Firewall

Lab Report 5

Information Systems Security course (01TYM, 02KRQ)

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Packet filter

- Which authorisation policy is configured by default on your machine (on each of the three chains)?

```
└─# iptables -L -v -n
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
```

- Which chain (out from INPUT, FORWARD, and OUTPUT) do you have to modify to protect your machine from connections originating from the external users?
  - INPUT and FORWARD in order to have protection from external users

```
┌──(root㉿geo)-[/home/george]
└─# iptables -P INPUT DROP

┌──(root㉿geo)-[/home/george]
└─# iptables -L -v -n
Chain INPUT (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 300 packets, 55360 bytes)
 pkts bytes target     prot opt in     out     source               destination
```

- Write down the iptables command to modify the authorisation policy of Alice's host, so that to reject any traffic (hint: you need to modify the default policy for the INPUT chain from ACCEPT to DROP):
- Does Bob receive any responses (to the ping) from Alice's host?
  - No, he doesn't

```
┌──(elion-man㉿Elion-Man-on-Kali)-[~]
└─$ ping 172.22.17.139
PING 172.22.17.139 (172.22.17.139) 56(84) bytes of data.
^C
── 172.22.17.139 ping statistics ──
31 packets transmitted, 0 received, 100% packet loss, time 30701ms
```

- Can Bob connect to Alice's host via SSH and HTTP (with the browser)?
  - No, he doesn't. In both cases, Bob doesn't receive any response from Alice because Alice's firewall has the INPUT chain set to DROP, so it discards all requests from the external source.
- Check with nmap (running the above indicated nmap command on Bob's host) the status of the ports 22 and 80 on Alice's host. What is their status now?

```
└─# nmap -sT -Pn -n -p 80,22 -v 172.22.17.139
Starting Nmap 7.94 ( https://nmap.org ) at 2023-12-05 12:24 CET
Initiating Connect Scan at 12:24
Scanning 172.22.17.139 [2 ports]
Completed Connect Scan at 12:24, 3.00s elapsed (2 total ports)
Nmap scan report for 172.22.17.139
Host is up.

PORT   STATE    SERVICE
22/tcp filtered ssh
80/tcp filtered http

Read data files from: /usr/bin/../share/nmap
Nmap done: 1 IP address (1 host up) scanned in 3.04 seconds
```

- Write down the iptables command to add a rule to the authorisation policy on Alice's host (for the input traffic), so that to enable all ICMP traffic (for simplicity, we provide you some of the parameters of the command)
  - iptables -A INPUT -p icmp -j ACCEPT

```
┌──(root㉿geo)-[/var/www/html]
└─# iptables -L -v -n
Chain INPUT (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    6   504 ACCEPT     1    --  *      *       172.22.16.108        0.0.0.0/0

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 1292 packets, 547K bytes)
 pkts bytes target     prot opt in     out     source               destination
```

- Does Bob receive this time any response from Alice's host in response to the ping command?
  - Yes, now he does because Alice allows all the icmp packets in input.

```
┌──(elion-man㉿Elion-Man-on-Kali)-[~]
└─$ ping 172.22.17.139
PING 172.22.17.139 (172.22.17.139) 56(84) bytes of data.
64 bytes from 172.22.17.139: icmp_seq=1 ttl=64 time=7.40 ms
64 bytes from 172.22.17.139: icmp_seq=2 ttl=64 time=7.32 ms
64 bytes from 172.22.17.139: icmp_seq=3 ttl=64 time=5.06 ms
64 bytes from 172.22.17.139: icmp_seq=4 ttl=64 time=4.27 ms
64 bytes from 172.22.17.139: icmp_seq=5 ttl=64 time=17.3 ms
64 bytes from 172.22.17.139: icmp_seq=6 ttl=64 time=19.5 ms
64 bytes from 172.22.17.139: icmp_seq=7 ttl=64 time=30.6 ms
64 bytes from 172.22.17.139: icmp_seq=8 ttl=64 time=7.02 ms
^C
── 172.22.17.139 ping statistics ──
8 packets transmitted, 8 received, 0% packet loss, time 7013ms
rtt min/avg/max/mdev = 4.271/12.311/30.586/8.699 ms
```

- Next, on Alice's host, write down the iptables command to allow the TCP input traffic towards the port 80 (on Alice):
  - iptables -A INPUT -p tcp --dport 80 -j ACCEPT

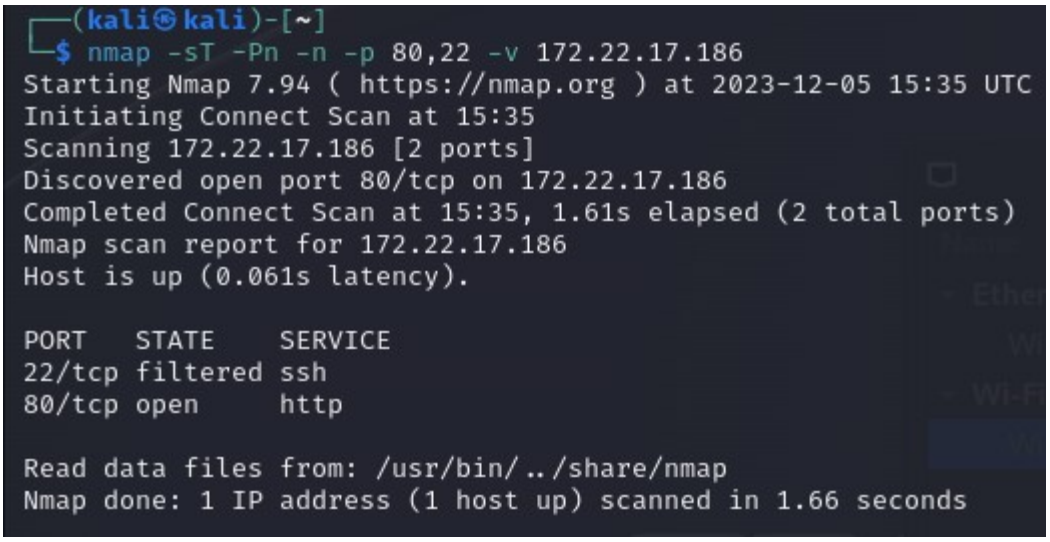
- Check out the configuration of IPtables on Alice's host. Which chain has been modified?
  - The chain modified is the INPUT chain as specified in the command

```
┌──(root㉿geo)-[/var/www/html]
└─# ./script_firewall.sh
Chain INPUT (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     1    --  *      *       0.0.0.0/0            0.0.0.0/0
    0     0 ACCEPT     6    --  *      *       0.0.0.0/0            0.0.0.0/0           tcp dpt:80

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 1544 packets, 609K bytes)
 pkts bytes target     prot opt in     out     source               destination
```

- Does Chuck receive any response (to the ping) from the Alice's host? Why?
  - Yes, Chuck receives ping responses from Alice because she doesn't drop the icmp requests (source is set to anyone)



- How can nmap distinguish between filtered ports and closed ports? Verify by analysing the traffic exchanged between the two machines (e.g. with wireshark).
  - Nmap distinguishes between these two states based on whether it receives a response to its probe. In the case of a closed port, it receives a TCP RST packet in response, whereas for a filtered port, it doesn't receive any packet.