Lab 1: Ubuntu Deployment on VirtualBox with Networking Modes, Linux Commands, and Nginx Setup

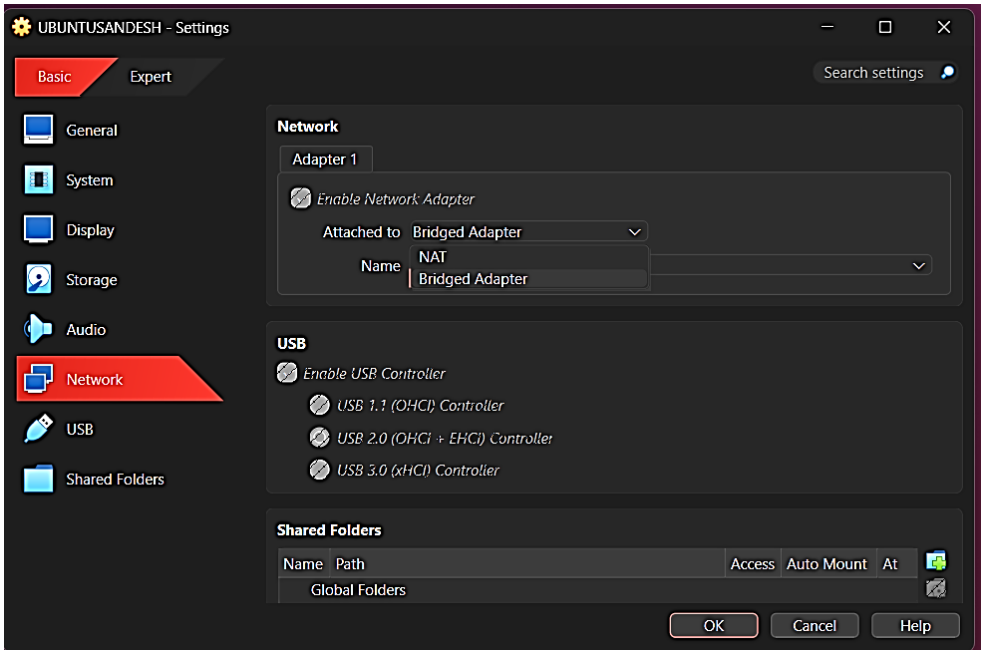
Objectives

1. Deploy Ubuntu OS using VirtualBox.
2. Understand and configure different networking modes (NAT vs Bridge).
3. Execute essential Linux commands for file and system management.
4. Understand the difference between absolute and relative paths.
5. Install and verify Nginx web server operation.
6. Check network ports and running services.

Tools and Technologies Used

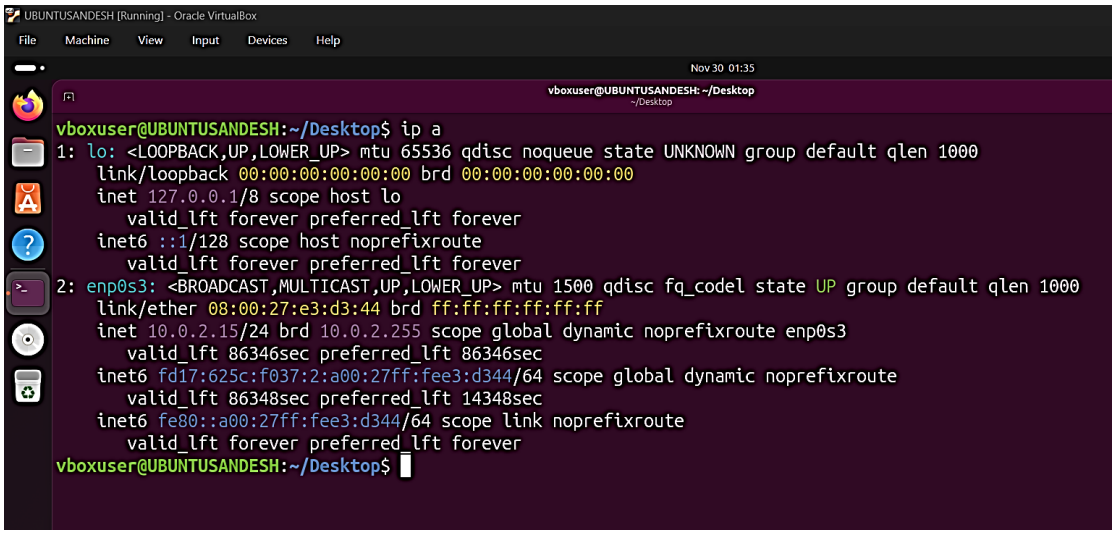
1. Oracle VirtualBox
2. Ubuntu OS (ISO Image)
3. Terminal / Bash Shell
4. Nginx Web Server
5. net-tools package

1. NAT vs Bridge Networking



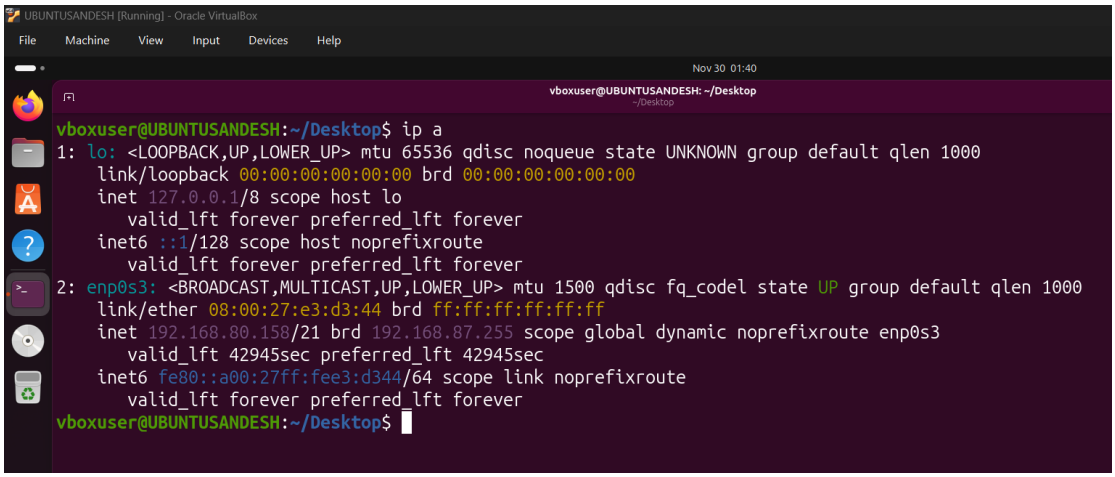
NAT (Network Address Translation)

a. Default network mode in VirtualBox.
b. VM gets a private IP assigned by VirtualBox.
c. VM can access the internet, but external devices cannot access the VM directly.
d. Useful for isolated setups where you do not want your VM exposed to the local network.



Bridge Mode

a. VM acts as a full device on the local network.
b. Gets an IP from the same router as the host machine.
c. Other devices in the network can ping or access the VM.
d. Useful for hosting services or testing server accessibility.



2. Basic Linux Commands Used

a. cd: change directory

b. pwd: Show current working directory

c. ls: List files and directories

d. mkdir <directory>: Create a new directory

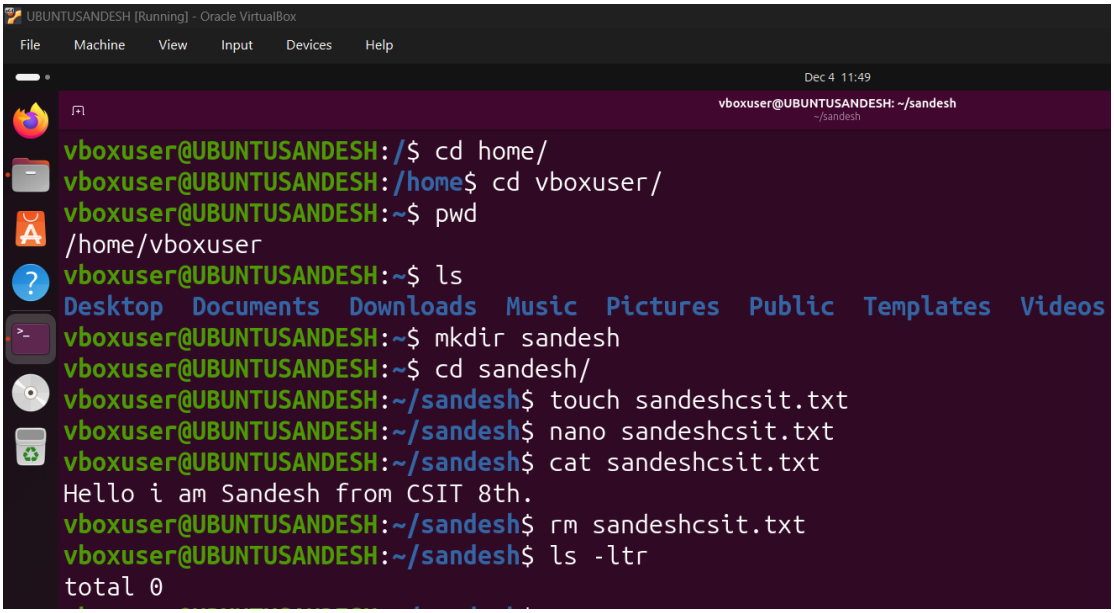
e. touch <file>: Create an empty file

f. nano <file>: Open file in nano editor (exit: Ctrl X)

g. cat <file>: Display file contents

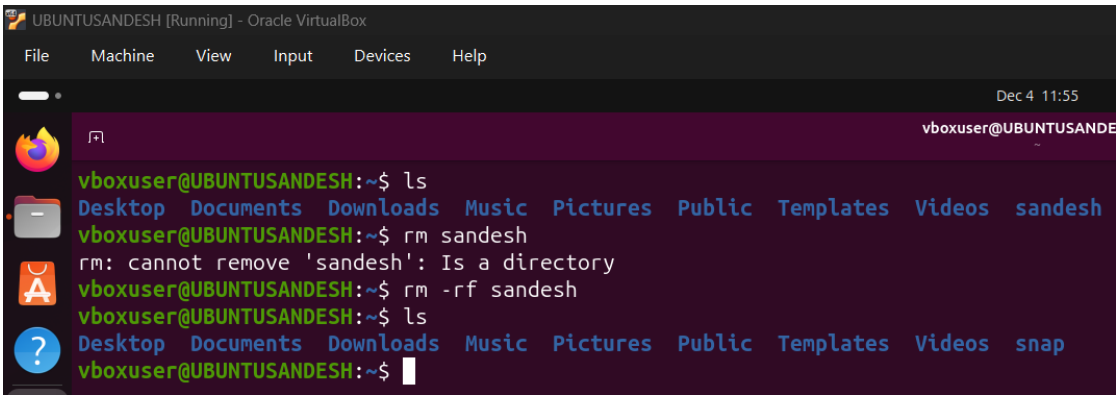
h. rm <file>: Delete a file

i. ls -ltr: List with details sorted by time



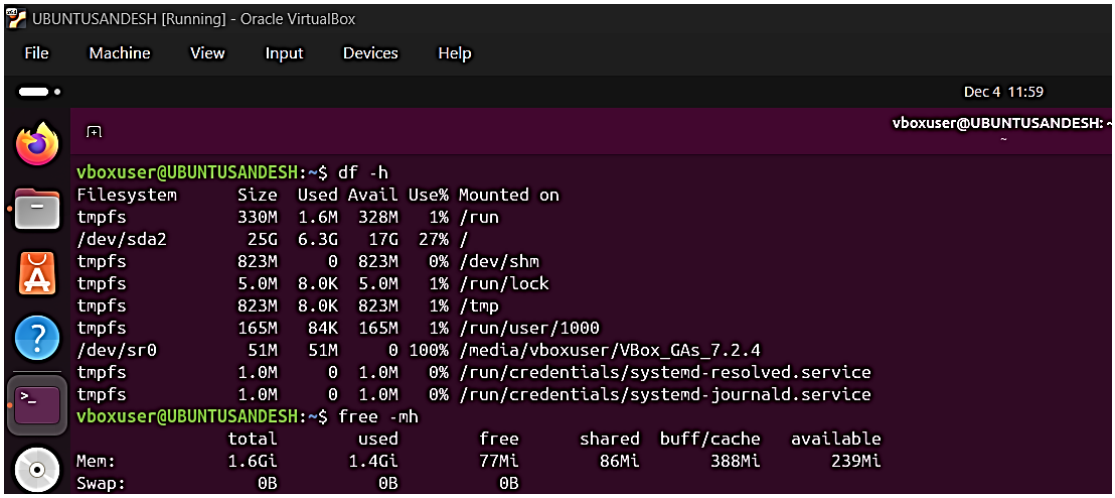
j. rm <directory>: Fails if directory not empty

k. rm -rf <directory>: Force delete directory

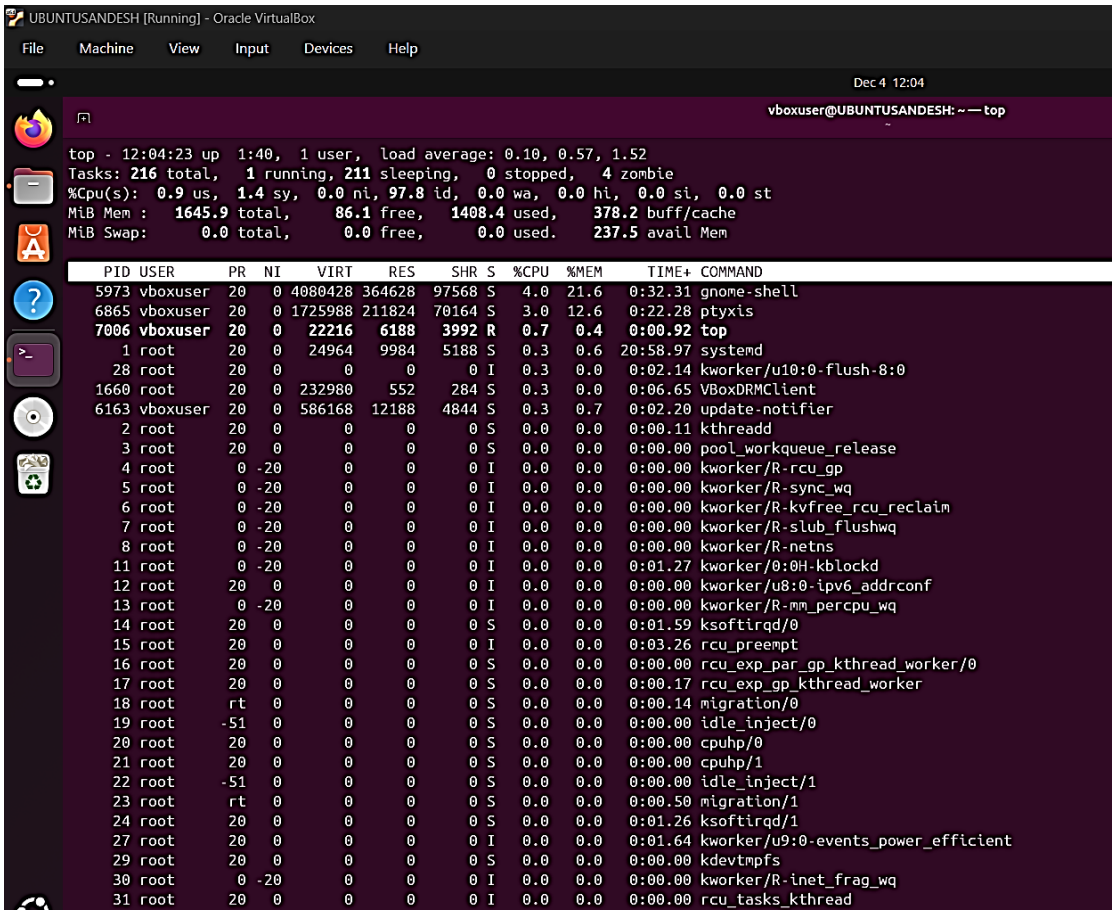


l. df -h: Show disk/storage usage

m. free -mh: Show RAM usage



n. top: Show running processes



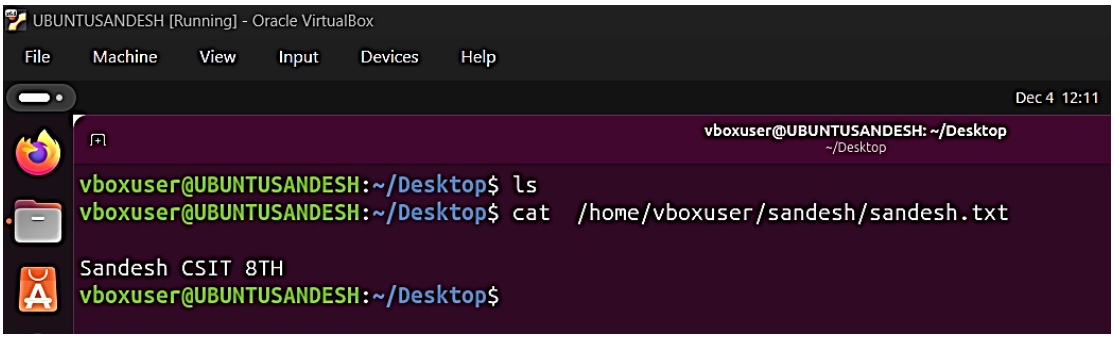
3. Absolute Path vs Relative Path

Absolute Path

a. Starts from root directory /.

b. Complete path to a file or folder.

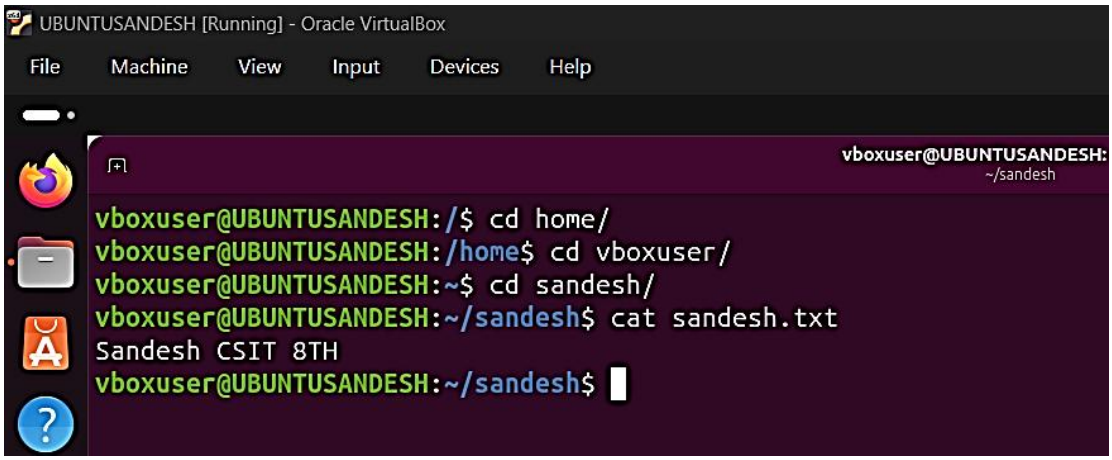
c. Example: /home/user/documents/file.txt



Relative Path

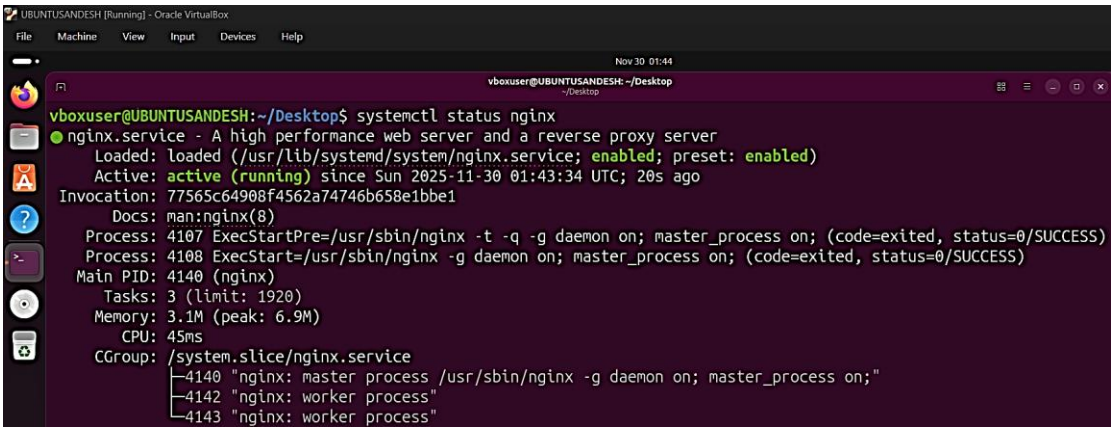
a. Based on current working directory.

b. Example: ../folder/file.txt or ./file.txt

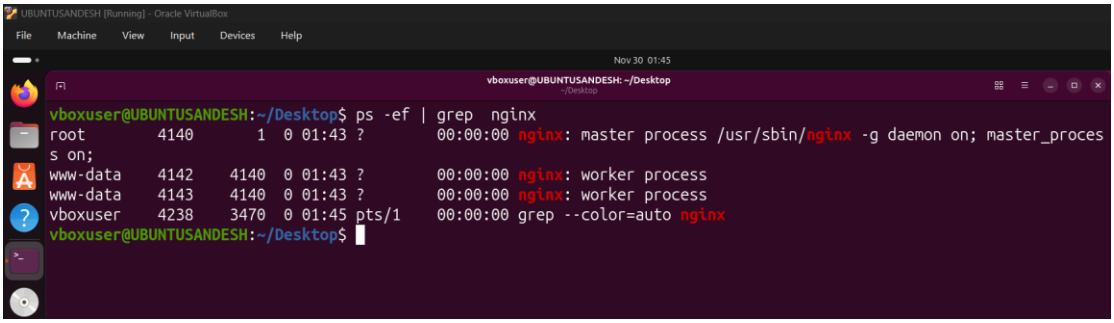


4. Use of Nginx on Ubuntu

Check if Nginx is running:

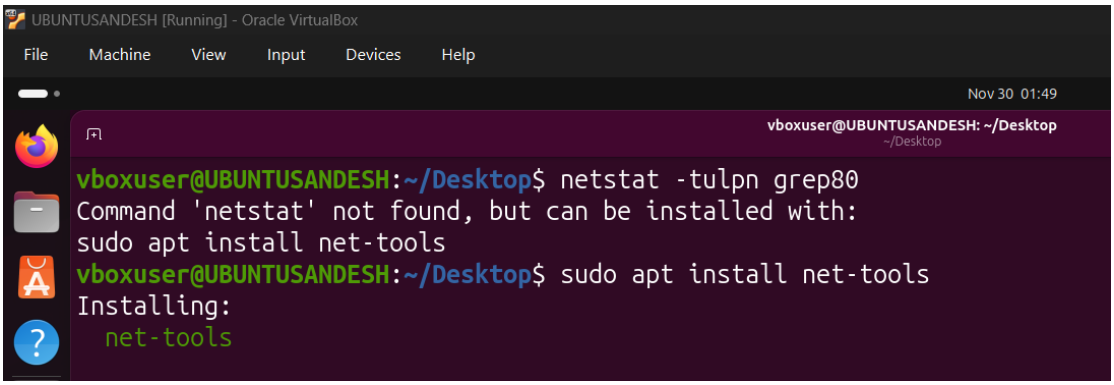


ps -ef | grep nginx



Install net-tools:

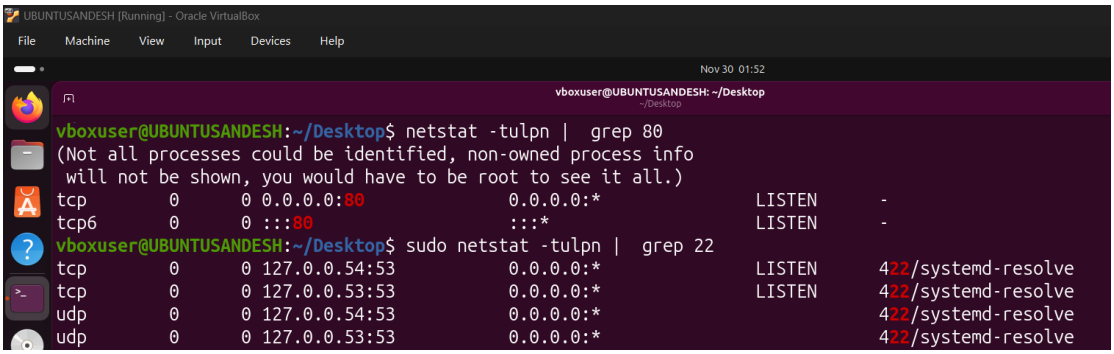
sudo apt install net-tools



Check listening ports (for port 80 or 22):

netstat -tulpn | grep 80

sudo netstat -tulpn | grep 22



Conclusion

This lab focused on installing and working with Ubuntu inside VirtualBox. NAT and Bridge modes were compared, followed by hands-on use of basic Linux commands. Path concepts were clarified (absolute vs relative), and Nginx installation and network port checks were performed.