world system administration duties?
WWe believe these skills are very important in real-world system administration because they help organize storage and protect files. On Windows Server, the same steps can be used to manage shared folders and set the right permissions for different groups. On Ubuntu Server, they are useful in handling storage and access control in enterprise environments where Linux is common. Overall, these activities showed us how system administrators secure data, manage resources, and keep systems stable.

Bicol University Polangui
Polangui, Albay
Computer Studies Department

IT-123

System Administration and Maintenance

Laboratory Week6 - Network Configuration and Management

Submitted by:
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Submitted to:
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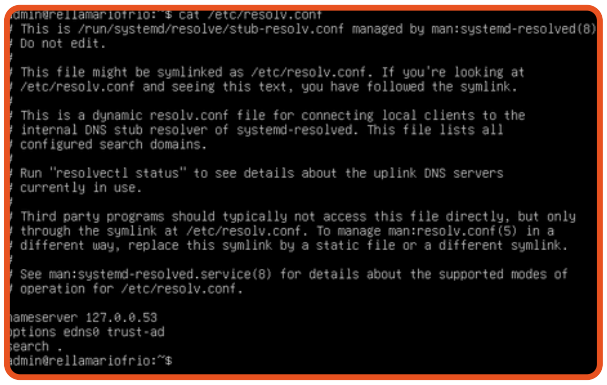
PROFFESOR

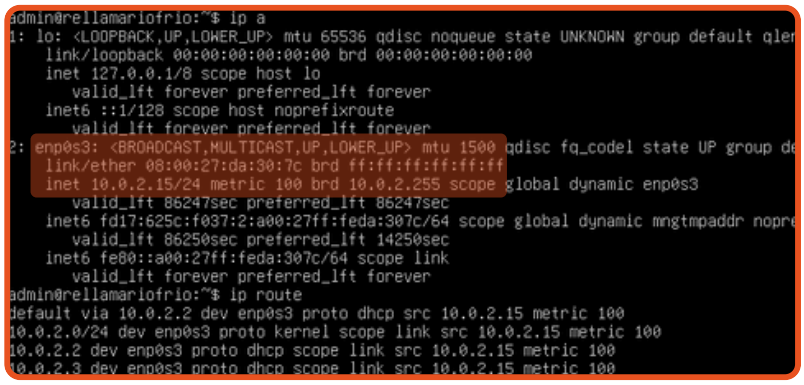
Ubuntu Server

Part 1. Checking Current Network Config

Commads:

- *ip a*
- *ip route*
- *cat /etc/resolv.conf*



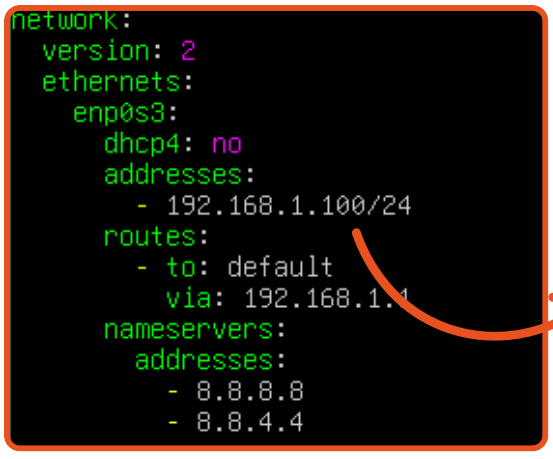


Part 2 – Configuring a Static IP Address

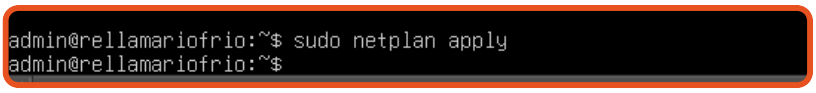
Commands:

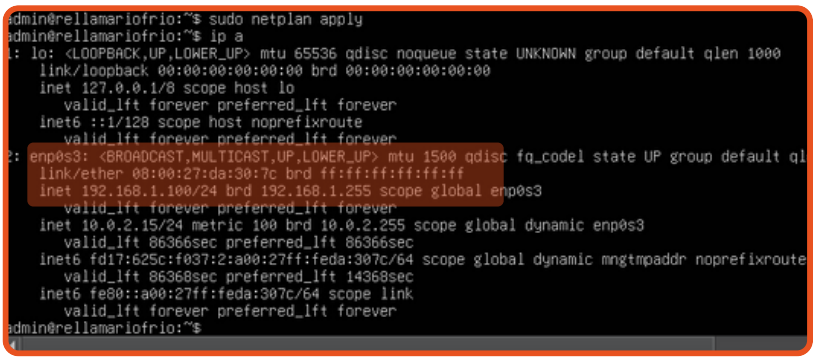
- sudo nano /etc/netplan/00-installer-config.yaml

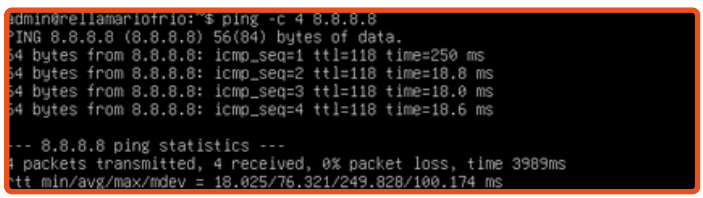
yaml configuration:



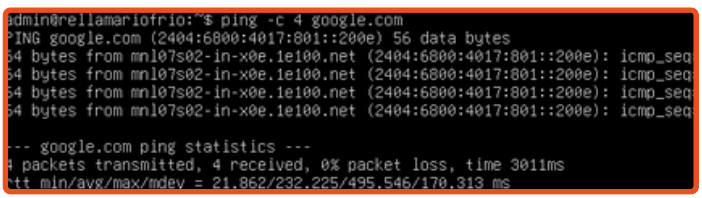
Then: sudo netplan apply







ping -c 4 8.8.8.8



ping -c 4 google.com

Part 3 – Switching Back to DHCP

Commads:

- sudo nano /etc/netplan/00-installer-config.yaml

yaml configuration:

```
 GNU nano 7.2
network:
  version: 2
  ethernets:
    enp0s3:
      dhcp4: yes
```

Then:

- *sudo netplan apply*
- *ip a / ip a show enp0s3*

```
admin@rellamariofrio:~$ sudo netplan apply
admin@rellamariofrio:~$ ip a show enp0s3
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group de
    link/ether 08:00:27:da:30:7c brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.7/24 metric 100 brd 192.168.1.255 scope global dynamic enp0s3
       valid_lft 86399sec preferred_lft 86399sec
    inet6 2001:4453:7f3:5900:a00:27ff:feda:307c/64 scope global dynamic mngtmpaddr nop
       valid_lft 259198sec preferred_lft 172798sec
    inet6 fe80::a00:27ff:feda:307c/64 scope link
       valid_lft forever preferred_lft forever
admin@rellamariofrio:~$ _
```

Part 4 – Troubleshooting with CLI Tools

1. Ping(Gateway test)

- *ping -c 4 192.168.1.1*

```
admin@rellamariofrio:~$ ping -c 4 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=11.3 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=6.83 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=4.35 ms
64 bytes from 192.168.1.1: icmp_seq=4 ttl=64 time=8.72 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 4324ms
rtt min/avg/max/mdev = 4.345/7.789/11.265/2.536 ms
```

2. Traceroute (Internet path)

- *traceroute google.com*

```
admin@rellamariofrio:~$ traceroute google.com
traceroute to google.com (142.251.220.174), 30 hops max, 60 byte packets
 1  _gateway (192.168.1.1)  7.803 ms  3.455 ms  2.853 ms
 2  100.67.0.1 (100.67.0.1)  11.079 ms  10.727 ms  9.029 ms
 3  122.2.181.173.static.pldt.net (122.2.181.173)  10.382 ms  10.238 ms  9.889 ms
 4  210.213.134.20.static.pldt.net (210.213.134.20)  11.311 ms 210.213.134.40.static.pldt.net (210.213.134.40)  10.943
 5  * * *
 6  * * *
 7  216.239.56.40 (216.239.56.40)  1081.057 ms 142.250.58.242 (142.250.58.242)  25.269 ms mnl07s02-in-f14.1e100.net (14
```

3. DNS Resolution (nslookup)

- *nslookup google.com*

```
admin@rellamariofrio:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.251.220.174
Name:   google.com
Address: 2404:6800:4017:802::200e
```

4. Active Connections (ss)

- *ss -tuln*

```
 4  210.213.134.20.static.pldt.net (210.213.134.20)  11.311 ms 210.213.134.40.static.pldt.net (210.213.134.40)  10.943
 5  * * *
 6  * * *
 7  216.239.56.40 (216.239.56.40)  1081.057 ms 142.250.58.242 (142.250.58.242)  25.269 ms mnl07s02-in-f14.1e100.net (14
admin@rellamariofrio:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.251.220.174
Name:   google.com
Address: 2404:6800:4017:802::200e

admin@rellamariofrio:~$ ss -tuln
Netid       State        Recv-Q       Send-Q                                  Local Address:Port
udp         UNCONN       0            0                                          127.0.0.54:53
udp         UNCONN       0            0                                       127.0.0.53%lo:53
udp         UNCONN       0            0                                   192.168.1.7%enp0s3:68
udp         UNCONN       0            0                      [fe80::a00:27ff:feda:307c]%enp0s3:546
tcp         LISTEN       0            4096                                       127.0.0.54:53
tcp         LISTEN       0            4096                                    127.0.0.53%lo:53
```

Part 6 – Student Exercise

- *Server A → Static IP: 192.168.1.150/24*
- *Server B → DHCP (Host machine at 192.168.1.3)*

```
Connection-specific DNS Suffix  . :
IPv6 Address. . . . . . . . . . . : [redacted]
Temporary IPv6 Address. . . . . . : [redacted]
Link-local IPv6 Address . . . . . : [redacted]
IPv4 Address. . . . . . . . . . . : 192.168.1.3
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : fe80::1%13
                                    192.168.1.1
```

Ping the host PC(Server B) from the Ubuntu Serve(VM)

```
admin@rellamariofrio:~$ ping -c 4 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 56(84) bytes of data.
64 bytes from 192.168.1.3: icmp_seq=1 ttl=128 time=0.703 ms
64 bytes from 192.168.1.3: icmp_seq=2 ttl=128 time=0.566 ms
64 bytes from 192.168.1.3: icmp_seq=3 ttl=128 time=0.563 ms
64 bytes from 192.168.1.3: icmp_seq=4 ttl=128 time=0.515 ms

--- 192.168.1.3 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3027ms
rtt min/avg/max/mdev = 0.515/0.586/0.703/0.070 ms
```

Ping Server A (Ubuntu Server from host pC

```
PS C:\Users\Mark> ping 192.168.1.150

Pinging 192.168.1.150 with 32 bytes of data:
Reply from 192.168.1.150: bytes=32 time=1ms TTL=64
Reply from 192.168.1.150: bytes=32 time=1ms TTL=64
Reply from 192.168.1.150: bytes=32 time=1ms TTL=64
Reply from 192.168.1.150: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.1.150:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

Part 6.1 – 8.8.8.8 and google.com ping tests

From Ubuntu Server

```
admin@rellamariofrio:~$ 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=118 time=122 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=118 time=410 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=118 time=18.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=118 time=18.4 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3012ms
rtt min/avg/max/mdev = 18.237/142.074/409.747/160.221 ms
```


```
admin@rellamariofrio:~$ 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=118 time=122 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=118 time=410 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=118 time=18.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=118 time=18.4 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3012ms
rtt min/avg/max/mdev = 18.237/142.074/409.747/160.221 ms
```


From Windows 11(HOST)

```
PS C:\Users\Mark> ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=336ms TTL=118
Reply from 8.8.8.8: bytes=32 time=17ms TTL=118
Reply from 8.8.8.8: bytes=32 time=17ms TTL=118
Reply from 8.8.8.8: bytes=32 time=16ms TTL=118

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 16ms, Maximum = 336ms, Average = 96ms
PS C:\Users\Mark> ping google.com
```


```
PS C:\Users\Mark> ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=336ms TTL=118
Reply from 8.8.8.8: bytes=32 time=17ms TTL=118
Reply from 8.8.8.8: bytes=32 time=17ms TTL=118
Reply from 8.8.8.8: bytes=32 time=16ms TTL=118

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 16ms, Maximum = 336ms, Average = 96ms
PS C:\Users\Mark> ping google.com
```

Bicol University Polangui
Polangui, Albay
Computer Studies Department

IT-123

System Administration and Maintenance

Laboratory Week7 - Configuring and Securing Network Services

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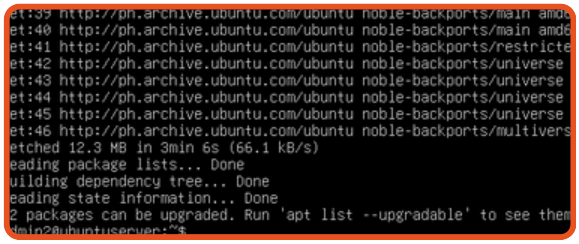
Submitted to:
Guillermo V. Red, Jr. DIT
PROFFESOR

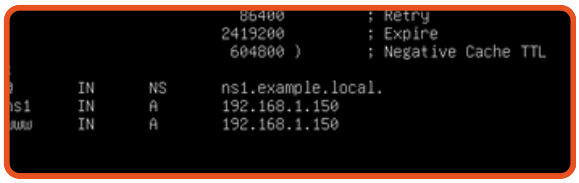
Part 1. DNS Configuration

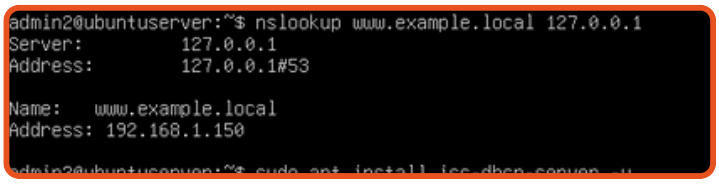
Commads:

- sudo apt update
- sudo apt install bind9 bind9utils -y
- sudo nano /etc/bind/named.conf.local



- sudo cp /etc/bind/db.local /etc/bind/db.company.local
- sudo nano /etc/bind/db.company.local
- sudo systemctl restart bind9
- nslookup www.company.local 127.0.0.1



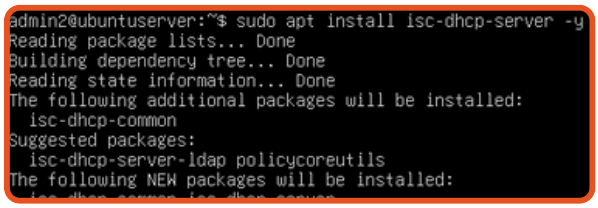


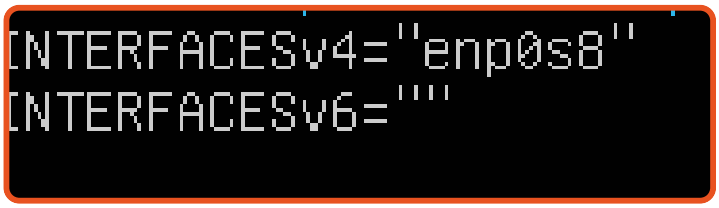
Part 2. DHCP Configuration

Commads:

- sudo apt install isc-dhcp-server -y
- sudo nano /etc/default/isc-dhcp-server

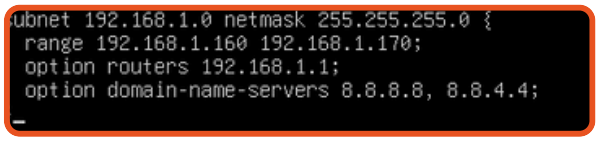
Change to enp0s8

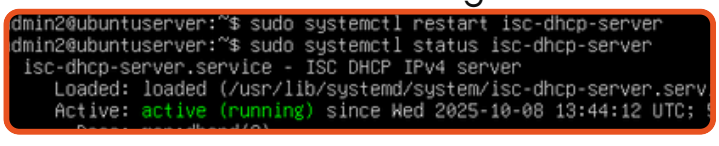




- sudo nano /etc/dhcp/dhcpd.conf
- sudo systemctl restart isc-dhcp-server
- sudo systemctl status isc-dhcp-server

DHCP Running





Part 3. HTTP Service (Apache)

Commads:

- sudo apt install apache2 -y
- sudo systemctl restart apache2
- curl http://192.168.1.150

```
dmin2@ubuntuserver:~$
dmin2@ubuntuserver:~$ sudo apt install apache2 -y
eading package lists... Done
uilding dependency tree... Done
eading state information... Done
```

```
dmin2@ubuntuserver:~$ sudo systemctl status apache2
 apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service;
     Active: active (running) since Wed 2025-10-08 12:26:22 U
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1695 (apache2)
      Tasks: 55 (limit: 5286)
     Memory: 5.4M (peak: 5.7M)
        CPU: 86ms
```

```
<div class="section_header">
    <div id="docroot"></div>
        Document Roots
</div>

<div class="content_section_text">
    <p>
        By default, Ubuntu does not allow access through the web browser to
        <em>any</em> file outside of those located in <tt>/var/www</tt>,
        <a href="http://httpd.apache.org/docs/2.4/mod/mod_userdir.html" rel="nofollow">public_html</a>
        directories (when enabled) and <tt>/usr/share</tt> (for web
        applications). If your site is using a web document root
        located elsewhere (such as in <tt>/srv</tt>) you may need to whitelist your
        document root directory in <tt>/etc/apache2/apache2.conf</tt>.
    </p>
    <p>
        The default Ubuntu document root is <tt>/var/www/html</tt>. You
        can make your own virtual hosts under /var/www.
    </p>
</div>

<div class="section_header">
  <div id="bugs"></div>
        Reporting Problems
</div>
<div class="content_section_text">
  <p>
        Please use the <tt>ubuntu-bug</tt> tool to report bugs in the
        Apache2 package with Ubuntu. However, check <a
        href="https://bugs.launchpad.net/ubuntu/+source/apache2"
        rel="nofollow">existing bug reports</a> before reporting a new bug.
  </p>
  <p>
        Please report bugs specific to modules (such as PHP and others)
        to their respective packages, not to the web server itself.
  </p>
</div>
```

Part 4. FTP Service

Commads:

- sudo apt install vsftpd -y
- sudo nano /etc/vsftpd.conf

```
dmin2@ubuntuserver:~$ sudo apt install vsftd -y
eading package lists... Done
uilding dependency tree... Done
eading state information... Done
```

```
Uncomment this to enable any form of FTP write command.
ite_enable=YES

Default umask for local users is 077. You may wish to chang
if your users expect that (022 is used by most other ftpd's
```

- sudo systemctl restart vsftpd
- ftp 192.168.1.150

```
admin2@ubuntuserver:~$ sudo systemctl restart vsftpd
admin2@ubuntuserver:~$ ftp 192.168.1.150
Connected to 192.168.1.150.
220 (vsFTPd 3.0.5)
Name (192.168.1.150:admin2):
```

Part 5. Securing Services (Firewall)

Commads:

- sudo ufw allow 22/tcp
- sudo ufw allow 53/tcp
- sudo ufw allow 80/tcp
- sudo ufw allow 21/tcp
- sudo ufw enable
- sudo ufw status

```
#
# Uncomment this to enable any f
write_enable=YES
listen_address=192.168.1.150
#
```

```
admin2@ubuntuserver:~$ sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
22/tcp                     ALLOW       Anywhere
53/tcp                     ALLOW       Anywhere
80/tcp                     ALLOW       Anywhere
21/tcp                     ALLOW       Anywhere
22/tcp (v6)                ALLOW       Anywhere (v6)
53/tcp (v6)                ALLOW       Anywhere (v6)
80/tcp (v6)                ALLOW       Anywhere (v6)
21/tcp (v6)                ALLOW       Anywhere (v6)
```

```
admin2@ubuntuserver:~$ sudo ufw allow 22/tcp
Rules updated
Rules updated (v6)
admin2@ubuntuserver:~$ sudo ufw allow 53/tcp
Rules updated
Rules updated (v6)
admin2@ubuntuserver:~$ sudo ufw allow 80/tcp
Rules updated
Rules updated (v6)
admin2@ubuntuserver:~$ sudo ufw allow 21/tcp
Rules updated
Rules updated (v6)
admin2@ubuntuserver:~$ sudo ufw enable
Firewall is active and enabled on system startup
admin2@ubuntuserver:~$ _
```

Part 6 – Student Exercise (Ubuntu CLI)

Commads:

- sudo apt update
- sudo apt install bind9 bind9utils -y
- sudo nano /etc/bind/named.conf.local
- sudo cp /etc/bind/db.local /etc/bind/db.company.local
- sudo nano /etc/bind/db.company.local
- sudo systemctl restart bind9
- nslookup www.company.local 127.0.0.1

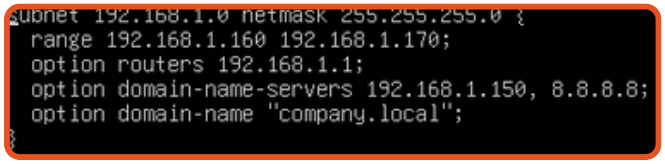
```
zone "company.local" {
    type master;
    file "/etc/bind/db.company.local";
};
```

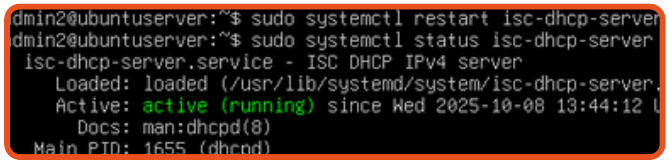
```
admin2@ubuntuserver:~$ sudo systemctl restart bind9
admin2@ubuntuserver:~$ nslookup www.company.local 127.0.0.1
Server:         127.0.0.1
Address:        127.0.0.1#53

Name:   www.company.local
Address: 192.168.1.150
```

```
;
; BIND data file for local loopback interface
;
$TTL    604800
@       IN      SOA     ns1.company.local. admin.company.local (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      ns1.company.local
ns1     IN      A       192.168.1.150
www     IN      A       192.168.1.150
```

Commads:

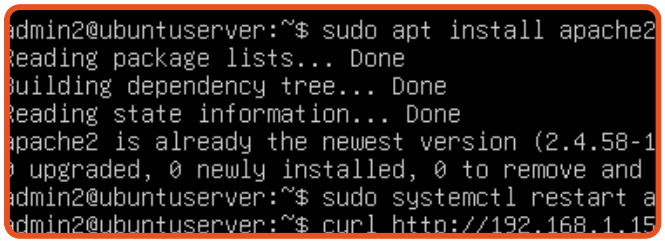
- sudo nano /etc/dhcp/dhcpd.conf
- sudo systemctl restart isc-dhcp-server
- sudo systemctl status isc-dhcp-server

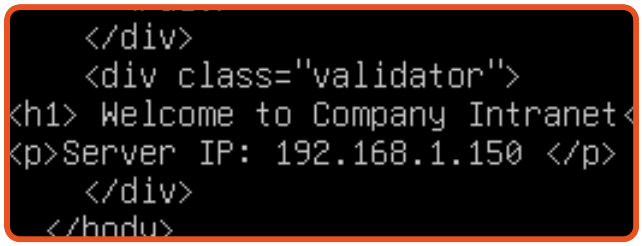




Commads:

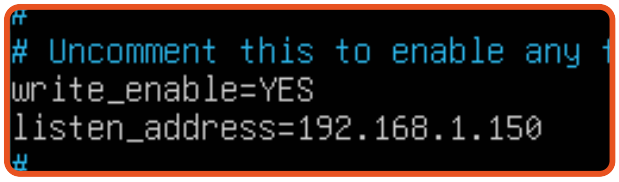
- sudo systemctl restart apache2
- curl http://192.168.1.150





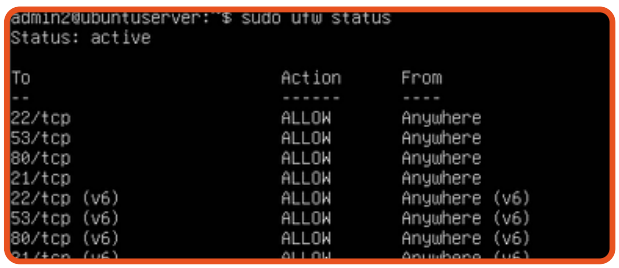
Commads:

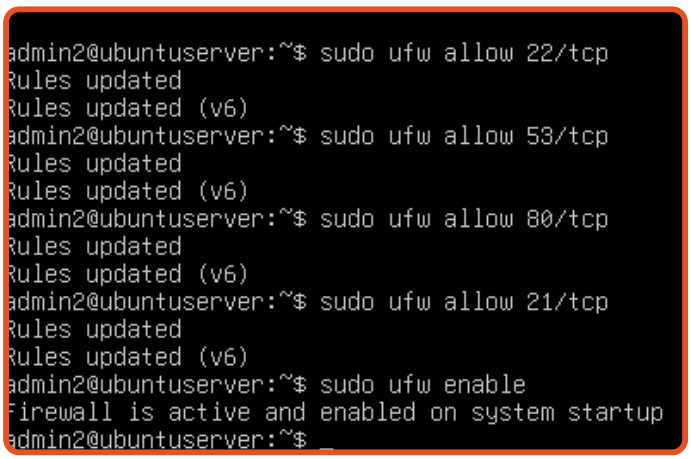
- sudo nano /etc/vsftpd.conf
- sudo systemctl restart vsftpd
- ftp 192.168.1.150



Commads:

- sudo ufw allow 22/tcp
- sudo ufw allow 53/tcp
- sudo ufw allow 80/tcp
- sudo ufw allow 21/tcp
- sudo ufw enable
- sudo ufw status





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IT-123

System Administration and Maintenance

Laboratory Week10 - Firewall and VPN Configuration

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Submitted to:
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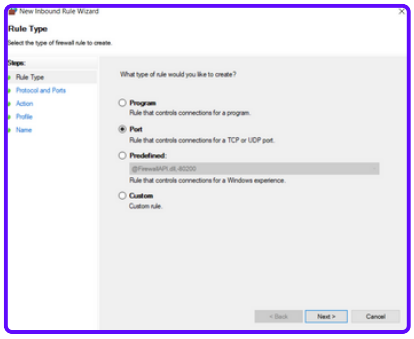
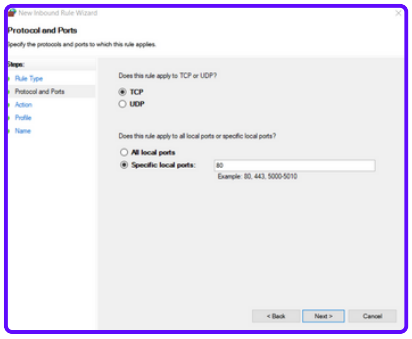
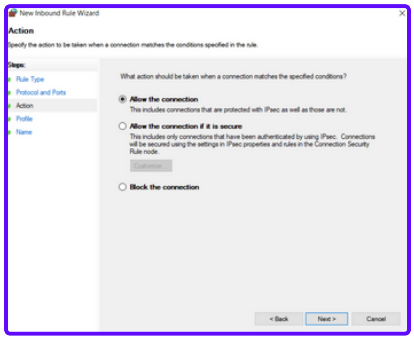
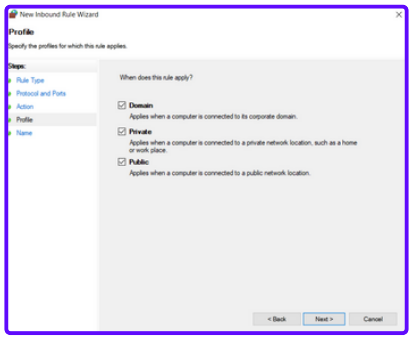
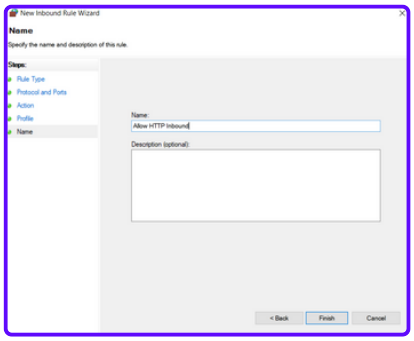
TASK 1: CONFIGURING WINDOWS FIREWALL RULES

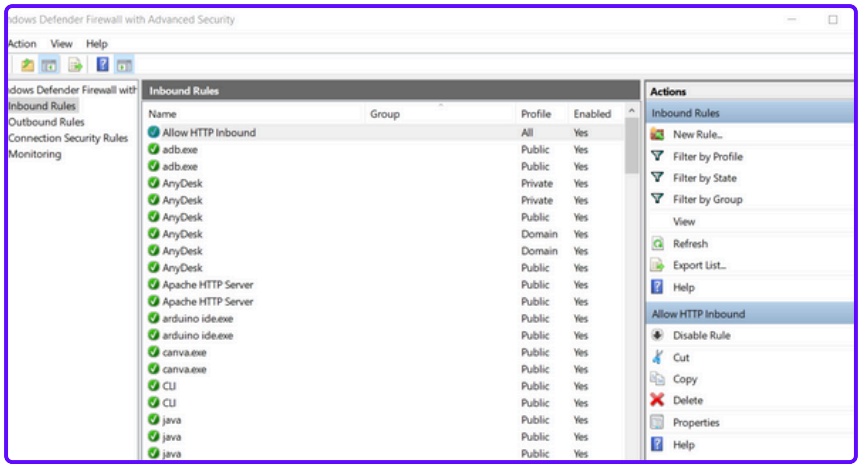
1. Configure Windows Firewall Rules (Inbound & Outbound)

a. In the left pane select **Inbound Rules**.
b. Click New Rule... in the right pane. Choose Port → Next.
c. Select TCP (or UDP as needed) and enter the Port number (e.g., 80). Click Next.
d. Choose Allow the connection → Next. Select profiles (Domain/Private/Public) appropriate to your test environment → Next.
e. Give the rule a name, e.g., Allow HTTP, and click Finish.

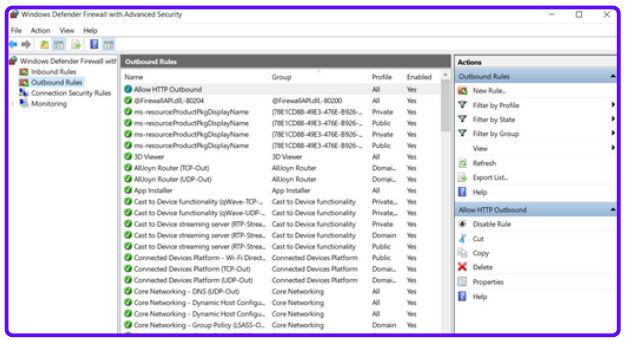
2. Create an Outbound Port Rule

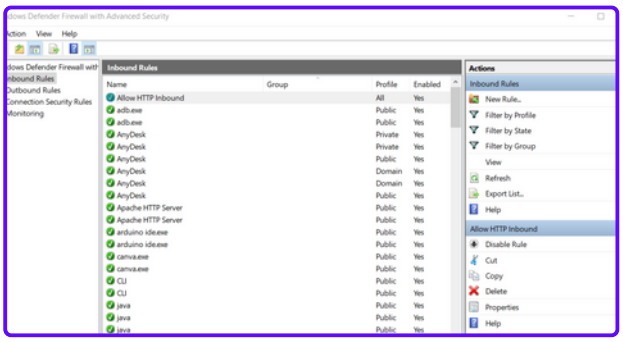
Repeat the inbound rule steps but start with **Outbound Rules** → New Rule...; configure the same port/protocol and name it (e.g., Allow Outbound HTTP).

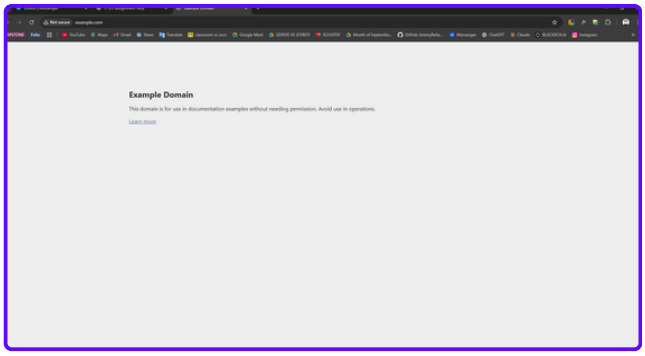


3. Test Service Accessibility (Rule Enabled)

a. If you opened port 80, run a simple web service (or point a client to a known web server) and use a browser on another machine/VM to connect to the server's IP on that port.
b. Confirm the connection succeeds while the **firewall rule is enabled.**

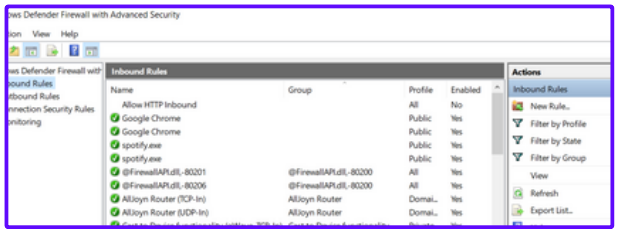


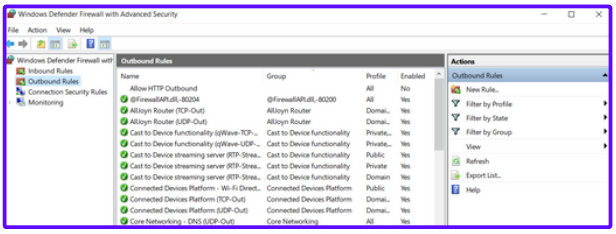


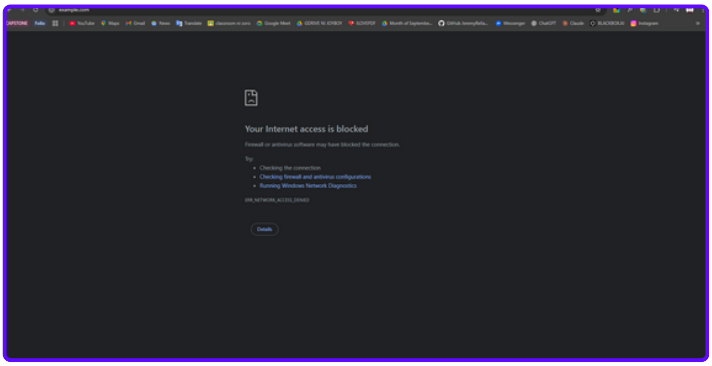


4. Disable Rule & Confirm Blocking

a. In the firewall console, **disable your inbound rule** (right-click → Disable Rule).
b. Retry the same connection — it should fail.





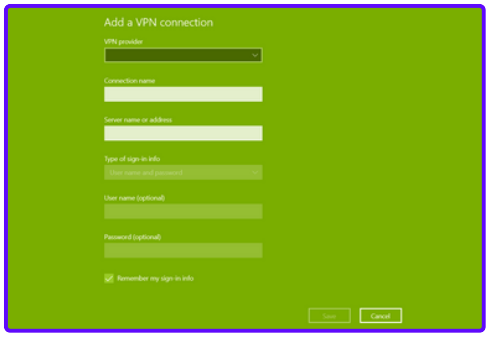


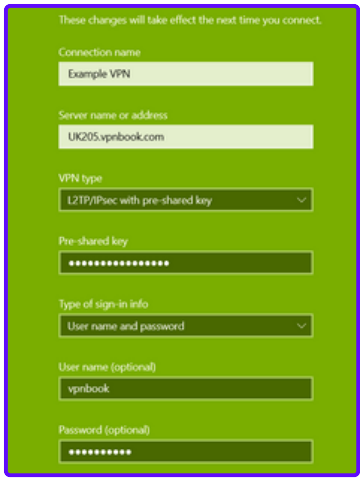
TASK 2: SETTING UP A VPN IN WINDOWS

1. Set Up a VPN (Windows)

Open VPN Settings then, **Create the VPN Profile**
In the Add VPN dialog:

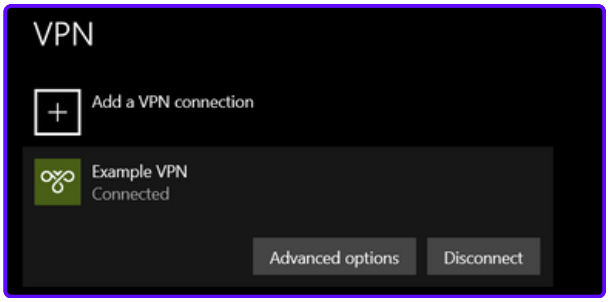
- VPN provider: Windows (built-in)
- Connection name: Example VPN
- Server name or address: enter VPN server IP/domain
- VPN type: L2TP/IPsec with pre-shared key
- Type of sign-in info: Username and password
- Enter Username and Password fields (or leave blank to prompt at connect) → Save.





1. Testing

a. Connect to VPN



b. Verify VPN Tunnel using **WhatIsMyIP.com**