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SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CSE3502 – INFORMATION SECURITY MANAGEMENT

LAB ASSESSMENT - 4

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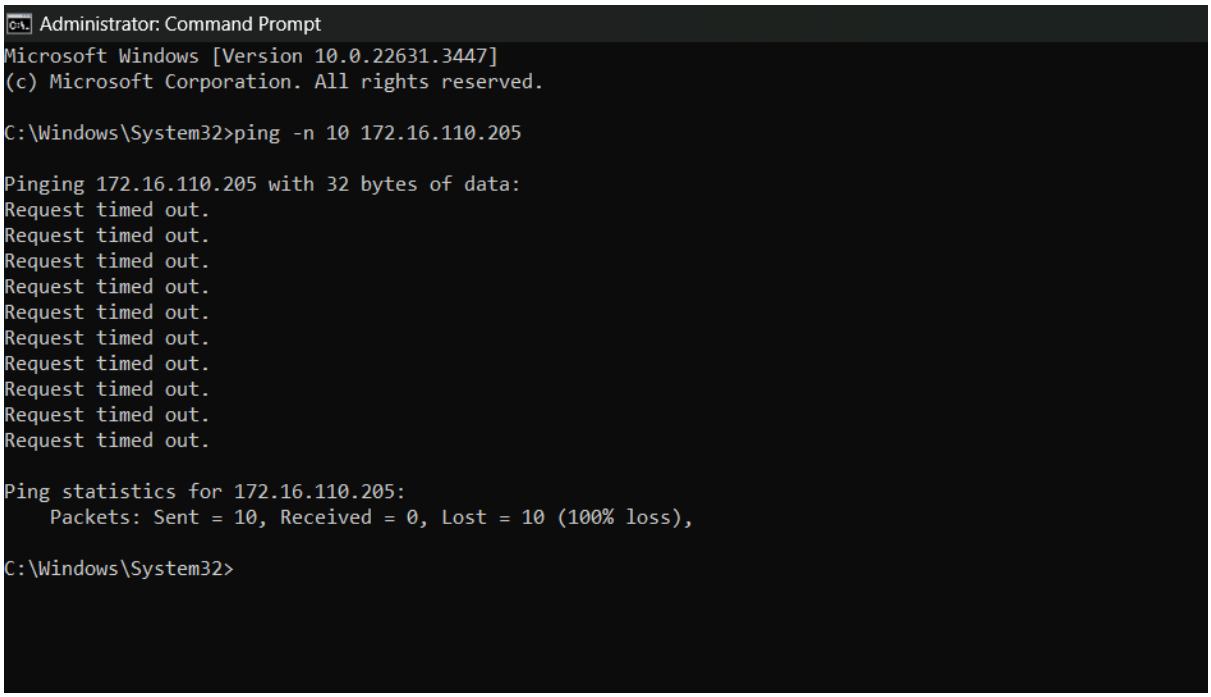
SLOT : L9+L10

1) Create different scenarios to troubleshoot internal and external attacks by correlating commands and wireshark.

These occur when the threat originates from outside the organization's network or infrastructure. External attacks are typically perpetrated by individuals or entities who do not have authorized access to the organization's systems. External attackers may attempt to breach the organization's defenses through various means, such as exploiting software vulnerabilities, launching phishing attacks, conducting distributed denial-of-service (DDoS) attacks, or infiltrating the network through social engineering tactics.

This involves simulating an external attack by flooding a laptop with ICMP packets. The attacker is my friend using his laptop, continuously pings the target (Me) laptop's IP address, causing network congestion and potential disruption. The objective is to understand the impact of ICMP flooding on network performance and security.

“ping -n 10 172.16.110.205”

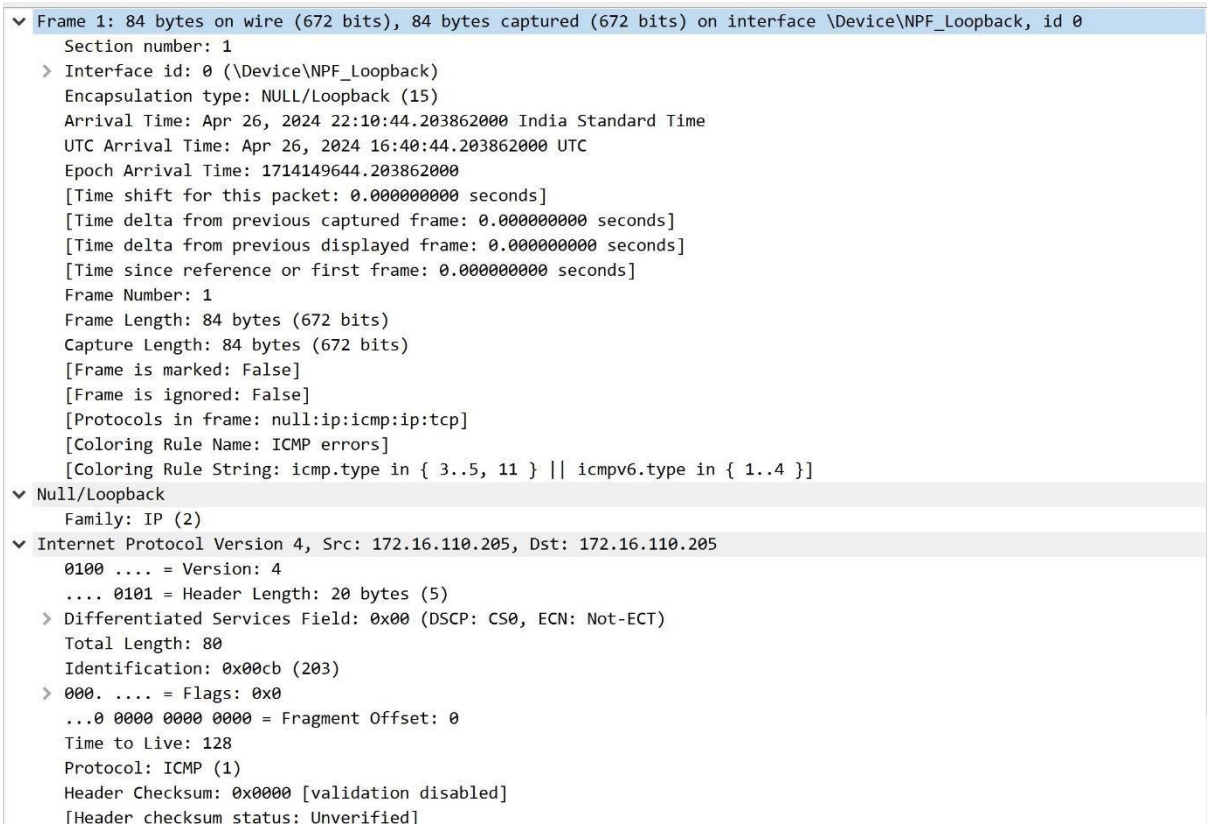


No.	Time	Source	Destination	Protocol	Length	Info
6	2.992369	172.16.110.205	172.16.110.205	ICMP	84	Destination unreachable (Host unreachable)
7	7.005852	172.16.110.205	172.16.110.205	ICMP	84	Destination unreachable (Host unreachable)
8	14.865465	::1	::1	TCP	65	64263 → 8889 [ACK] Seq=1 Ack=1 Win=10141 Len=1
9	14.865490	::1	::1	TCP	76	8889 → 64263 [ACK] Seq=1 Ack=2 Win=10179 Len=0 SLE=1 SRE=
10	14.998779	172.16.110.205	172.16.110.205	ICMP	84	Destination unreachable (Host unreachable)
11	21.319123	::1	::1	TCP	65	64307 → 8889 [ACK] Seq=1 Ack=1 Win=10224 Len=1
12	21.319144	::1	::1	TCP	76	8889 → 64307 [ACK] Seq=1 Ack=2 Win=10230 Len=0 SLE=1 SRE=
13	30.030128	::1	::1	TCP	66	8889 → 64142 [PSH, ACK] Seq=3 Ack=7 Win=10052 Len=2
14	30.030167	::1	::1	TCP	64	64142 → 8889 [ACK] Seq=7 Ack=5 Win=10139 Len=0
15	30.030285	::1	::1	TCP	70	64142 → 8889 [PSH, ACK] Seq=7 Ack=5 Win=10139 Len=6
16	30.030320	::1	::1	TCP	64	8889 → 64142 [ACK] Seq=5 Ack=13 Win=10052 Len=0
17	34.848249	::1	::1	TCP	65	64262 → 8889 [ACK] Seq=1 Ack=1 Win=10191 Len=1
18	34.848270	::1	::1	TCP	76	8889 → 64262 [ACK] Seq=1 Ack=2 Win=10192 Len=0 SLE=1 SRE=
19	36.640396	::1	::1	TCP	65	64008 → 8889 [ACK] Seq=1 Ack=1 Win=10029 Len=1
20	36.640424	::1	::1	TCP	76	8889 → 64008 [ACK] Seq=1 Ack=2 Win=10230 Len=0 SLE=1 SRE=

A packet with Response and reply received from the attacker is displayed below:

Certain packets had its TTL exceeded and couldn't reach.

Remaining packets couldn't get any response.



```
Frame 1: 84 bytes on wire (672 bits), 84 bytes captured (672 bits) on interface \Device\NPF_Loopback, id 0
    Section number: 1
  > Interface id: 0 (\Device\NPF_Loopback)
    Encapsulation type: NULL/Loopback (15)
    Arrival Time: Apr 26, 2024 22:10:44.203862000 India Standard Time
    UTC Arrival Time: Apr 26, 2024 16:40:44.203862000 UTC
    Epoch Arrival Time: 1714149644.203862000
    [Time shift for this packet: 0.000000000 seconds]
    [Time delta from previous captured frame: 0.000000000 seconds]
    [Time delta from previous displayed frame: 0.000000000 seconds]
    [Time since reference or first frame: 0.000000000 seconds]
    Frame Number: 1
    Frame Length: 84 bytes (672 bits)
    Capture Length: 84 bytes (672 bits)
    [Frame is marked: False]
    [Frame is ignored: False]
    [Protocols in frame: null:ip:icmp:ip:tcp]
    [Coloring Rule Name: ICMP errors]
    [Coloring Rule String: icmp.type in { 3..5, 11 } || icmpv6.type in { 1..4 }]
Null/Loopback
    Family: IP (2)
Internet Protocol Version 4, Src: 172.16.110.205, Dst: 172.16.110.205
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 80
    Identification: 0x00cb (203)
  > 000. .... = Flags: 0x0
    ...0 0000 0000 0000 = Fragment Offset: 0
    Time to Live: 128
    Protocol: ICMP (1)
    Header Checksum: 0x0000 [validation disabled]
    [Header checksum status: Unverified]
```

With this packet we can find who the attacker is along with his IP and device name as marked in the below image

We can also retrieve the user name of this attacker.

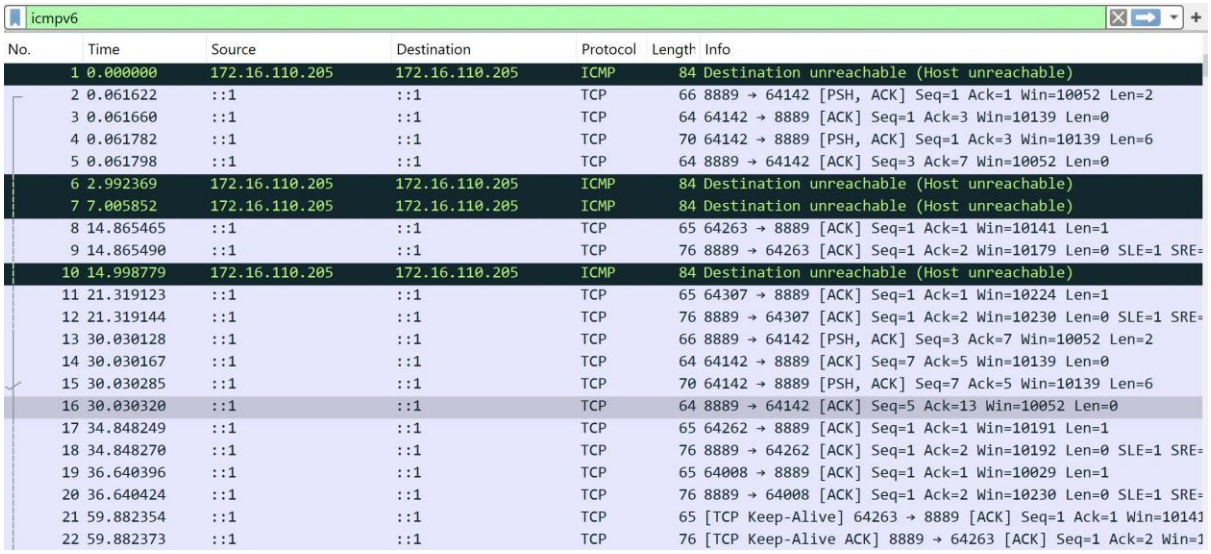
Neighbour Solicitation (NS):

1. NS messages are sent by an IPv6 node to request the link-layer address (MAC address) of another node on the same link.
2. NS messages are typically sent in two scenarios:

- When a node wants to resolve the link-layer address of a neighbor for which it has an IPv6 address.
- When a node performs Duplicate Address Detection (DAD) to check if its own IPv6 address is already in use on the network.

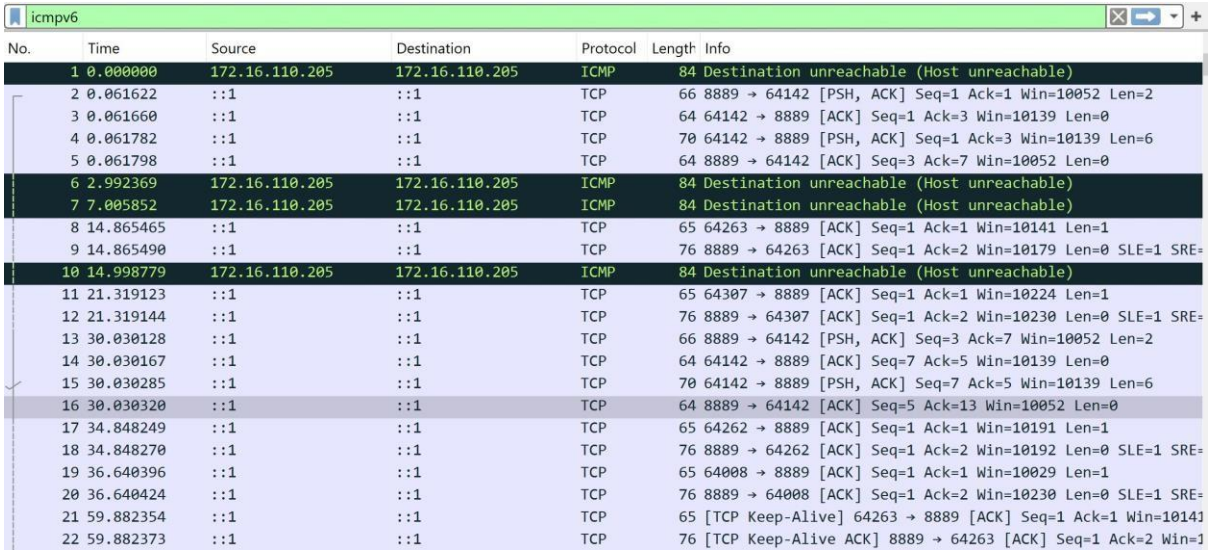
Neighbour Advertisement (NA):

1. NA messages are sent in response to NS messages to provide the link-layer address (MAC address) to the sender.

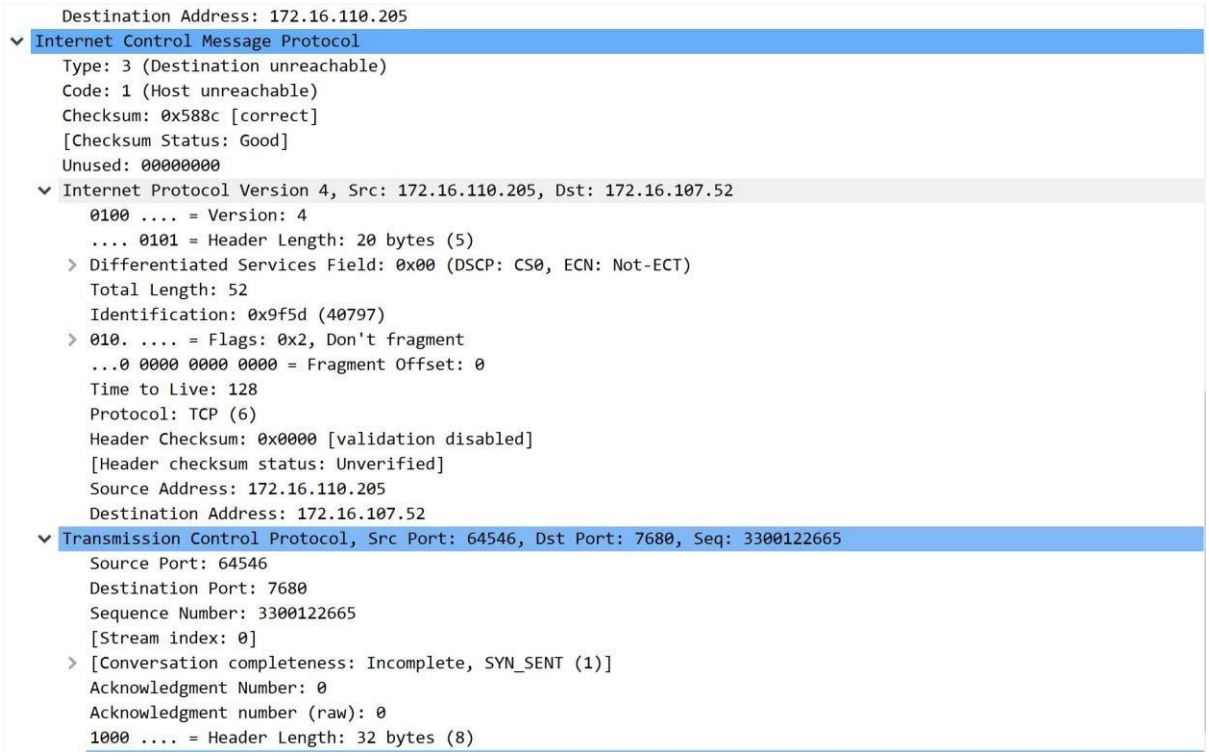


Internal Attacks:

Considering I work for the Google organisation. Internal attacks occur when the threat originates from within the organization's network or infrastructure. Internal attacks are typically carried out by insiders, such as employees, contractors, or partners who have authorized access to the organization's systems. Internal attackers may exploit vulnerabilities in the system, abuse their privileges, or engage in malicious activities for personal gain or other motives.



Use Wireshark's analysis features to pinpoint the source of the problem. Look for issues like misconfigurations, packet loss, network congestion, or protocol errors.



Finally, we will verify the effectiveness of the solutions by monitoring network traffic and ensuring that the problem no longer exists.