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**.

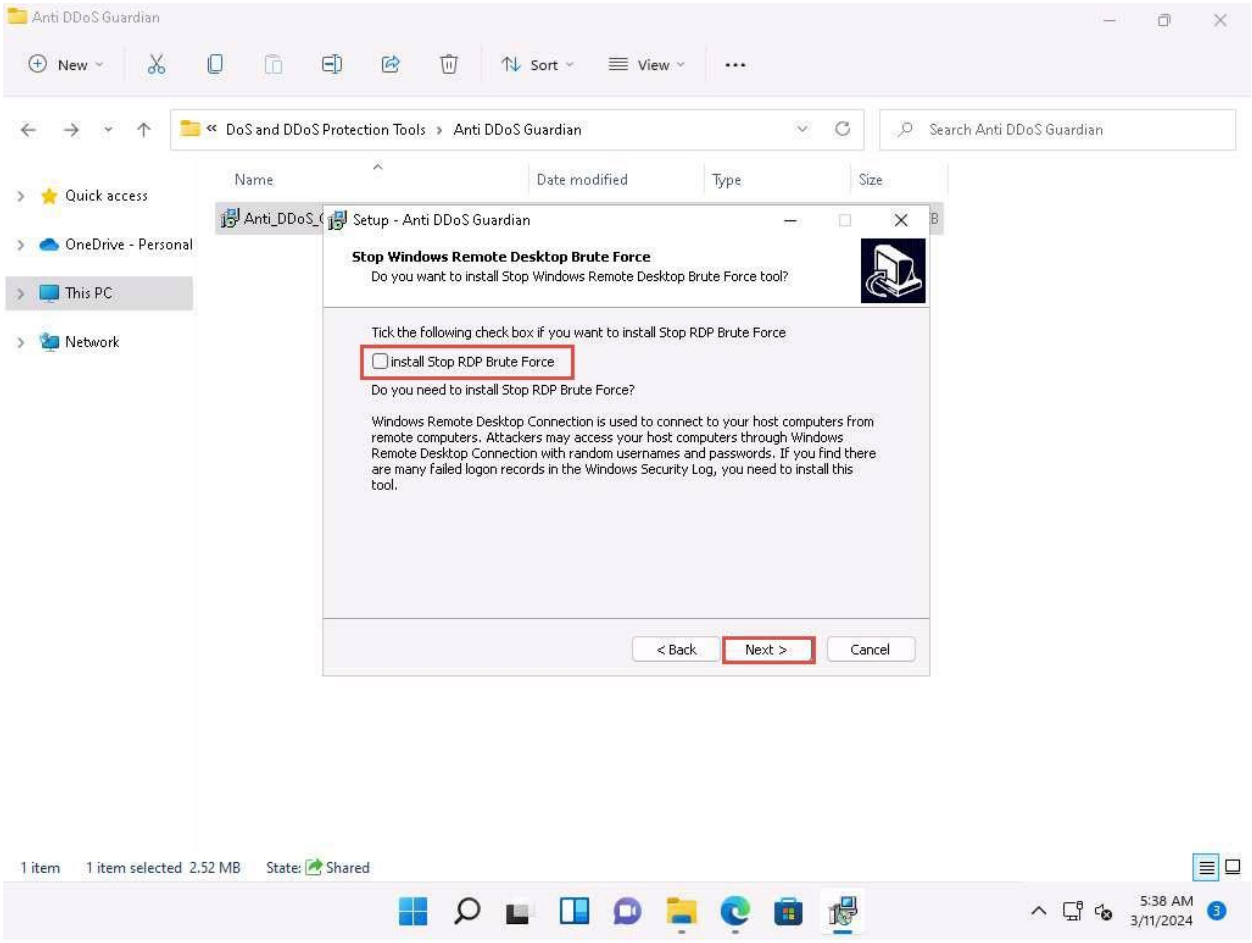
1. On the **Windows 11** machine, navigate to **E:\CEH-Tools\CEHv13 Module 10 Denial-of-Service\DoS and DDoS Protection Tools\Anti DDoS Guardian** and double-click **Anti_DDoS_Guardian_setup.exe.**

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.

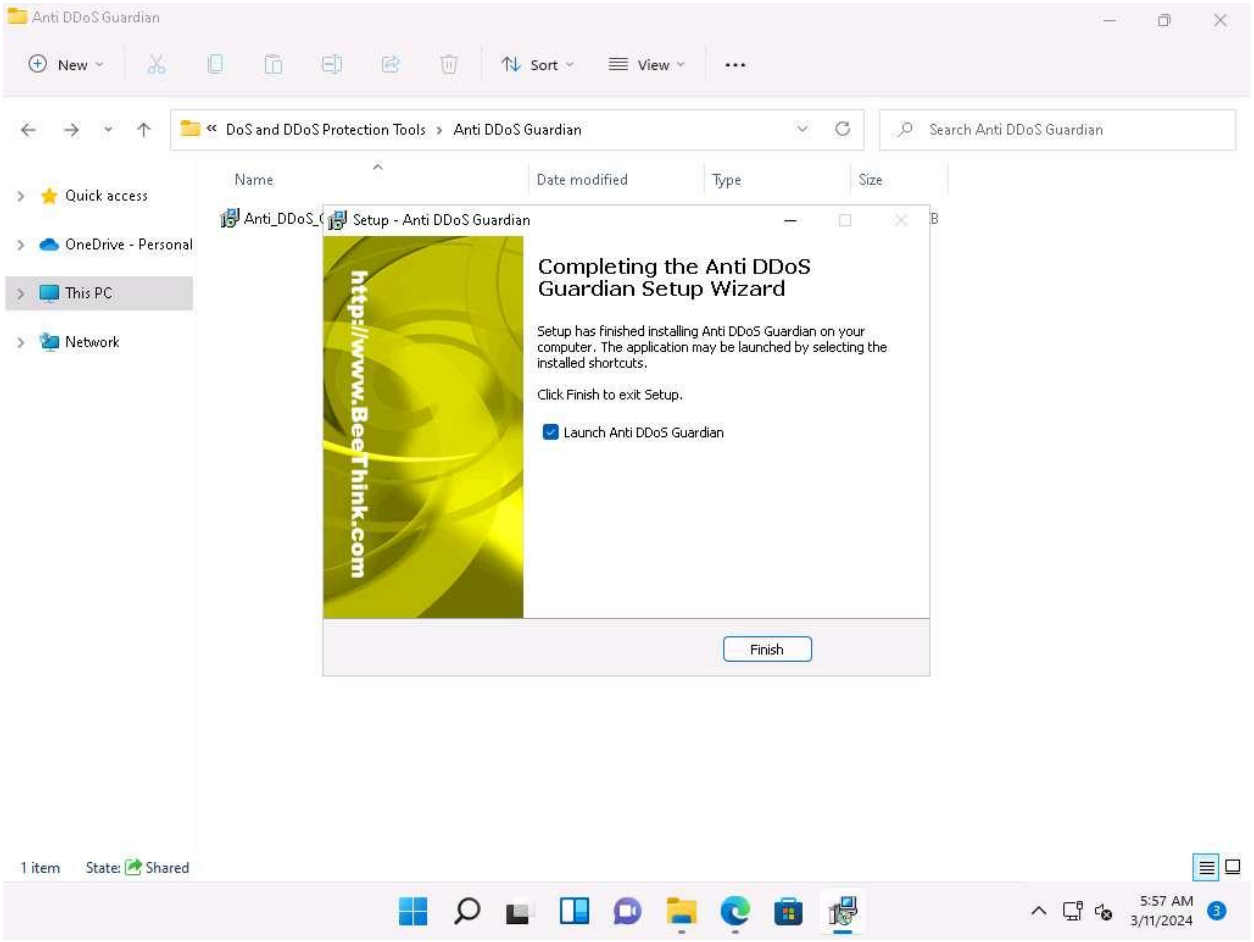
3. In the **Stop Windows Remote Desktop Brute Force** wizard, uncheck the **install Stop RDP Brute Force** option, and click **Next**.



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

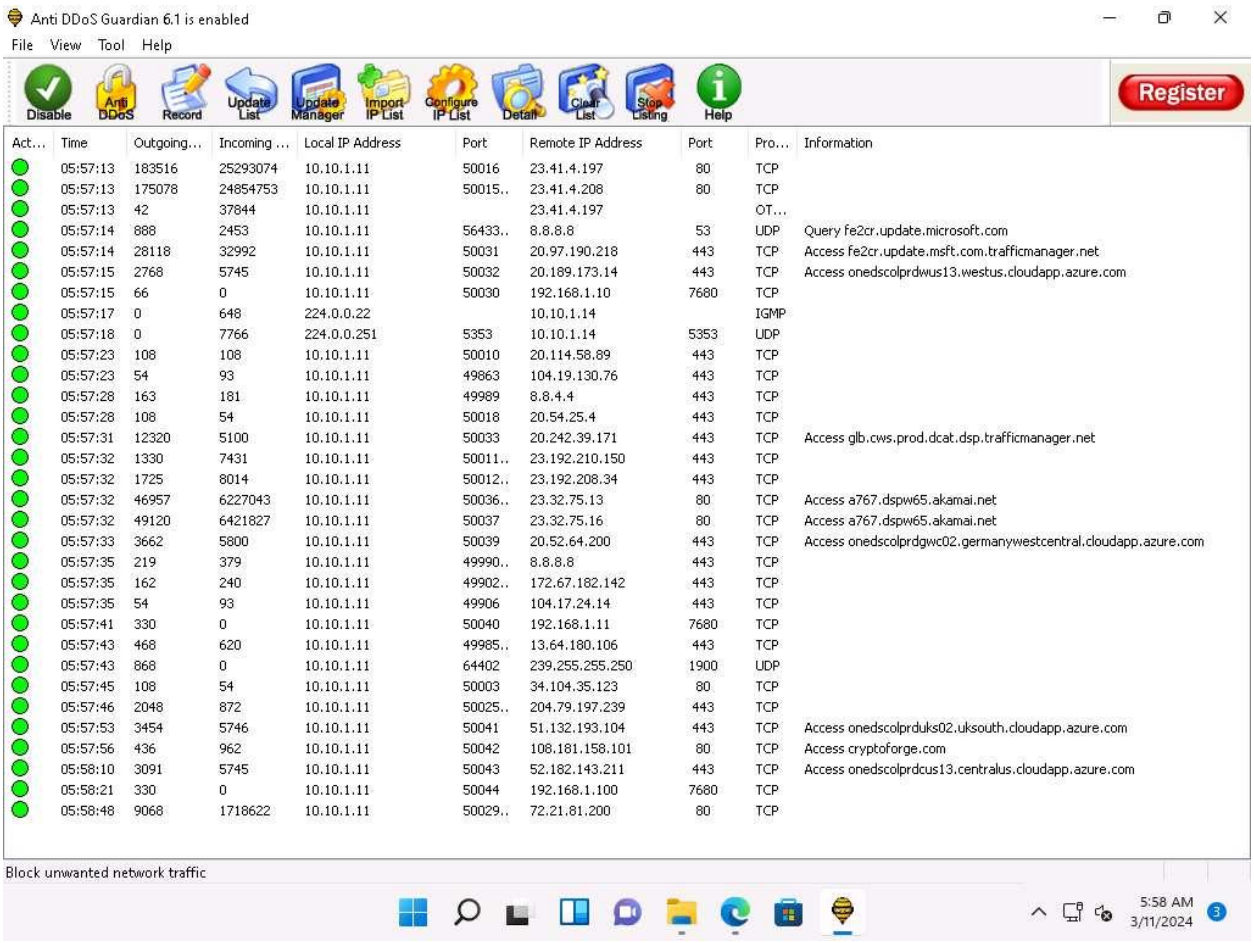
5. The **Ready to Install** wizard appears; click **Install**.

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**.

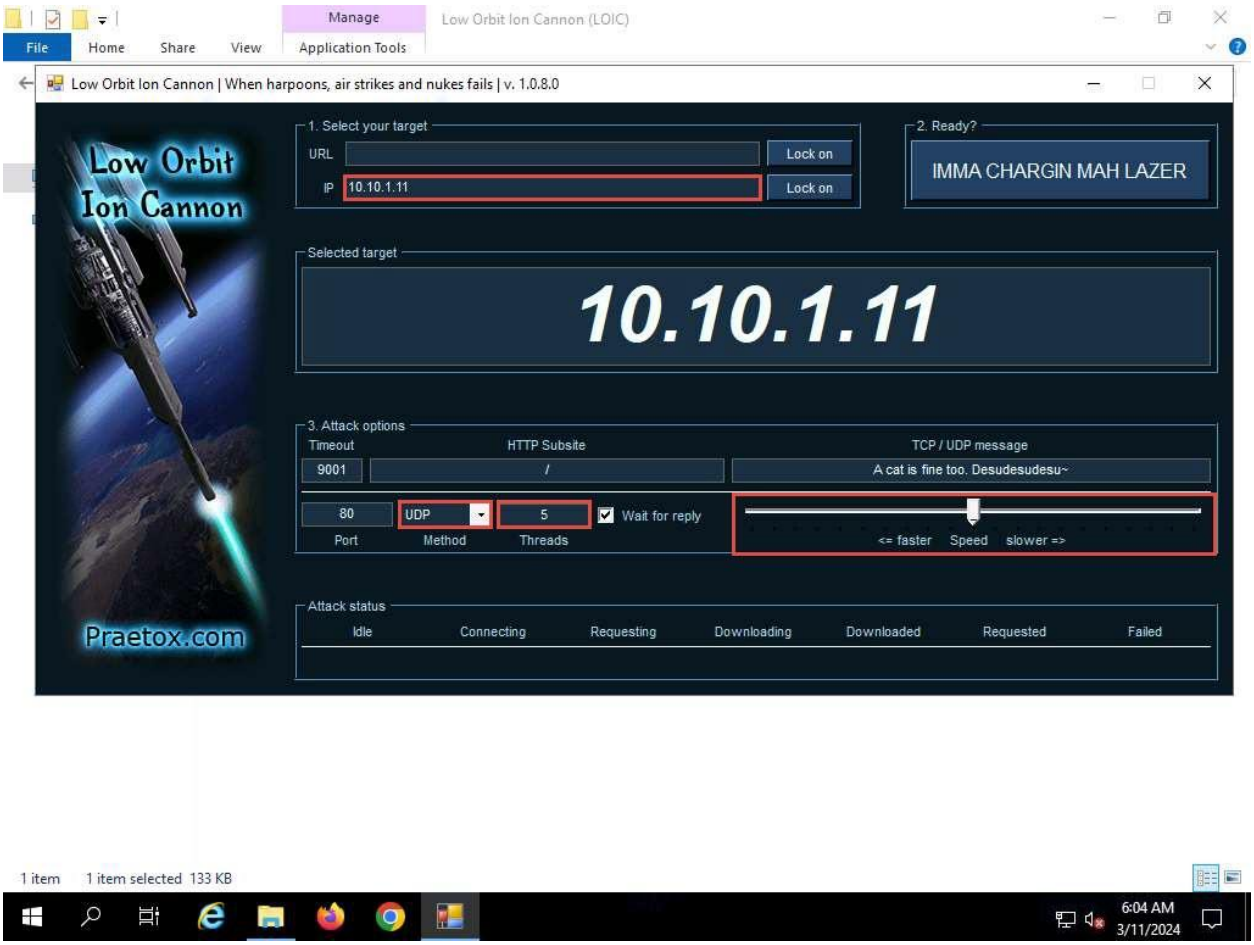
8. The **Anti DDoS Guardian** window appears, displaying information about incoming and outgoing traffic, as shown in the screenshot.



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**.

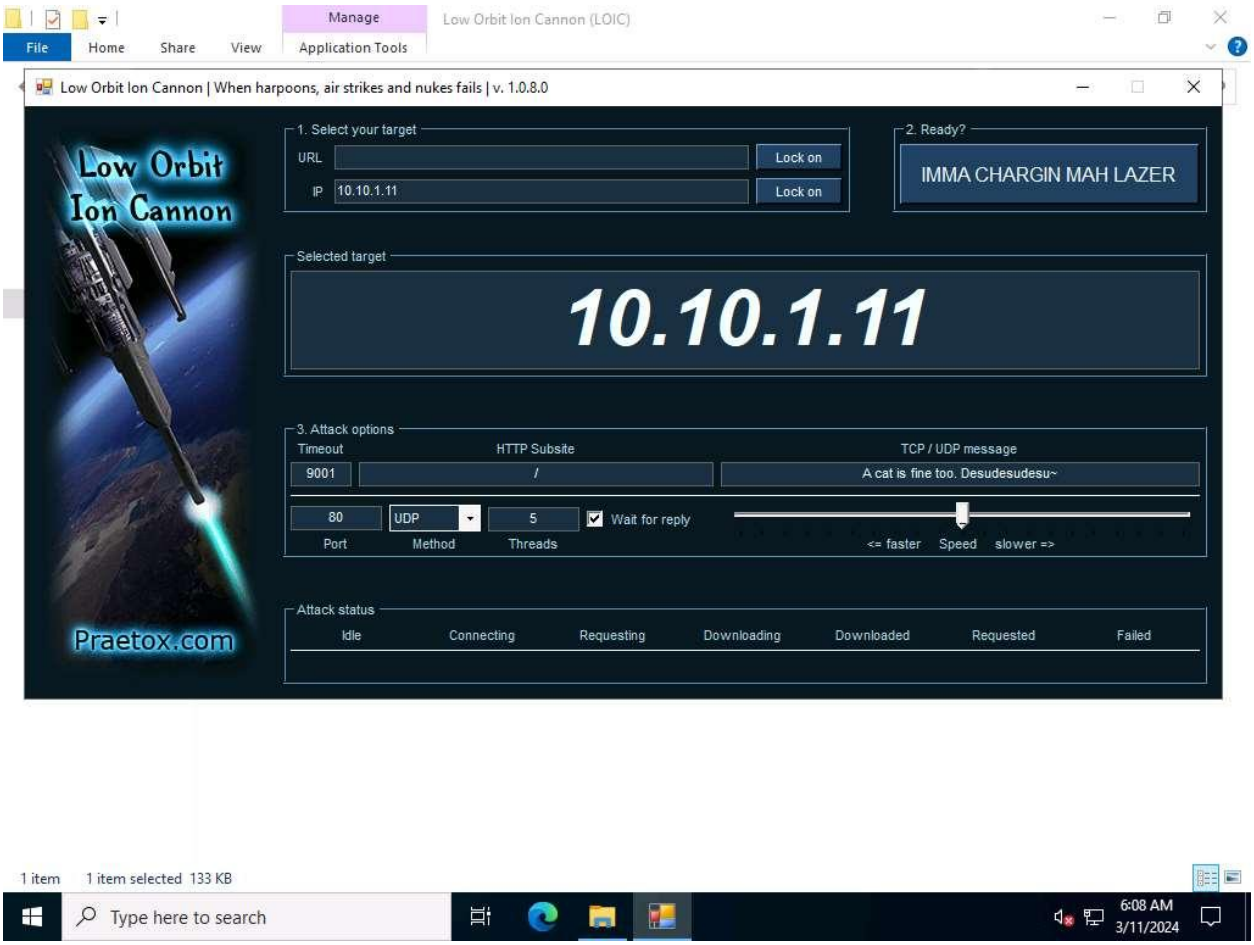
11. The **Low Orbit Ion Cannon** main window appears.
12. Perform the following settings:
    - Under the **Select your target** section, type the target IP address under the **IP** field (here, **10.10.1.11**), and then click the **Lock on** button to add the target devices.
    - Under the **Attack 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.



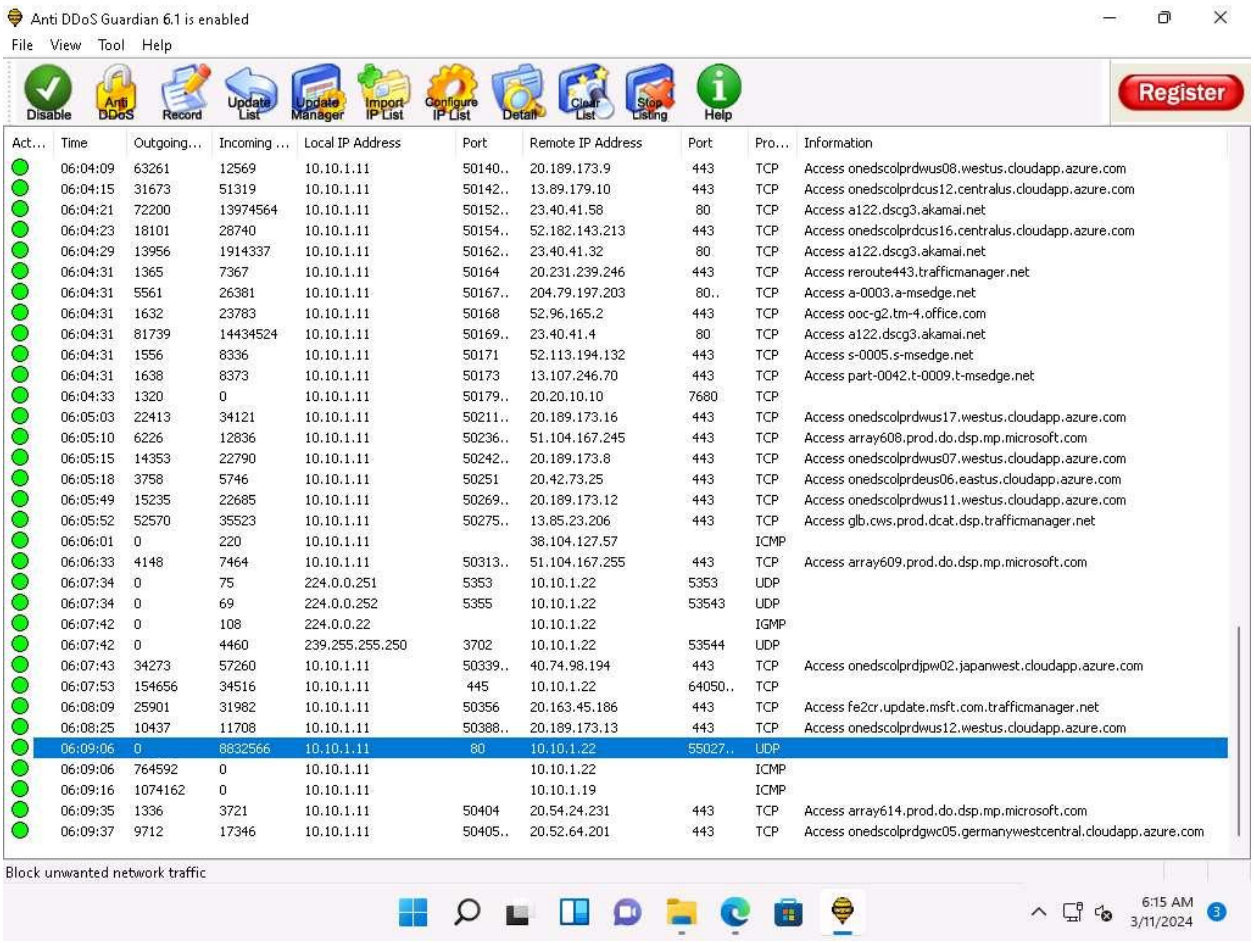
13. Now, switch to the **Windows Server 2022** machine and follow **Steps#10-12** to launch LOIC and configure it.

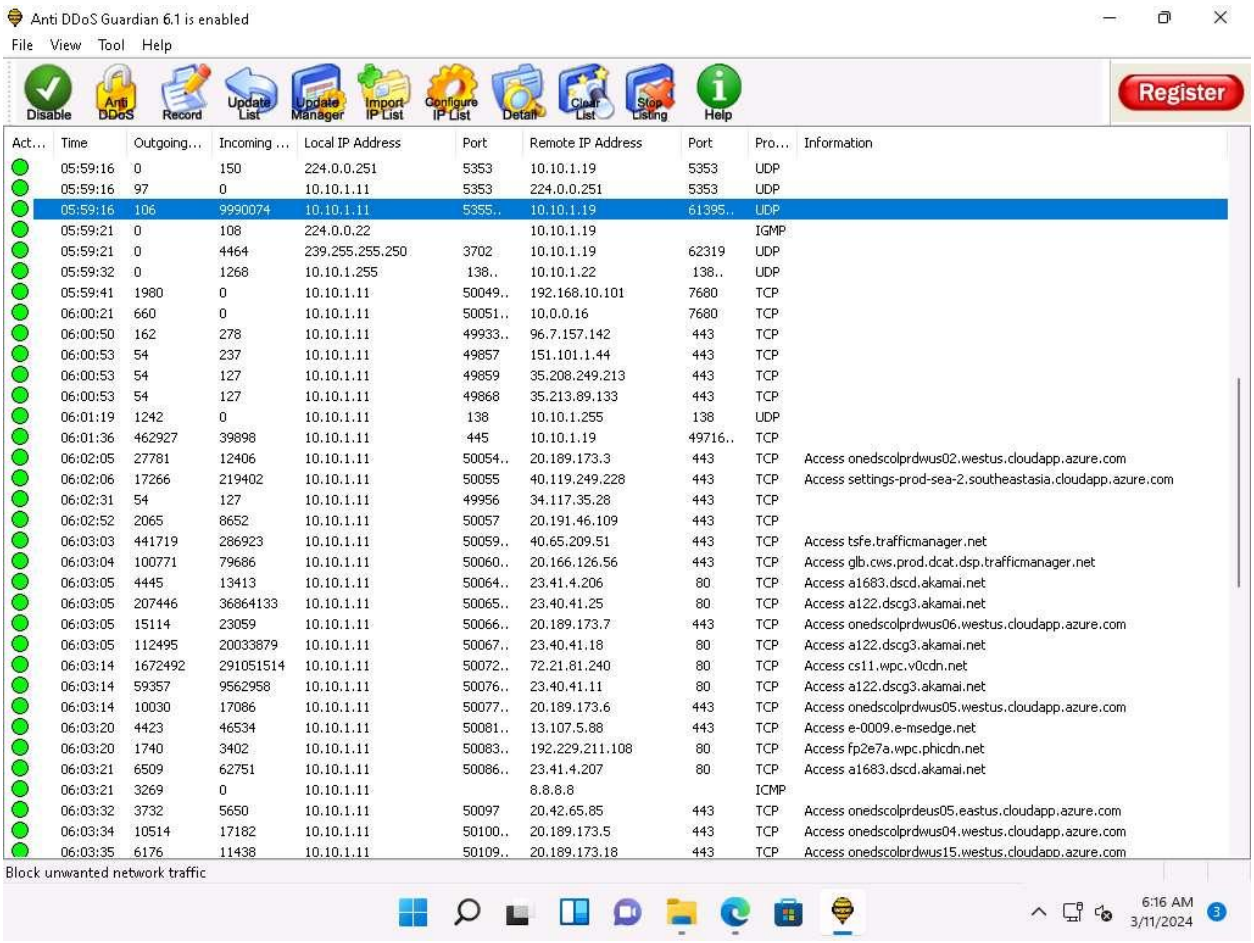
To switch to the **Windows Server 2022**, click Windows Server 2022.

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



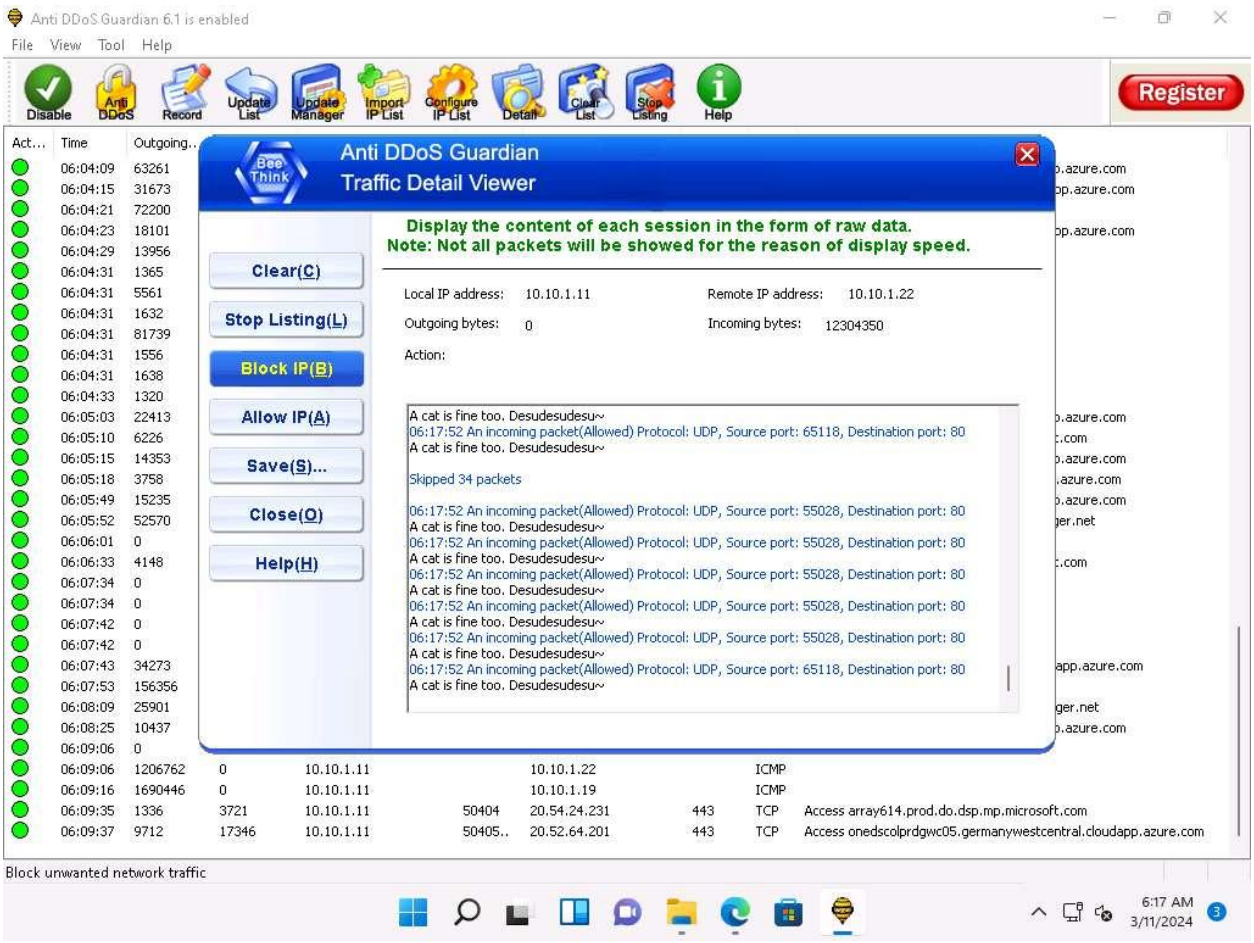
17. Double-click any of the sessions **10.10.1.19** or **10.10.1.22**.

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

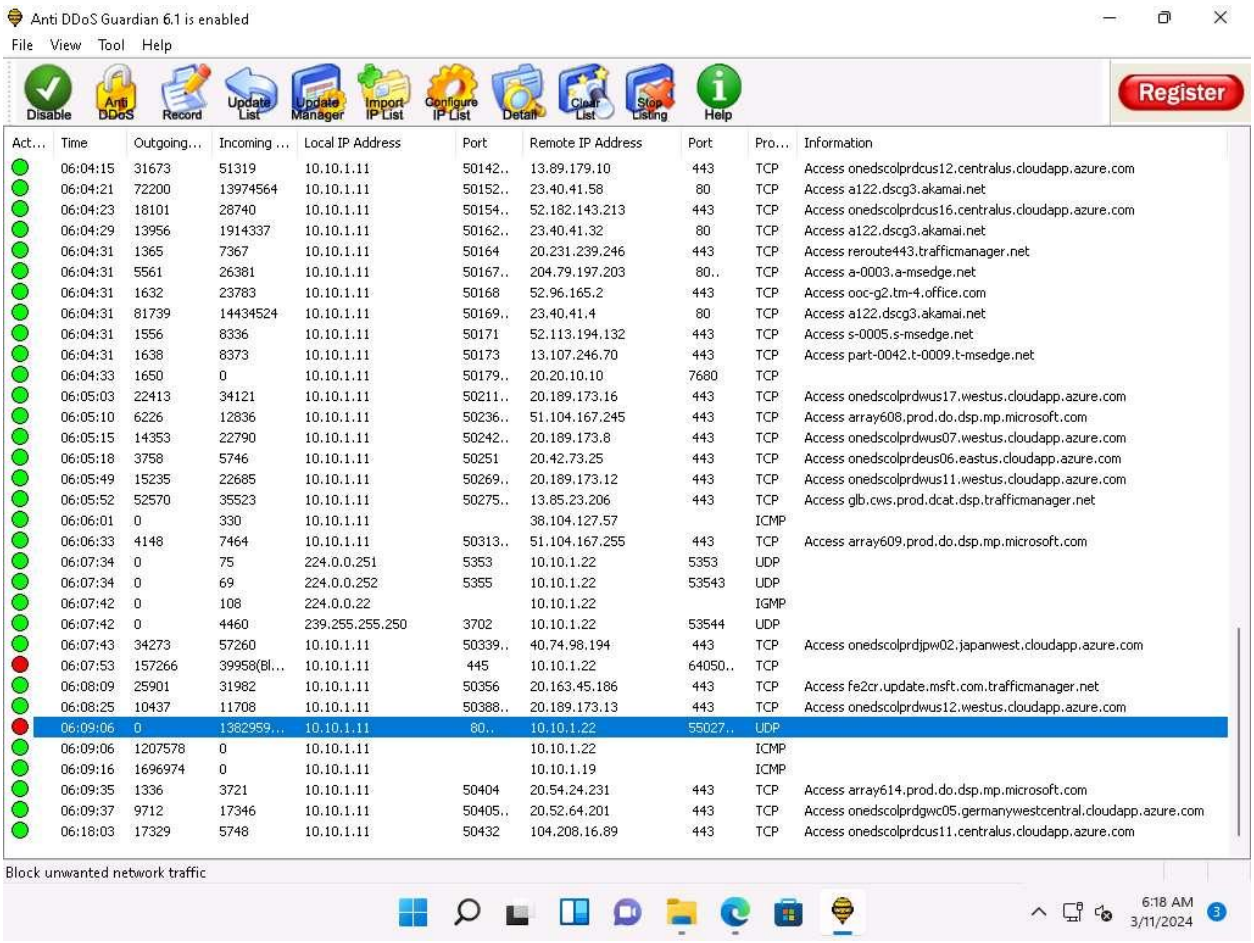
18. The **Anti DDoS Guardian Traffic Detail Viewer** window appears, displaying the content of the selected session in the form of raw data. You can observe the high number of incoming bytes from **Remote IP address 10.10.1.22**.

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.



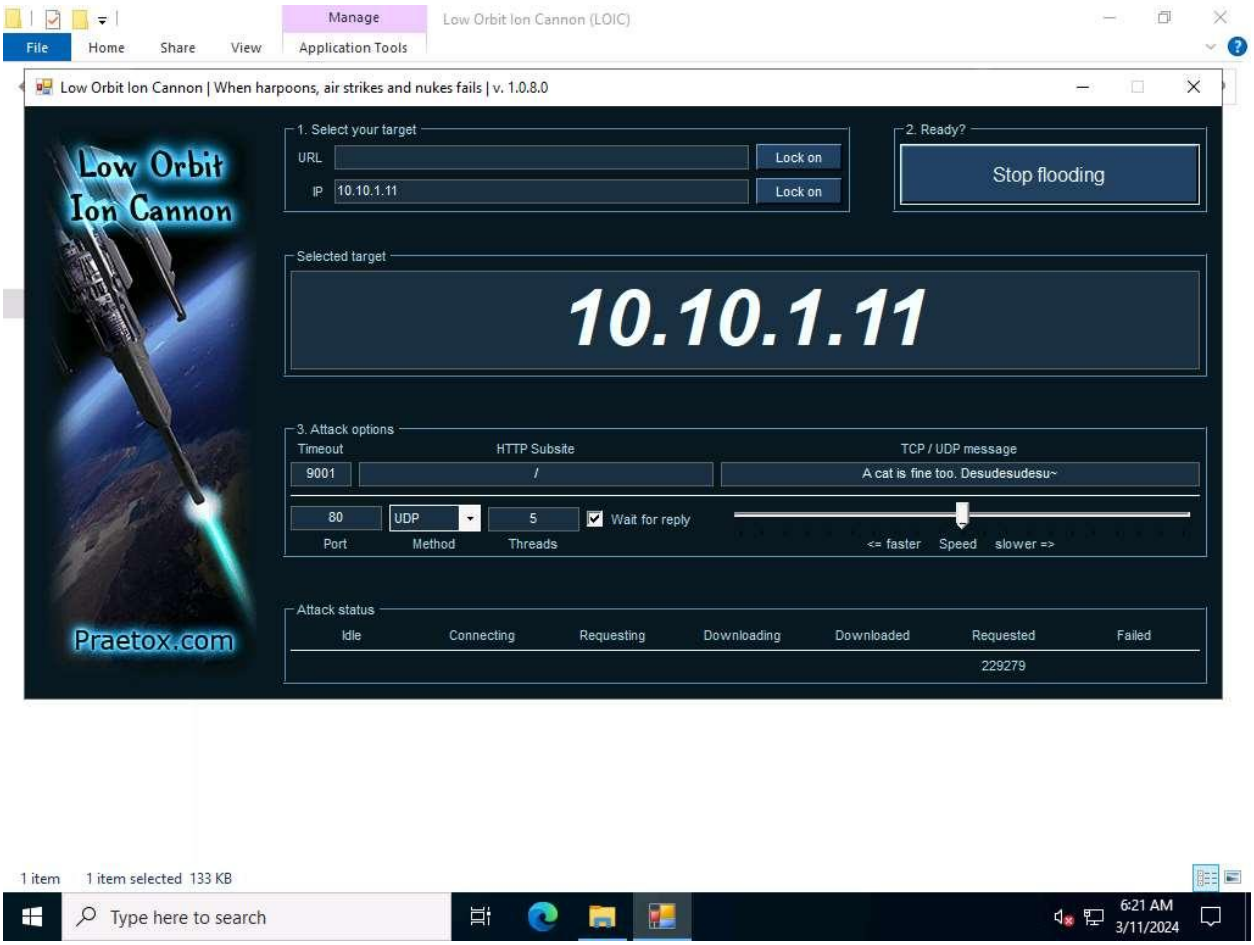
21. Observe that the blocked IP session turns red in the **Action Taken** column.



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?