EXPERIMENT 6 - IMPLEMENTATION OF PACKET SNIFFING USING RAW SOCKETS IN PYTHON

Introduction:

Packet sniffing reads raw network packets from your NIC so you can see headers (Ethernet/IP/TCP/UDP) and a bit of payload. This simple experiment uses Linux raw sockets to capture and print a brief summary for each IPv4 packet.

Aim: Write a minimal Python program that captures packets using a raw socket and prints source/destination IP, protocol, ports (if TCP/UDP) and a short hex dump of the payload.

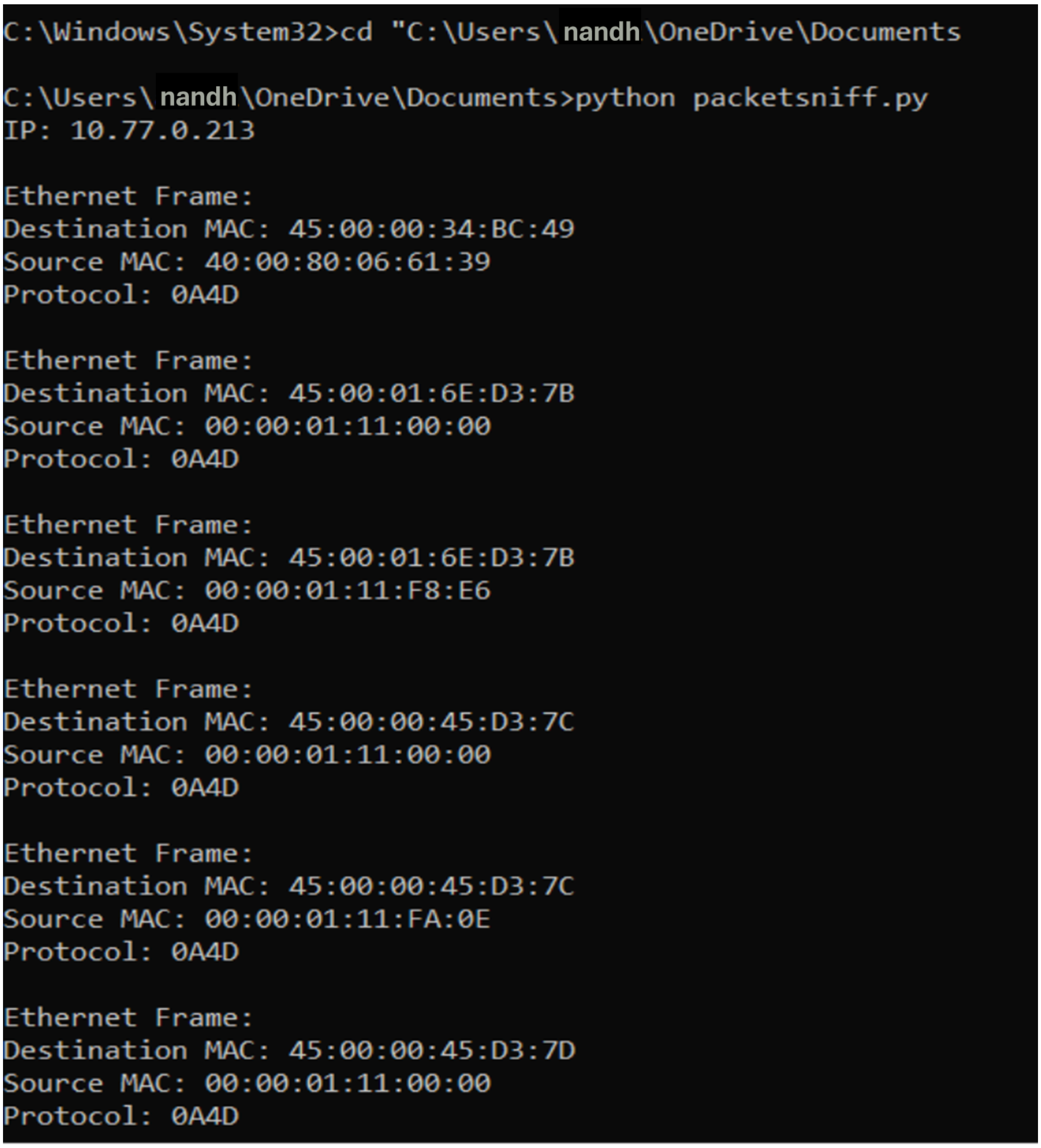
Algorithm :

1. Open a raw AF_PACKET socket (capture all EtherTypes).
2. Loop: receive a packet.
3. Parse Ethernet header; if IPv4, parse IP header.
4. If TCP/UDP, parse ports. Print a one-line summary + short hex of payload.
5. Repeat until Ctrl+C.

Code:

```
import socket

import struct

import binascii

import textwrap

def main():

    # Get host

    host = socket.gethostbyname(socket.gethostname())

    print('IP: {}'.format(host))

    # Create a raw socket and bind it

    conn = socket.socket(socket.AF_INET, socket.SOCK_RAW, socket.IPPROTO_IP)

    conn.bind((host, 0))

    # Include IP headers
    conn.setsockopt(socket.IPPROTO_IP, socket.IP_HDRINCL, 1)
    # Enable promiscuous mode
    conn.ioctl(socket.SIO_RCVALL, socket.RCVALL_ON)
    while True:
        # Recive data
        raw_data, addr = conn.recvfrom(65536)
        # Unpack data
        dest_mac, src_mac, eth_proto, data = ethernet_frame(raw_data)
        print('\nEthernet Frame:')
        print("Destination MAC: {}".format(dest_mac))
        print("Source MAC: {}".format(src_mac))
        print("Protocol: {}".format(eth_proto))
# Unpack ethernet frame
def ethernet_frame(data):
    dest_mac, src_mac, proto = struct.unpack('!6s6s2s', data[:14])
    return get_mac_addr(dest_mac), get_mac_addr(src_mac), get_protocol(proto), data[14:]
# Return formatted MAC address AA:BB:CC:DD:EE:FF
def get_mac_addr(bytes_addr):
    bytes_str = map('{:02x}'.format, bytes_addr)
    mac_address = ':'.join(bytes_str).upper()
    return mac_address
# Return formatted protocol ABCD
def get_protocol(bytes_proto):
    bytes_str = map('{:02x}'.format, bytes_proto)
    protocol = ''.join(bytes_str).upper()
    return protocol
main()
```

Output:



```
C:\Windows\System32>cd "C:\Users\nandh\OneDrive\Documents

C:\Users\nandh\OneDrive\Documents>python packetsniff.py
IP: 10.77.0.213

Ethernet Frame:
Destination MAC: 45:00:00:34:BC:49
Source MAC: 40:00:80:06:61:39
Protocol: 0A4D

Ethernet Frame:
Destination MAC: 45:00:01:6E:D3:7B
Source MAC: 00:00:01:11:00:00
Protocol: 0A4D

Ethernet Frame:
Destination MAC: 45:00:01:6E:D3:7B
Source MAC: 00:00:01:11:F8:E6
Protocol: 0A4D

Ethernet Frame:
Destination MAC: 45:00:00:45:D3:7C
Source MAC: 00:00:01:11:00:00
Protocol: 0A4D

Ethernet Frame:
Destination MAC: 45:00:00:45:D3:7C
Source MAC: 00:00:01:11:FA:0E
Protocol: 0A4D

Ethernet Frame:
Destination MAC: 45:00:00:45:D3:7D
Source MAC: 00:00:01:11:00:00
Protocol: 0A4D
```

Result:

The Python program for packet sniffing using raw sockets was executed successfully.
It captured live network packets and displayed the source IP, destination IP, protocol type, port numbers, and part of the data in hexadecimal form.