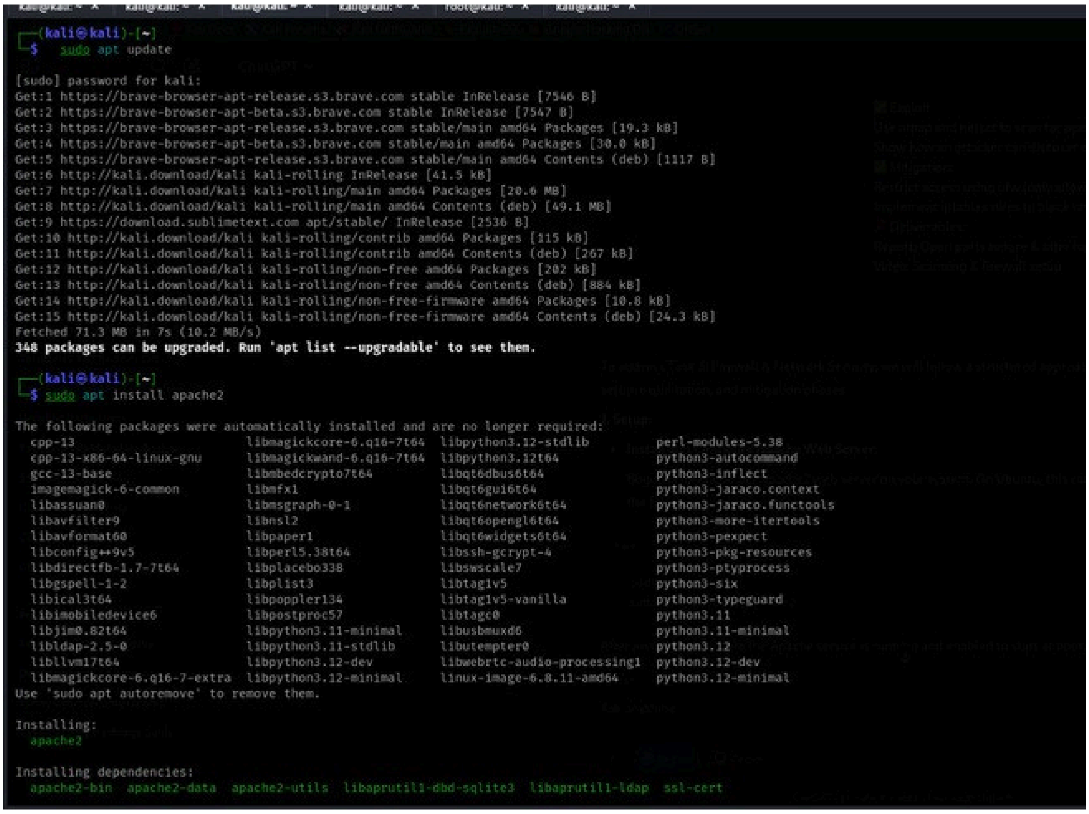
POC TASK 3

Step 1: Setting Up Apache Web Server

1. Install and Configure Apache

To install the Apache2 web server on Ubuntu, use the following commands:

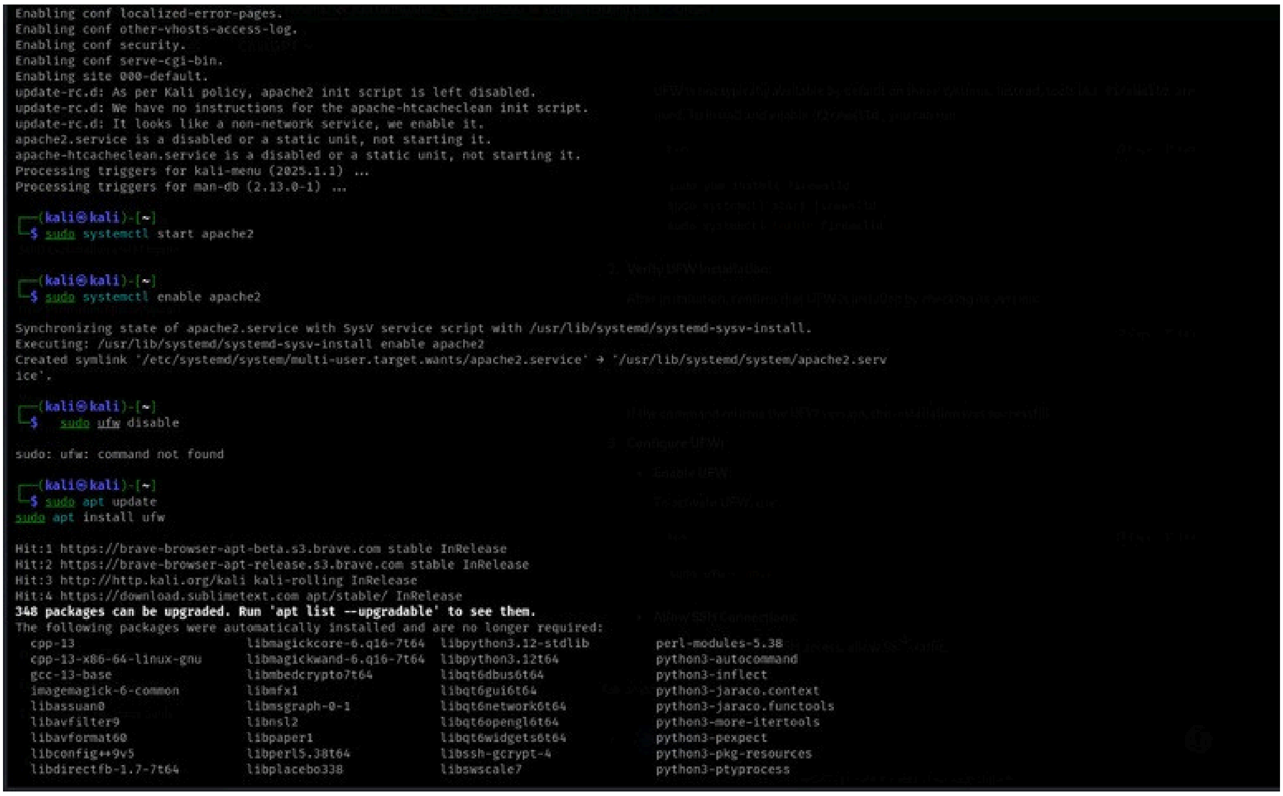
- sudo apt update
- sudo apt install apache2



```
┌──(kali㉿kali)-[~]
└─$   sudo apt update

[sudo] password for kali:
Get:1 https://brave-browser-apt-release.s3.brave.com stable InRelease [7546 B]
Get:2 https://brave-browser-apt-beta.s3.brave.com stable InRelease [7547 B]
Get:3 https://brave-browser-apt-release.s3.brave.com stable/main amd64 Packages [19.3 kB]
Get:4 https://brave-browser-apt-beta.s3.brave.com stable/main amd64 Packages [30.0 kB]
Get:5 https://brave-browser-apt-release.s3.brave.com stable/main amd64 Contents (deb) [1117 B]
Get:6 http://kali.download/kali kali-rolling InRelease [41.5 kB]
Get:7 http://kali.download/kali kali-rolling/main amd64 Packages [20.6 MB]
Get:8 http://kali.download/kali kali-rolling/main amd64 Contents (deb) [49.1 MB]
Get:9 https://download.sublimetext.com apt/stable/ InRelease [2536 B]
Get:10 http://kali.download/kali kali-rolling/contrib amd64 Packages [115 kB]
Get:11 http://kali.download/kali kali-rolling/contrib amd64 Contents (deb) [267 kB]
Get:12 http://kali.download/kali kali-rolling/non-free amd64 Packages [202 kB]
Get:13 http://kali.download/kali kali-rolling/non-free amd64 Contents (deb) [884 kB]
Get:14 http://kali.download/kali kali-rolling/non-free-firmware amd64 Packages [10.8 kB]
Get:15 http://kali.download/kali kali-rolling/non-free-firmware amd64 Contents (deb) [24.3 kB]
Fetched 71.3 MB in 7s (10.2 MB/s)
348 packages can be upgraded. Run 'apt list --upgradable' to see them.

┌──(kali㉿kali)-[~]
└─$ sudo apt install apache2

The following packages were automatically installed and are no longer required:
  cpp-13                          libmagickcore-6.q16-7t64  libpython3.12-stdlib          perl-modules-5.38
  cpp-13-x86-64-linux-gnu         libmagickwand-6.q16-7t64  libpython3.12t64              python3-autocommand
  gcc-13-base                     libmbedcrypto7t64         libqt6dbus6t64                python3-inflect
  imagemagick-6-common            libmfx1                   libqt6gui6t64                 python3-jaraco.context
  libassuan0                      libmsgraph-0-1            libqt6network6t64             python3-jaraco.functools
  libavfilter9                    libnsl2                   libqt6opengl6t64              python3-more-itertools
  libavformat60                   libpaper1                 libqt6widgets6t64             python3-pexpect
  libconfig++9v5                  libperl5.38t64            libssh-gcrypt-4               python3-pkg-resources
  libdirectfb-1.7-7t64            libplacebo338             libswscale7                   python3-ptyprocess
  libgspell-1-2                   libplist3                 libtag1v5                     python3-six
  libical3t64                     libpoppler134             libtag1v5-vanilla             python3-typeguard
  libimobiledevice6               libpostproc57             libtagc0                      python3.11
  libjim0.82t64                   libpython3.11-minimal     libusbmuxd6                   python3.11-minimal
  libldap-2.5-0                   libpython3.11-stdlib      libutempter0                  python3.12
  libllvm17t64                    libpython3.12-dev         libwebrtc-audio-processing1   python3.12-dev
  libmagickcore-6.q16-7-extra     libpython3.12-minimal     linux-image-6.8.11-amd64      python3.12-minimal
Use 'sudo apt autoremove' to remove them.

Installing:
  apache2

Installing dependencies:
  apache2-bin  apache2-data  apache2-utils  libaprutil1-dbd-sqlite3  libaprutil1-ldap  ssl-cert
```

Once installed, ensure the Apache service is running and set to start automatically on boot:

- sudo systemctl start apache2
- sudo systemctl enable apache2



```
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
update-rc.d: As per Kali policy, apache2 init script is left disabled.
update-rc.d: We have no instructions for the apache-htcacheclean init script.
update-rc.d: It looks like a non-network service, we enable it.
apache2.service is a disabled or a static unit, not starting it.
apache-htcacheclean.service is a disabled or a static unit, not starting it.
Processing triggers for kali-menu (2025.1.1) ...
Processing triggers for man-db (2.13.0-1) ...

┌──(kali㉿kali)-[~]
└─$ sudo systemctl start apache2

┌──(kali㉿kali)-[~]
└─$ sudo systemctl enable apache2

Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
Created symlink '/etc/systemd/system/multi-user.target.wants/apache2.service' → '/usr/lib/systemd/system/apache2.serv
ice'.

┌──(kali㉿kali)-[~]
└─$   sudo ufw disable

sudo: ufw: command not found

┌──(kali㉿kali)-[~]
└─$ sudo apt update
sudo apt install ufw

Hit:1 https://brave-browser-apt-beta.s3.brave.com stable InRelease
Hit:2 https://brave-browser-apt-release.s3.brave.com stable InRelease
Hit:3 http://http.kali.org/kali kali-rolling InRelease
Hit:4 https://download.sublimetext.com apt/stable/ InRelease
348 packages can be upgraded. Run 'apt list --upgradable' to see them.
The following packages were automatically installed and are no longer required:
  cpp-13                       libmagickcore-6.q16-7t64  libpython3.12-stdlib       perl-modules-5.38
  cpp-13-x86-64-linux-gnu      libmagickwand-6.q16-7t64  libpython3.12t64           python3-autocommand
  gcc-13-base                  libmbedcrypto7t64         libqt6dbus6t64             python3-inflect
  imagemagick-6-common         libmfx1                   libqt6gui6t64              python3-jaraco.context
  libassuan0                   libmsgraph-0-1            libqt6network6t64          python3-jaraco.functools
  libavfilter9                 libnsl2                   libqt6opengl6t64           python3-more-itertools
  libavformat60                libpaper1                 libqt6widgets6t64          python3-pexpect
  libconfig++9v5               libperl5.38t64            libssh-gcrypt-4            python3-pkg-resources
  libdirectfb-1.7-7t64         libplacebo338             libswscale7                python3-ptyprocess
```

2. Disable UFW to Allow All Traffic

To temporarily allow all incoming and outgoing traffic, disable the Uncomplicated Firewall (UFW):

- sudo ufw disable

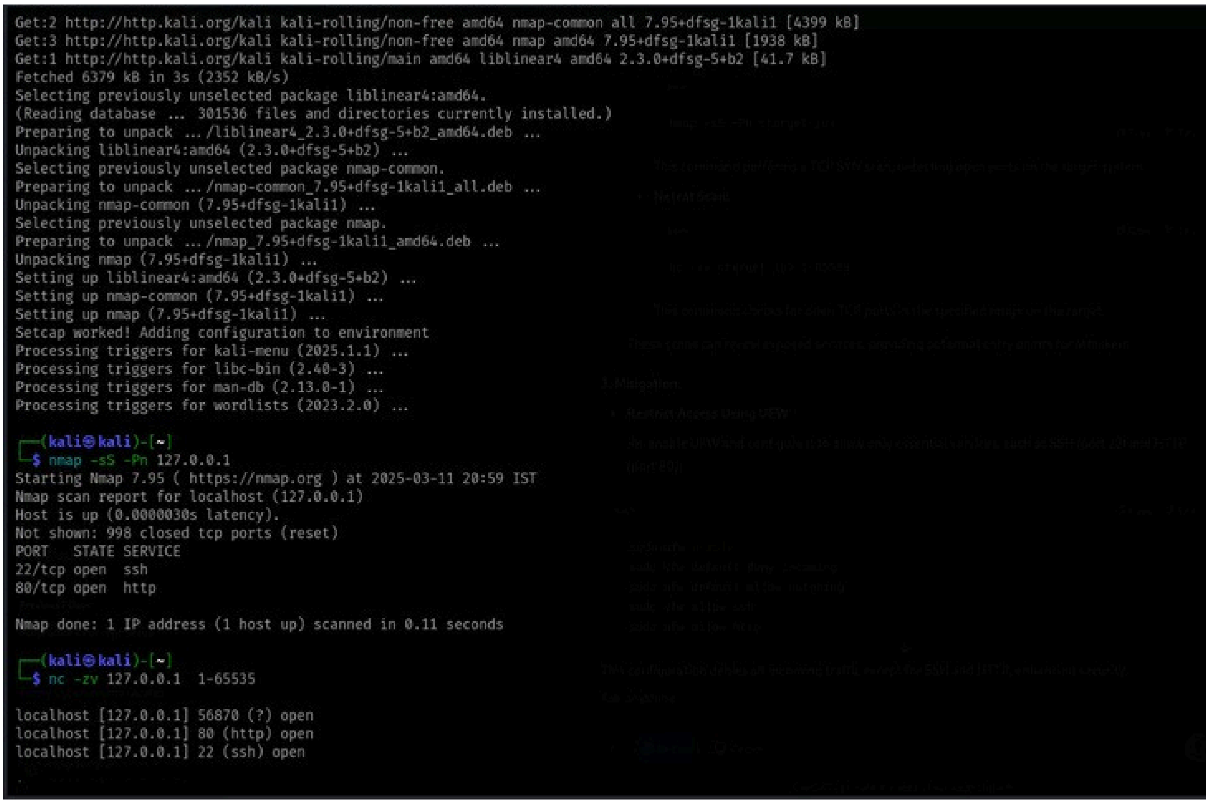
Step 2: Exploiting Open Ports and Services

1. Scanning with Nmap

With the firewall disabled, attackers can use tools like Nmap to detect open ports and running services:

- nmap -sS -Pn <target_ip>

This command performs a TCP SYN scan, identifying active services on the target machine.



```
Get:2 http://http.kali.org/kali kali-rolling/non-free amd64 nmap-common all 7.95+dfsg-1kali1 [4399 kB]
Get:3 http://http.kali.org/kali kali-rolling/non-free amd64 nmap amd64 7.95+dfsg-1kali1 [1938 kB]
Get:1 http://http.kali.org/kali kali-rolling/main amd64 liblinear4 amd64 2.3.0+dfsg-5+b2 [41.7 kB]
Fetched 6379 kB in 3s (2352 kB/s)
Selecting previously unselected package liblinear4:amd64.
(Reading database ... 301536 files and directories currently installed.)
Preparing to unpack .../liblinear4_2.3.0+dfsg-5+b2_amd64.deb ...
Unpacking liblinear4:amd64 (2.3.0+dfsg-5+b2) ...
Selecting previously unselected package nmap-common.
Preparing to unpack .../nmap-common_7.95+dfsg-1kali1_all.deb ...
Unpacking nmap-common (7.95+dfsg-1kali1) ...
Selecting previously unselected package nmap.
Preparing to unpack .../nmap_7.95+dfsg-1kali1_amd64.deb ...
Unpacking nmap (7.95+dfsg-1kali1) ...
Setting up liblinear4:amd64 (2.3.0+dfsg-5+b2) ...
Setting up nmap-common (7.95+dfsg-1kali1) ...
Setting up nmap (7.95+dfsg-1kali1) ...
Setcap worked! Adding configuration to environment
Processing triggers for kali-menu (2025.1.1) ...
Processing triggers for libc-bin (2.40-3) ...
Processing triggers for man-db (2.13.0-1) ...
Processing triggers for wordlists (2023.2.0) ...

┌──(kali㉿kali)-[~]
└─$ nmap -sS -Pn 127.0.0.1
Starting Nmap 7.95 ( https://nmap.org ) at 2025-03-11 20:59 IST
Nmap scan report for localhost (127.0.0.1)
Host is up (0.0000030s latency).
Not shown: 998 closed tcp ports (reset)
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http

Nmap done: 1 IP address (1 host up) scanned in 0.11 seconds

┌──(kali㉿kali)-[~]
└─$ nc -zv 127.0.0.1  1-65535

localhost [127.0.0.1] 56870 (?) open
localhost [127.0.0.1] 80 (http) open
localhost [127.0.0.1] 22 (ssh) open
```

2. Scanning with Netcat

Another method involves using Netcat to check for open ports across a specified range:

- nc -zv <target_ip> 1-65535

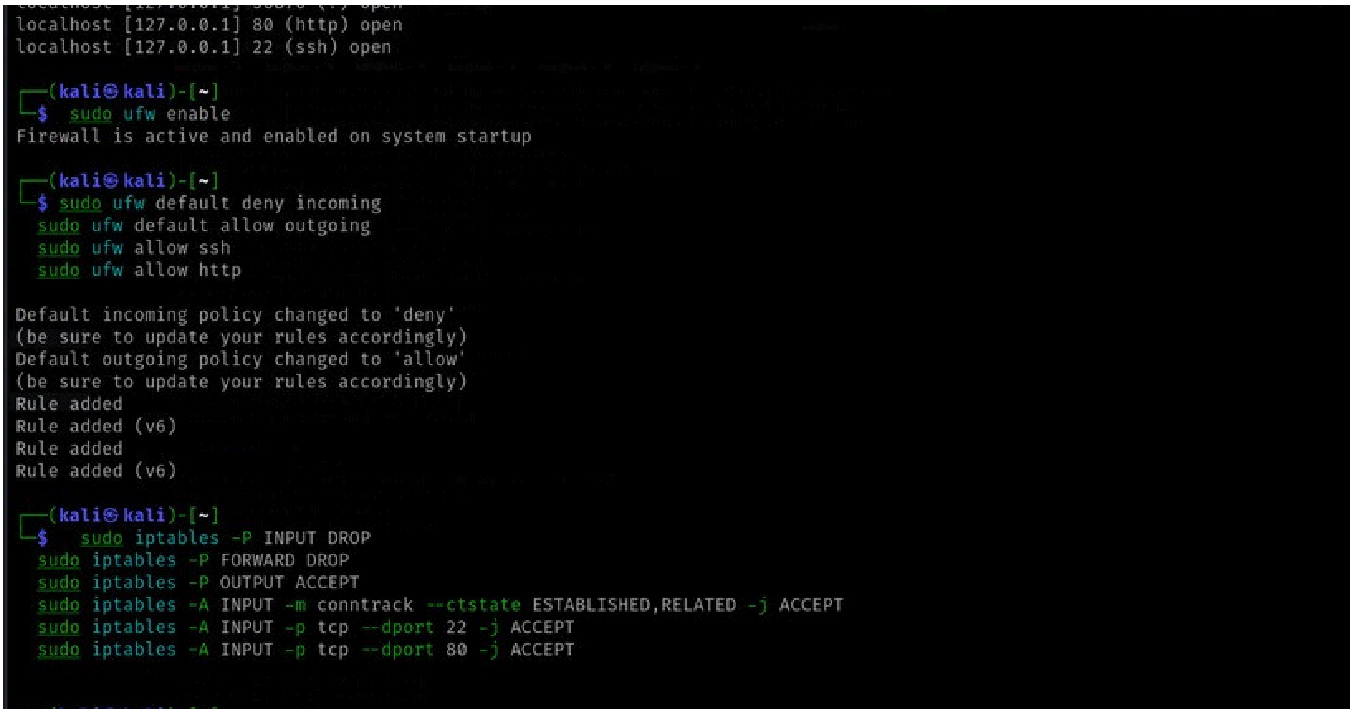
This scan attempts to establish TCP connections, revealing available ports that may be vulnerable.

Step 1: Setting Up Apache Web Server

1. Restricting Access with UFW

Re-enable the firewall and configure it to allow only necessary services, such as SSH (port 22) and HTTP (port 80):

- sudo ufw enable
- sudo ufw default deny incoming
- sudo ufw default allow outgoing
- sudo ufw allow ssh
- sudo ufw allow http



```
localhost [127.0.0.1] 80 (http) open
localhost [127.0.0.1] 22 (ssh) open

┌──(kali㉿kali)-[~]
└─$  sudo ufw enable
Firewall is active and enabled on system startup

┌──(kali㉿kali)-[~]
└─$ sudo ufw default deny incoming
  sudo ufw default allow outgoing
  sudo ufw allow ssh
  sudo ufw allow http

Default incoming policy changed to 'deny'
(be sure to update your rules accordingly)
Default outgoing policy changed to 'allow'
(be sure to update your rules accordingly)
Rule added
Rule added (v6)
Rule added
Rule added (v6)

┌──(kali㉿kali)-[~]
└─$   sudo iptables -P INPUT DROP
  sudo iptables -P FORWARD DROP
  sudo iptables -P OUTPUT ACCEPT
  sudo iptables -A INPUT -m conntrack --ctstate ESTABLISHED,RELATED -j ACCEPT
  sudo iptables -A INPUT -p tcp --dport 22 -j ACCEPT
  sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT
```

2. Implementing iptables Rules for Advanced Filtering

For stricter access control, use iptables to define security rules:

- sudo iptables -P INPUT DROP
- sudo iptables -P FORWARD DROP
- sudo iptables -P OUTPUT ACCEPT
- sudo iptables -A INPUT -m conntrack --ctstate ESTABLISHED,RELATED -j ACCEPT
- sudo iptables -A INPUT -p tcp --dport 22 -j ACCEPT
- sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT