

CYBR3010

Cybersecurity Foundations

Build Your Virtual Network Lab

Arr Domingo

Student ID: 200458099

Instructor: Sam El-Awour

Table of Contents

Introduction1

Network Diagram1

Rebuild Guide2

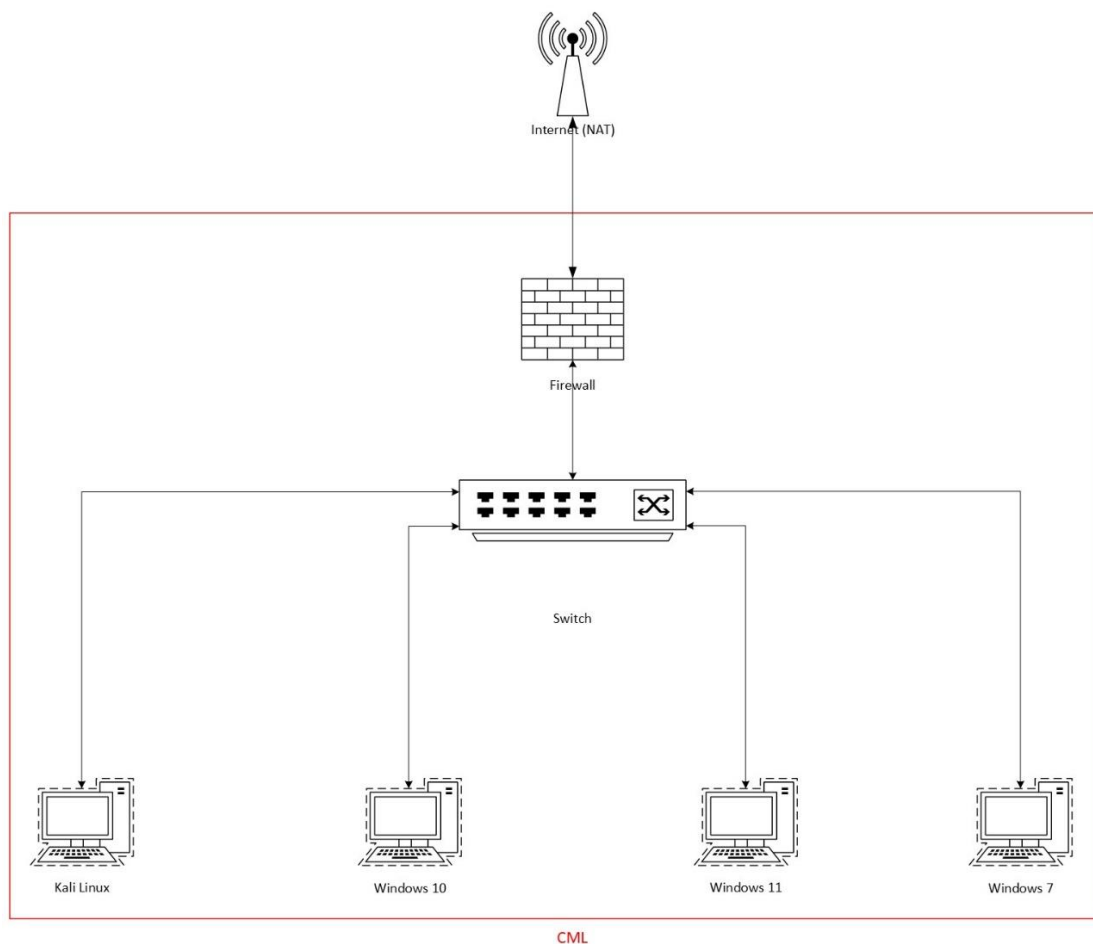
Device Status Proof10

Introduction

This lab is an interconnected network configuration designed through MS Visio and built within Cisco Modelling Lab (CML) environment. Its purpose is to provide reliable communication/connectivity between different network resources.

Network Diagram

This is the network layout which consists of 4 virtual client machines running on different operating systems (Kali Linux, Windows 10, Windows 11, Windows 7), a network switch, and a firewall connected to the internet via NAT network adapter.



Rebuild Guide

1. Install VMware Workstation Pro:

- To get the installer, go to <https://support.broadcom.com/>
- Click "Register".
- Verification code will be sent in email. Continue filling-up the form until account is created.
- Click "Login" to login to your account for the first time.
- Once logged-in, you will see your dashboard.
- On the left pane, click "My Downloads".
- You can either search VMware Workstation Pro or where you see "Free Software Downloads", click "HERE"
- Click "VMware Workstation Pro". You will then see an option to download different versions of Windows and Linux.
- Click the version depending on the machine you are using. Agree to the terms and conditions.
- You can now download the installer and use the executable file to install VMware Workstation Pro in your machine.

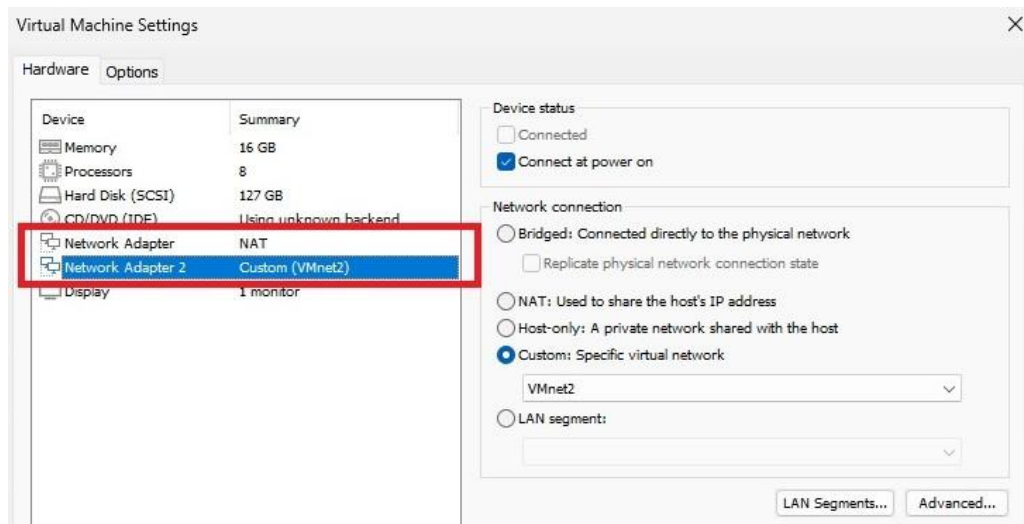
2. Download the images needed to setup CML and FortiManager

For this assignment, there are 2 folders needed to download and unzip. One folder is for FortiManager and one folder is for CML Student.

- To download and unzip FortiManager folder:
 - Go to Brightspace where FortiManager folder is uploaded.
 - Click "Download".
 - Keep the "File name" and "Save as type", then choose the location where you want to save the unzipped folder.
 - Click "Save".
 - Go to the location where you saved the unzipped folder.
 - Right click the folder.
 - Click "Extract All".
 - Choose a location where you want to save the extracted/zipped folder.
 - Click "Extract".
- To download and unzip (using 7zip) CML Student folder:
 - Go to Brightspace where CML Student folder is uploaded.

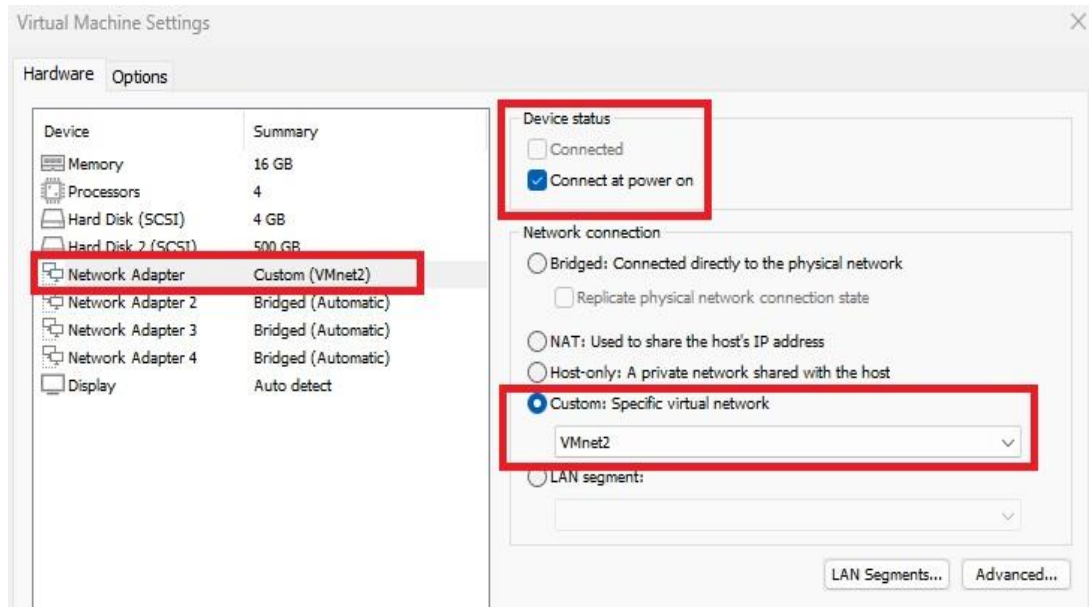
- Notice that there are 13 OVA (Open Virtual Appliance) files, download those 13 files one-by-one (depending on your internet connection, this would take time).
 - Keep the "File name" and "Save as type", then choose the location where you want to save the OVA files.
 - Click "Save". Repeat until you get all 13 OVA 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 13 OVA files.
 - Highlight the first (.001) OVA file.
 - Click "Extract".
 - Choose a location where you want to extract.
 - Click "OK". Depending on your machine, the extract process takes some time.
- When both FortiManager folder and CML Student folder are extracted, there are images you need to run/click to open it in VMware Workstation Pro.
 - For CML Student folder (main CML):
 - Click .ovf (Open Virtualization Format) file.
 - Enter a name of the new virtual machine.

- Browse for the storage path of the new virtual machine.
- Click "Import". This process will take some time to finish.
- Once done, you will see VMware Workstation. Click "Edit virtual machine settings".
- "Network Adapter" should be set to "NAT".
- "Network Adapter 2" should be set to "Custom: VMnet2".



- Click OK.
- For FortiManager (required for firewall licensing):
 - Click .ovf file (Open Virtualization Format).
 - Enter a name of the new virtual machine.
 - Browse for the storage path of the new virtual machine.
 - Click "Import".

- Once done, you will see VMware Workstation. Click "Edit virtual machine settings".
- "Network Adapter" should be set to "Custom: VMnet2". Also check "Connect at power on" under Device status.



- Click OK.

3. Power on the new VM and explore CML

- For FortiManager VM environment:
 - Click "Power on this virtual machine".
 - Wait for couple minutes until it reaches the "FortiManager login", leave it like that, just keep the image open.

- For CML VM environment:
 - Click "Power on this virtual machine".
 - You will see an IP address to access CML UI. Note that it is different for everybody depending on your setup.
 - Open a browser and paste the ip address. If the browser is not allowing it, click the "Advanced" and proceed.
 - On the login page, "admin" is the username and "P@ssw0rd25" is the password.
 - Right off the bat, you will see your CML dashboard where you can add projects/lab. Below the screen, you will see the health data which includes the CPU, Memory, and Disk, as well as the licensing.

4. Building the Lab in CML

- To add Nodes (network devices)
 - On the CML screen, click "Add"
 - You will then proceed to the lab dashboard environment where you can see the workbench consisting of different tools to complete the lab.
 - At the top of the screen where you see a dropdown icon, rename the "Lab Title". "Lab Description" is optional.

- The most important tool in the workbench is the "Add Nodes" where you can add network resources such as firewall, switch, router, desktop machine, etc. Depending on the requirement, drag and drop a node into your lab environment.
- To check and edit the details of the Nodes (network devices)
 - Click the node to see the details on the right side of the screen.
 - On the right side of the screen, you can see "Settings" tab where you can change the "Node Name", "Connectivity" tab, "Config" tab, and "Interfaces" tab.
 - ***TIP: Before starting the nodes/devices, it is recommended to first setup the nodes/devices properly.***
- To connect each Nodes (network devices)
 - If you drag and drop all the nodes you need and it is time for you to make a connection within each node, right click the node and click "Add Link".
 - Choose a port number where you want to connect from "Source Interface" to "Target Interface".
 - Click "Create Link".
- To start the Node (network devices)

- When connection is done, right click the node and click "Start" (It is advisable to start the node one at a time to avoid stressing the machine because starting the nodes at the same time requires heavy amount of CPU and RAM. You know the node successfully started if you notice a green check icon in the node)

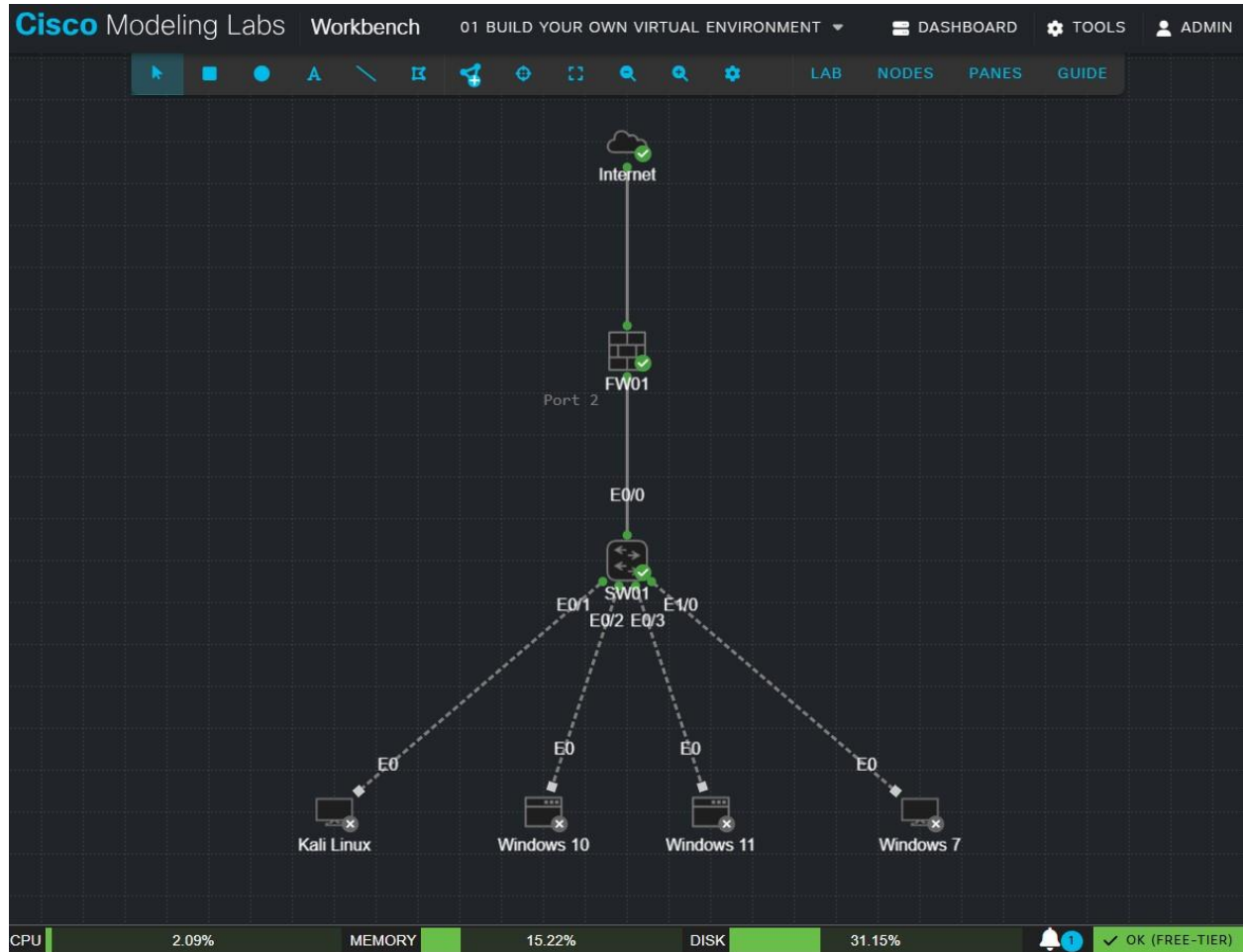
- To check the status and configure the nodes/devices you started
 - Right click the node and click "Console" for switches and routers. Click "Open Console".
 - Otherwise, click "VNC" for client desktop machine and click "Open VNC".

- To delete the nodes/devices that you started
 - Right click the node then click "Stop".
 - Right click the node again and click "Wipe" (Wipe means going back to the original state with no configuration).
 - Click "Confirm".
 - Right click on the node and click "Delete".

Device Status Proof

- Screenshot of the CML.

Note that individual virtual machines are not turned-on here. The proof that virtual machines were turned-on is on the next page.



- Firewall is turned on.

Cisco Modeling Labs Workbench 01 BUILD YOUR OWN VIRTUAL ENVIRONMENT DASHBOARD

LAB NODES PANES GUIDE

FW01

```
System is starting...
Serial number is FGVM01TM25002880

System storage Virtual-Disk disk-usage changed, system will perform auto-format 16 in a moment.
It might take minutes to complete. Please wait... (depend on storage size).

Disk usage changed, please wait for reboot...

Formatting the disk...
Unmounting...
Partitioning and formatting /dev/vdb label LOGUSEDXD256388D ... done

The system is going down NOW !!

Please stand by while rebooting the system.

Restarting system

System is starting...
Serial number is FGVM01TM25002880

System storage Virtual-Disk disk-info changed, if not auto-format, please 'execute disk format 16'
after boot up.

Disk usage changed, please wait for reboot...


FW01 login:
```

CPU	1.93%	MEMORY	21.08%	DISK	29.18%	🔔 0	✓ OK (FREE-TIER)
-----	-------	--------	--------	------	--------	-----	------------------

- Switch is turned on.

Cisco Modeling Labs Workbench 01 BUILD YOUR OWN VIRTUAL ENVIRONMENT ▾ DASHBOARD

LAB NODES PANES GUIDE



FW01 SW01

```

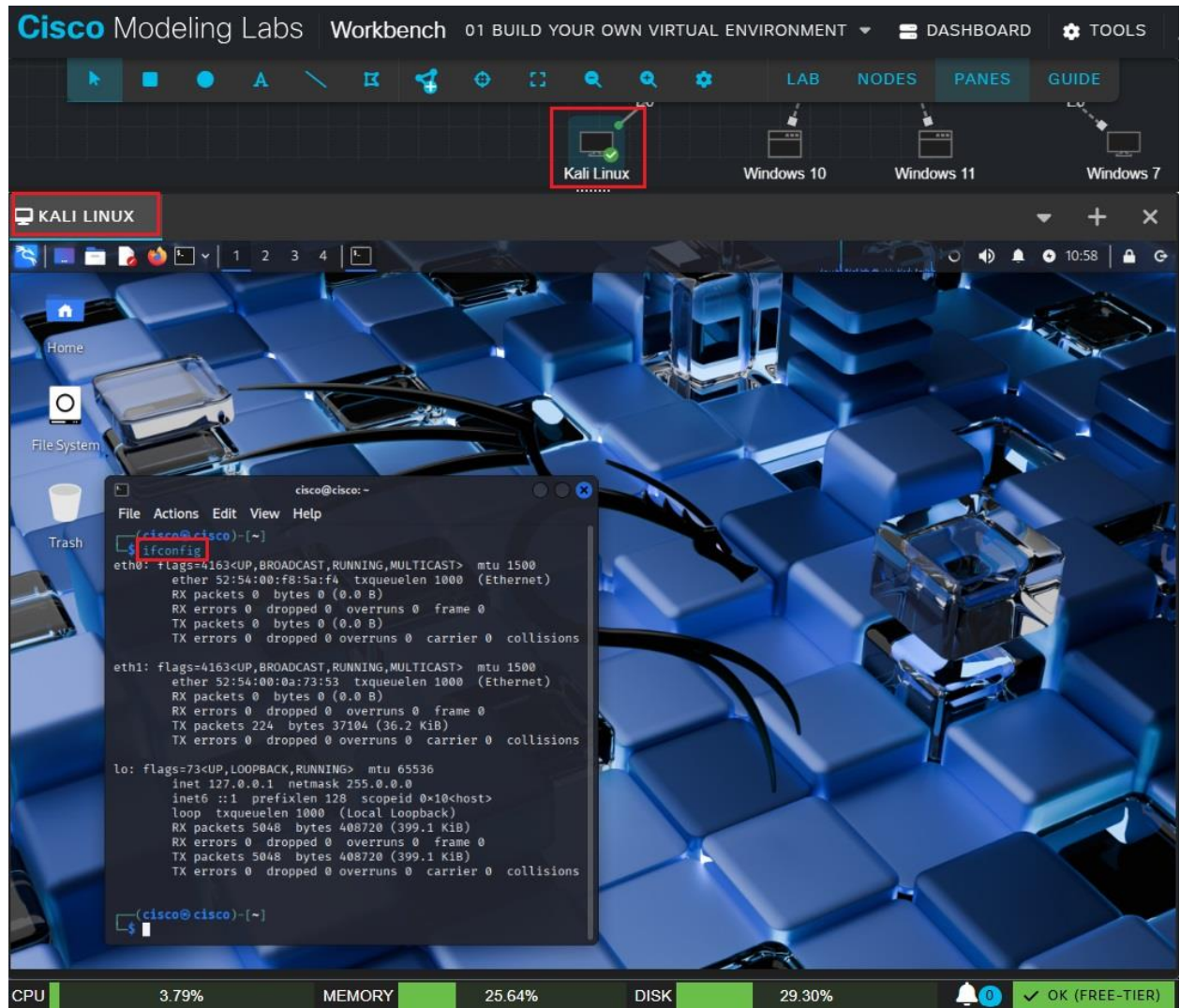
*Oct 4 16:19:55.082: %LINK-5-UPDOWN: Interface Ethernet1/0, changed state to up
*Oct 4 16:19:55.099: %LINK-5-UPDOWN: Interface Ethernet1/1, changed state to up
*Oct 4 16:19:55.118: %LINK-5-UPDOWN: Interface Ethernet1/2, changed state to up
*Oct 4 16:19:55.135: %LINK-5-UPDOWN: Interface Ethernet1/3, changed state to up
*Oct 4 16:19:56.012: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
*Oct 4 16:19:56.028: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to up
*Oct 4 16:19:56.046: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to up
*Oct 4 16:19:56.066: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/3, changed state to up
*Oct 4 16:19:56.083: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
*Oct 4 16:19:56.099: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
*Oct 4 16:19:56.118: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to up
*Oct 4 16:19:56.136: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/3, changed state to up
*Oct 4 16:20:14.562: %PKI-6-SUDI_INFO: PKI: platform doesn't support sudi certificate
*Oct 4 16:20:14.562: %PKI-6-SUDI_INFO: PKI: no sudi certificate is installed
*Oct 4 16:20:14.562: %PKI-2-NON_AUTHORITATIVE_CLOCK: PKI functions can not be initialized until an authoritative time source, like NTP, can be obtained.
inserthostname-here#enable
inserthostname-here#
*Oct 4 16:24:44.828: %PNP-6-PNP_SAVING_TECH_SUMMARY: Saving PnP tech summary (/pnp-tech/pnp-tech-discovery-summary)... Please wait. Do not interrupt.
inserthostname-here#
*Oct 4 16:24:44.936: %SYS-5-CONFIG_P: Configured programmatically by process PnP Agent Discovery from console as vty0
*Oct 4 16:24:44.938: %SYS-5-CONFIG_P: Configured programmatically by process PnP Agent Discovery from console as vty0
*Oct 4 16:24:45.063: %SYS-5-CONFIG_P: Configured programmatically by process PnP Agent Discovery from console as vty0
inserthostname-here#
*Oct 4 16:24:45.164: %PNP-6-PNP_TECH_SUMMARY_SAVED_OK: PnP tech summary (/pnp-tech/pnp-tech-discovery-summary) saved successfully (elapsed time: 0 seconds).
*Oct 4 16:24:45.164: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery stopped (Config Wizard)
inserthostname-here#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
inserthostname-here(config)#hostname SW01
SW01(config)#
SW01(config)#exit
SW01#
*Oct 4 16:27:26.079: %SYS-5-CONFIG_I: Configured from console by console
SW01#

```

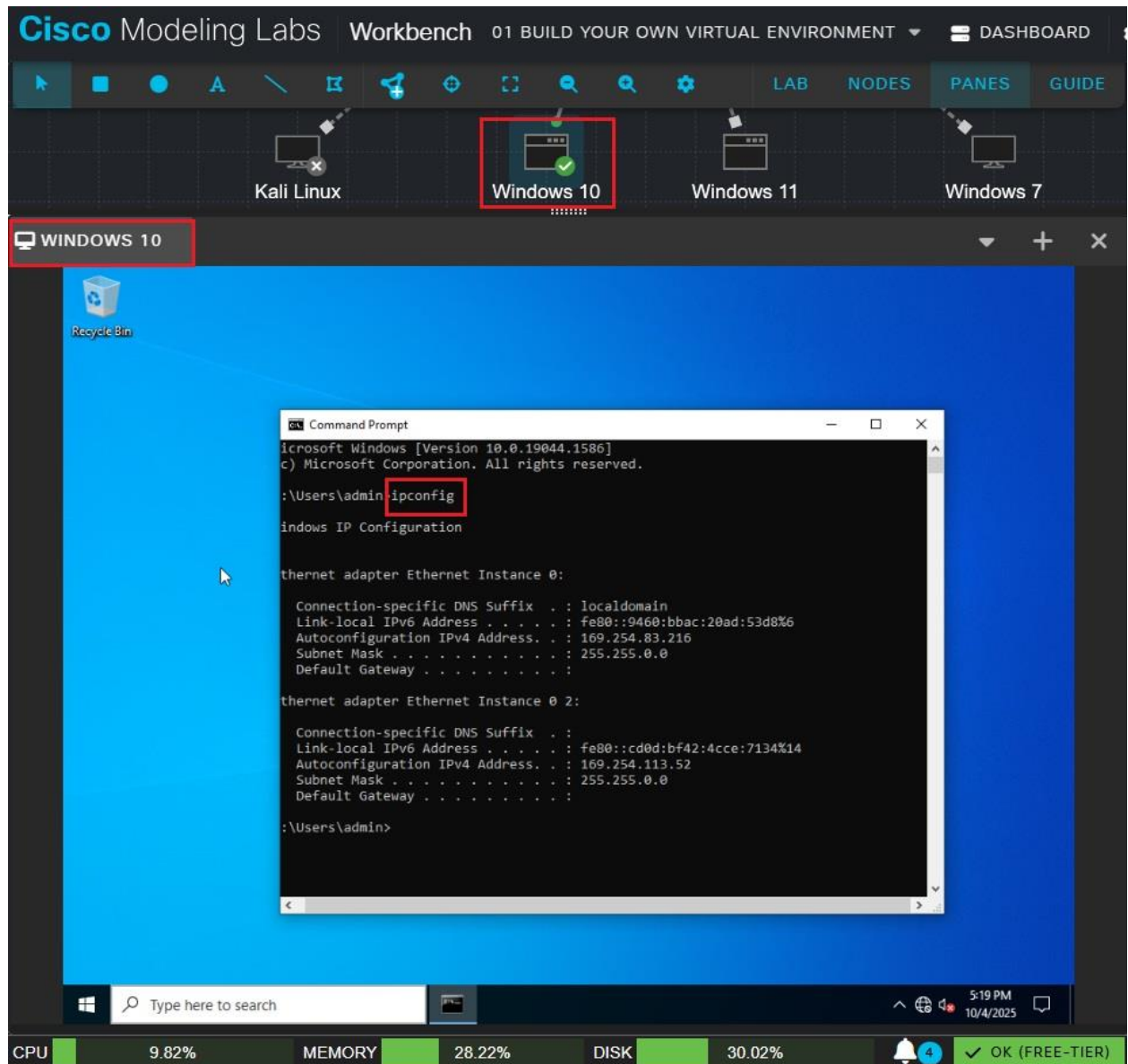
CPU 1.23% MEMORY 20.81% DISK 29.17%

🔔 1 ✓ OK (FREE-TIER)

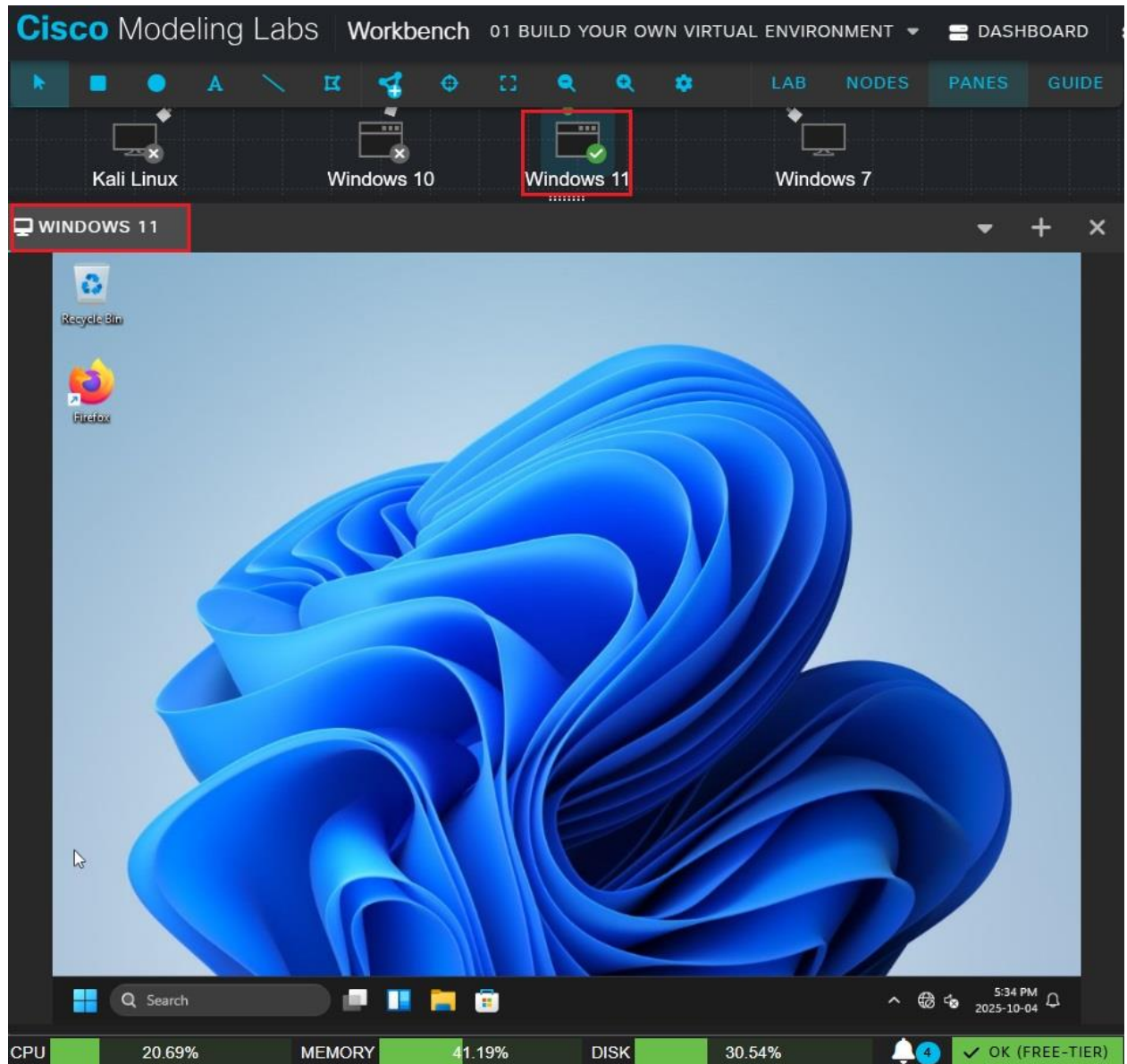
- Kali Linux is turned on.
 - username: cisco
 - password: cisco



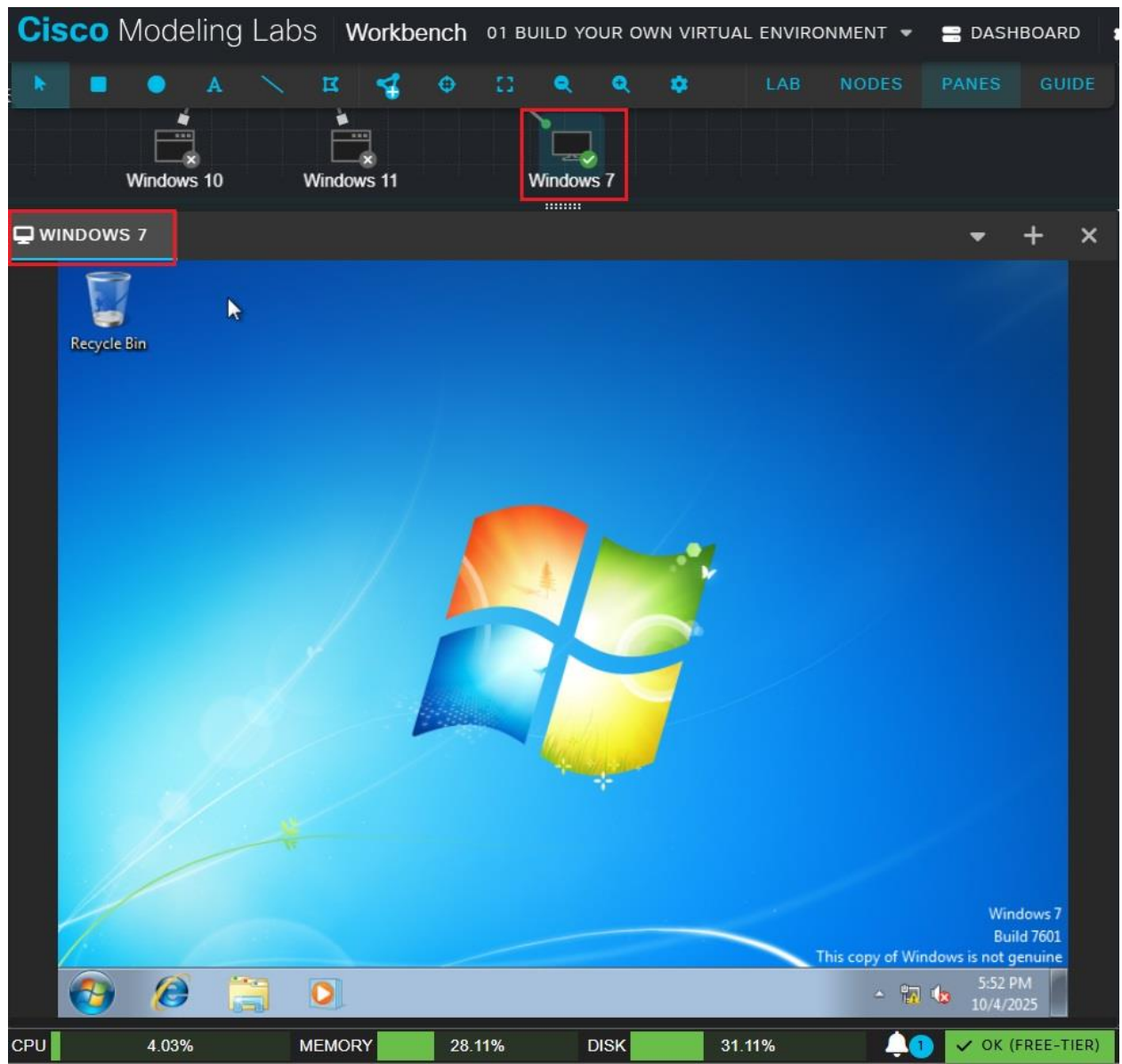
- Windows 10 is turned on (no username and password).



- Windows 11 is turned on.
 - password: P@ssw0rd



- Windows 7 is turned on
 - It would take some time to open for the first time.
 - Click Next.
 - " Type a username" is cisco.
 - Click "Next".
 - For "Set a password for your account", just leave it blank and click "Next".
 - For "Type your Windows product key", click "Skip".
 - Accept the license terms and click "Next".
 - Click "Use recommended settings".
 - Click "Next".
 - Click "Public Network"
 - Click "cisco" account.



END