PONDICHERRY UNIVERSITY

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SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

Master of Computer Applications

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NETWORK PACKET SNIFFER

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Mini Project report submitted in partial fulfillment of the requirements for the award of the degree of

MASTER OF COMPUTER APPLICATIONS

DEPARTMENT OF COMPUTER SCIENCE

SCHOOL OF ENGINEERING & TECHNOLOGY

PONDICHERRY UNIVERSITY

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BONAFIDE CERTIFICATE

This is to certify that this project work entitled **"NETWORK PACKET SNIFFER"** is a bonafide record of work done by **Mr. MRITUNJAY KUMAR SOURAV** (Reg. Number 17352032) in the partial fulfillment for the degree of Master of Computer Applications of Pondicherry University.

This work has not been submitted elsewhere for the award of any other degree to the best of our knowledge.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I am in great pleasure while I express my gratitude to all the people around me who have involved in this project and have helped me complete it successfully. This project has given me knowledge as well as confidence to work in a professional environment. Also, it has helped me to understand how to proceed through a complex process of learning and implementing the knowledge.

I would like to express my gratitude to the **Department of Computer Science, Pondicherry University** for offering this opportunity. It has made me realize my abilities and disabilities as well as how to overcome them.

I express my sincere gratitude to **Dr. R. Sunitha, Assistant Professor, Department of Computer Science, Pondicherry University**, who played the key role as my project guide. I thank her for mentoring me and strengthening my work with academic and mental support.

(By- Mritunjay Kumar Sourav)

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1. INTRODUCTION

Packet sniffing is defined as a technique that is used to monitor every packet that crosses the network. A packet sniffer is a piece of hardware or software that monitors all network traffic. Using the information captured by the packet sniffers an administrator can identify erroneous packets and use the data to pinpoint bottlenecks and help to maintain efficient network data transmission . For most organizations packet sniffer is largely an internal threat. Packet sniffers can be operated in both switched and non switched environment. Determination of packet sniffing in a non switched environment is a technology that can be understand by everyone. In this technology all hosts are connected to a hub. There are a large number of commercial and non commercial tools are available that makes possible eavesdropping of network traffic. Now a problem comes that how this network traffic can be eavesdrop; this problem can be solved by setting network card into a special “promiscuous mode”. N ow businesses are updating their network infrastructure, replacing aging hubs with new switches. The replacement of hub with new switches that makes switched environment is widely used because “it increases security”. However, the thinking behind is somewhat flawed. It cannot be said that packet sniffing is not possible in switched environment. It is also possible in switched environment.

HOW PACKET SNIFFER WORKS

Packet sniffer’s working can be understood in both switched and non switched environment. For setup of a local network there exist machines. These machines have its own hardware address which differs from the other.

When a non switched environment is considered then all nodes are connected to a hub which broadcast network traffic to everyone. So as soon as a packet comes in the network, it gets transmitted to all the available hosts on that local network. Since all computers on that local network share the same wire, so in normal situation all machines will be able to see the traffic passing through. When a packet goes to a host then firstly network card checks it MAC address, if MAC address matches with the host's MAC address then the host will be able to receive the content of that packet otherwise it will forward the packet to other host connected in the network. Now here a need arises to see the content of all packets that passes through the host. Thus we can say that when a host or machine's NIC is setup in promiscuous mode then all the packets that is designed for other machines, is captured easily by that host or machine.

When a switched environment is considered then all hosts are connected to a switch instead of a hub, it is called a switched Ethernet also. Since in switched environment packet sniffing is more complex in comparison to non switched network, because a switch does not broadcast network traffic. Switch works on unicast method, it does not broadcast network traffic, it sends the traffic directly to the destination host. This happens because switches have CAM Tables. These tables store information like MAC addresses, switch port and VLAN information To understand working of packet sniffer in switched environment, an ARP cache table is considered. This is a table that stores both MAC addresses and IP addresses of the corresponding hosts. This table exists in local area network. Before sending traffic a source host should have its destination host, this destination host is checked in the ARP cache table. If destination host is available in the ARP cache then traffic will be sent to it through a switch, but if it is not available in the ARP cache then source host sends a ARP request and this request is broadcasted to all the hosts. When the host replies the traffic can be send to it. This traffic is sent in two parts to the destination host. First of all it goes from the source host to the switch and then switch transfers it directly on the destination host. So sniffing is not possible.

SNIFFING METHODS USED

1. IP based sniffing is the most commonly used method of packet sniffing. In this method a requirement of setting network card into promiscuous mode exist. When network card is set into promiscuous mode then host will be able to sniff all packets. A key point in the IP based sniffing is that it uses an IP based filter, and the packets matching the IP address filter is captured only. Normally the IP address filter is not set so it can capture all the packets. This method only works in non switched network managers to put security measures, such as firewalls, in place to prevent intrusion to the network.

2. MAC based sniffing is another method of packet sniffing. This is as like IP based sniffing. Same concept of IP based sniffing is also used here besides using an IP based filter. Here also a requirement of setting network card into promiscuous mode exists. Here in place of IP address filter a MAC address filter is used and sniffing all packets matching the MAC addresses.

3. ARP based Sniffing method works a little different. It does not put the network card into promiscuous mode. This is not necessary because ARP packets will be sent to us. This is an effective method for sniffing in switched environment. Here sniffing is possible due to of being stateless nature of Address Resolution Protocol.

PROJECT OBJECTIVE

The objective of my project is to intercept and log traffic that passes over a digital network or part of a network.

USES OF PACKET SNIFFER

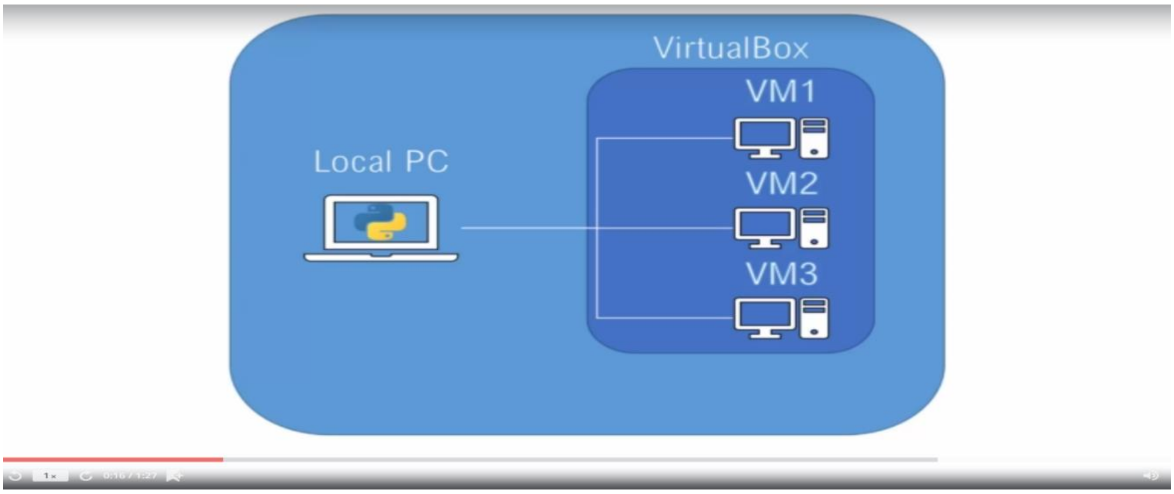
Packet sniffers can:

- Analyze network problems
- Detect network intrusion attempts
- Detect network misuse by internal and external users
- Documenting regulatory compliance through logging all perimeter and endpoint traffic
- Gain information for effecting a network intrusion
- Isolate exploited systems
- Monitor WAN bandwidth utilization
- Monitor network usage (including internal and external users and systems)
- Monitor data in transit
- Monitor WAN and endpoint security status
- Gather and report network statistics
- Identify suspect content in network traffic
- Serve as primary data source for day-to-day network monitoring and management
- Spy on other network users and collect sensitive information such as login details or users cookies (depending on any content encryption methods that may be in use)
- Reverse engineer proprietary protocols used over the network

- Debug client/server communications
- Debug network protocol implementations
- Verify adds, moves and changes
- Verify internal control system effectiveness (firewalls, access control, Web filter, spam filter, proxy)

Packet capture can be used to fulfill a warrant from a law enforcement agency to wiretap all network traffic generated by an individual. Internet service providers and VoIP providers in the United States must comply with Communications Assistance for Law Enforcement Act regulations. Using packet capture and storage, telecommunications carriers can provide the legally required secure and separate access to targeted network traffic and are able to use the same device for internal security purposes. Collecting data from a carrier system without a warrant is illegal due to laws about interception. By using end-to-end encryption, communications can be kept confidential from telecommunication carriers and legal authorities.

<u>Network Architecture</u>



PRACTICAL APPROACH

- ✓ A practical approach of this title is developed by us in which we have shown actual packet capturing. This approach is mostly developed for:
- ✓ To make data identity stealing available by tracing the packets from the network.
- ✓ To provide an easy and effective way of sniffing of data packets.
- ✓ To provide a user friendly environment.
- ✓ It is possible only when the server code is running.

2. SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

Existing system supports only the packet capturing there is no sniffing concept. It can show only the captured packet in the network and it can show only the size of the packet. In this application it cannot show the source machine and destination machine which are involved in the packet transferring.

2.1 PROPOSED SYSTEM

In this application it can show the "packet sniffing" concept. In this manner it can show the captured packets and size of the packet and source and destination machine IP addresses which are involved in the packet transferring. It can show the working of different layers in graphical manner. It can give the complete information about the captured packet like which layers are involved and which protocols are involved at that time. And you have a facility to store the information of the packets. For developing this application we have made five modules they are as:

- ✓ Packet sniffing module
- ✓ Analyze layer module
- ✓ Analyze protocol module

2.3 SYSTEM SPECIFICATION

2.3.1 HARDWARE SPECIFICATION

- RAM : 8GB
- OS: WINDOWS 10 64bit
- STORAGE : 8GB
- GPU : 2GB

2.3.2 SOFTWARE AND TOOLS SPECIFICATION

- Python3
- Virtualbox
- Scapy
- Pip
- Arista switch/router vEOS
- Arista Aboot iso
- Ubuntu VM

3. SYSTEM DESIGN

3.1 MODULE DESIGN

nps.py

This is the module to capture and analysing the packets over the network.

Scapy is the library used in it , we will use the sniff() function to capture network packets.

#To see a list of what functions Scapy has available, open Scapy and run the lsc() function.

#Run the ls() function to see ALL the supported protocols.

#Run the ls(protocol) function to see the fields and default values for any protocol. E.g. ls(BOOTP)

#See packet layers and contents with the .show() method.

#Dig into a specific packet layer using a list index: pkts[3][2].summary()

#...the first index chooses the packet out of the pkts list, the second index chooses the layer for that specific packet.

#Using the .command() method will return a string for the command necessary to recreate that sniffed packet.

#To see the list of optional arguments for the sniff() function:

#print(sniff.__doc__)

'''

Sniff packets and return a list of packets.

Arguments:

count: number of packets to capture. 0 means infinity.

store: whether to store sniffed packets or discard them

prn: function to apply to each packet. If something is returned, it is displayed.

Ex: prn = lambda x: x.summary()

filter: BPF filter to apply.

lfilter: Python function applied to each packet to determine if further action may be done.

Ex: lfilter = lambda x: x.haslayer(Padding)

offline: PCAP file (or list of PCAP files) to read packets from, instead of sniffing them

timeout: stop sniffing after a given time (default: None).

L2socket: use the provided L2socket (default: use conf.L2listen).

opened_socket: provide an object (or a list of objects) ready to use .recv() on.

stop_filter: Python function applied to each packet to determine if we have to stop the capture after this packet.

Ex: stop_filter = lambda x: x.haslayer(TCP)

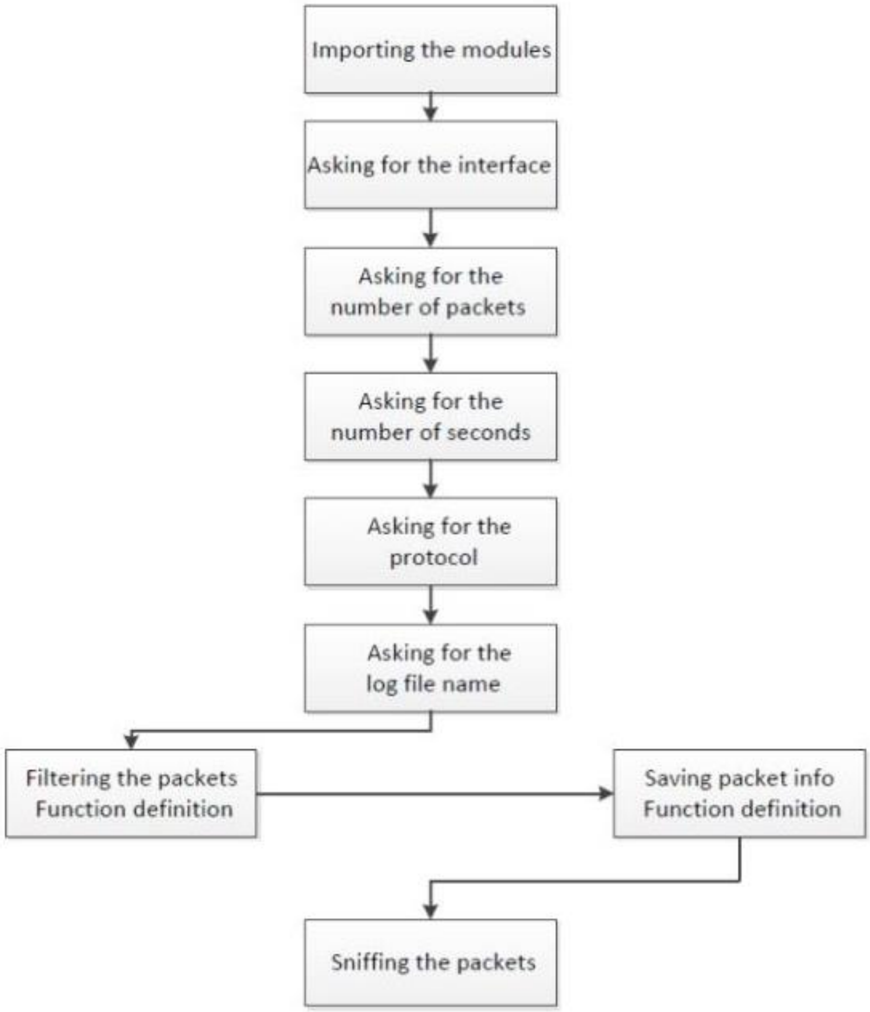
iface: interface or list of interfaces (default: None for sniffing on all interfaces).

The iface, offline and opened_socket parameters can be either an element, a list of elements, or a dict object mapping an element to a label (see examples below).

Examples:

```
  >>> sniff(filter="arp")

  >>> sniff(lfilter=lambda pkt: ARP in pkt)

  >>> sniff(iface="eth0", prn=Packet.summary)

  >>> sniff(iface=["eth0", "mon0"],
  ...       prn=lambda pkt: "%s: %s" % (pkt.sniffed_on,
  ...                                   pkt.summary()))

  >>> sniff(iface={"eth0": "Ethernet", "mon0": "Wifi"},
  ...       prn=lambda pkt: "%s: %s" % (pkt.sniffed_on,
  ...                                   pkt.summary()))
'''
```

3.2 DATA FLOW DIAGRAM



4. IMPLEMENTATION, CONFIGURATION AND TESTING

Setting up the working environment

Installing the Virtualization Software on Windows OS

Downloading VirtualBox for Windows OS:

https://www.virtualbox.org/wiki/Downloads

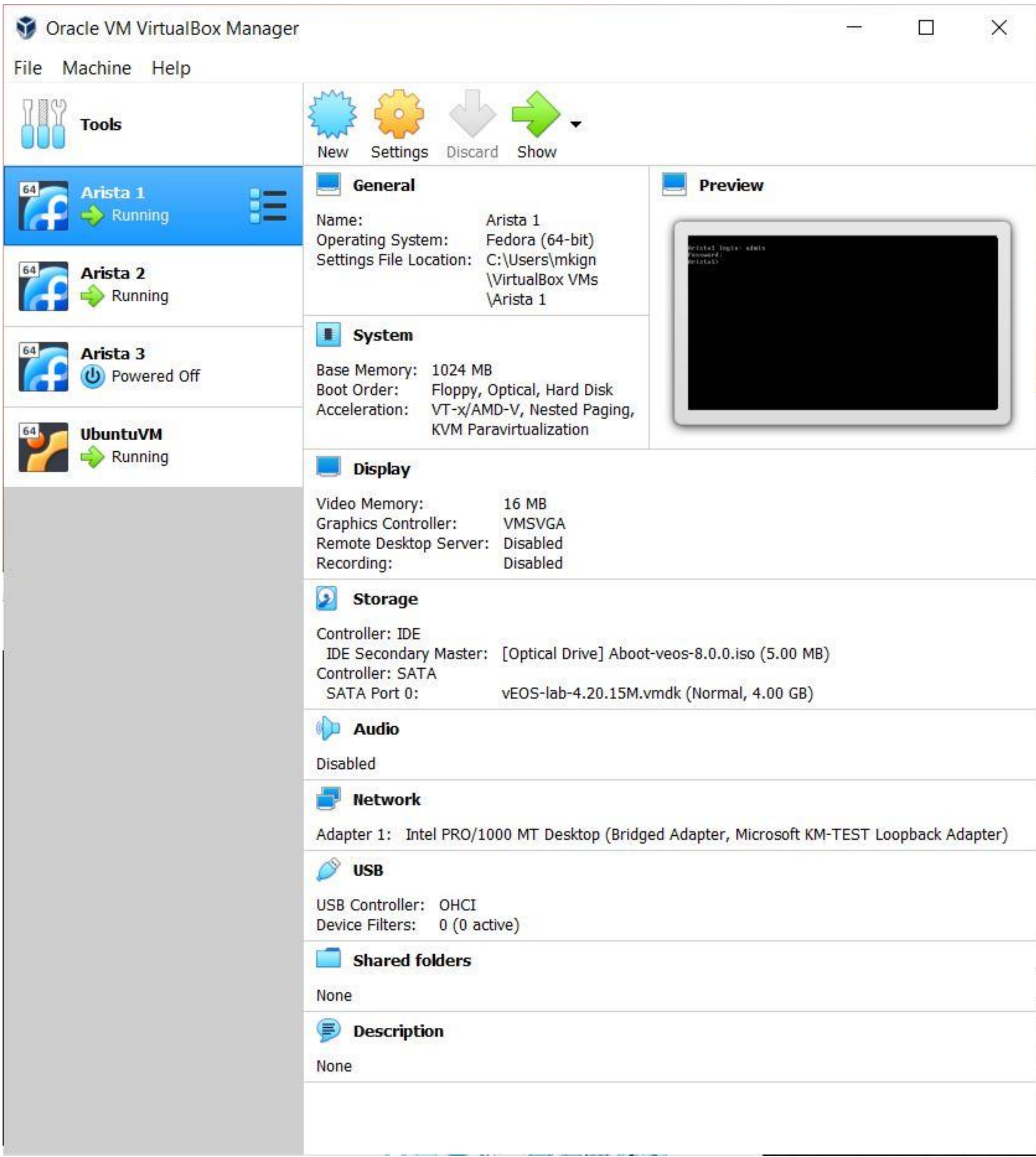
Downloading necessary files for Arista switch:

simply go to the EOS Download section at https://www.arista.com/en/support/software-download and search for the following:-

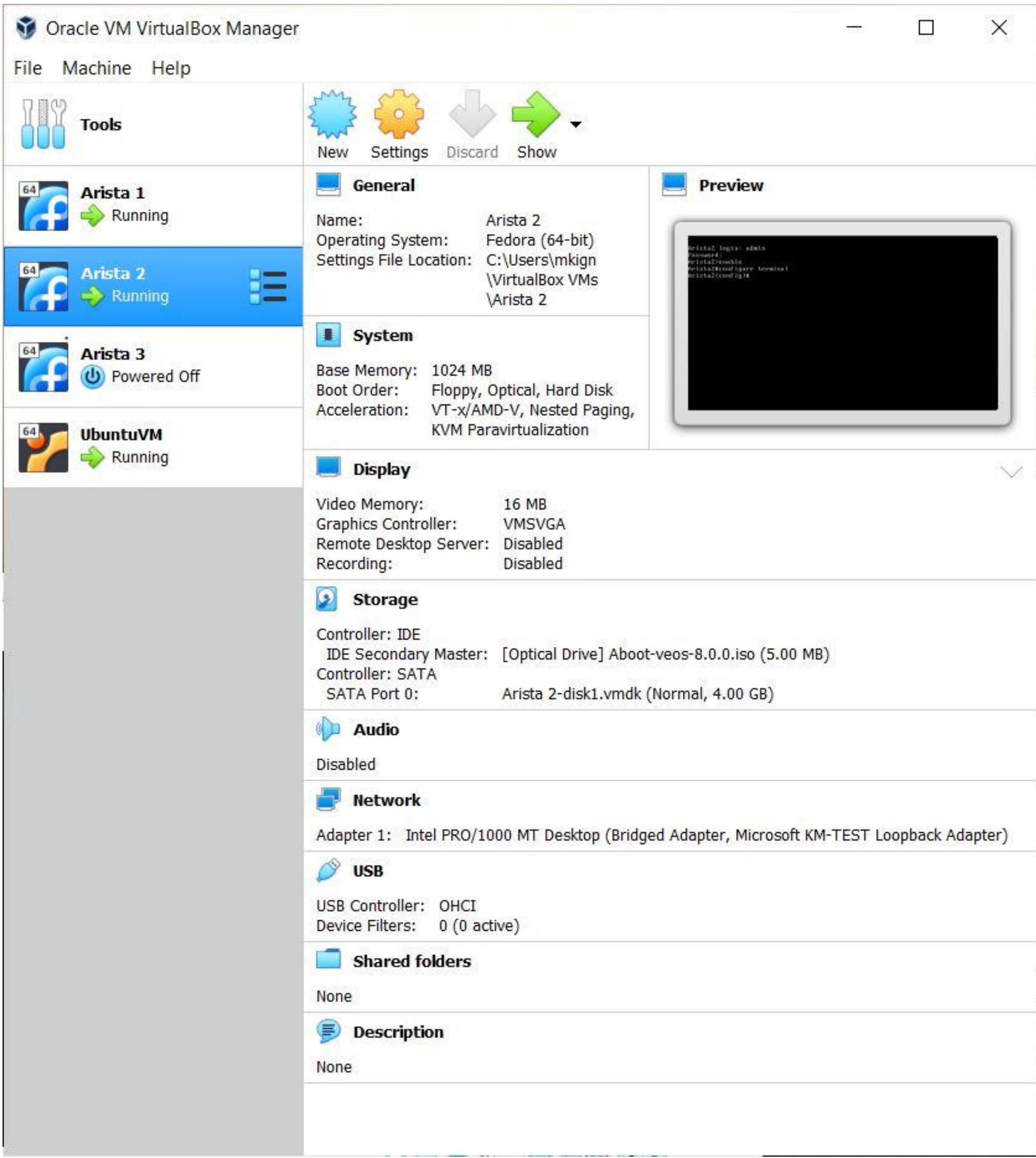
- **Aboot-veos-8.0.0.iso**
- **vEOS-lab-4.20.15M.vmdk**

Configuring the Arista Switch/Router VM

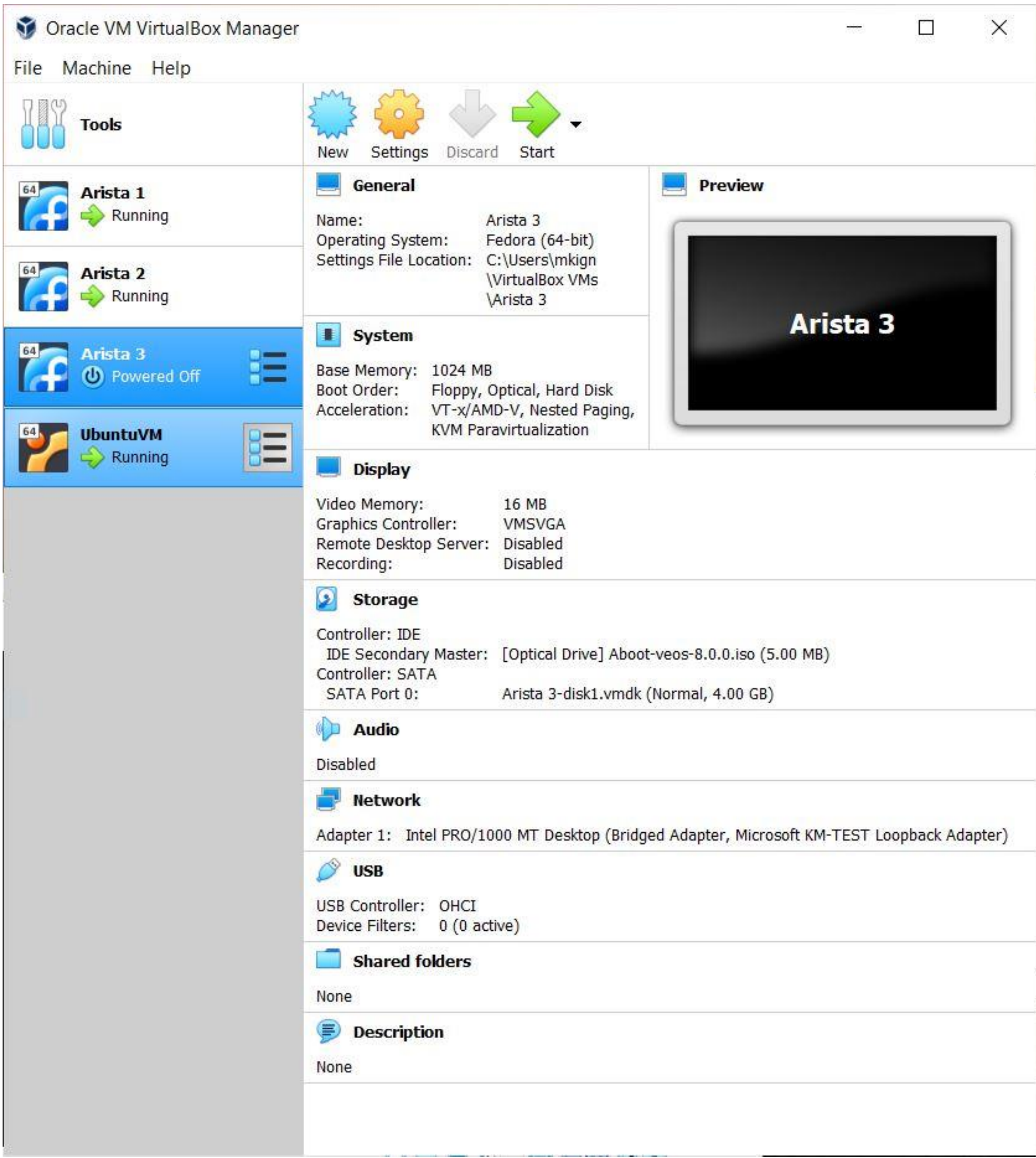
✓ Arista 1 VM configuration



✓ Arista 2 VM configuration



✓ Arista 3 VM configuration

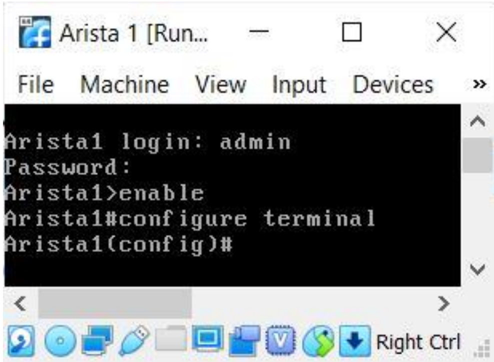


Necessary Switch/Router Configuration

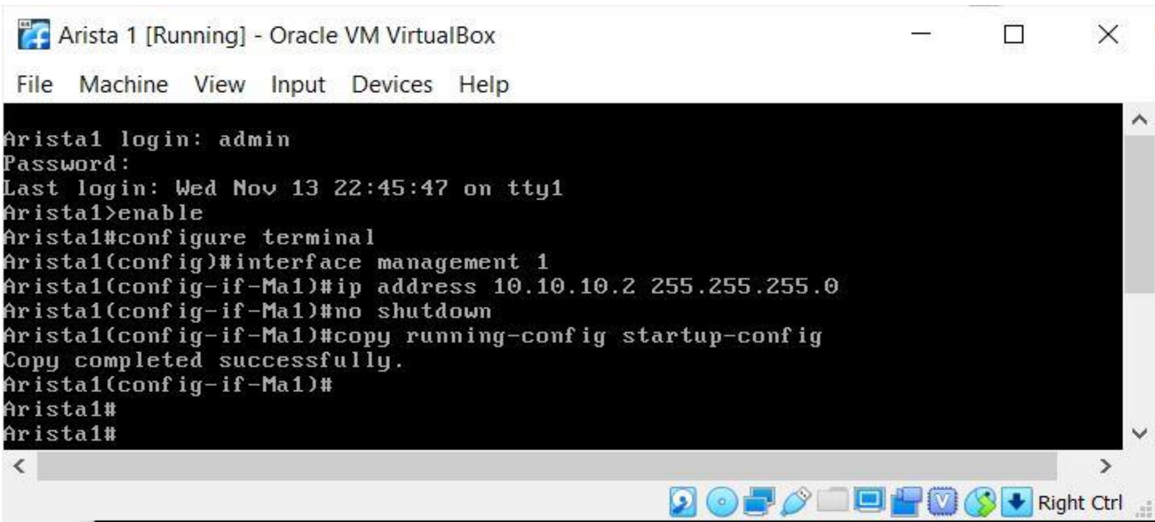
1. **Arista1**

✓ **Configuring the user and password for Arista1**

✓ **Now exit the switch/router by using exit command and login the device again**

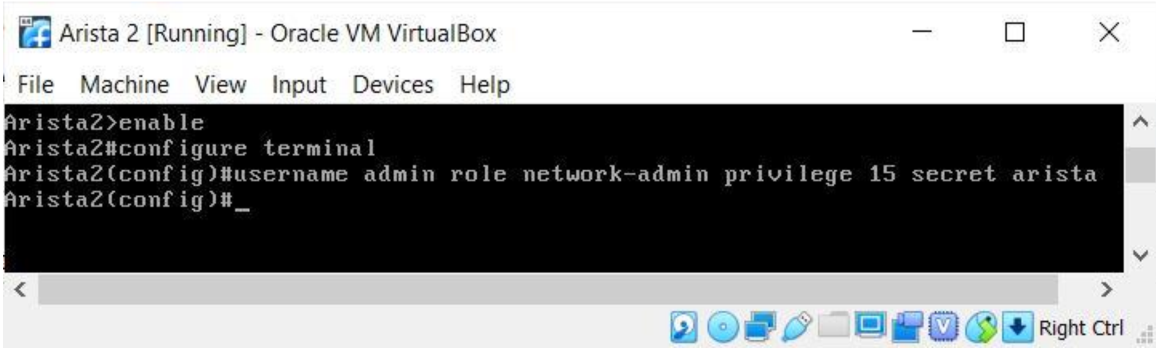


✓ **Configuring Arista1 interface ip address and save the configuration by using command- 'copy running-config startup-config'**

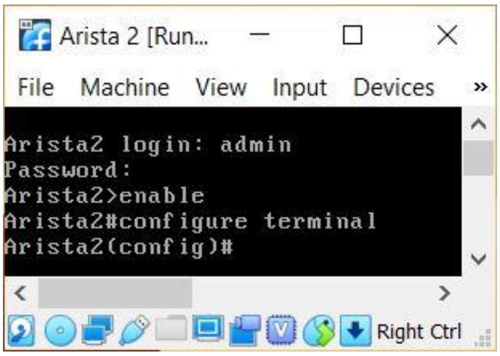


2. Arista2

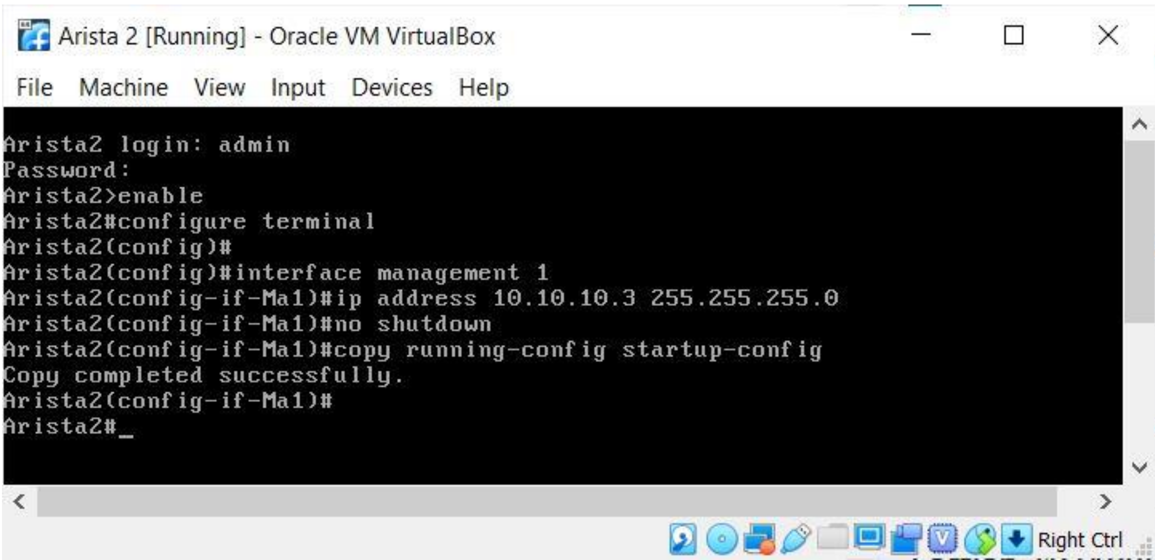
- ✓ **Configuring the user and password for Arista2**



- ✓ **Now exit the switch/router by using exit command and login the device again**

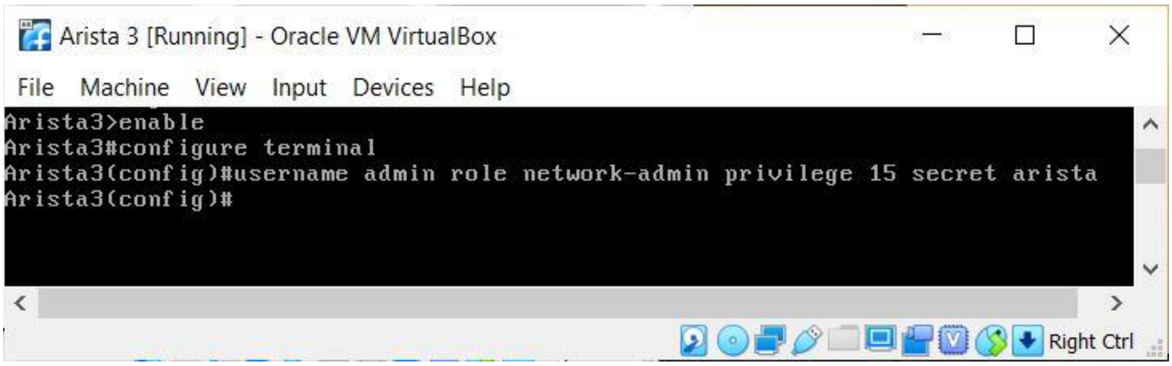


- ✓ **Configuring Arista2 interface ip address and save the configuration by using command- 'copy running-config startup-config'**

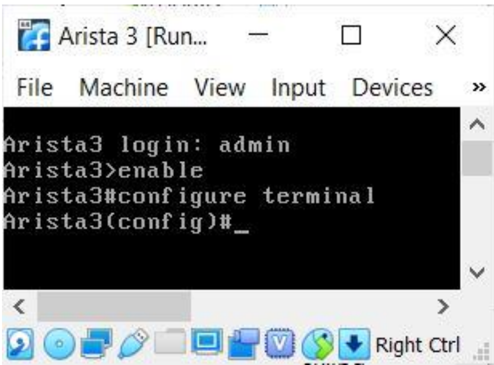


3. Arista3

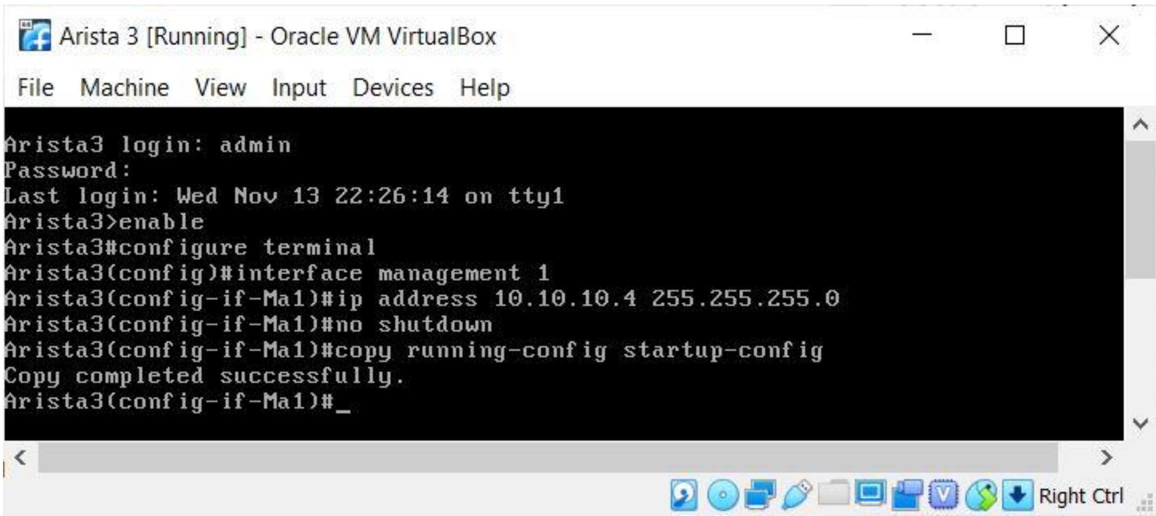
✓ **Configuring the user and password for Arista3**



✓ **Now exit the switch/router by using exit command and login the device again**



✓ **Configuring Arista3 interface ip address and save the configuration by using command- 'copy running-config startup-config'**



Required resource & it's configuration to develop the network packet sniffer application

Downloading the Linux VM

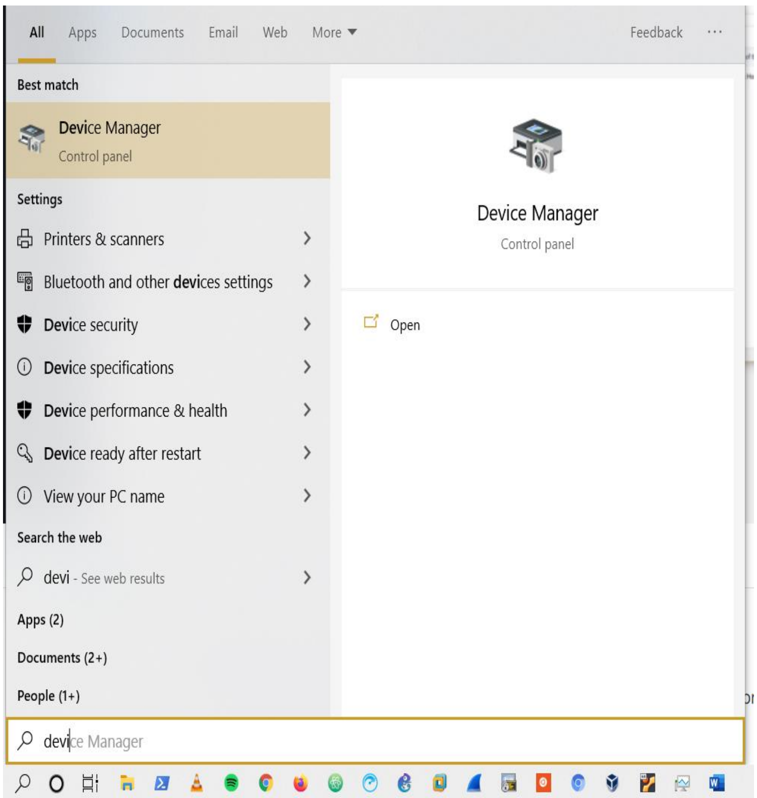
Download the Ubuntu 18.04 LTS .iso file:

Official link: https://www.ubuntu.com/download/desktop

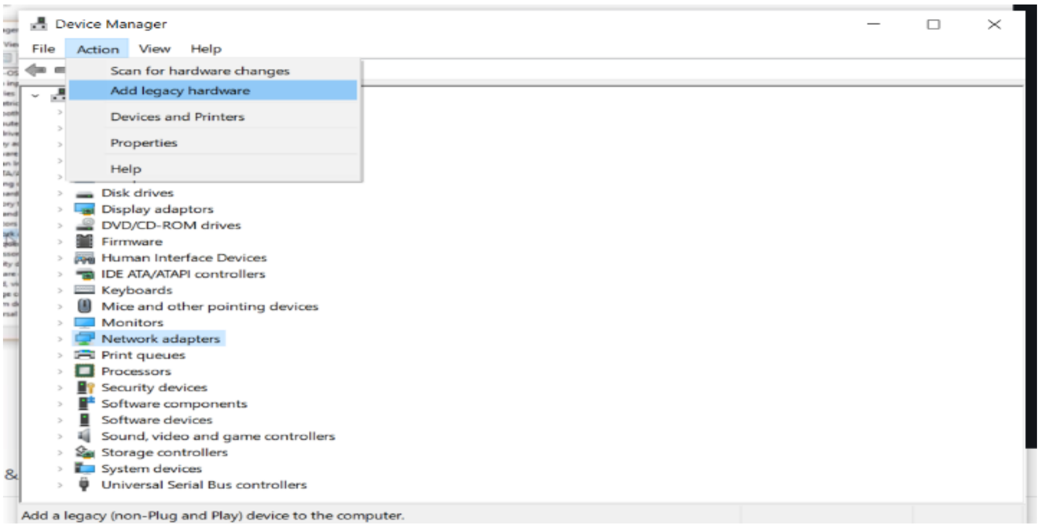
Connecting the local PC to the device

Steps to Configuring the network adapter: Microsoft KM-TEST loopback adapter on local system

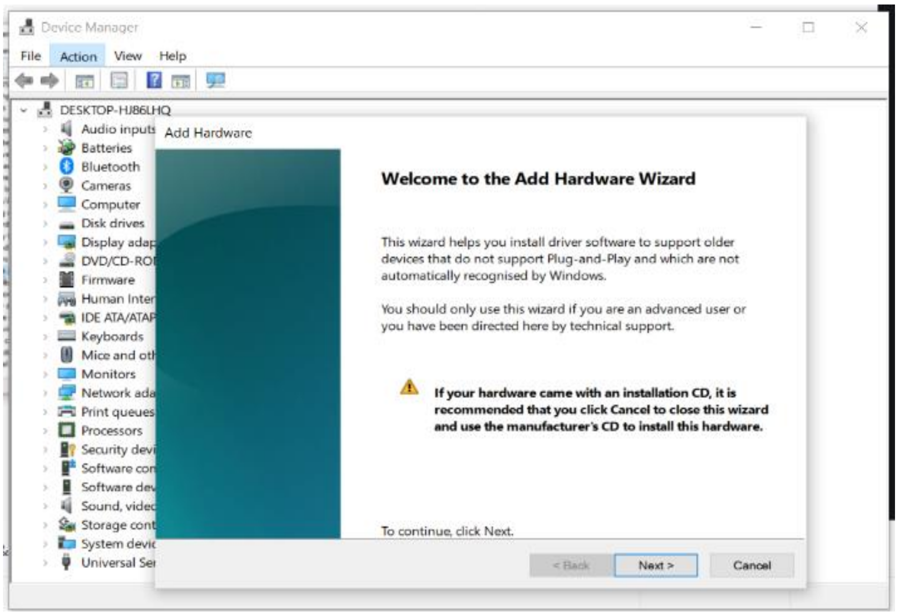
- ✓ **Open the device manager from start menu on local system(Windows 10)**



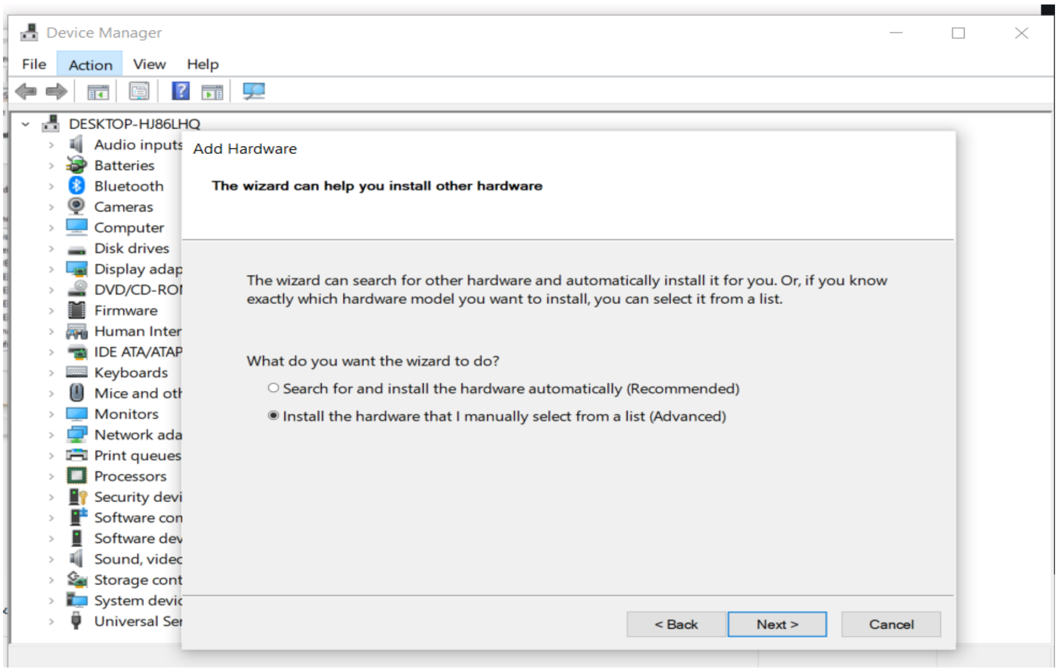
✓ **Select the network adapter and add the legacy hardware in action menu**



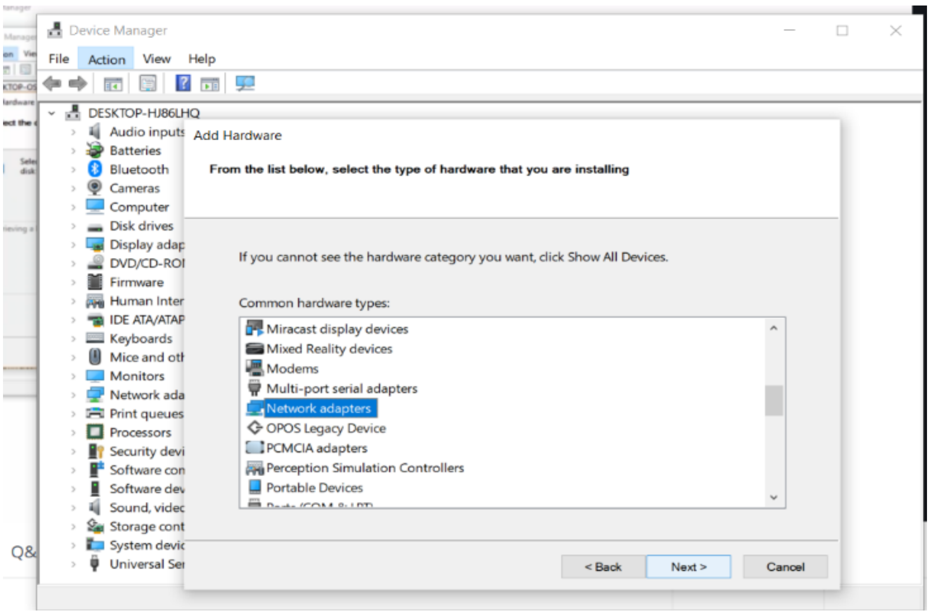
✓ **Proceed to next step by click next**



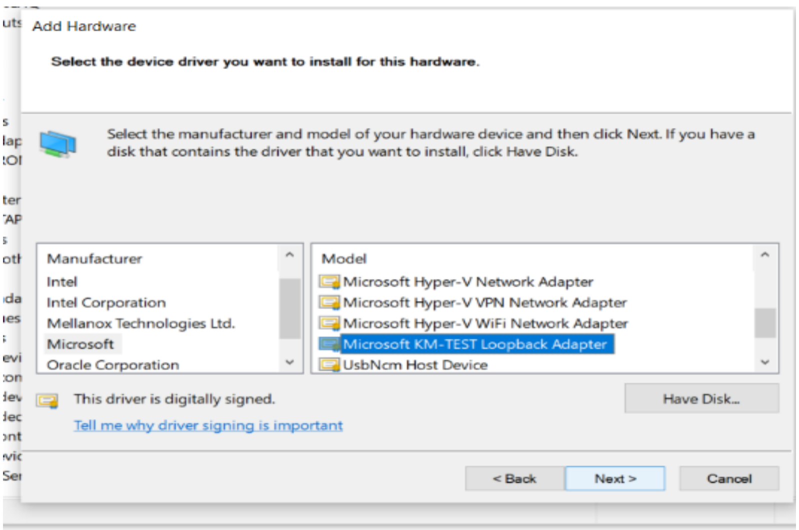
✓ **Now select second option(Install the hardware that I manually select from a list) and click next**



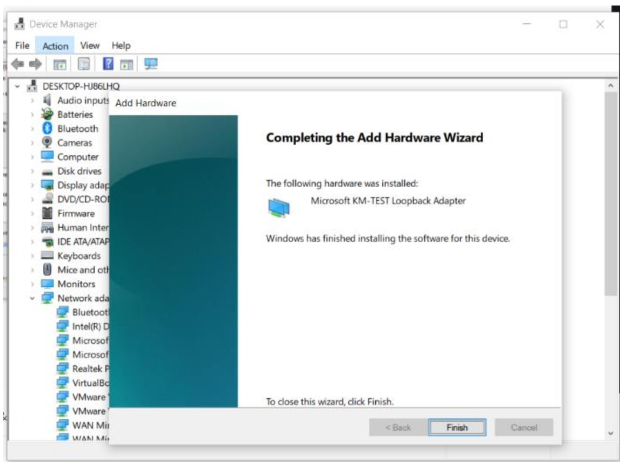
✓ **Select network adapter and click next**



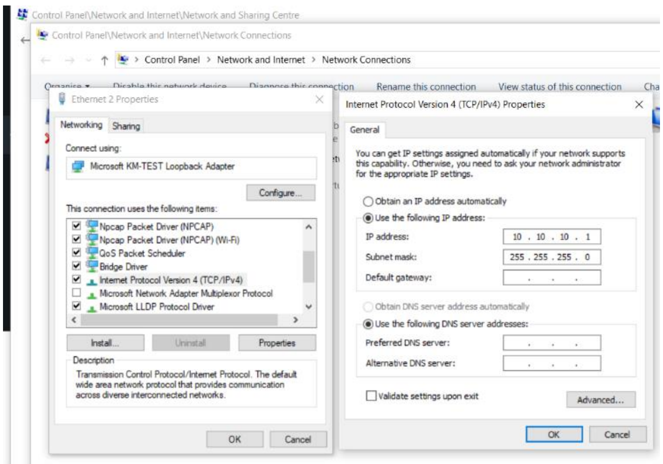
✓ **Select Microsoft from left side and Microsoft KM-Test Loopback Adapter and click next**



✓ **Then click Finish**



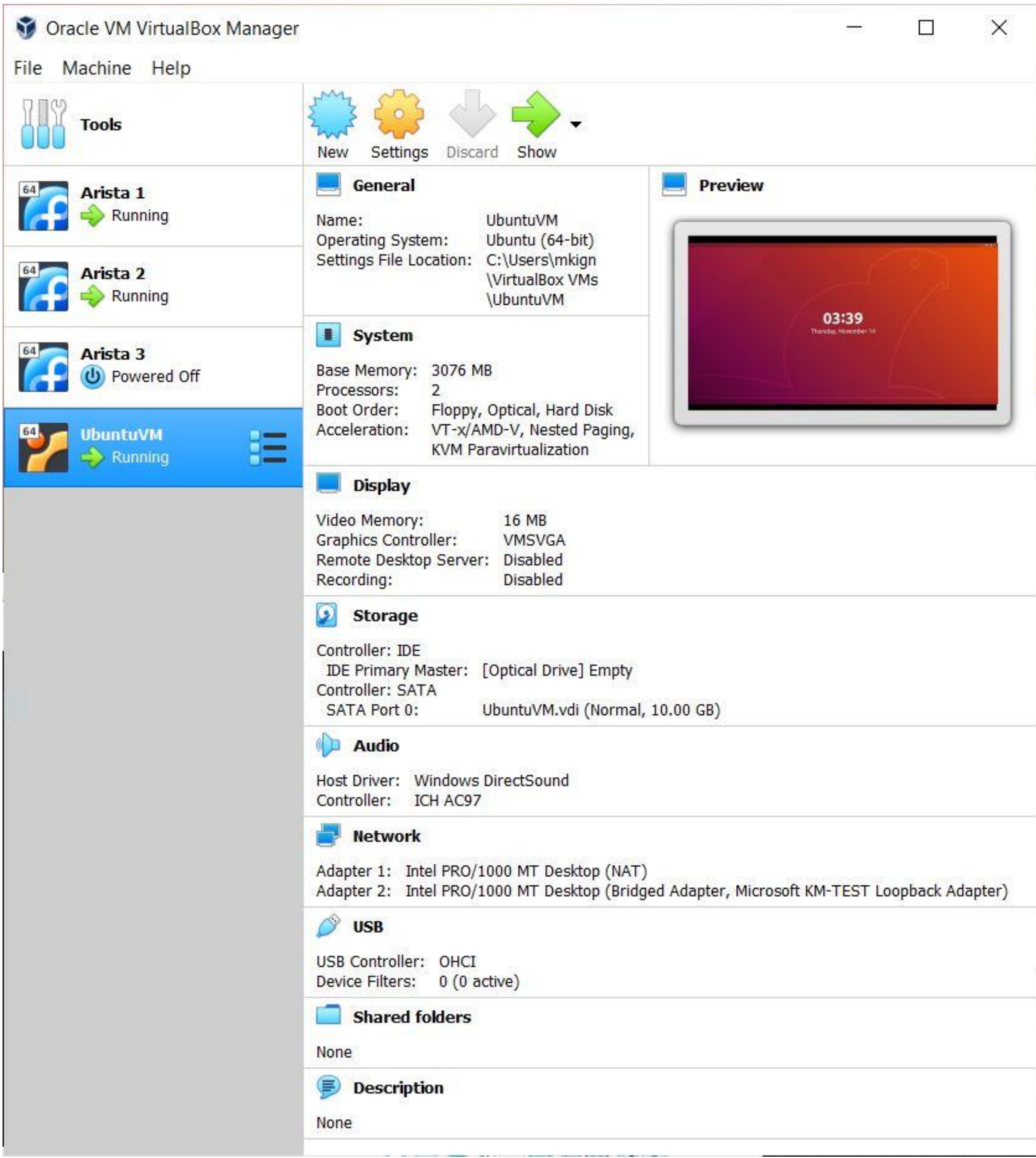
✓ **Configuring the ip address for the above adapter**



Configuring the Linux VM

Step 1 - VirtualBox settings for the Ubuntu 18.04 VM (in VirtualBox select the Ubuntu VM and click on the **Settings** button):

- **System** tab - Base memory: 3076 MB (preferably)
- **Network** tab - **Adapter 1**: NAT, **Adapter 2**: Bridged Adapter (then choose your Microsoft loopback adapter)

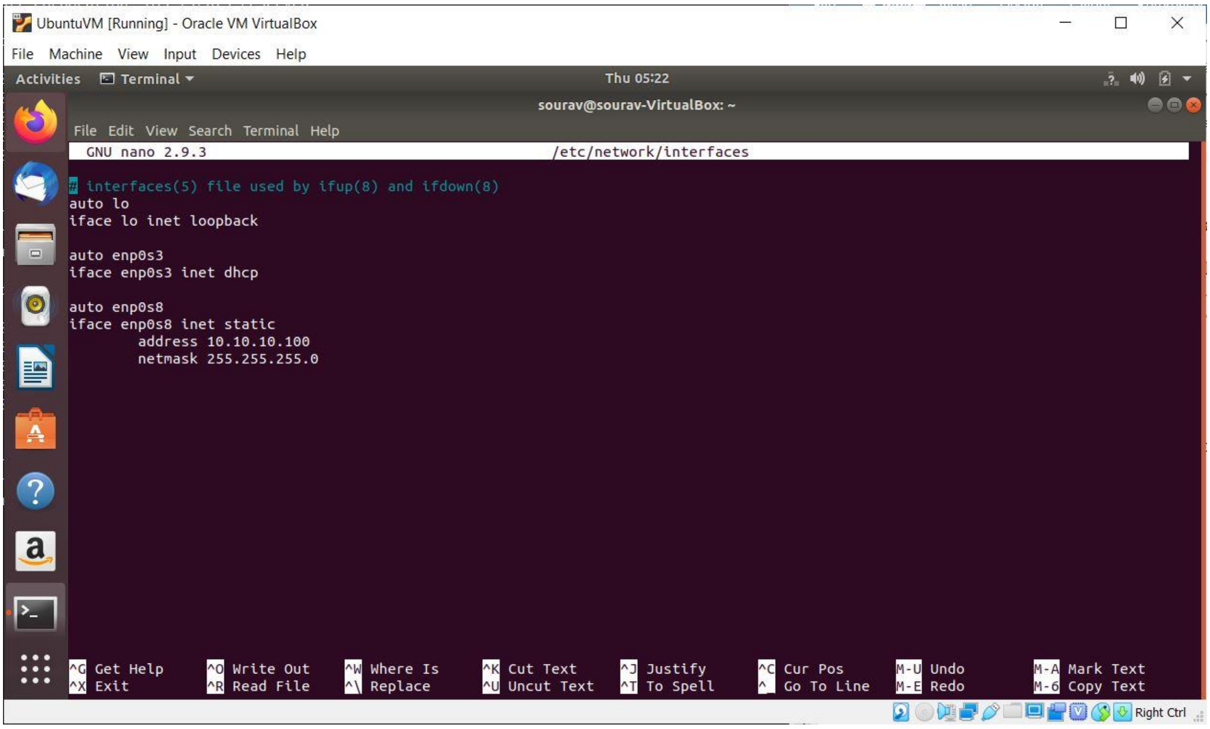


Step 2 - Ubuntu settings in the Linux Terminal:

- ***cat /etc/network/interfaces*** - showing the current network settings
- ***sudo nano /etc/network/interfaces*** - editing the network settings, making them available after reboot (use the root password that you configured at installation time)
- **use Ctrl+O, hit Enter to confirm, then use Ctrl+X** to save your settings and exit nano.

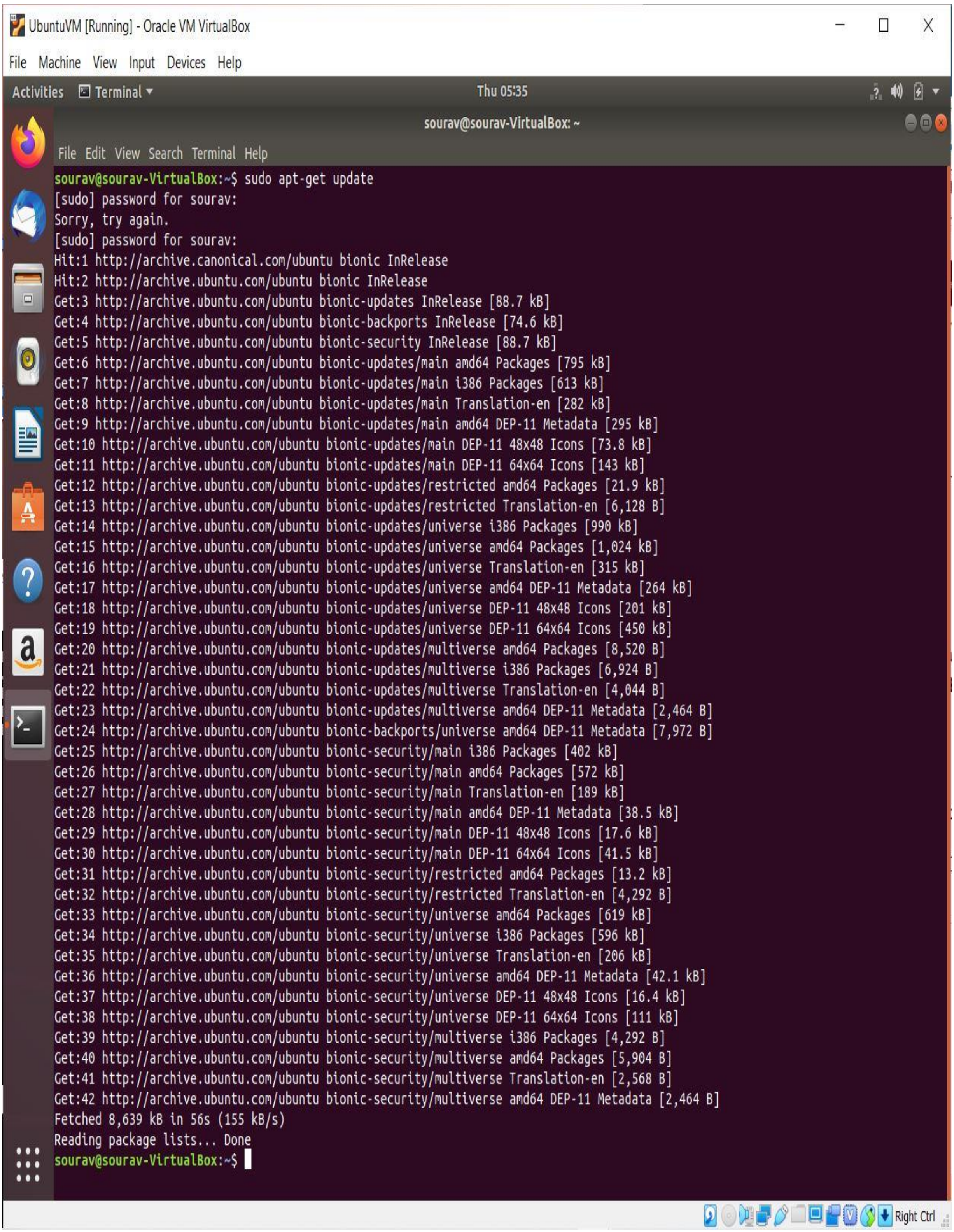
Step 3 - /etc/network/interfaces settings to add to the default file:

1. auto enp0s3
2. iface enp0s3 inet dhcp
3.
4. auto enp0s8
5. iface enp0s8 inet static
6.   address 10.10.10.100
7.   netmask 255.255.255.0



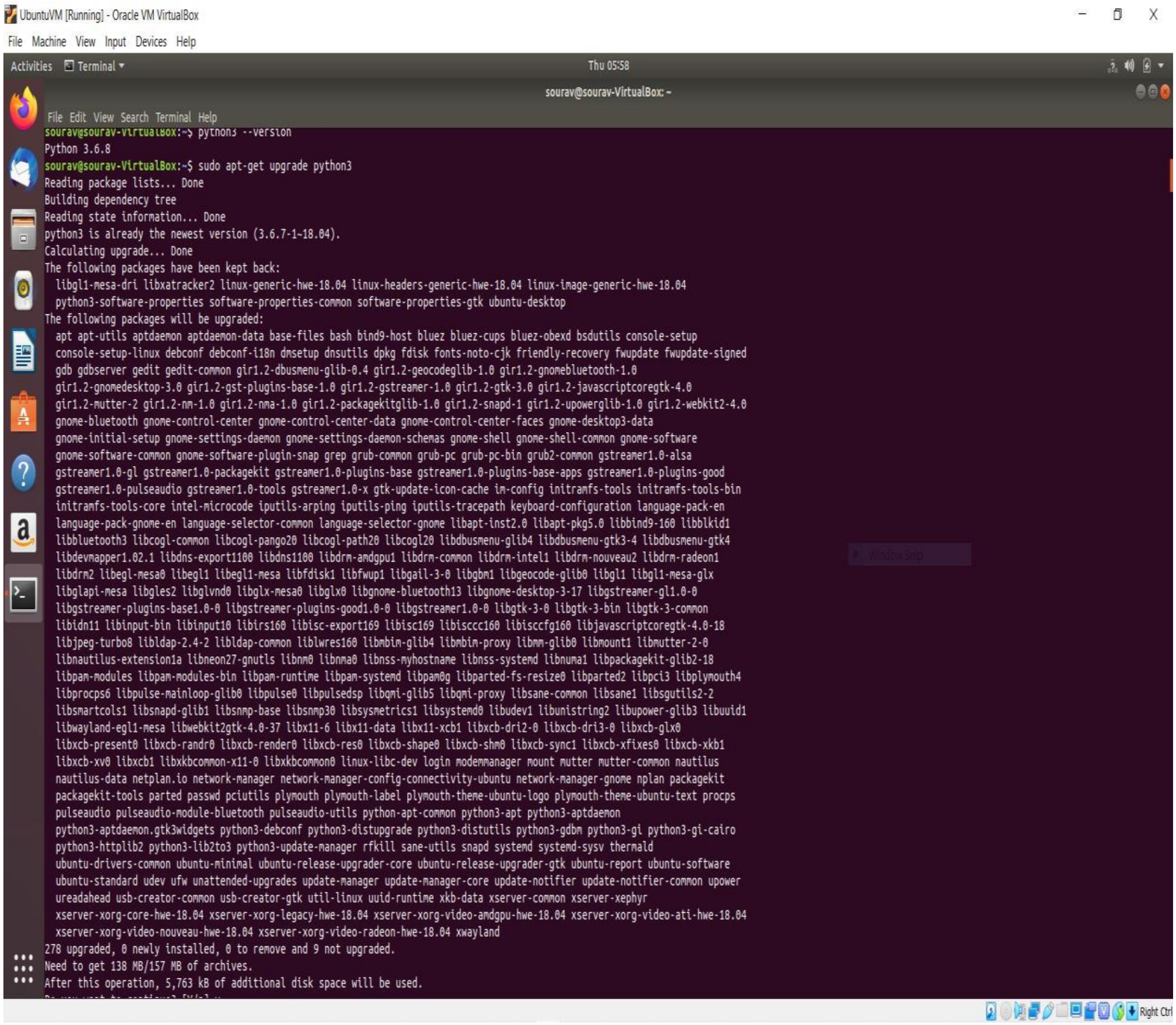
Step 4 - Update the package lists

- **sudo apt-get update** - run in Terminal, use the root password that we configured at installation time



Step 5 - Upgrade Python 3

- **python3 --version** - run in Terminal to see the current Python 3 version
- **sudo apt-get upgrade python3** - upgrade Python to the latest version (may take a couple of minutes to finish)



Step 6 - Install net-tools (and ifconfig) and the pip package manager

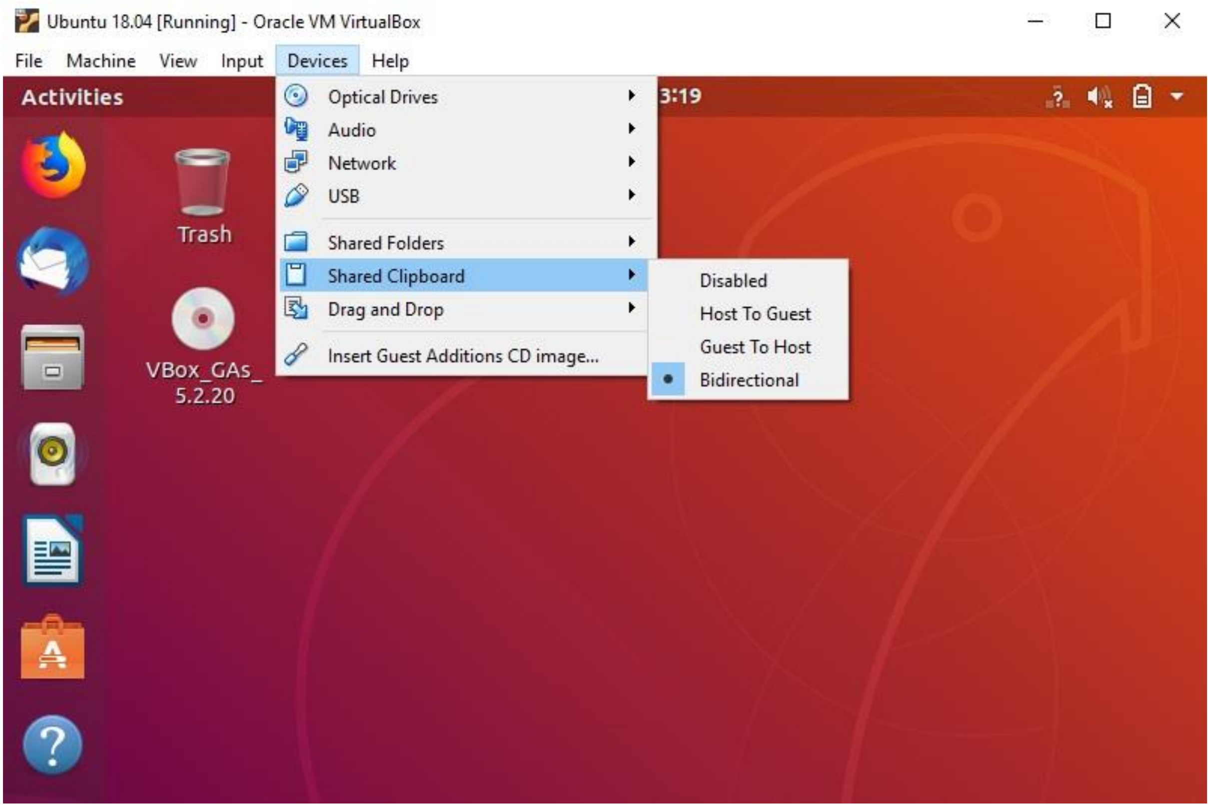
- **sudo apt install net-tools** - run in Terminal, use the root password that we configured at installation time
- use the **ifconfig** command in the Terminal to see all the network interfaces
- **sudo apt install python3-pip** - run in Terminal, use the root password that we configured at installation time

Step 7 - Install Scapy

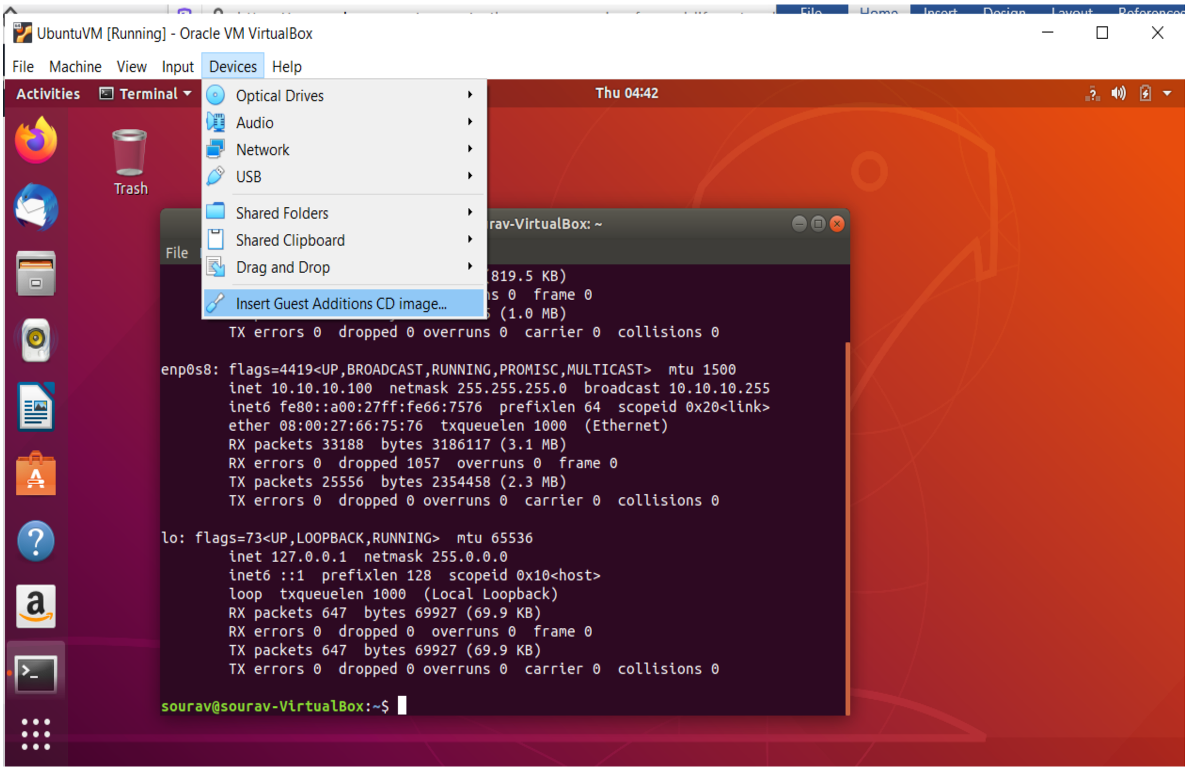
- **sudo pip3 install scapy** - run in Terminal, use the root password that we configured at installation time
- Scapy's official documentation available at https://scapy.readthedocs.io/en/latest/

Step 8 (optional) - Install VirtualBox Guest Additions to enable shared clipboard (copying and pasting between the host OS and guest OS) and other useful features.

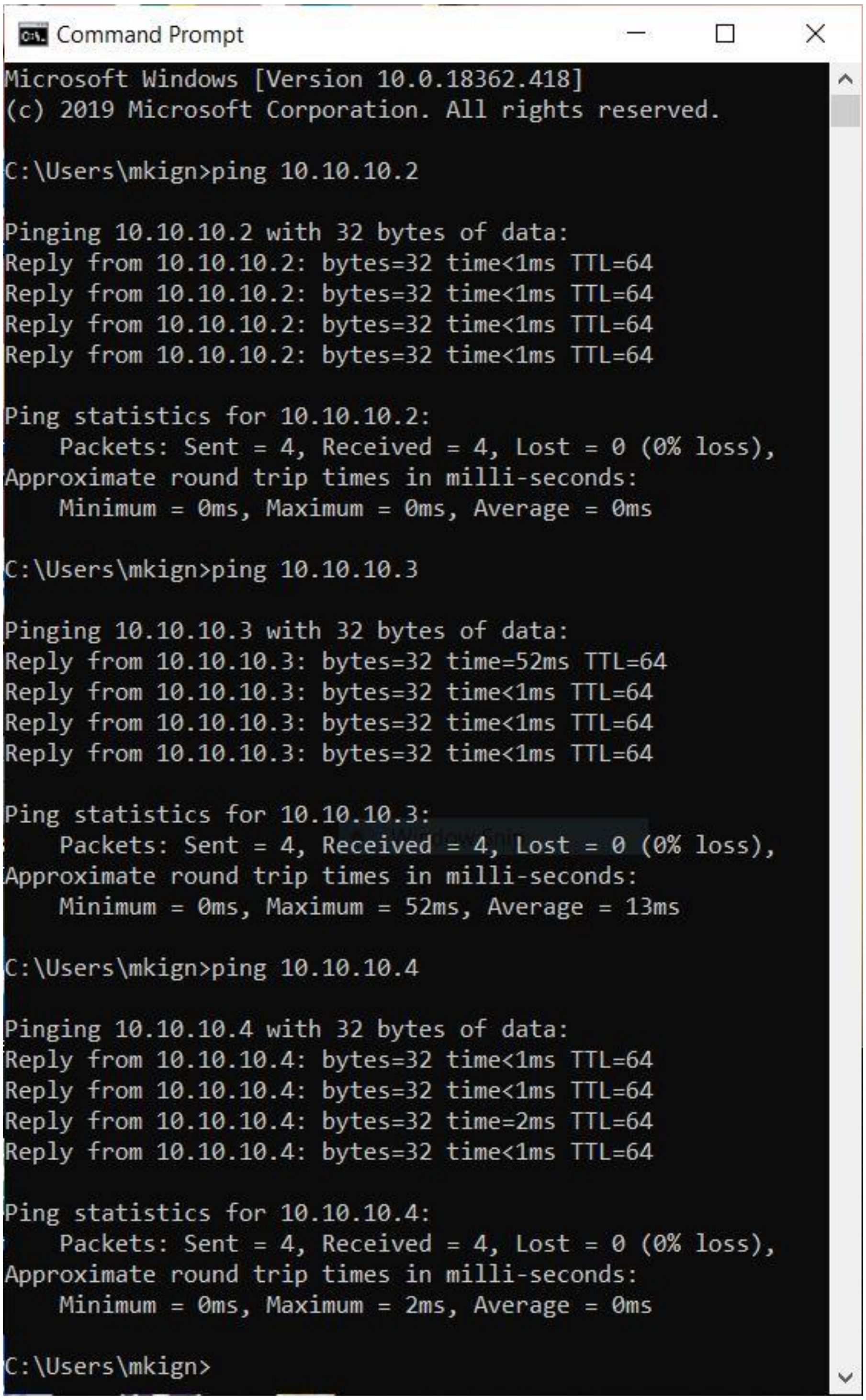
- Having your Ubuntu VM open, click on **Devices - Shared Clipboard** and select **Bidirectional**.



- Having our Ubuntu VM open, click on **Devices - Install Guest Additions CD Image**, then click on **Run**, enter your root password and wait for the process to finish. Finally, press **Enter** when prompted and **reboot** the Ubuntu VM.



Testing the connections from local devices to network devices(Switch/router)



```
Command Prompt
Microsoft Windows [Version 10.0.18362.418]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\mkign>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:
Reply from 10.10.10.2: bytes=32 time<1ms TTL=64
Reply from 10.10.10.2: bytes=32 time<1ms TTL=64
Reply from 10.10.10.2: bytes=32 time<1ms TTL=64
Reply from 10.10.10.2: bytes=32 time<1ms TTL=64

Ping statistics for 10.10.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\mkign>ping 10.10.10.3

Pinging 10.10.10.3 with 32 bytes of data:
Reply from 10.10.10.3: bytes=32 time=52ms TTL=64
Reply from 10.10.10.3: bytes=32 time<1ms TTL=64
Reply from 10.10.10.3: bytes=32 time<1ms TTL=64
Reply from 10.10.10.3: bytes=32 time<1ms TTL=64

Ping statistics for 10.10.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 52ms, Average = 13ms

C:\Users\mkign>ping 10.10.10.4

Pinging 10.10.10.4 with 32 bytes of data:
Reply from 10.10.10.4: bytes=32 time<1ms TTL=64
Reply from 10.10.10.4: bytes=32 time<1ms TTL=64
Reply from 10.10.10.4: bytes=32 time=2ms TTL=64
Reply from 10.10.10.4: bytes=32 time<1ms TTL=64

Ping statistics for 10.10.10.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\Users\mkign>
```

5. CONCLUSION

packet sniffer is not just a hacker’s tool. It can be used for network traffic monitoring, traffic analysis, troubleshooting and other useful purposes. Packet sniffers can capture things like passwords and usernames or other sensitive information. Networks Sniffing in non switched network is easy but sniffing in switched network is difficult because we use switches in network which narrow the traffic and send to particular system, so for sniffing in this type of network we use some methods. There are many available tools. Packet sniffer can be enhanced in future by Incorporating features like making the packet sniffer program platform independent, and making tool by neural network.10 GBPS LAN which are used currently, sniffing can done on this rate in future very effectively.

6. REFERENCES

- Tkinter tkFileDialog module - Python Tutorial
- Python GUI Development with Tkinter: Part 3
- https://stackoverflow.com/
- https://www.datacamp.com/community/tutorials/gui-tkinter-python

7. ANNEXURE

7.1 Coding

nps.py

```
'''

Sniff packets and return a list of packets.

Arguments:

  count: number of packets to capture. 0 means infinity.

  store: whether to store sniffed packets or discard them

  prn: function to apply to each packet. If something is returned, it

      is displayed.

      Ex: prn = lambda x: x.summary()

  filter: BPF filter to apply.

  lfilter: Python function applied to each packet to determine if

      further action may be done.

      Ex: lfilter = lambda x: x.haslayer(Padding)

  offline: PCAP file (or list of PCAP files) to read packets from,

      instead of sniffing them

  timeout: stop sniffing after a given time (default: None).

  L2socket: use the provided L2socket (default: use conf.L2listen).

  opened_socket: provide an object (or a list of objects) ready to use
```

```
        .recv() on.


    stop_filter: Python function applied to each packet to determine if
        we have to stop the capture after this packet.
        Ex: stop_filter = lambda x: x.haslayer(TCP)
    iface: interface or list of interfaces (default: None for sniffing
        on all interfaces).
The iface, offline and opened_socket parameters can be either an
element, a list of elements, or a dict object mapping an element to a
label (see examples below).
Examples:
    >>> sniff(filter="arp")
    >>> sniff(lfilter=lambda pkt: ARP in pkt)
    >>> sniff(iface="enp0s8", prn=Packet.summary)
    >>> sniff(iface=["enp0s8", "mon0"],
    ...       prn=lambda pkt: "%s: %s" % (pkt.sniffed_on,
    ...                                   pkt.summary()))
    >>> sniff(iface={"enp0s8": "Ethernet", "mon0": "Wifi"},
    ...       prn=lambda pkt: "%s: %s" % (pkt.sniffed_on,
    ...                                   pkt.summary()))
'''
```

```
#Importing the necessary modules

import logging

from datetime import datetime

import subprocess

import sys

from tkinter import *

import tkinter.ttk as ttk

from tkinter.ttk import Notebook



#This will suppress all messages that have a lower level of seriousness than error messages, while running or loading Scapy

logging.getLogger("scapy.runtime").setLevel(logging.ERROR)

logging.getLogger("scapy.interactive").setLevel(logging.ERROR)

logging.getLogger("scapy.loading").setLevel(logging.ERROR)



try:

    from scapy.all import *

except ImportError:

    print("Scapy package for Python is not installed on your system.")

    sys.exit()
```

```
#Printing a message to the user; always use "sudo scapy" in Linux!

print("\n! Make sure to run this program as ROOT !\n")



#Asking the user for some parameters: interface on which to sniff, the number of packets to sniff, the time interval to sniff, the protocol

#Asking the user for input - the interface on which to run the sniffer

net_iface = input("* Enter the interface on which to run the sniffer (e.g. 'enp0s8'): ")

#Setting network interface in promiscuous mode

'''

In computer networking, promiscuous mode or "promisc mode"[1] is a mode for a wired network interface controller (NIC) or wireless network interface controller (WNIC) that causes the controller to pass all traffic it receives to the central processing unit (CPU) rather than passing only the frames that the controller is intended to receive.

This mode is normally used for packet sniffing that takes place on a router or on a computer connected to a hub.

'''

try:

    subprocess.call(["ifconfig", net_iface, "promisc"], stdout = None, stderr = None, shell = False)

except:

    print("\nWARNING! Failed to configure interface as promiscuous.\n")



else:
```

```
    #Executed if the try clause does not raise an exception
    print("\n=>Interface %s was set to PROMISC mode!\n" % net_iface)


#Asking the user for the number of packets to sniff (the "count" parameter)
pkt_to_sniff = input("\n* Enter the number of packets to capture (0 is infinity): ")


#Considering the case when the user enters 0 (infinity)
if int(pkt_to_sniff) != 0:
    print("\n=>The program will capture %d packets!\n" % int(pkt_to_sniff))


elif int(pkt_to_sniff) == 0:
    print("\n=>The program will capture packets until the timeout!\n")



#Asking the user for the time interval to sniff (the "timeout" parameter)
time_to_sniff = input("\n* Enter the number of seconds to run the capture: ")


#Handling the value entered by the user
if int(time_to_sniff) != 0:
    print("\n=>The program will capture packets for %d seconds!\n" % int(time_to_sniff))


#Asking the user for any protocol filter he might want to apply to the sniffing process
```

```
#For this example I chose three protocols: ARP, ICMP

#You can customize this to add your own desired protocols

proto_sniff = input("\n* Enter the protocol to filter by (arp || icmp || 0 is all): ")



#Considering the case when the user enters 0 (meaning all protocols)

if (proto_sniff == "arp") or (proto_sniff == "icmp"):

   print("\n=>The program will capture only %s packets!\n" % proto_sniff.upper())



elif (proto_sniff) == "0":

   print("\n=>The program will capture all protocols!\n")



#Asking the user to enter the name and path of the log file to be created

file_name = input("\n* Please give a name to the log file: ")



#Creating the text file (if it doesn't exist) for packet logging and/or opening it for appending

sniffer_log = open(file_name, "a")
```

```
#This is the function that will be called for each captured packet

#The function will extract parameters from the packet and then log each packet to the log file

def packet_log(packet):


    #Getting the current timestamp

    now = datetime.now()


    #Writing the packet information to the log file, also considering the protocol or 0 for all protocols

    if proto_sniff == "0":

        #Writing the data to the log file

        print("Time: " + str(now) + " Protocol: ALL" + " SMAC: " + packet[0].src + " DMAC: " + packet[0].dst, file = sniffer_log)


    elif (proto_sniff == "arp") or (proto_sniff == "icmp"):

        #Writing the data to the log file

        print("Time: " + str(now) + " Protocol: " + proto_sniff.upper() + " SMAC: " + packet[0].src + " DMAC: " + packet[0].dst, file = sniffer_log)
```

```
#Printing an informational message to the screen
print("\n* Starting the capture...")


#Running the sniffing process (with or without a filter)
if proto_sniff == "0":
    sniff(iface = net_iface, count = int(pkt_to_sniff), timeout = int(time_to_sniff), prn = packet_log)


elif (proto_sniff == "arp") or (proto_sniff == "icmp"):
    sniff(iface = net_iface, filter = proto_sniff, count = int(pkt_to_sniff), timeout = int(time_to_sniff), prn = packet_log)


else:
    print("\nWARNING! Could not identify the protocol.\n")
    sys.exit()


#Printing the closing message
print("\n* Displaying the captured packets saved in %s.\n" % file_name)


#Closing the log file
sniffer_log.close()
```

```
#subprocess.call(" python3 disp.py 1", shell=True)

#Displaying the captured packets information through GUI mode

container=Tk()



container.title('Network Packet Sniffer')

container.geometry('800x600')

generalites=Frame(container,bg='powder blue')

generalites.pack(side=BOTTOM)



s_generalites= Scrollbar(generalites)

T_generalites= Text(generalites,bg='powder blue',width=350,height=350)



s_generalites.pack(side=RIGHT, fill=Y)

T_generalites.pack(side=LEFT, fill=Y)

s_generalites.config(command=T_generalites.yview)

T_generalites.config(yscrollcommand=s_generalites.set)



filename =(file_name)

fichier = open(filename, "r")

content_generalites= fichier.read()

fichier.close()
```

```
T_generalites.insert(END, content_generalites)

container.mainloop()

print("Thank you for using the service!")



#End of the program.
```

7.2 INTERFACE

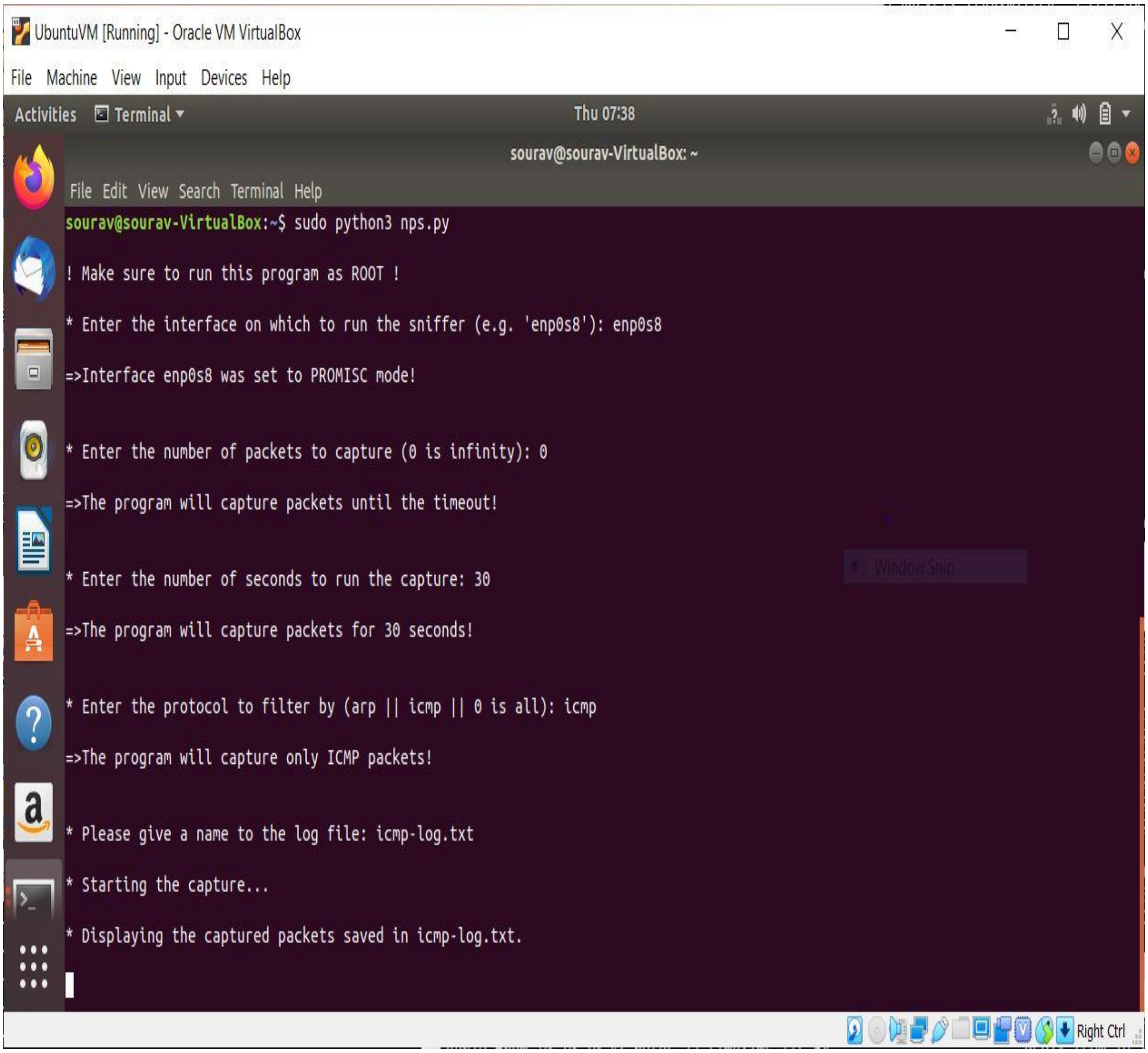
I. (CLI)Command line Interface

Asking the User for Input, extracting parameters from Packets, Writing to a Log File by running the Sniffer in CLI mode.

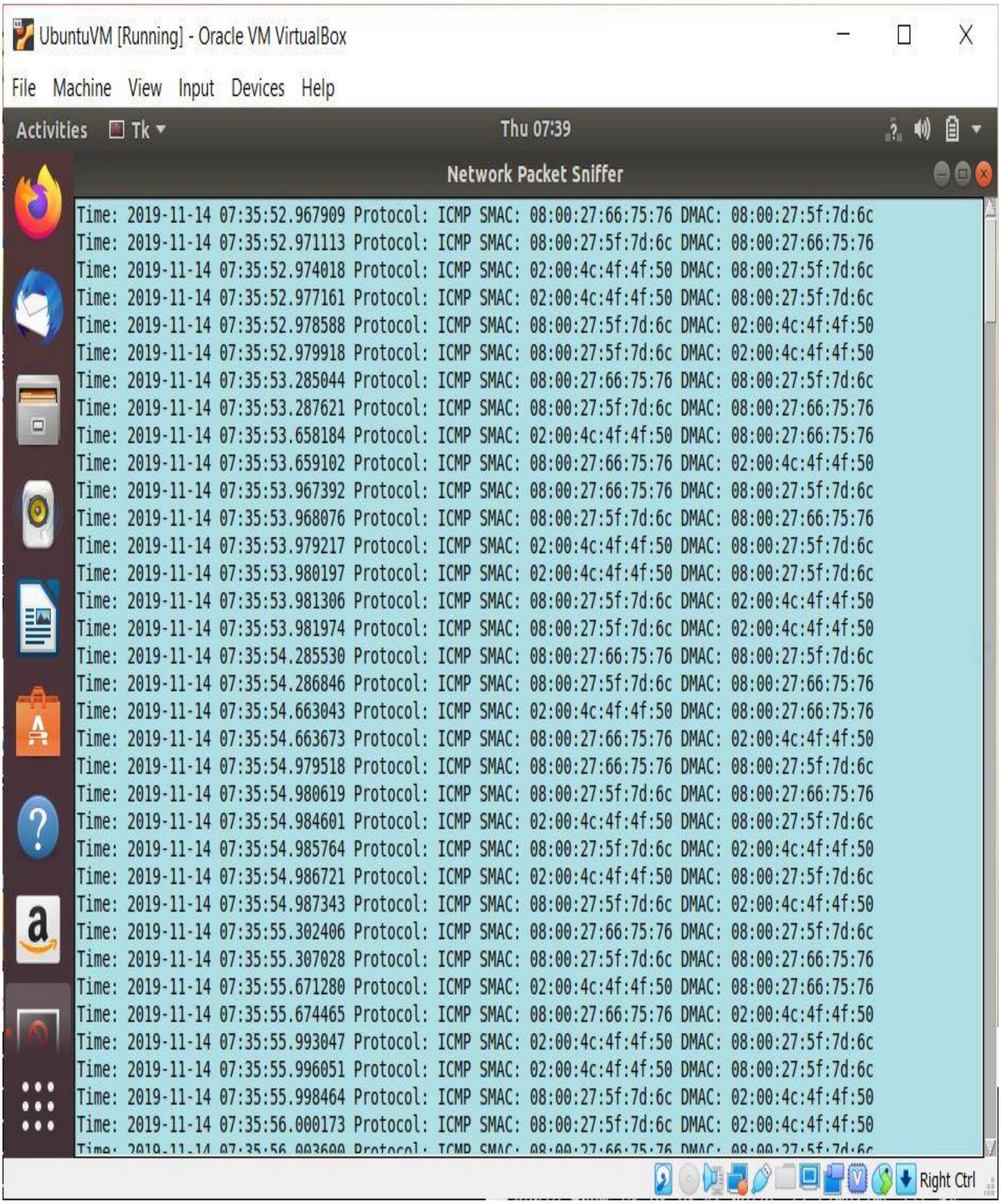
II. GUI(Graphical User Interface)

Displaying the log file in the GUI interface mode

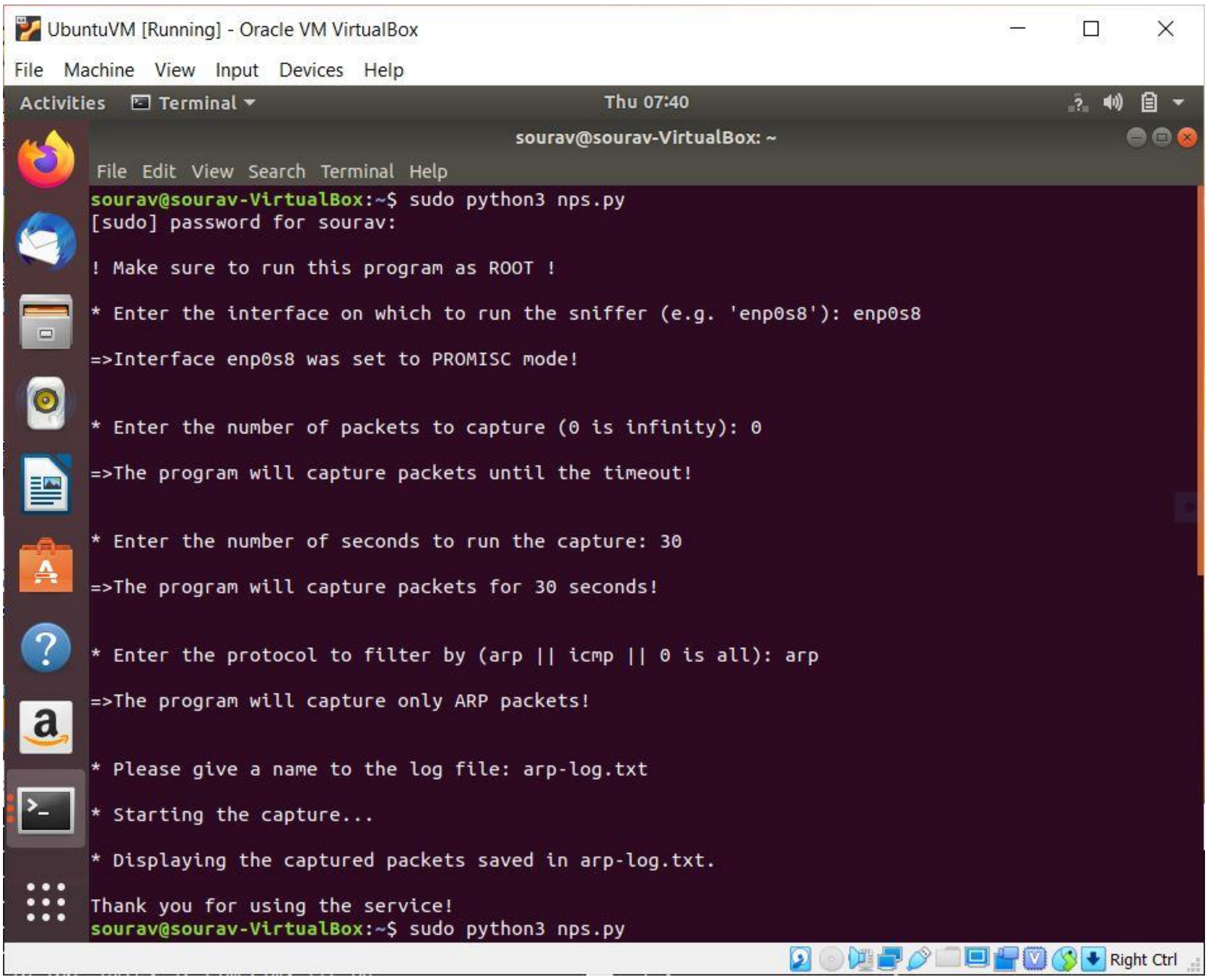
❖ Capturing ICMP protocol packets



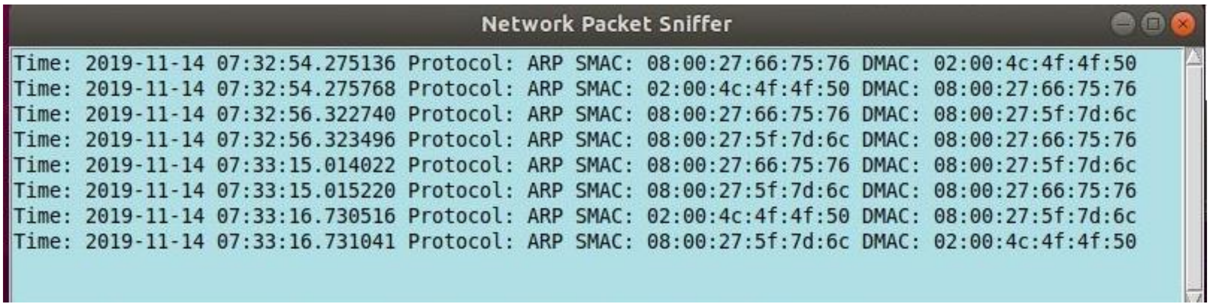
❖ Output for captured ICMP protocol packets



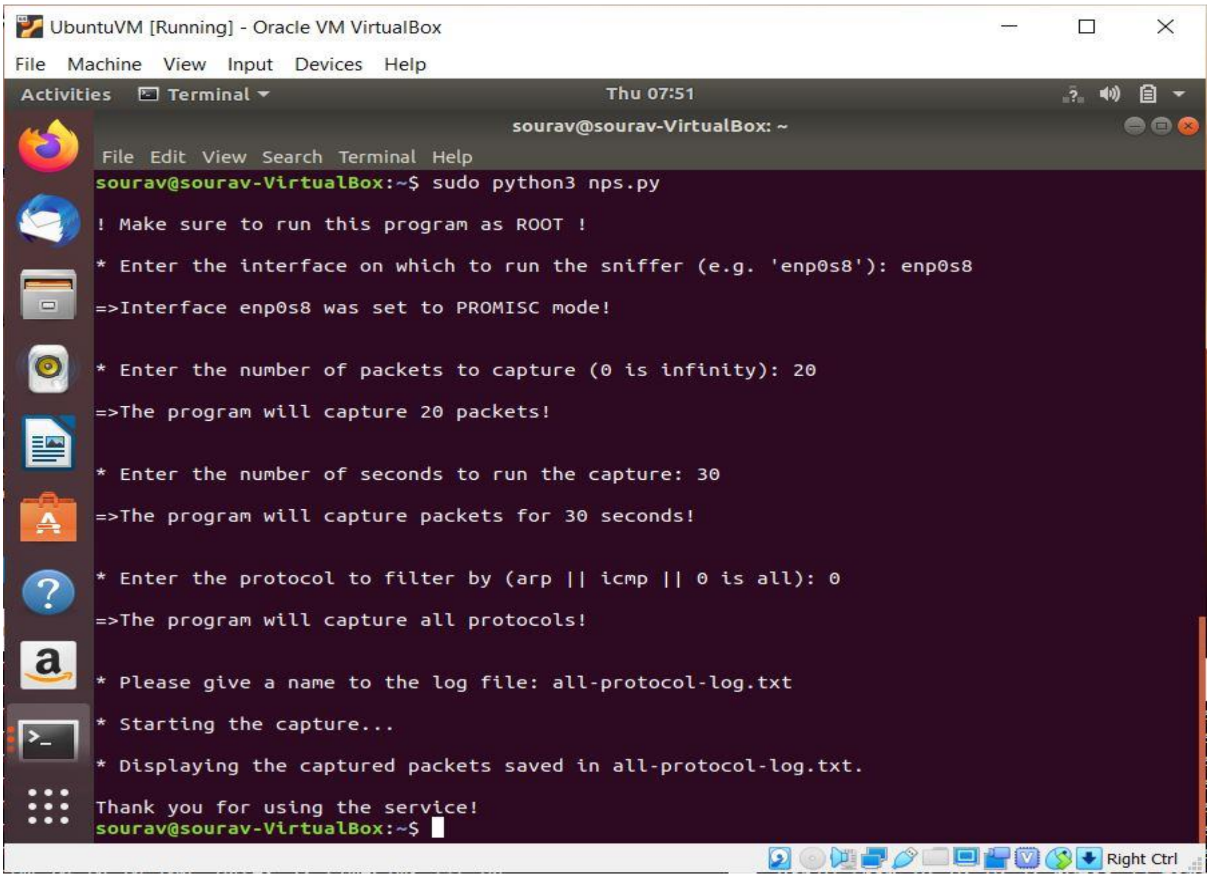
❖ Capturing ARP protocol packets



❖ Output for captured ARP protocol packets



❖ Capturing All protocol packets



❖ Output for captured All protocol packets