BASIC NETWORK SNIFFER

Title: Building a Python Packet Sniffer to Capture and Analyze Network Traffic

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Task Objective

To build a Python program that captures network traffic packets, analyzes them to understand their structure and content, and displays useful information such as:

- Source IP
- Destination IP
- Protocol (TCP/UDP/ICMP)
- Payload data

Tools and Technologies Used

- **Operating System:** Kali Linux
- **Programming Language:** Python 3
- **Libraries Used:** `scapy`
- **Terminal:** Kali Terminal
- **Environment:** Python Virtual Environment (`venv`)

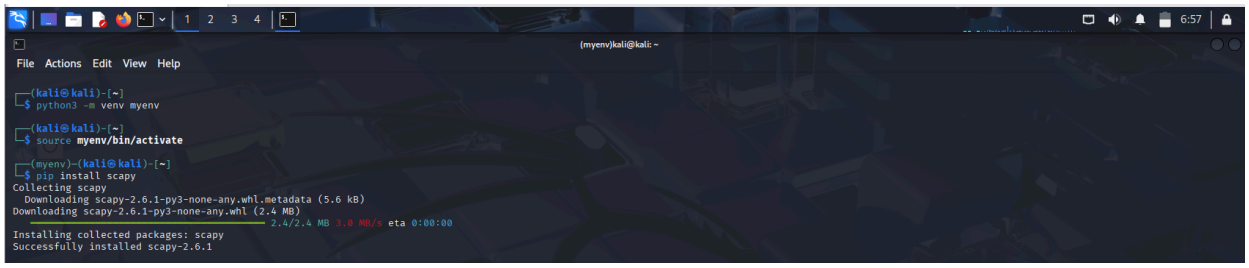
Step-by-Step Implementation

Step 1: Create a Virtual Environment

```
python3 -m venv myenv
```

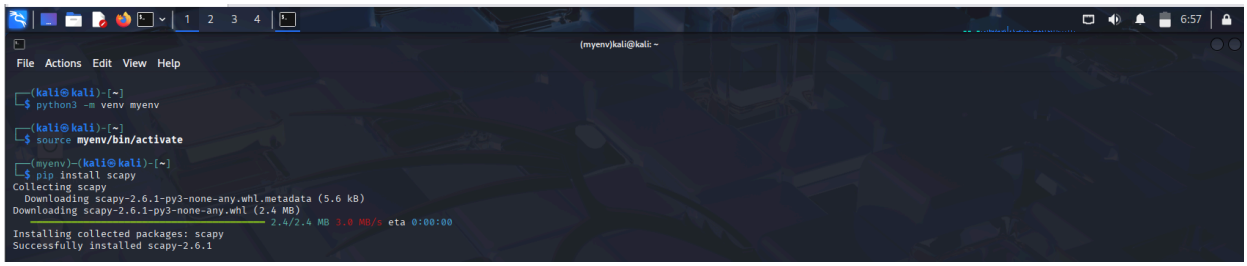
Activate it:

```
source myenv/bin/activate
```



Step 2: Install Scapy Library Inside the Virtual Environment

```
pip install scapy
```



Step 3: Create the Packet Sniffer Script

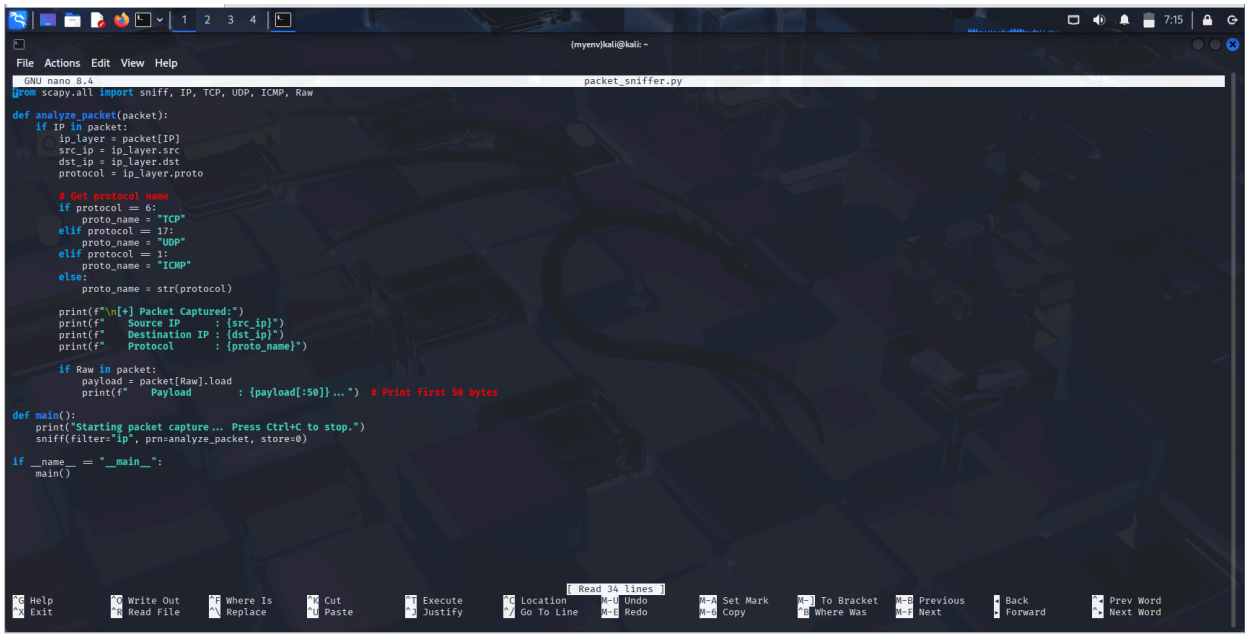
Create a Python file:

```
nano packet_sniffer.py
```

Paste the following code:

```
from scapy.all import sniff, IP, TCP, UDP, ICMP, Raw

def analyze_packet(packet):
    if IP in packet:
        ip_layer = packet[IP]
        src_ip = ip_layer.src
```

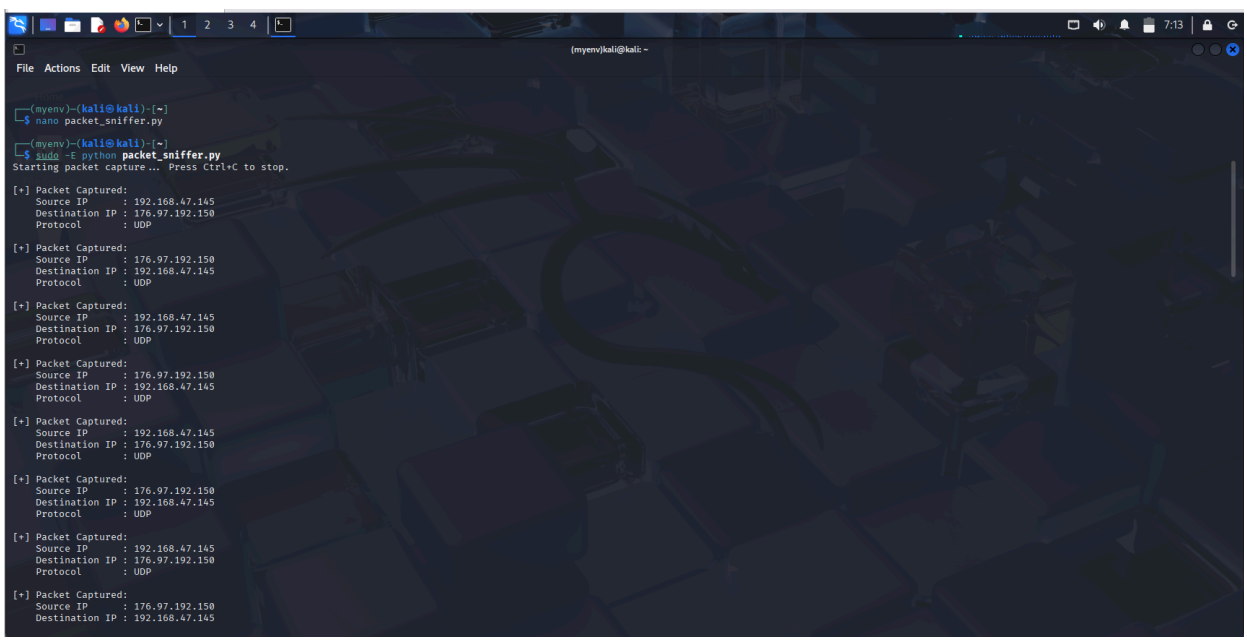
```
        dst_ip = ip_layer.dst
        protocol = ip_layer.proto

        if protocol == 6:
            proto_name = "TCP"
        elif protocol == 17:
            proto_name = "UDP"
        elif protocol == 1:
            proto_name = "ICMP"
        else:
            proto_name = str(protocol)

        print(f"\n[+] Packet Captured:")
        print(f"    Source IP      : {src_ip}")
        print(f"    Destination IP : {dst_ip}")
        print(f"    Protocol       : {proto_name}")

        if Raw in packet:
            payload = packet[Raw].load
            print(f"    Payload        : {payload[:50]}...")

def main():
    print("Starting packet capture... Press Ctrl+C to stop.")
    sniff(filter="ip", prn=analyze_packet, store=0)

if __name__ == "__main__":
    main()
```



Step 4: Run the Script with Root Privileges

Use this command:

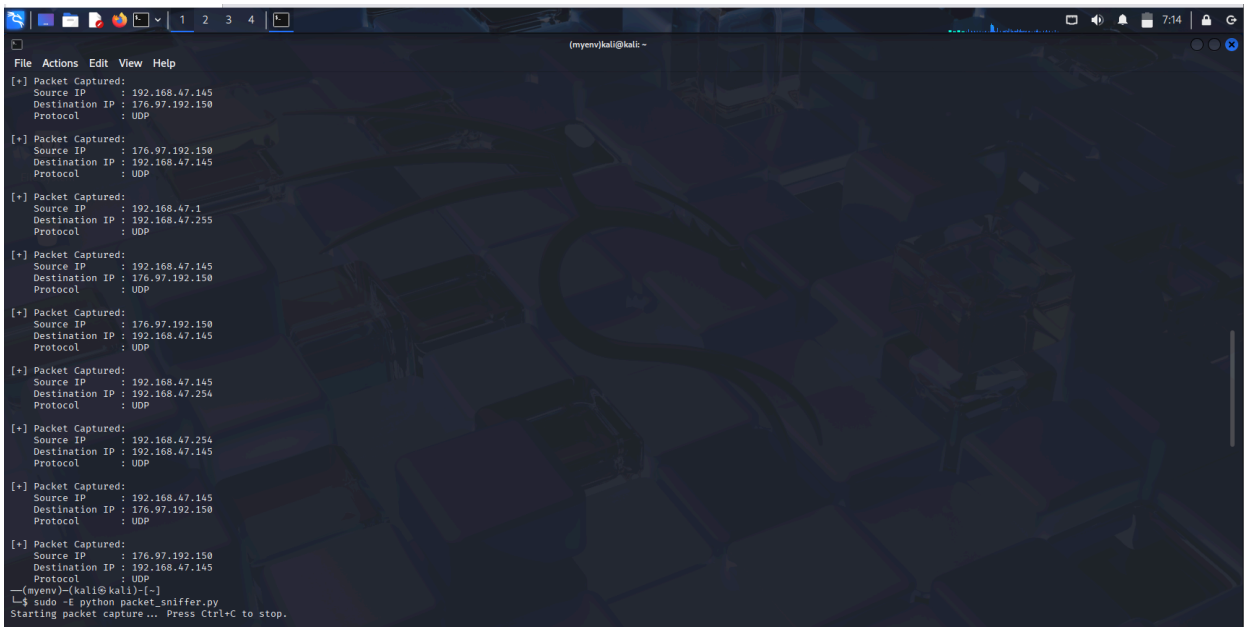
```
sudo -E python packet_sniffer.py
```



Step 5: Stop the Capture

When enough packets are captured, stop the program using:

```
Ctrl + C
```



Summary of What I Learned

- **Scapy Usage:** How to use Scapy to sniff and analyze real-time network packets.
- **Protocols:**
  - **TCP** ensures reliable delivery of data.
  - **UDP** sends fast but doesn't guarantee delivery.
  - **ICMP** helps with network diagnostics (e.g., ping).
- **Data Flow:** Data flows through packets that have headers (with source/destination info) and payload (the actual content).
- **Packet Analysis:** I learned how to extract and print data from raw packet headers and payloads.