Build Your Virtual

Network Lab

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Course / Section: CYBR3090 – Cyberthreat Intelligence / O01, O02.1252

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1.0 Introduction

This document is about building the virtual machines (VMs) for hands-on cybersecurity training in a simulated real-world environment. The main tools used in this lab is Hyper-V, which is a virtualization software developed by Microsoft, allowing to create and run virtual machines (VMs) on x86-64 systems running Windows. Each virtual machine acts like a complete computer, running an operating system and applications, providing a flexible and efficient way to use hardware resources. Additionally, local computer must have a minimum specification of Intel i7 with 16 GB RAM (32 GB RAM is recommended for better experience).

2.0 Devices Used

Below is a diagram to better understand how the devices linked with each other. Beginning with the local machine/host where Hyper-V is installed. In this Hyper-V, there is a virtual machine which is “adomingo” where another Hyper-V is installed inside this virtual machine which is “NESTEDVM01”. In this NESTEDVM01 Hyper-V, there are four virtual machines namely: Kali-Linux, Metasploitable2, Windows10ProWS1, and WinXPSP3.

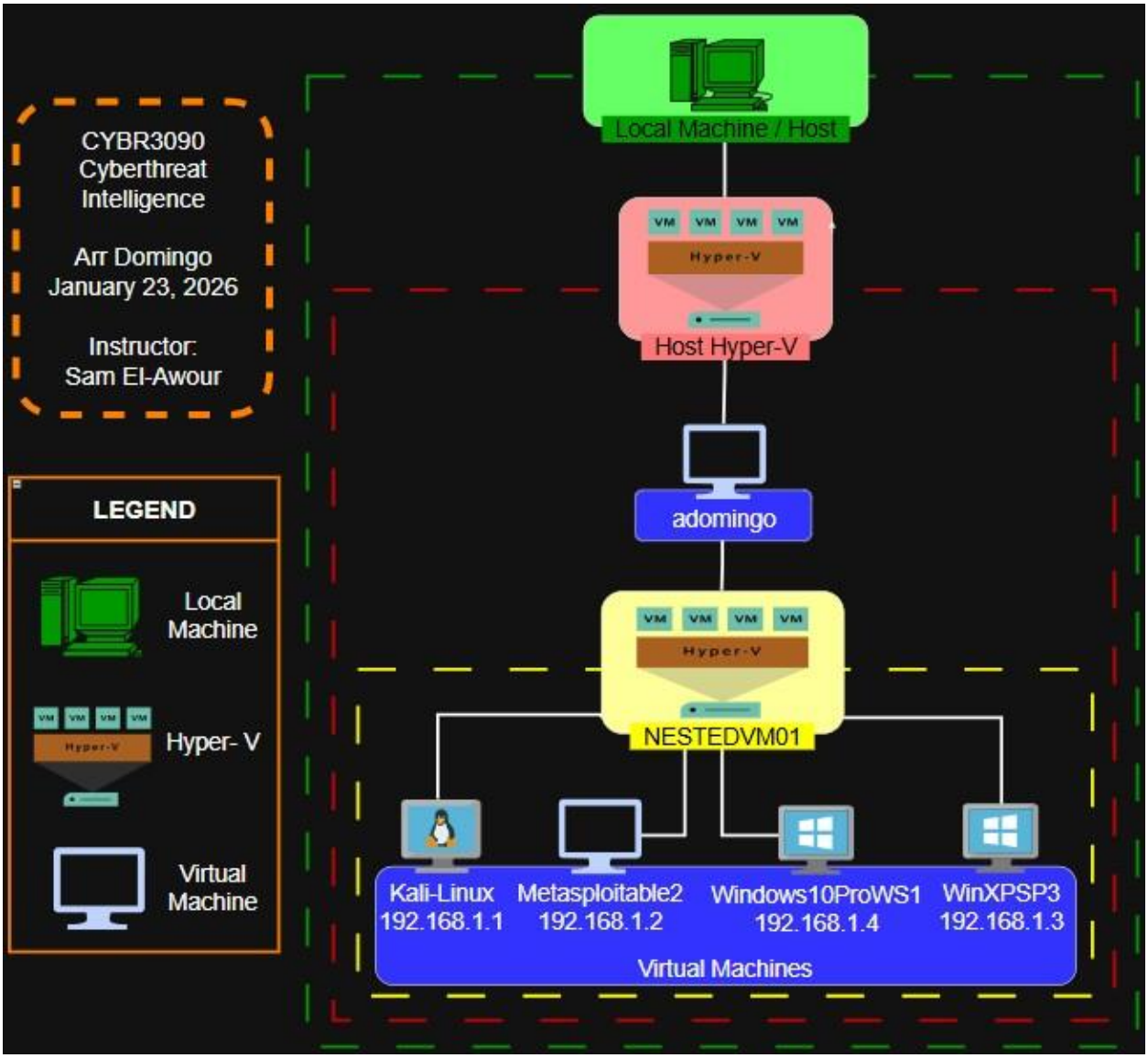

Figure 1. Diagram of devices used.

3.0 Step-by-Step Rebuild Guide

3.1 Download “vhdx” file and unzip (using 7zip)

- In the Brightspace, go to “Resources” under “Build Your Virtual Network Lab”.
- Notice that there are 12 VHDX (Virtual Hard Disk Extended) files, download those 12 files one-by-one (depending on your internet connection, this would take time).
- Keep the "File name" and "Save as type", then choose the location where you want to save the VHDX files.
- Click "Save". Repeat until you get all 12 VHDX files.
- If your machine does not have 7zip File Manager, download the app.
- Open 7zip File Manager app.
- Where you see a folder icon, paste the location of those 12 VHDX files.
- Highlight the first (.001) VHDX file.
- Click "Extract".
- Choose a location where you want to extract.
- Click "OK". When ask for password, it is “CYBR3090!!” (without the double quotation). Depending on your machine, the extract process takes some time.

3.2 Set-up Hyper-V in your machine

To be able to run Hyper-V on your machine, version of Windows 11 must be Education or Pro. If your machine is Windows 11 Home, follow below instructions to upgrade:

- First, check the version of your Windows 11. Click Windows and type “winver”.
- If the version of Windows 11 is Home, follow the next steps to upgrade the version to Education or Pro. Otherwise, no action is required.

Figure 2. Check the version of Windows 11.

- Go to https://portal.azure.com/#home
- Under “Azure service”, click “Education”. If “Education” doesn’t show, click “More services” and search for “Education”.
- On the left panel, expand “Learning resources” and click “Software”.
- Search for Windows 11 and click “Windows 11 Education, version 25H2”.

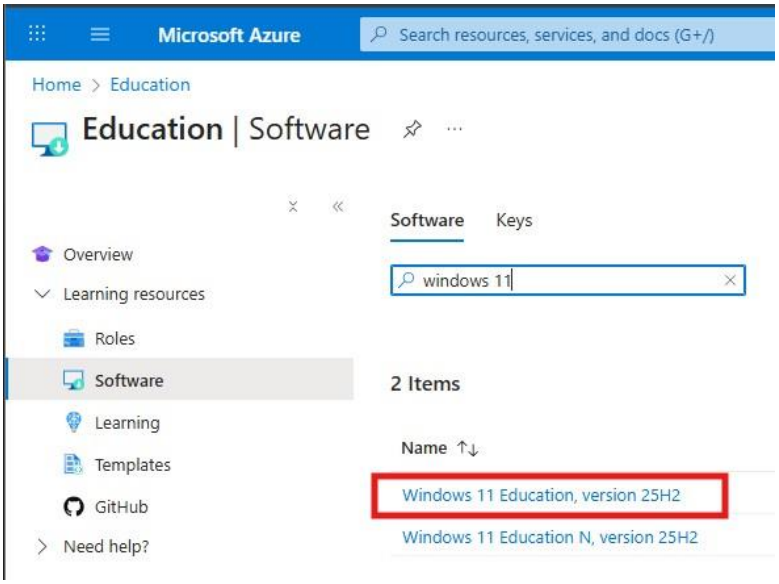

Figure 3. Install Windows 11 Education.

- Click “View Key” button, take note and save the “Product key”.
- Click Windows and go to “System”.
- Scroll down and click “Product key and activation”.
- Click “Change” in Change product key.

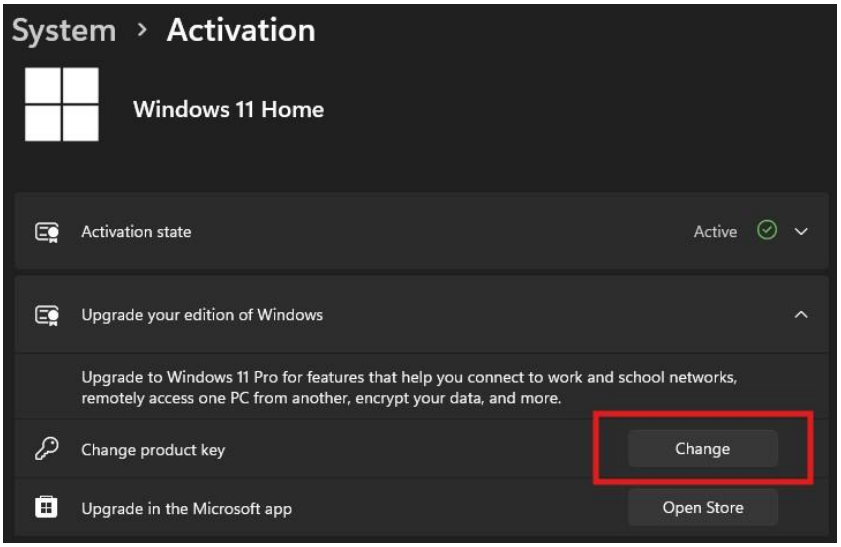

Figure 4. Change product key.

- Paste the Product key and click Next.
- When ask to “Upgrade your edition of Windows”, make sure to save all your works and click “Start”. This will restart your machine and will take some time.

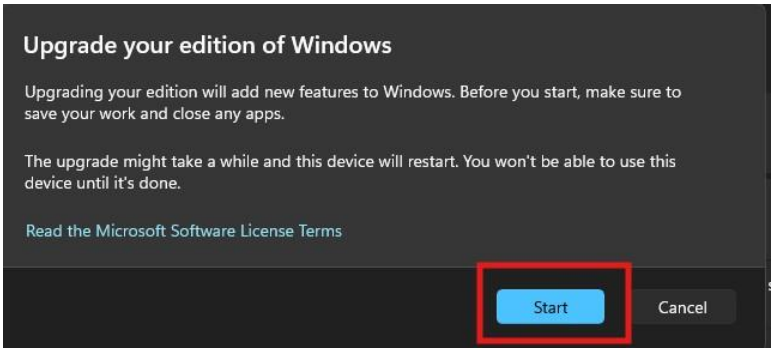

Figure 5. Click "Start" to upgrade Windows 11.

- After restarting, check the version of Windows 11. Click Windows and type “winver”. By this time, Windows 11 must be Education.

Figure 6. Upgraded to Windows 11 Education to enable Hyper-V.

- Go to Windows and search for “Turn Windows features on or off”.
- A window will show up, enable “Hyper-V” and “Virtual Machine Platform”.

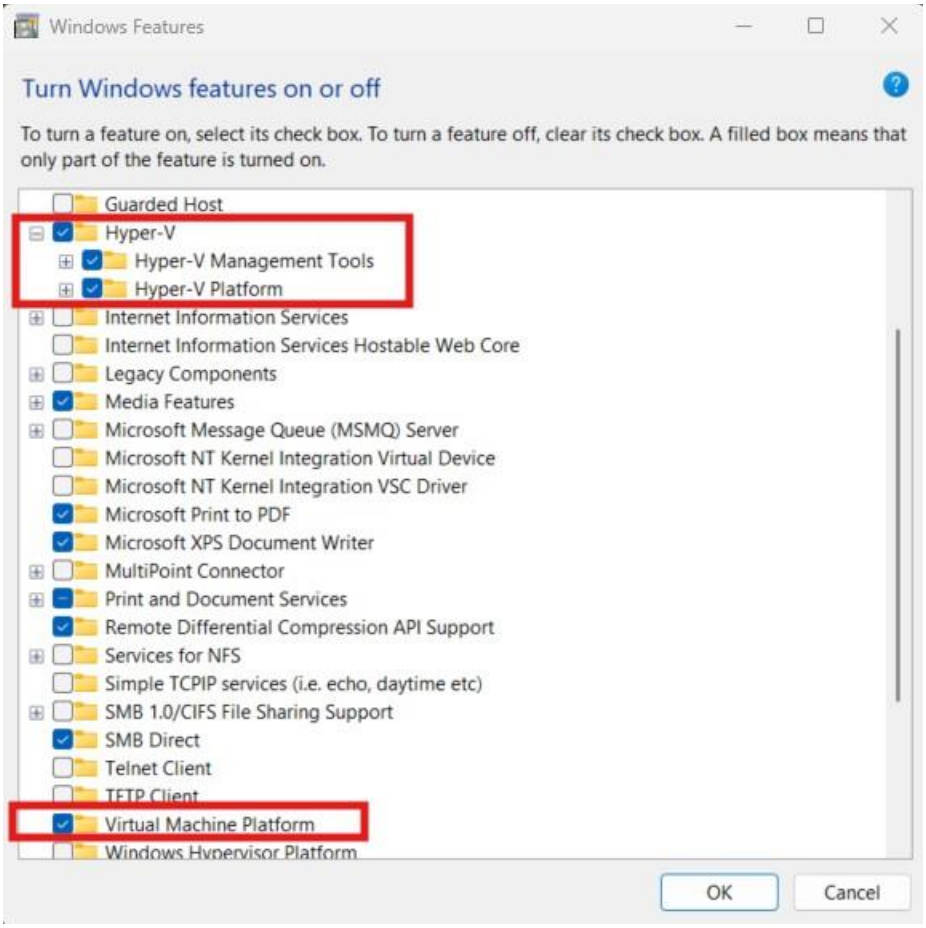

Figure 7. Enable Windows features.

- Click OK and it will ask to restart your computer. After restarting, Hyper-V is now ready to use.

3.3 Create Virtual Machine in Hyper-V Manager

- Go to Windows, search “Hyper-V Manager” and click on it.
- Hyper-V window will appear. The left panel shows the available machines.

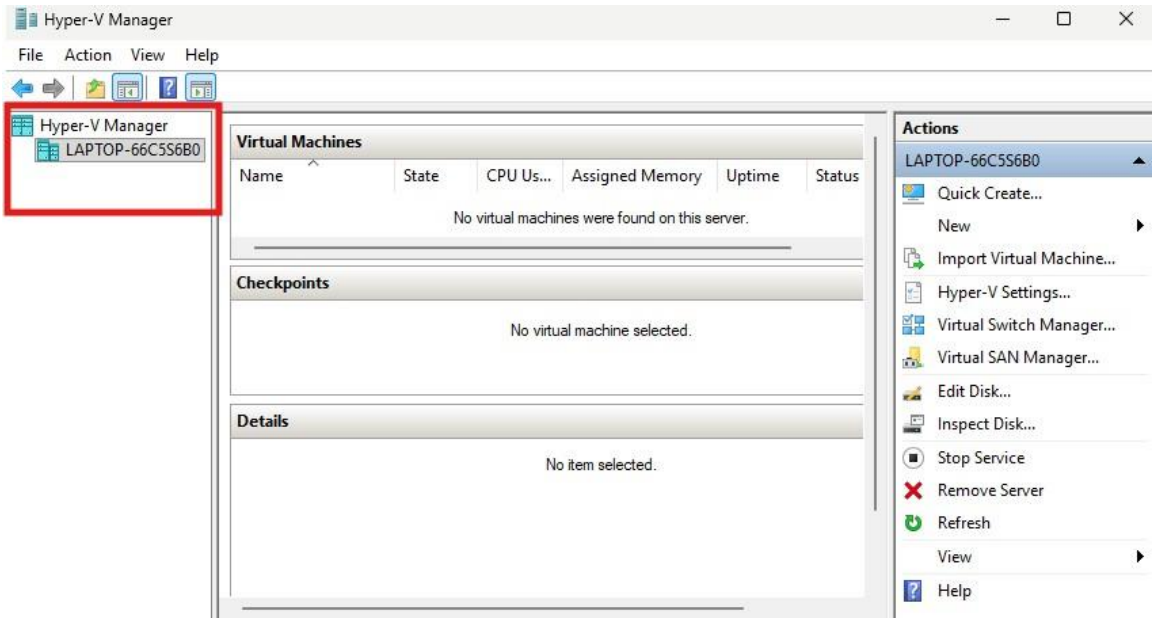

Figure 8. Hyper-V Manager window.

- To build a virtual machine for this lab, go to the left panel and right click on your machine > New > Virtual Machine.
- "New Virtual Machine Wizard" window will appear. Click Next on "Before You Begin".

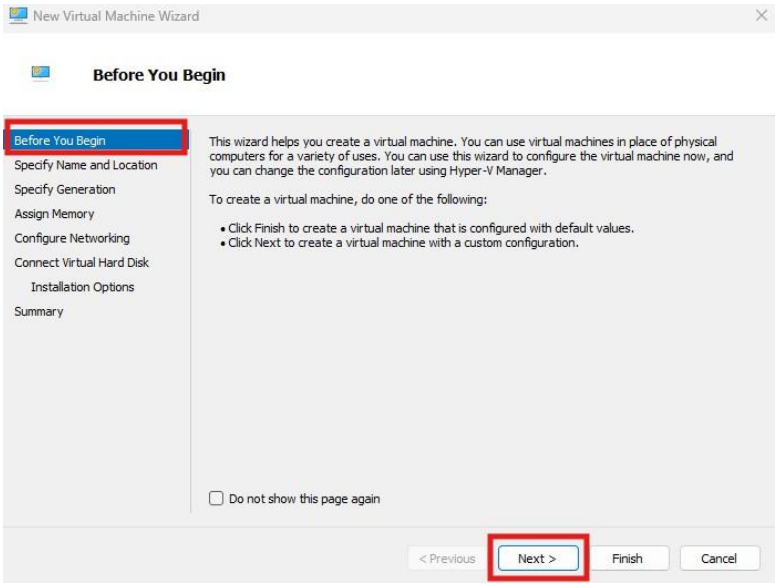

Figure 9. Creating new virtual machine in Hyper-V Manager.

- Name the newly created virtual machine after your NAIT username. Click Next.

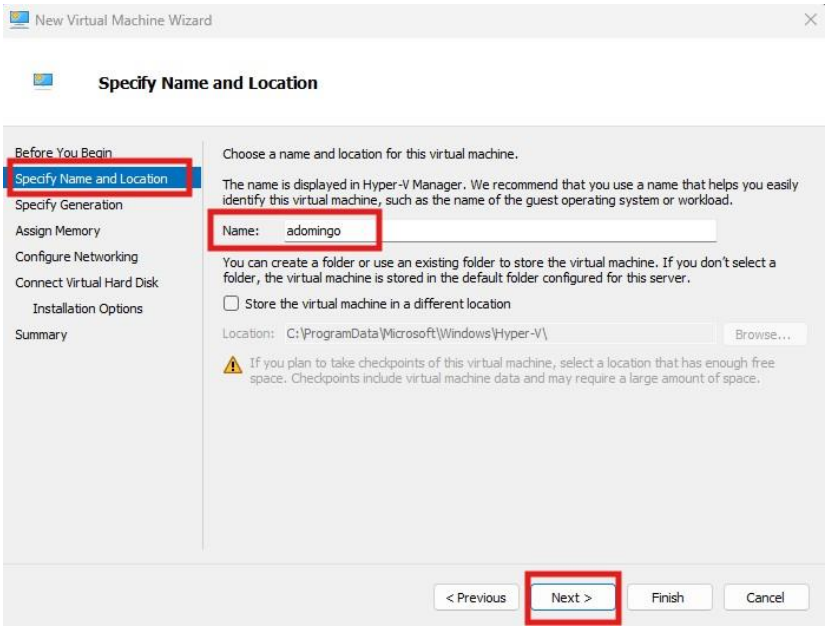

Figure 10. Name of the virtual machine.

- Choose “Generation 2” and click Next.

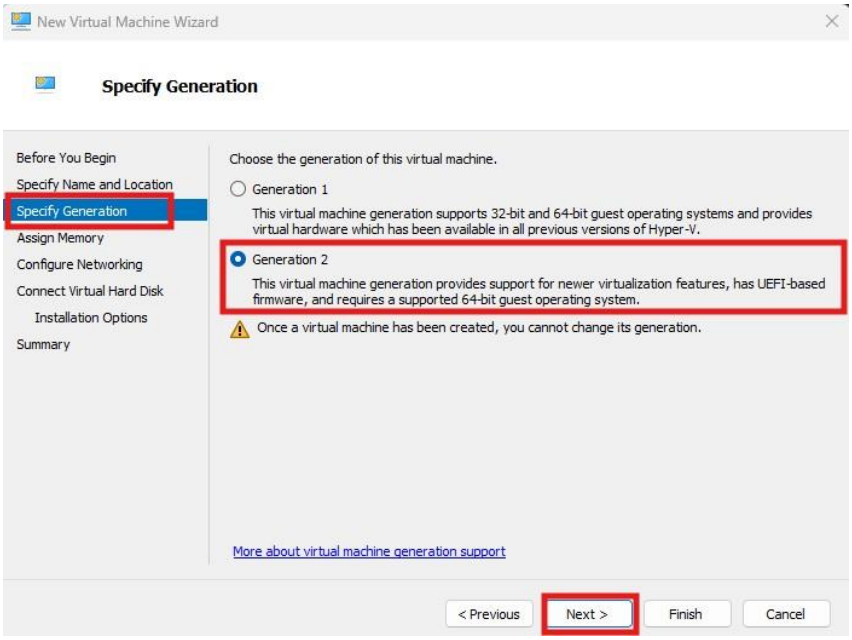

Figure 11. Choose Generation 2.

- Enter 16,000 MB (16 GB) in the Startup memory and make sure to enable “Use Dynamic Memory for this virtual machine”. Click Next.

  Note: 16 GB Startup memory is applicable for 32GB local RAM. If your local RAM is lower than 32GB, consider reducing the Startup memory, otherwise virtual machine won’t be able to start.

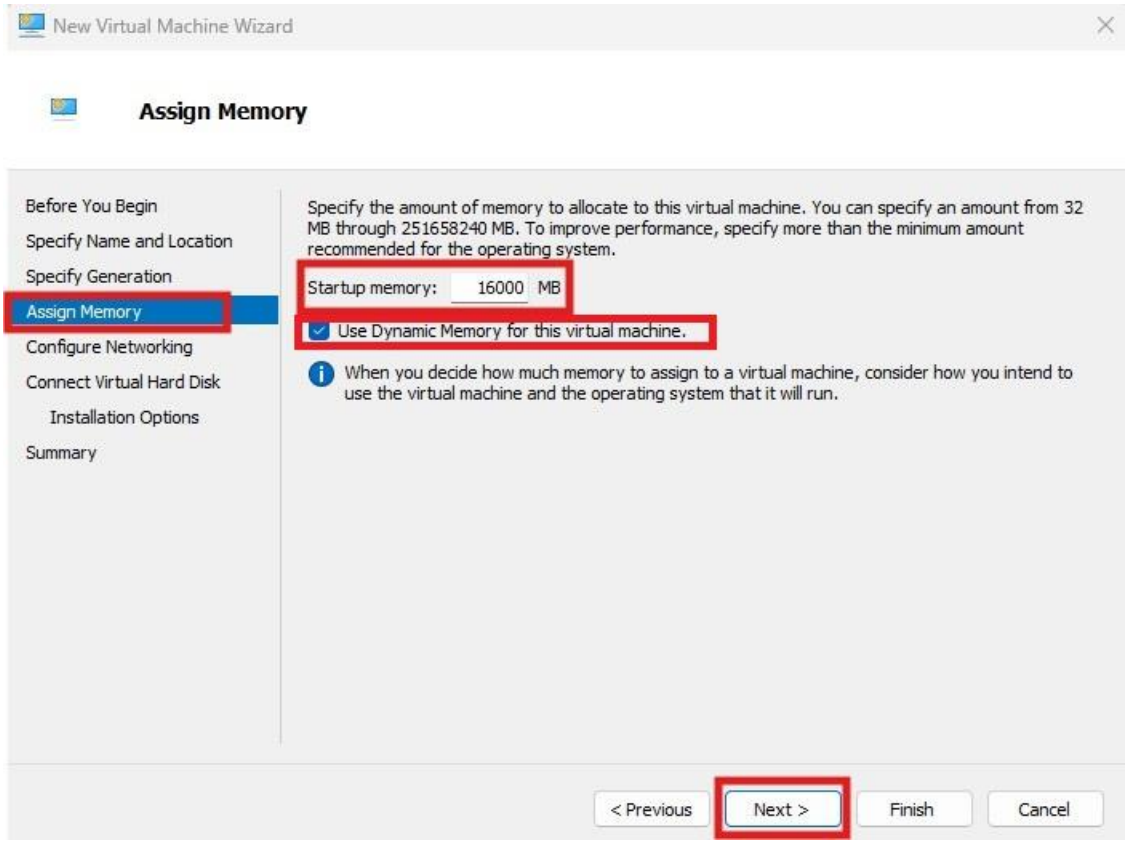

Figure 12. Set the memory.

- On Configure Networking, set the connection to “Not Connected” for now. Click Next.

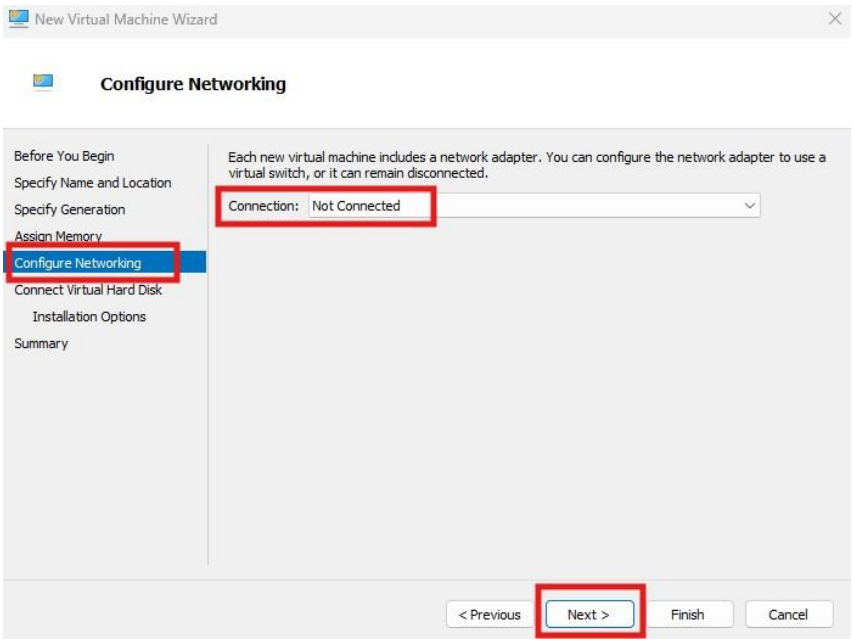

Figure 13. Configure networking must be set to Not Connected.

- On “Connect Virtual Hard Disk”, choose “Use an existing virtual hard disk”.
- Click on Browse and go to where you saved the extracted VHDX file. Click Next.

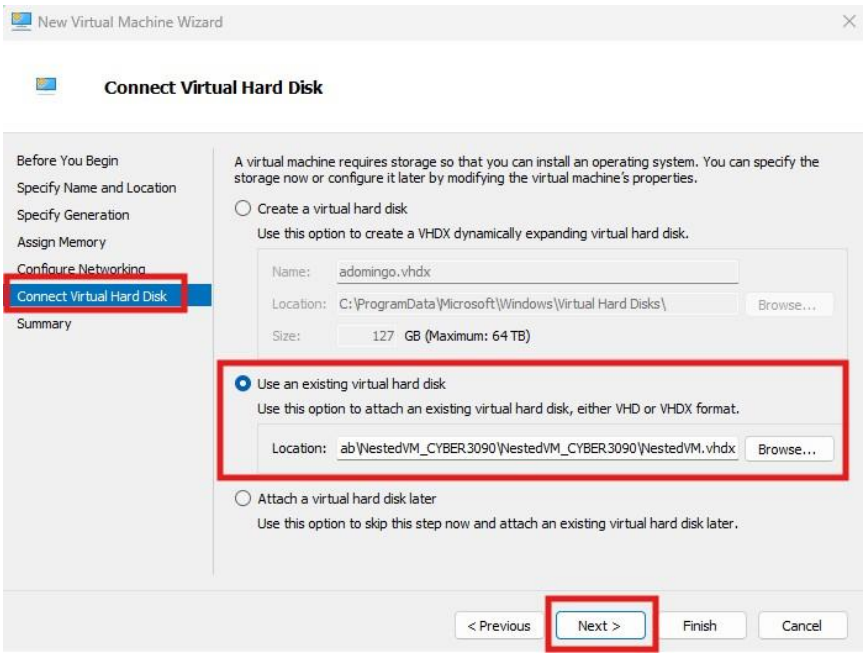

Figure 14. Connecting to the extracted VHDX file.

- Click Finish.

3.4 Enable nested virtualization

To be able to run a virtual machine inside a virtual machine commonly known as nested virtualization in Hyper-V, follow below instructions:

- Go to Windows and look for “Command Prompt” or “Windows PowerShell”. Right click and choose “Run as administrator”.
- Make sure Hyper-V Manager application is close.
- Run the command:

  Set-VMProcessor -VMName "<VMName>" -ExposeVirtualizationExtensions $true

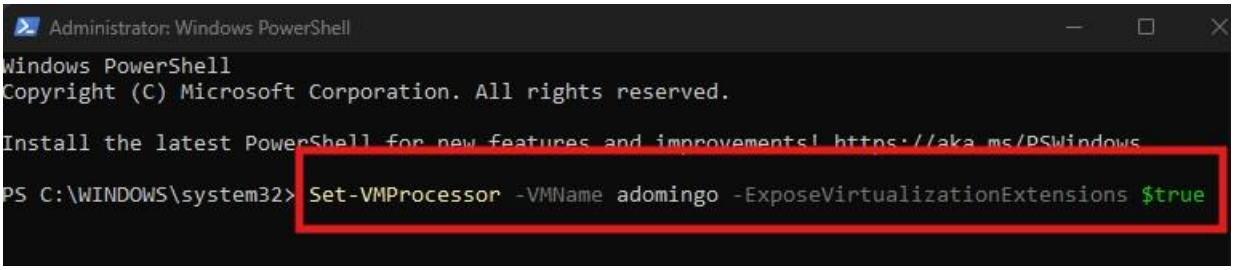

Figure 15. Command for nested virtualization.

3.5 Start the new virtual machine

- Highlight the new virtual machine and click “Connect”.

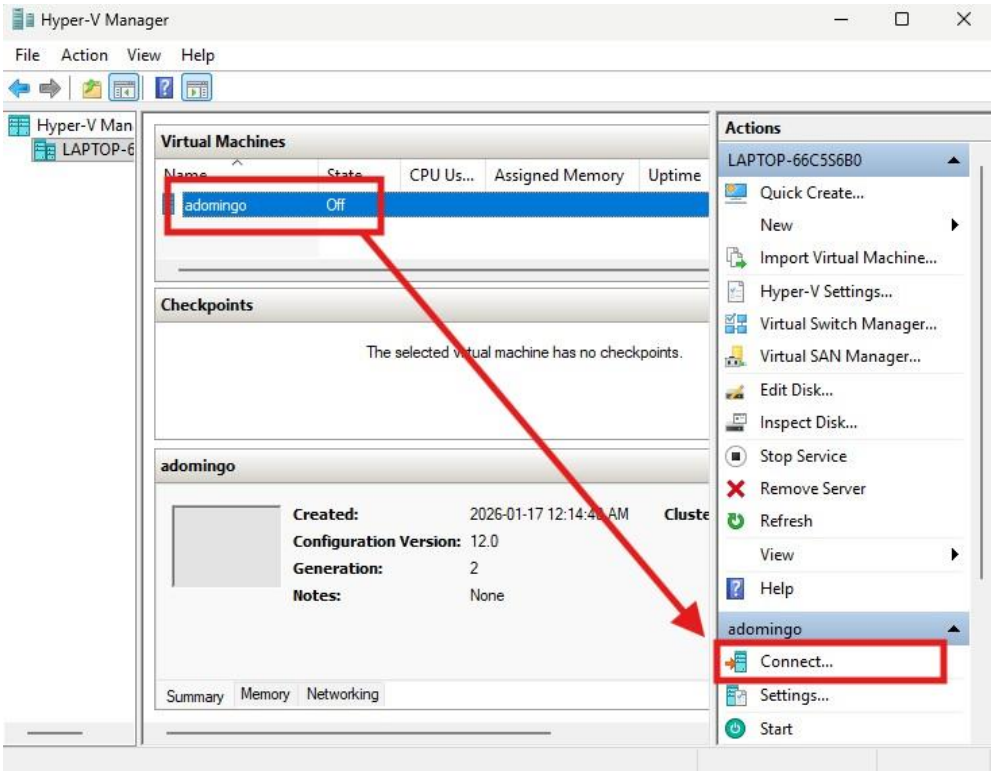

Figure 16. Connect the new virtual machine.

- A window will appear, click Start.

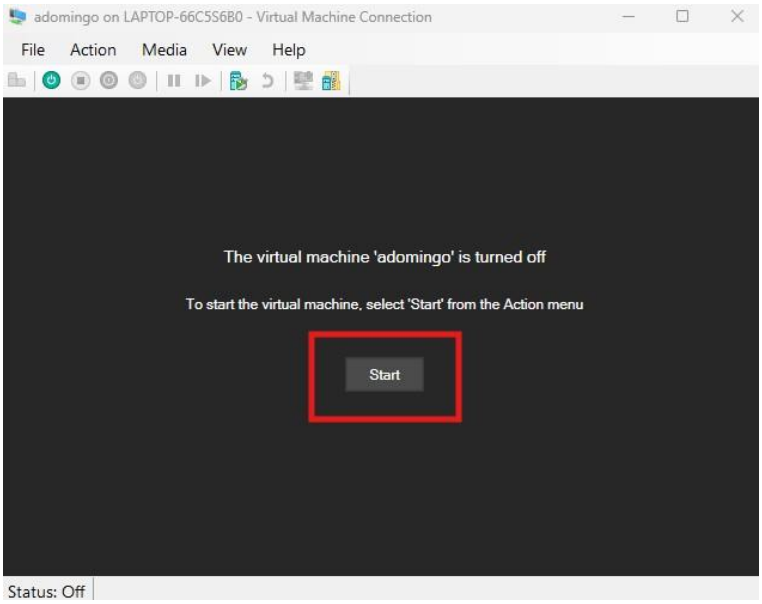

Figure 17. Start the new virtual machine.

- An option to adjust the desktop size will appear. Adjust based on your preference and click Connect.

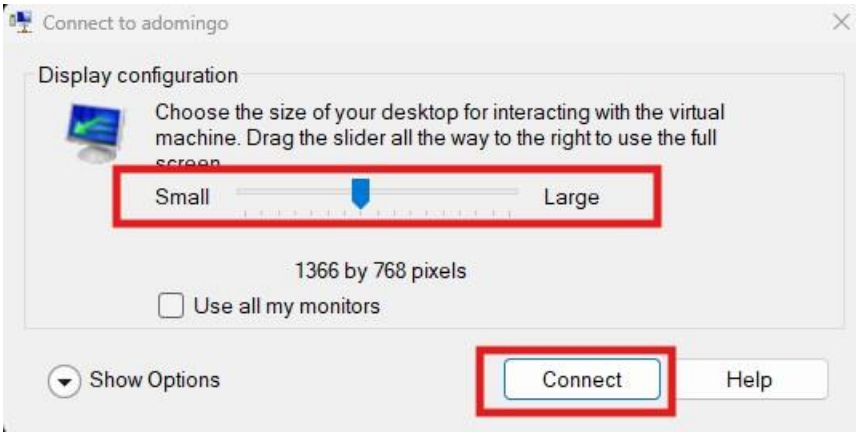

Figure 18. Adjust desktop size.

- Use the password (without the double quotation) “Cyber3090” to login to Administrator.

Figure 19. Login to Administrator.

- Once inside Administrator account, click Windows and search for “Hyper-V Manager”.
- In here, there are four virtual machines.

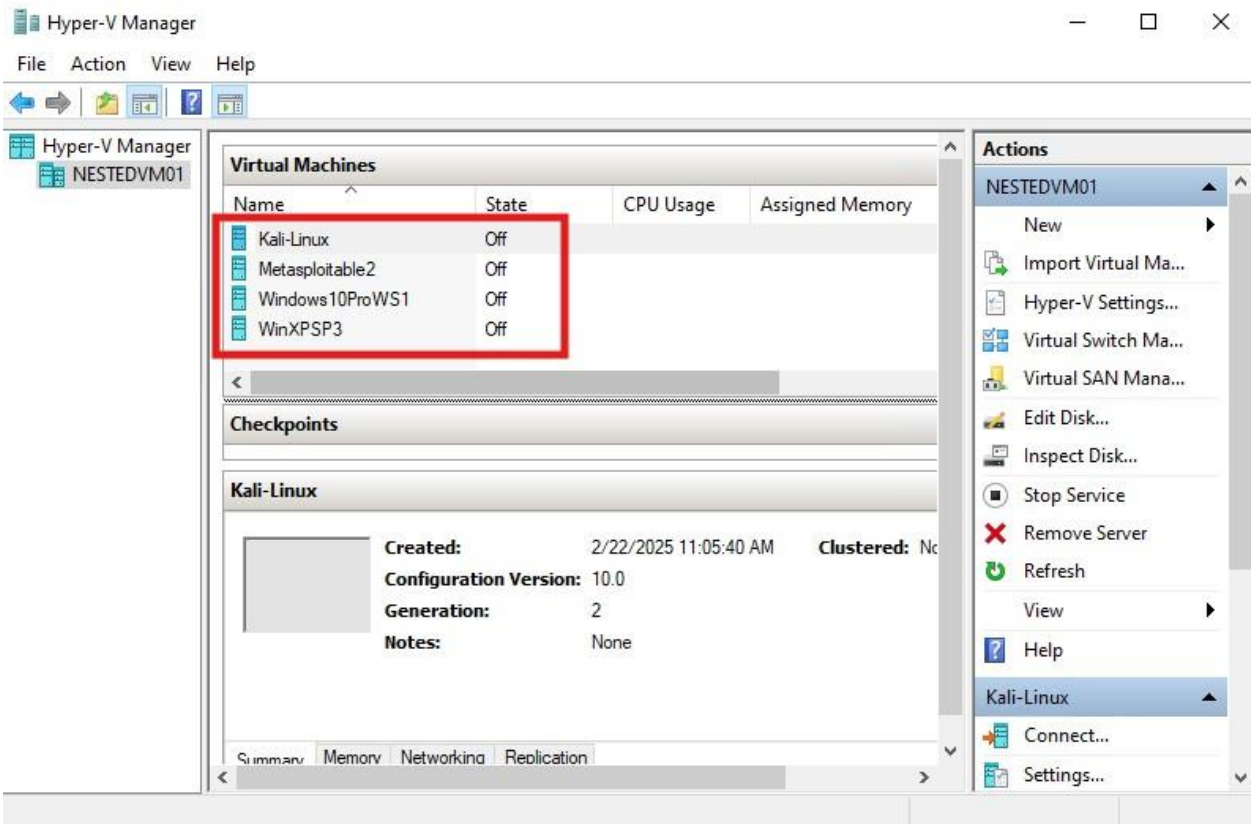

Figure 20. Virtual machines in nested virtualization.

3.6 Run virtual machines within virtual machines

3.6.1 Kali-Linux VM

- Highlight “Kali-Linux” VM and press Connect.

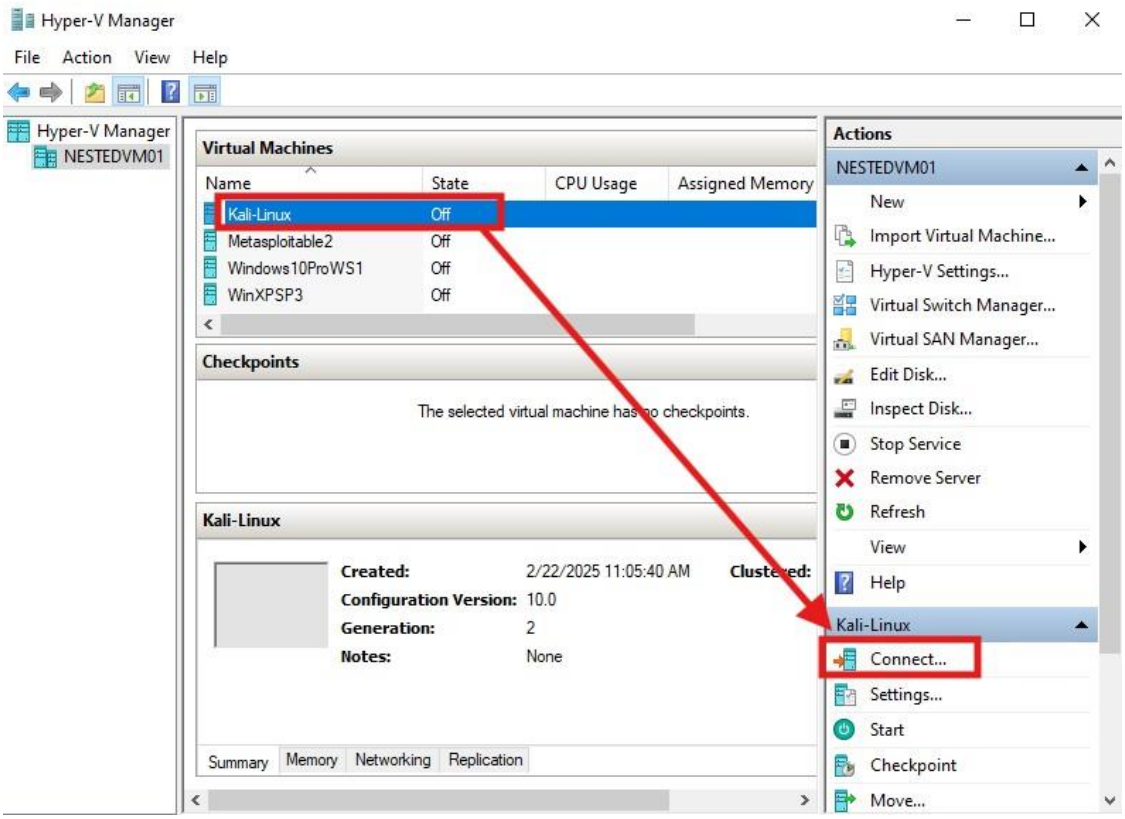

Figure 21. Connect Kali-Linux VM.

- Press Start button.
- Enter “kali” in the username and “Cyber3090” in the password. Press Log In.
- Open the terminal and run the command “ifconfig” to check the IP address.
- Below screenshot is the Kali-Linux VM.

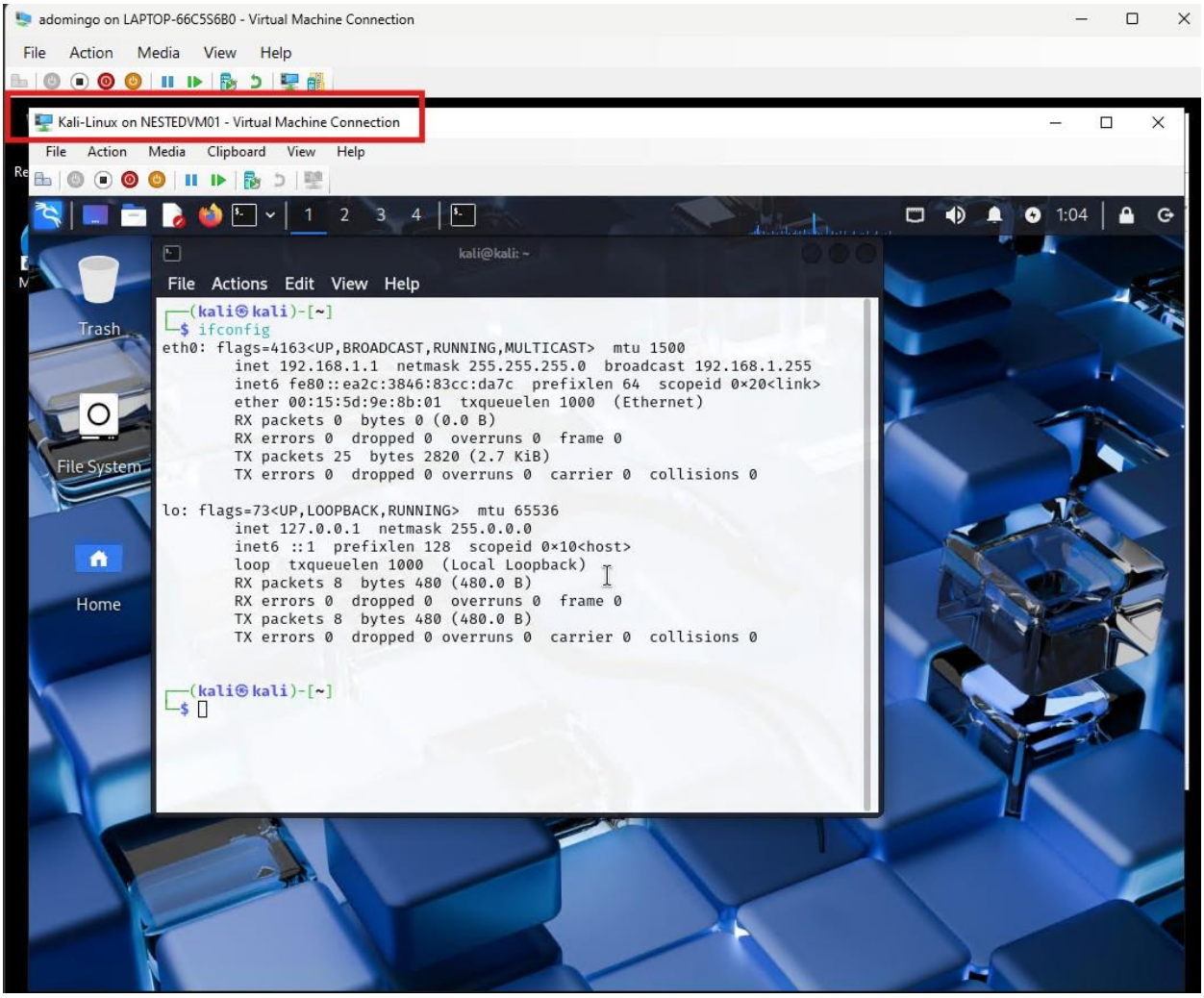

Figure 22. Inside Kali-Linux VM. 192.168.1.1 is the IP address.

3.6.2 Metasploitable2 VM

- Highlight “Metasploitable2” VM and press Connect.

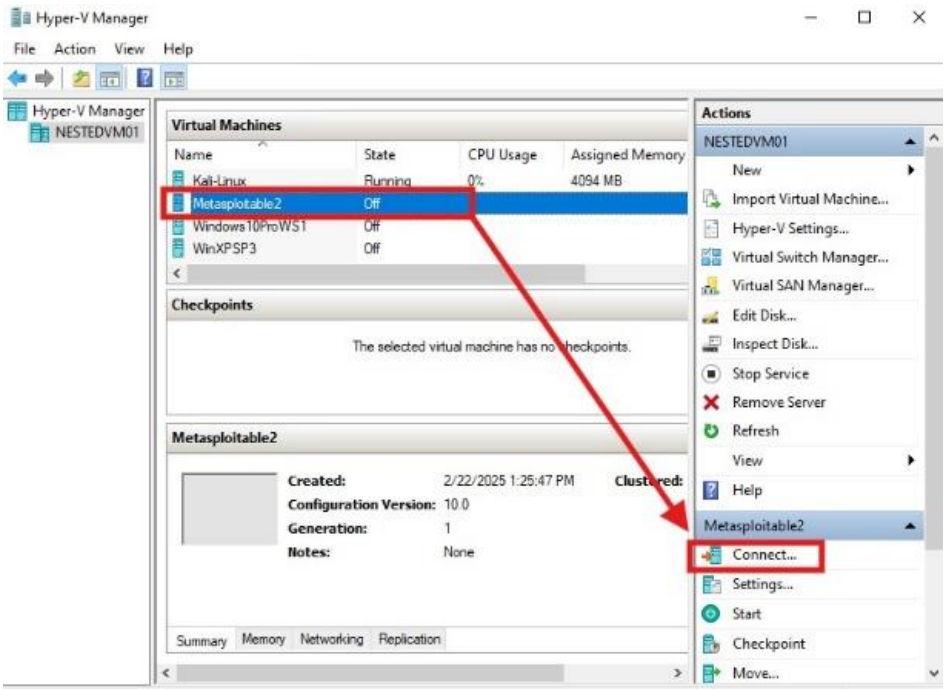

Figure 23.Connect Metasploitable2 VM.

- Press Start button. Connecting would take some time.
- Enter “msfadmin” in the metasploitable login and “Cyber3090” in the password.
- Type “ifconfig” to check the IP address.
- Below screenshot is the Metasploitable2 VM.

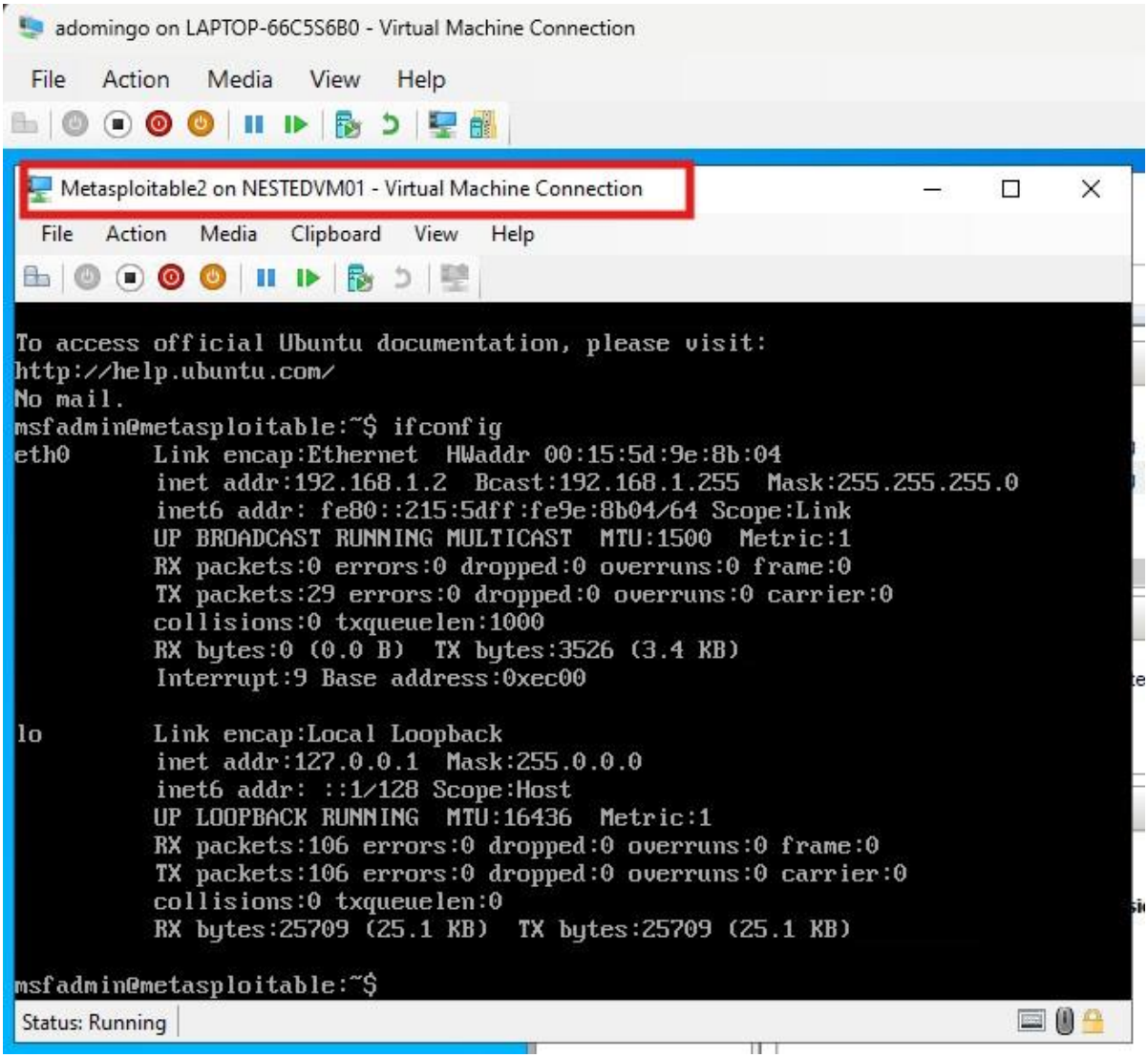

Figure 24. Inside Metasploitable2 VM. 192.168.1.2 is the IP address.

3.6.3 Windows10ProWS1 VM

- Highlight “Windows10ProWS1” VM and press Connect.

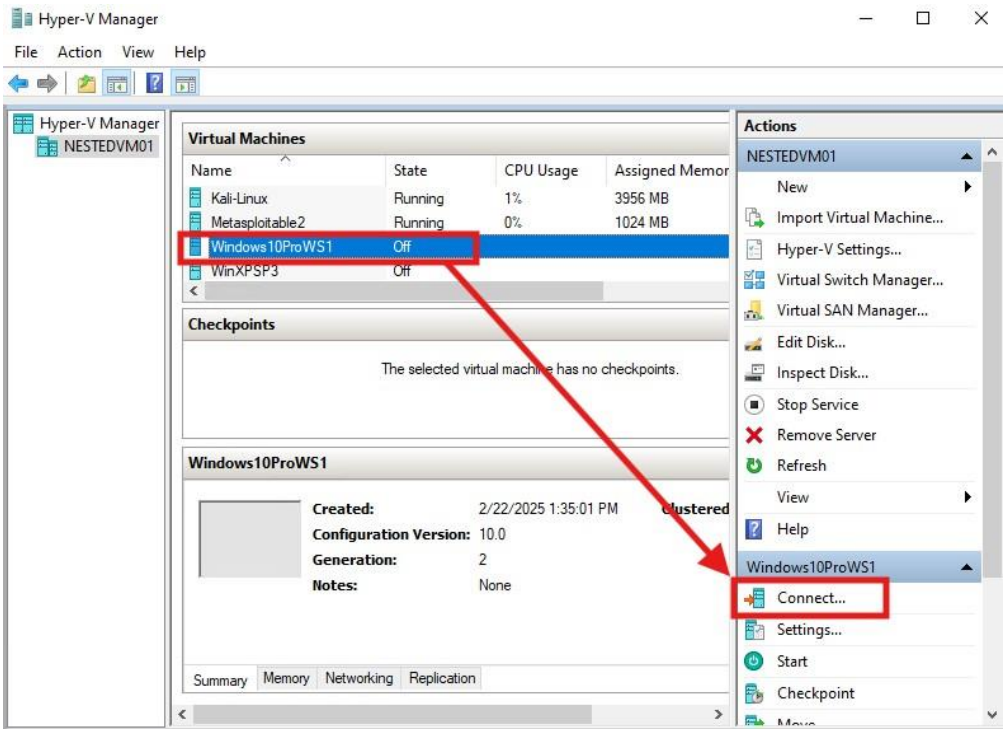

Figure 25. Connect Windows10ProWS1 VM.

- Press Start button.
- In the admin account, enter “Cyber3090” as the password.

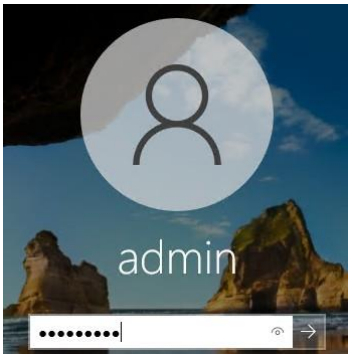

Figure 26. Login to admin account.

- Open command prompt and run the command “ipconfig /all”.
- Below screenshot is the Windows10ProWS1 VM.

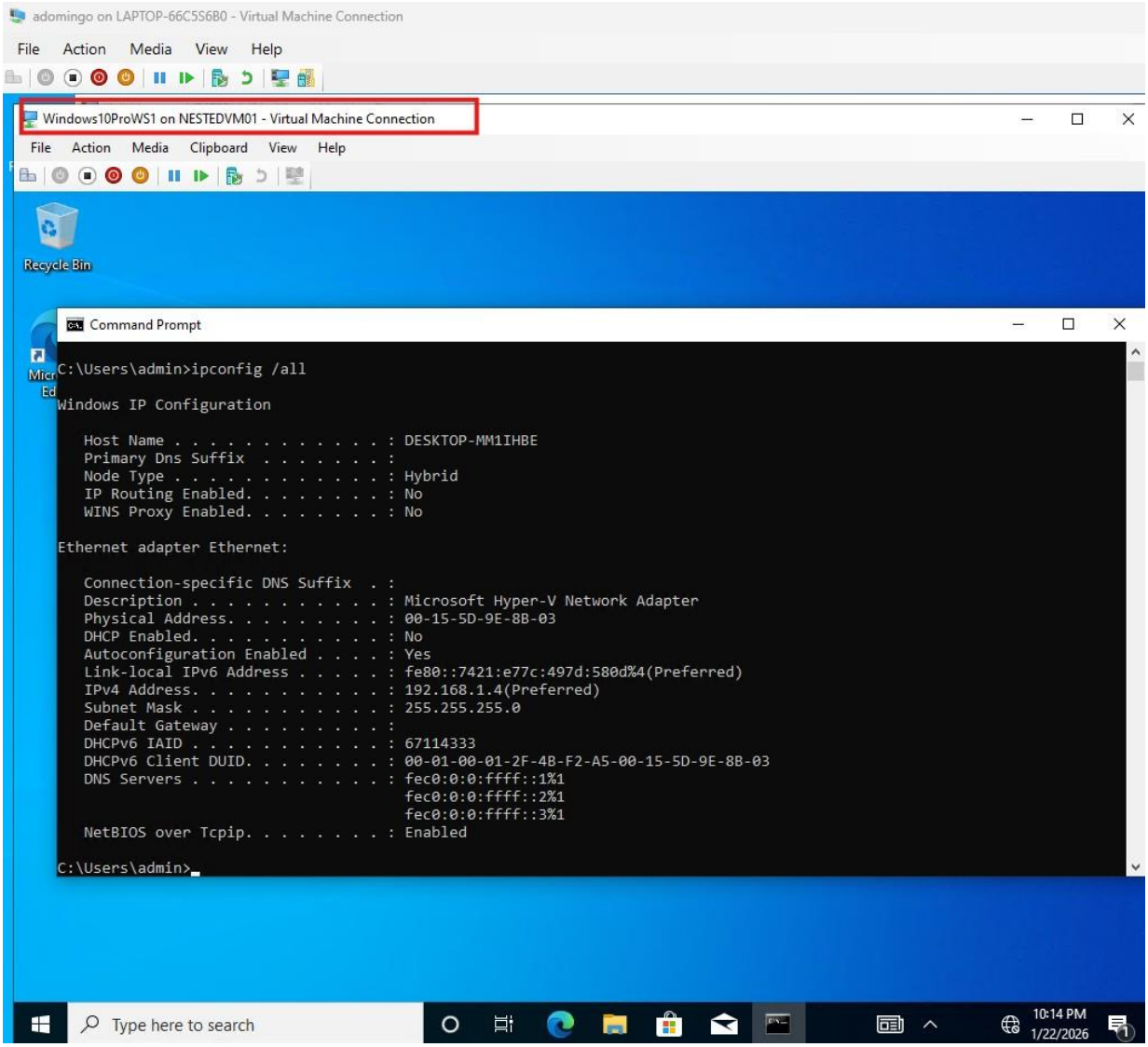

Figure 27. Inside Windows10ProWS1 VM. 192.168.1.4 is the IP address.

3.6.4 WinXPSP3 VM

- Highlight “WinXPSP3” VM and press Connect.

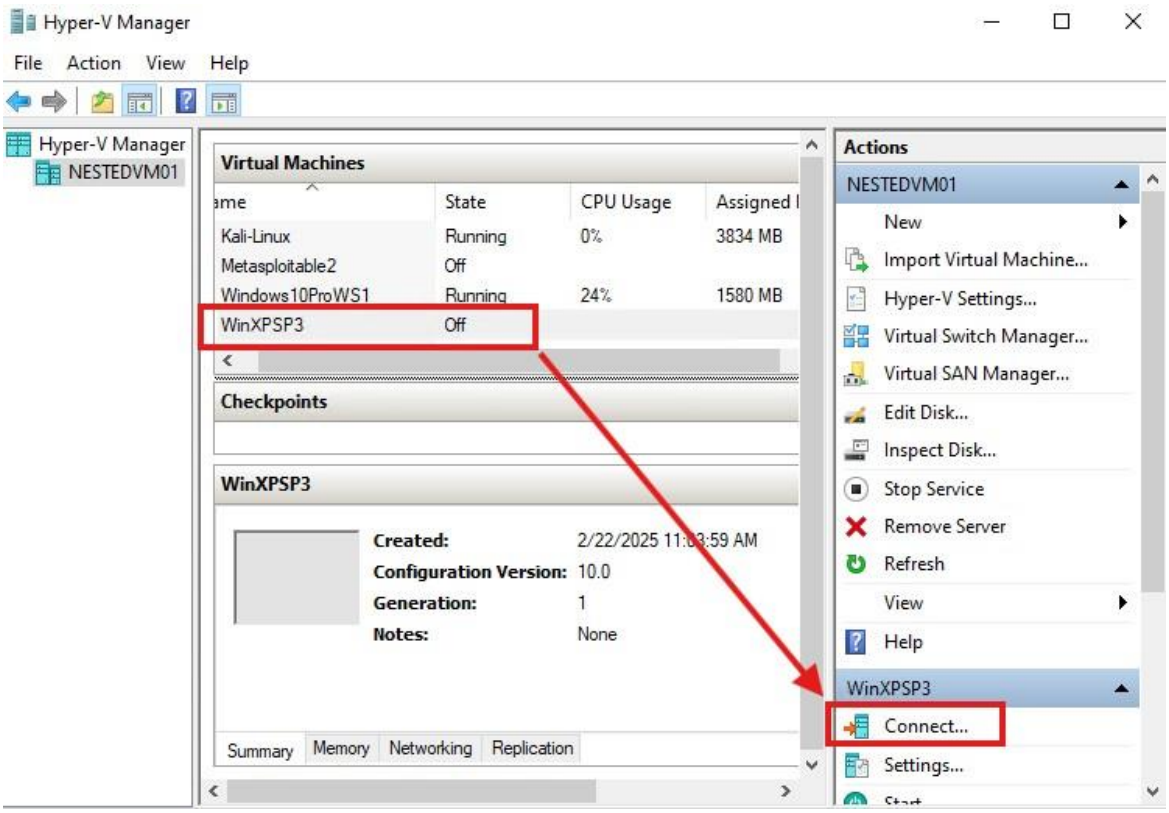

Figure 28. Connect WinXPSP3 VM.

- Press Start button.
- In the Administrator account, enter “Cyber3090” as the password.

Figure 29. Login to Administrator account.

- Open command prompt and run the command “ipconfig /all”.
- Below screenshot is the WinXPSP3 VM.

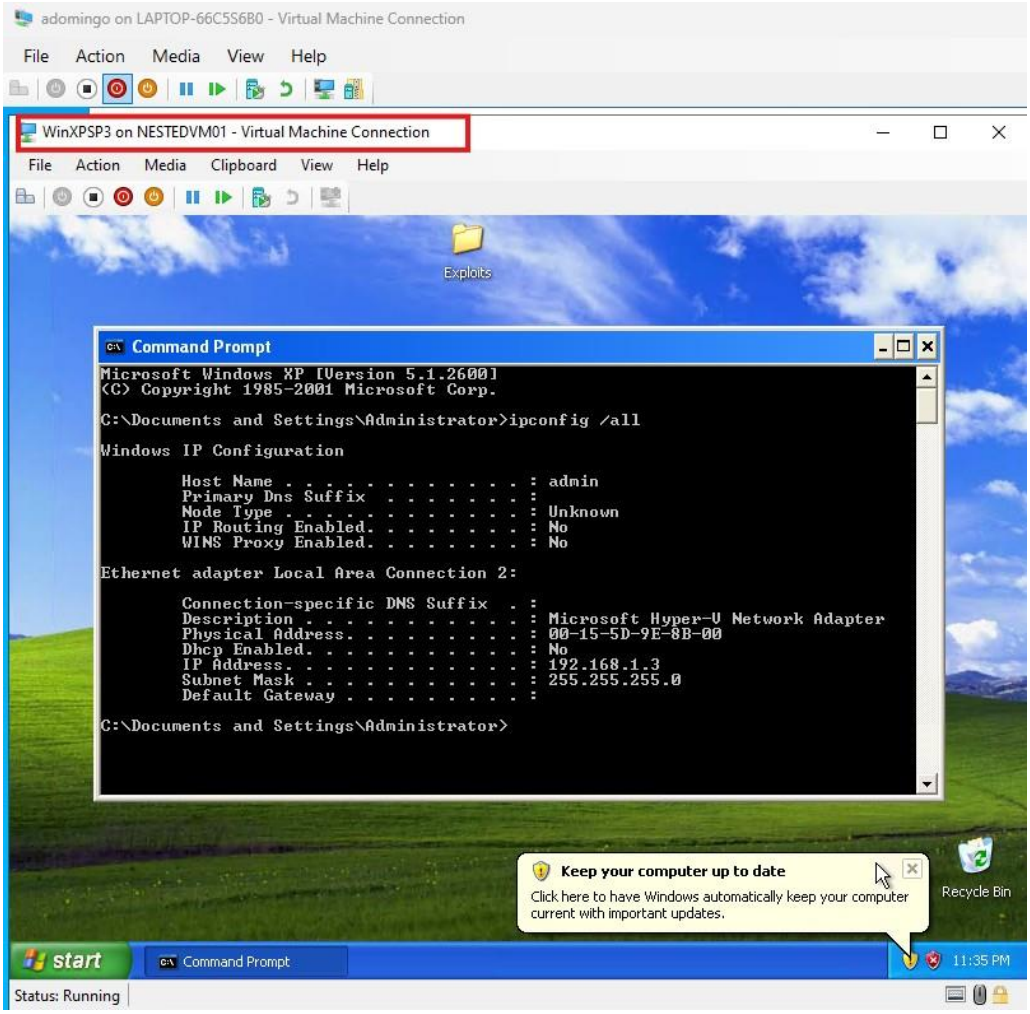

Figure 30. Inside WinXPSP3 VM. 192.168.1.3 is the IP address.

References

Searle-Jones, H. (2025, May 13). *What is Hyper-V on Windows 11, and what can it do?* Retrieved from TechTarget: https://www.techtarget.com/searchvirtualdesktop/tip/What-is-Hyper-V-on-Windows-11-and-what-can-it-do#:~:text=Hyper%2DV%20is%20a%20built,up%20of%20several%20key%20components: