Lab 5: Perform Network Scanning using Various Scanning Tools

Lab Scenario

The information obtained in the previous steps might be insufficient to reveal potential vulnerabilities in the target network: there may be more information available that could help in finding loopholes in the target network. As an ethical hacker and pen tester, you should look for as much information as possible about systems in the target network using various network scanning tools when needed. This lab will demonstrate other techniques/commands/methods that can assist you in extracting information about the systems in the target network using various scanning tools.

Lab Objectives

- Scan a target network using Metasploit

Overview of Network Scanning Tools

Scanning tools are used to scan and identify live hosts, open ports, running services on a target network, location-info, NetBIOS info, and information about all TCP/IP and UDP open ports. Information obtained from these tools will assist an ethical hacker in creating the profile of the target organization and to scan the network for open ports of the devices connected.

Task 1: Scan a Target Network using Metasploit

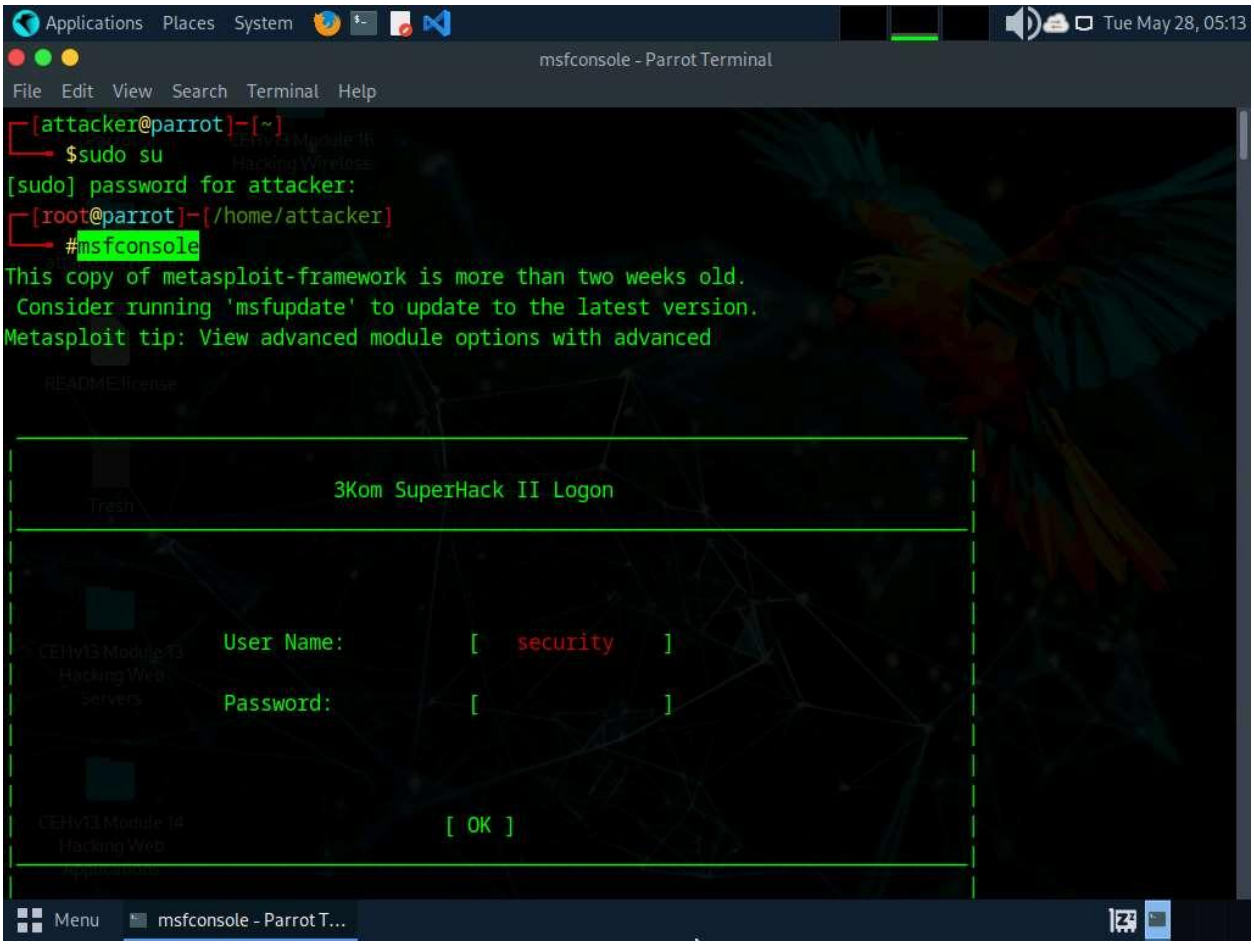
Metasploit Framework is a tool that provides information about security vulnerabilities in the target organization's system, and aids in penetration testing and IDS signature development. It facilitates the tasks of attackers, exploit writers, and payload writers. A major advantage of the framework is the modular approach, that is, allowing the combination of any exploit with any payload.

Here, we will use Metasploit to discover active hosts, open ports, services running, and OS details of systems present in the target network.

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**).

The password that you type will not be visible.

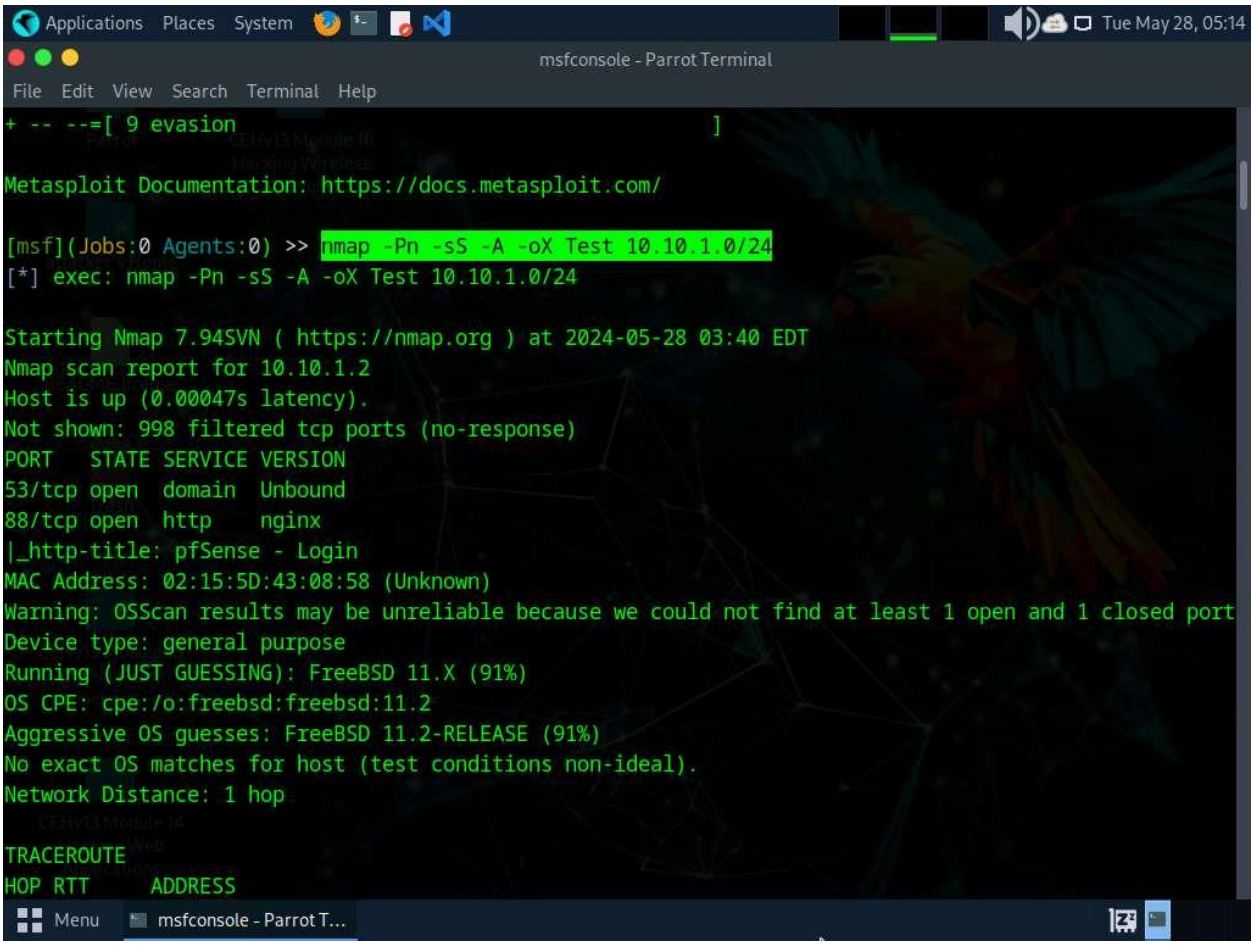
2. Execute command **msfconsole** to launch Metasploit.

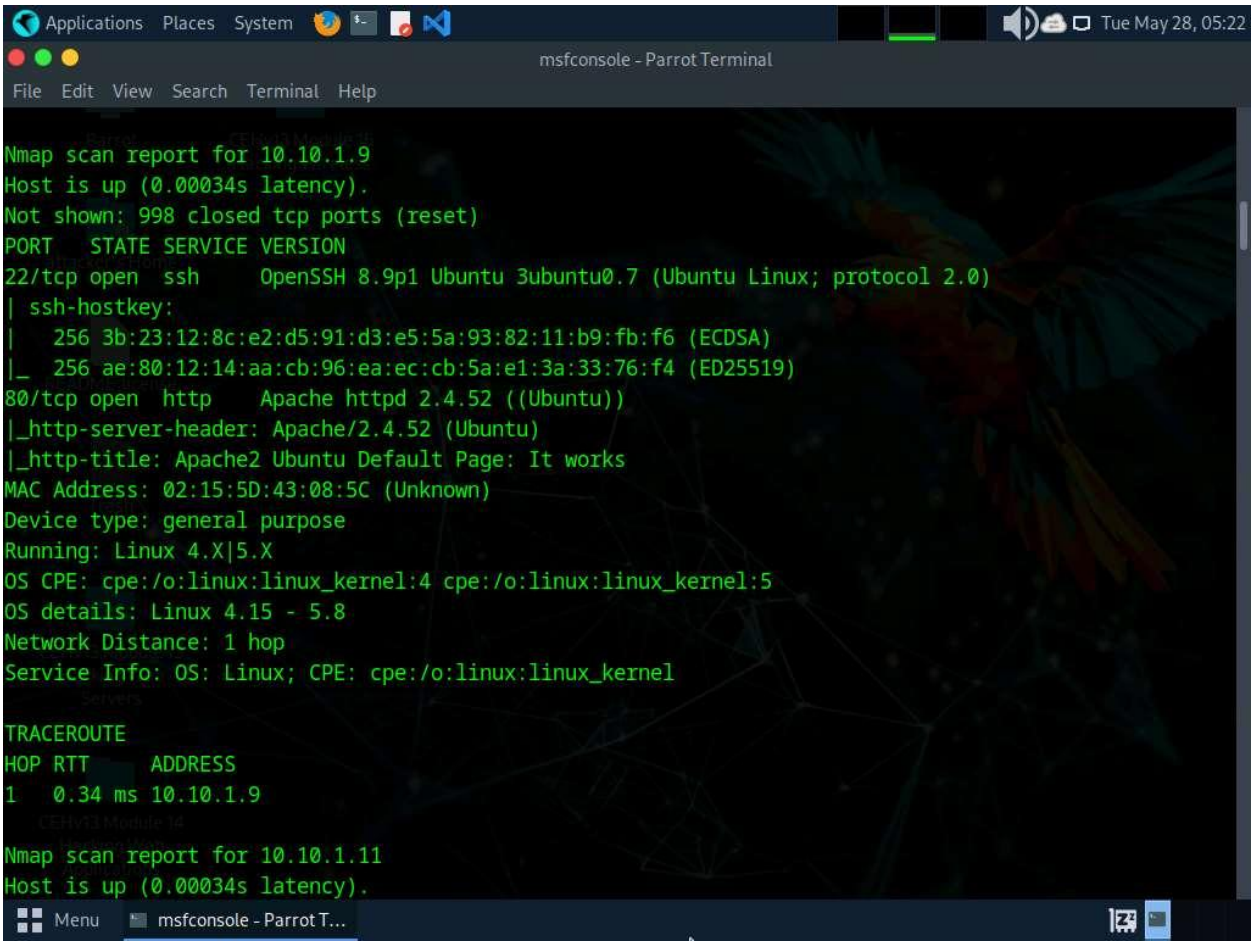


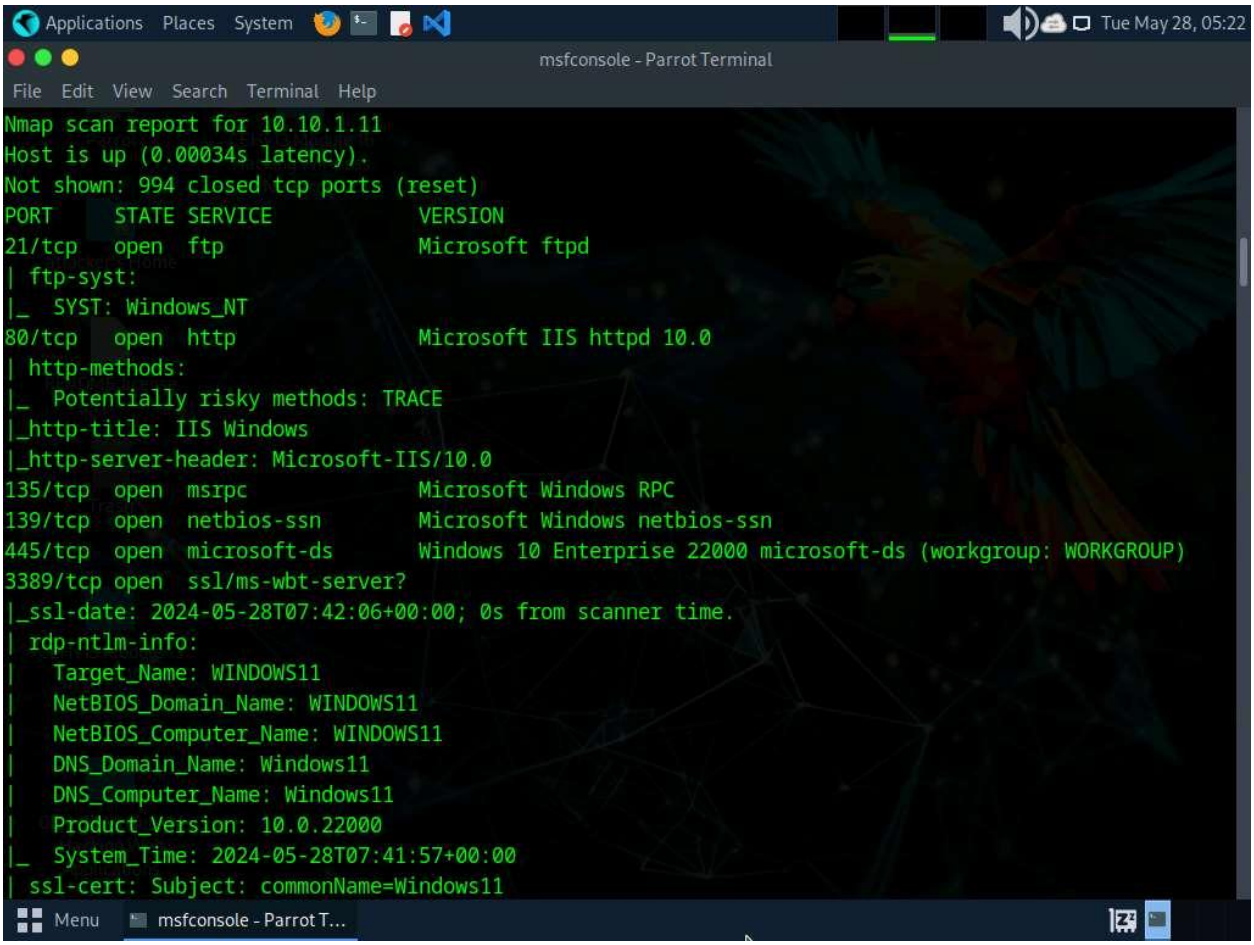
3. An msf command line appears. Type **nmap -Pn -sS -A -oX Test 10.10.1.0/24** and press **Enter** to scan the subnet, as shown in the screenshot.

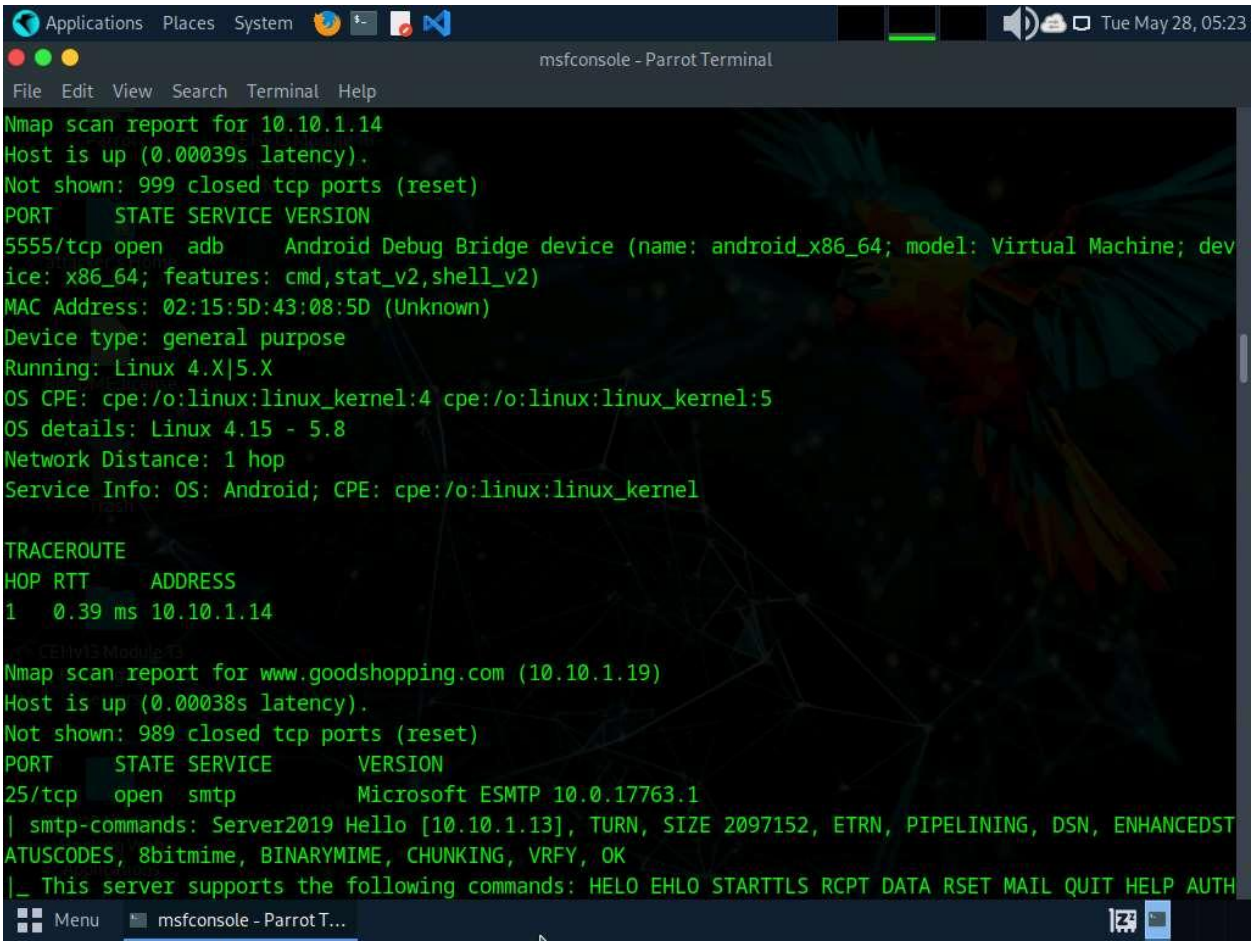
Here, we are scanning the whole subnet 10.10.1.0/24 for active hosts.

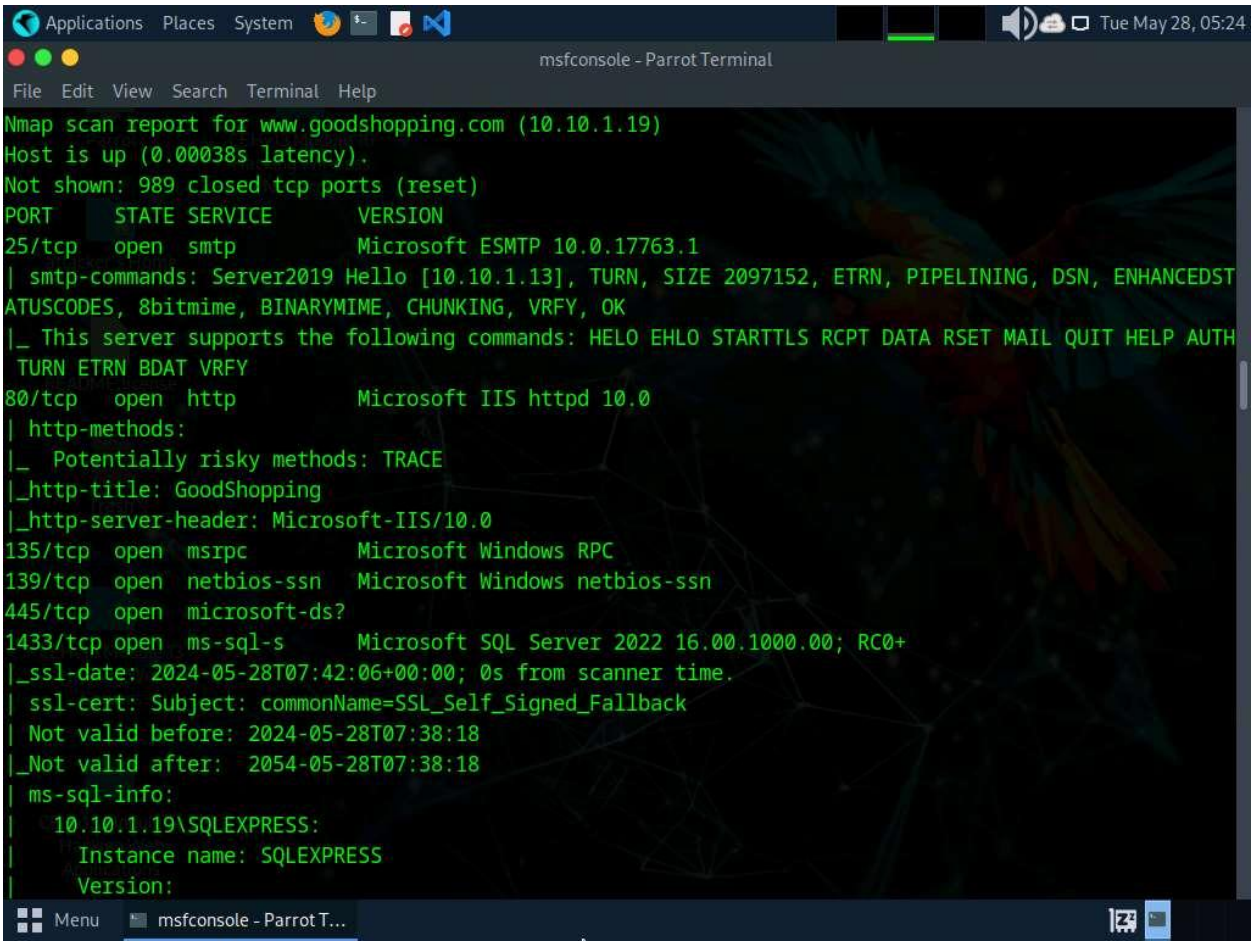
4. Nmap begins scanning the subnet and displays the results. It takes approximately 5 minutes for the scan to complete.
5. After the scan completes, Nmap displays the host information in the target network along with open ports, service and OS enumeration.

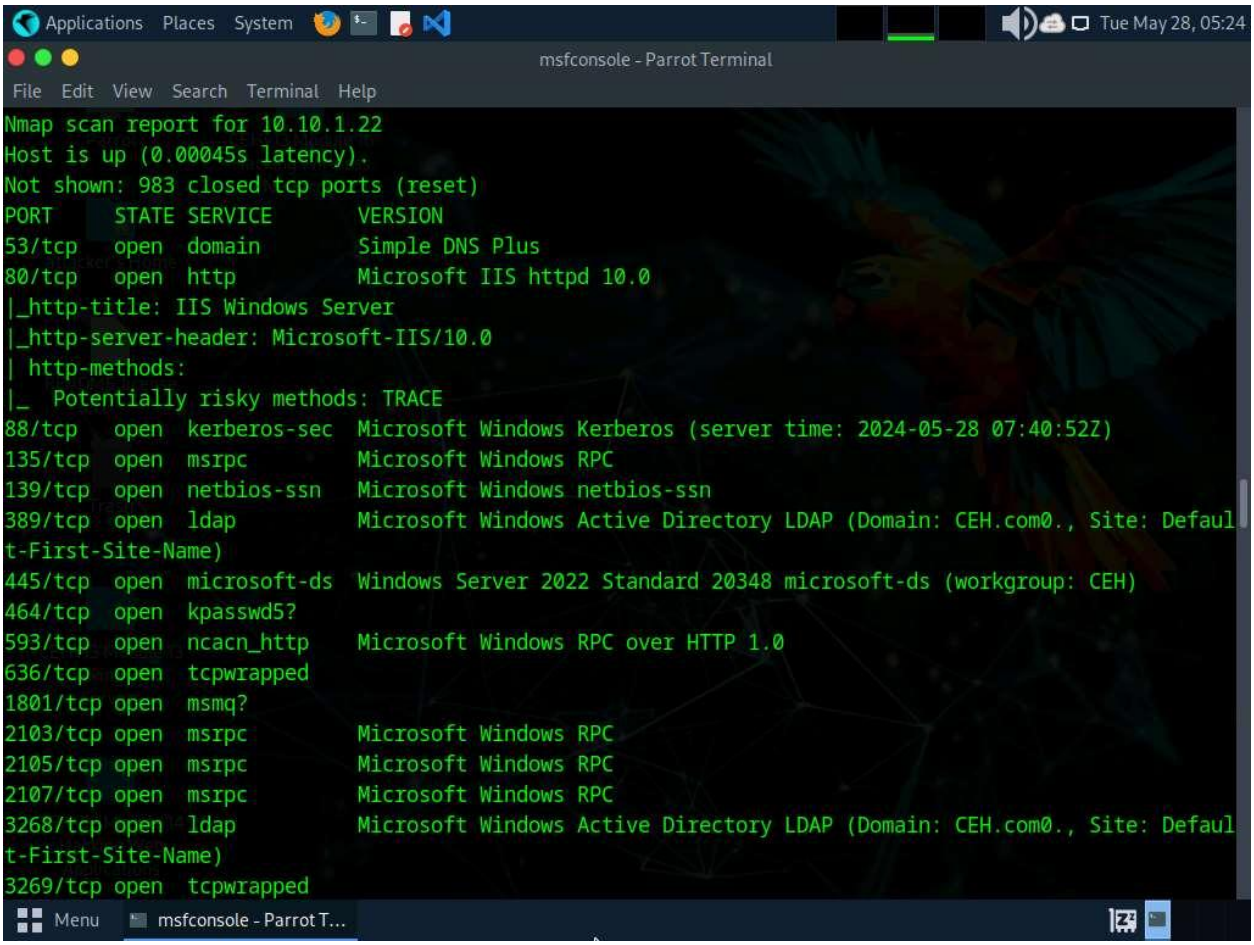

Applications Places System
Tue May 28, 05:14
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
+ -- --=[9 evasion]
Metasploit Documentation: https://docs.metasploit.com/
[msf](Jobs:0 Agents:0) >> nmap -Pn -sS -A -oX Test 10.10.1.0/24
[*] exec: nmap -Pn -sS -A -oX Test 10.10.1.0/24
Starting Nmap 7.94SVN (https://nmap.org) at 2024-05-28 03:40 EDT
Nmap scan report for 10.10.1.2
Host is up (0.00047s latency).
Not shown: 998 filtered tcp ports (no-response)
PORT STATE SERVICE VERSION
53/tcp open domain Unbound
88/tcp open http nginx
|_http-title: pfSense - Login
MAC Address: 02:15:5D:43:08:58 (Unknown)
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose
Running (JUST GUESSING): FreeBSD 11.X (91%)
OS CPE: cpe:/o:freebsd:freebsd:11.2
Aggressive OS guesses: FreeBSD 11.2-RELEASE (91%)
No exact OS matches for host (test conditions non-ideal).
Network Distance: 1 hop
TRACEROUTE
HOP RTT ADDRESS
Menu
msfconsole - Parrot T...

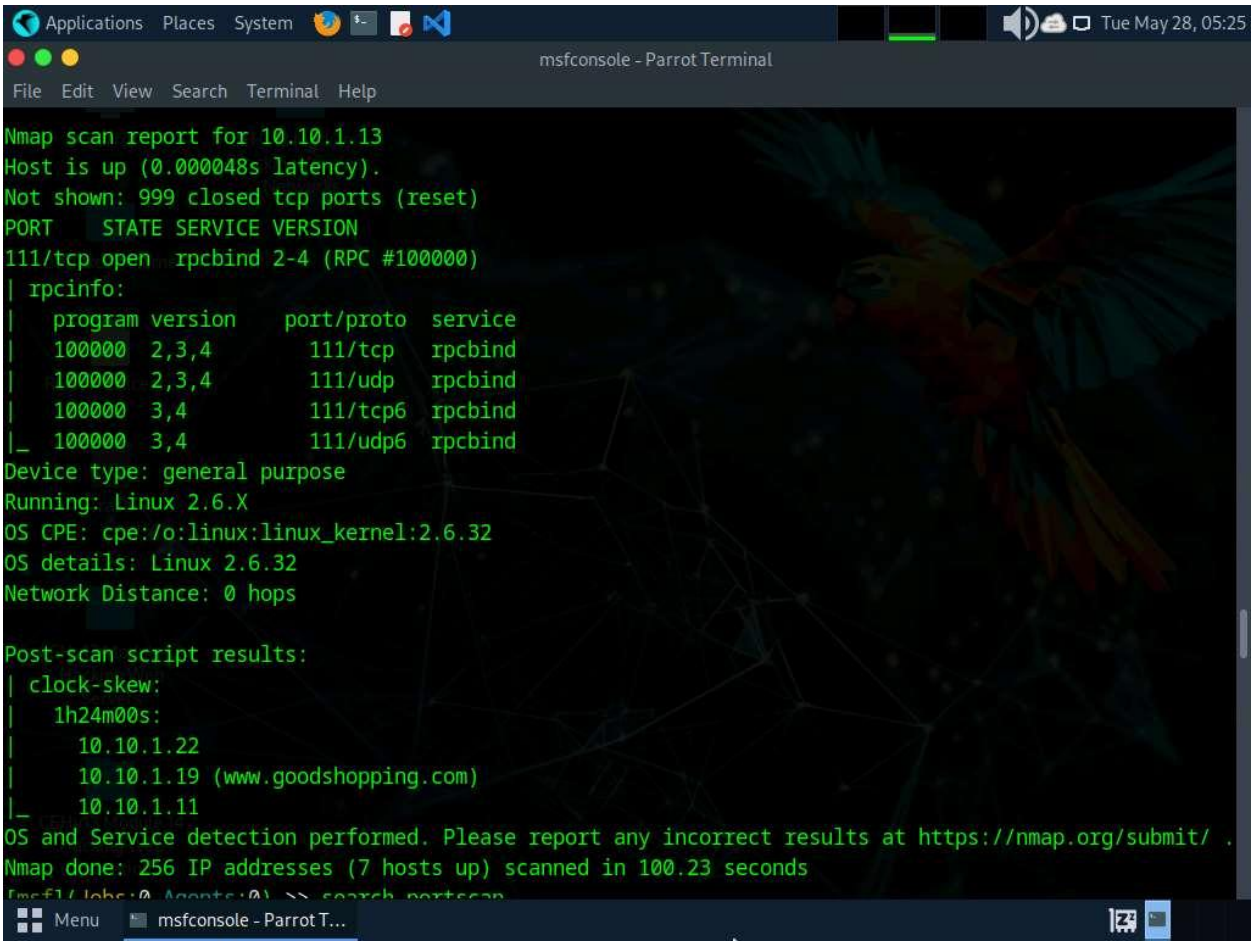

Applications Places System
Tue May 28, 05:22
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
Nmap scan report for 10.10.1.9
Host is up (0.00034s latency).
Not shown: 998 closed tcp ports (reset)
PORT STATE SERVICE VERSION
22/tcp open ssh OpenSSH 8.9p1 Ubuntu 3ubuntu0.7 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
| 256 3b:23:12:8c:e2:d5:91:d3:e5:5a:93:82:11:b9:fb:f6 (ECDSA)
|_ 256 ae:80:12:14:aa:cb:96:ea:ec:cb:5a:e1:3a:33:76:f4 (ED25519)
80/tcp open http Apache httpd 2.4.52 ((Ubuntu))
|_http-server-header: Apache/2.4.52 (Ubuntu)
|_http-title: Apache2 Ubuntu Default Page: It works
MAC Address: 02:15:5D:43:08:5C (Unknown)
Device type: general purpose
Running: Linux 4.X|5.X
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5
OS details: Linux 4.15 - 5.8
Network Distance: 1 hop
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
TRACEROUTE
HOP RTT ADDRESS
1 0.34 ms 10.10.1.9
Nmap scan report for 10.10.1.11
Host is up (0.00034s latency).
Menu
msfconsole - Parrot T...


Applications Places System
Tue May 28, 05:22
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
Nmap scan report for 10.10.1.11
Host is up (0.00034s latency).
Not shown: 994 closed tcp ports (reset)
PORT STATE SERVICE VERSION
21/tcp open ftp Microsoft ftpd
| ftp-syst:
|_ SYST: Windows_NT
80/tcp open http Microsoft IIS httpd 10.0
| http-methods:
|_ Potentially risky methods: TRACE
|_http-title: IIS Windows
|_http-server-header: Microsoft-IIS/10.0
135/tcp open msrpc Microsoft Windows RPC
139/tcp open netbios-ssn Microsoft Windows netbios-ssn
445/tcp open microsoft-ds Windows 10 Enterprise 22000 microsoft-ds (workgroup: WORKGROUP)
3389/tcp open ssl/ms-wbt-server?
|_ssl-date: 2024-05-28T07:42:06+00:00; 0s from scanner time.
| rdp-ntlm-info:
| Target_Name: WINDOWS11
| NetBIOS_Domain_Name: WINDOWS11
| NetBIOS_Computer_Name: WINDOWS11
| DNS_Domain_Name: Windows11
| DNS_Computer_Name: Windows11
| Product_Version: 10.0.22000
|_ System_Time: 2024-05-28T07:41:57+00:00
| ssl-cert: Subject: commonName=Windows11
Menu
msfconsole - Parrot T...

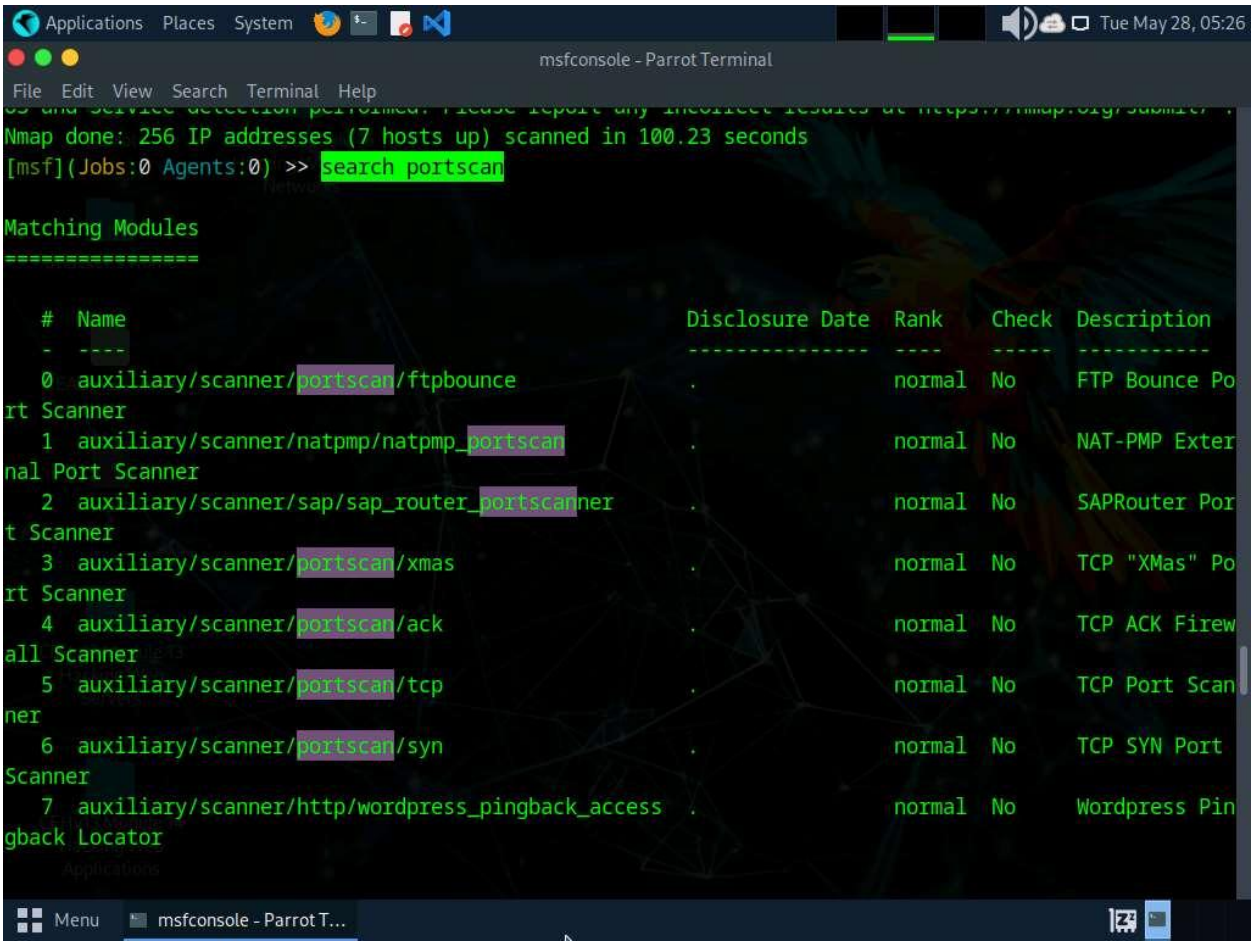

Applications Places System
Tue May 28, 05:23
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
Nmap scan report for 10.10.1.14
Host is up (0.00039s latency).
Not shown: 999 closed tcp ports (reset)
PORT STATE SERVICE VERSION
5555/tcp open adb Android Debug Bridge device (name: android_x86_64; model: Virtual Machine; dev
ice: x86_64; features: cmd,stat_v2,shell_v2)
MAC Address: 02:15:5D:43:08:5D (Unknown)
Device type: general purpose
Running: Linux 4.X|5.X
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5
OS details: Linux 4.15 - 5.8
Network Distance: 1 hop
Service Info: OS: Android; CPE: cpe:/o:linux:linux_kernel
TRACEROUTE
HOP RTT ADDRESS
1 0.39 ms 10.10.1.14
Nmap scan report for www.goodshopping.com (10.10.1.19)
Host is up (0.00038s latency).
Not shown: 989 closed tcp ports (reset)
PORT STATE SERVICE VERSION
25/tcp open smtp Microsoft ESMTP 10.0.17763.1
| smtp-commands: Server2019 Hello [10.10.1.13], TURN, SIZE 2097152, ETRN, PIPELINING, DSN, ENHANCEDST
ATUSCODES, 8bitmime, BINARYMIME, CHUNKING, VRFY, OK
|_ This server supports the following commands: HELO EHLO STARTTLS RCPT DATA RSET MAIL QUIT HELP AUTH
Menu
msfconsole - Parrot T...


Applications Places System
Tue May 28, 05:24
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
Nmap scan report for www.goodshopping.com (10.10.1.19)
Host is up (0.00038s latency).
Not shown: 989 closed tcp ports (reset)
PORT STATE SERVICE VERSION
25/tcp open smtp Microsoft ESMTP 10.0.17763.1
| smtp-commands: Server2019 Hello [10.10.1.13], TURN, SIZE 2097152, ETRN, PIPELINING, DSN, ENHANCEDST
ATUSCODES, 8bitmime, BINARYMIME, CHUNKING, VRFY, OK
|_ This server supports the following commands: HELO EHLO STARTTLS RCPT DATA RSET MAIL QUIT HELP AUTH
TURN ETRN BDAT VRFY
80/tcp open http Microsoft IIS httpd 10.0
| http-methods:
|_ Potentially risky methods: TRACE
|_http-title: GoodShopping
|_http-server-header: Microsoft-IIS/10.0
135/tcp open msrpc Microsoft Windows RPC
139/tcp open netbios-ssn Microsoft Windows netbios-ssn
445/tcp open microsoft-ds?
1433/tcp open ms-sql-s Microsoft SQL Server 2022 16.00.1000.00; RC0+
|_ssl-date: 2024-05-28T07:42:06+00:00; 0s from scanner time.
| ssl-cert: Subject: commonName=SSL_Self_Signed_Fallback
| Not valid before: 2024-05-28T07:38:18
|_Not valid after: 2054-05-28T07:38:18
| ms-sql-info:
| 10.10.1.19\SQLEXPRESS:
| Instance name: SQLEXPRESS
| Version:
Menu
msfconsole - Parrot T...


Applications Places System
Tue May 28, 05:24
msfconsole - Parrot Terminal
File Edit View Search Terminal Help
Nmap scan report for 10.10.1.22
Host is up (0.00045s latency).
Not shown: 983 closed tcp ports (reset)
PORT STATE SERVICE VERSION
53/tcp open domain Simple DNS Plus
80/tcp open http Microsoft IIS httpd 10.0
|_http-title: IIS Windows Server
|_http-server-header: Microsoft-IIS/10.0
| http-methods:
|_ Potentially risky methods: TRACE
88/tcp open kerberos-sec Microsoft Windows Kerberos (server time: 2024-05-28 07:40:52Z)
135/tcp open msrpc Microsoft Windows RPC
139/tcp open netbios-ssn Microsoft Windows netbios-ssn
389/tcp open ldap Microsoft Windows Active Directory LDAP (Domain: CEH.com0., Site: Default-First-Site-Name)
445/tcp open microsoft-ds Windows Server 2022 Standard 20348 microsoft-ds (workgroup: CEH)
464/tcp open kpasswd5?
593/tcp open ncacn_http Microsoft Windows RPC over HTTP 1.0
636/tcp open tcpwrapped
1801/tcp open msmq?
2103/tcp open msrpc Microsoft Windows RPC
2105/tcp open msrpc Microsoft Windows RPC
2107/tcp open msrpc Microsoft Windows RPC
3268/tcp open ldap Microsoft Windows Active Directory LDAP (Domain: CEH.com0., Site: Default-First-Site-Name)
3269/tcp open tcpwrapped
Menu
msfconsole - Parrot T...



6. Type **search portscan** and press **Enter**. The Metasploit port scanning modules appear, as shown in the screenshot.



7. Here, we will use the **auxiliary/scanner/portscan/syn** module to perform an SYN scan on the target systems. To do so, type **use auxiliary/scanner/portscan/syn** and hit **Enter**.
8. We will use this module to perform an SYN scan against the target IP address range (**10.10.1.5-23**) to look for open port 80 through the eth0 interface.

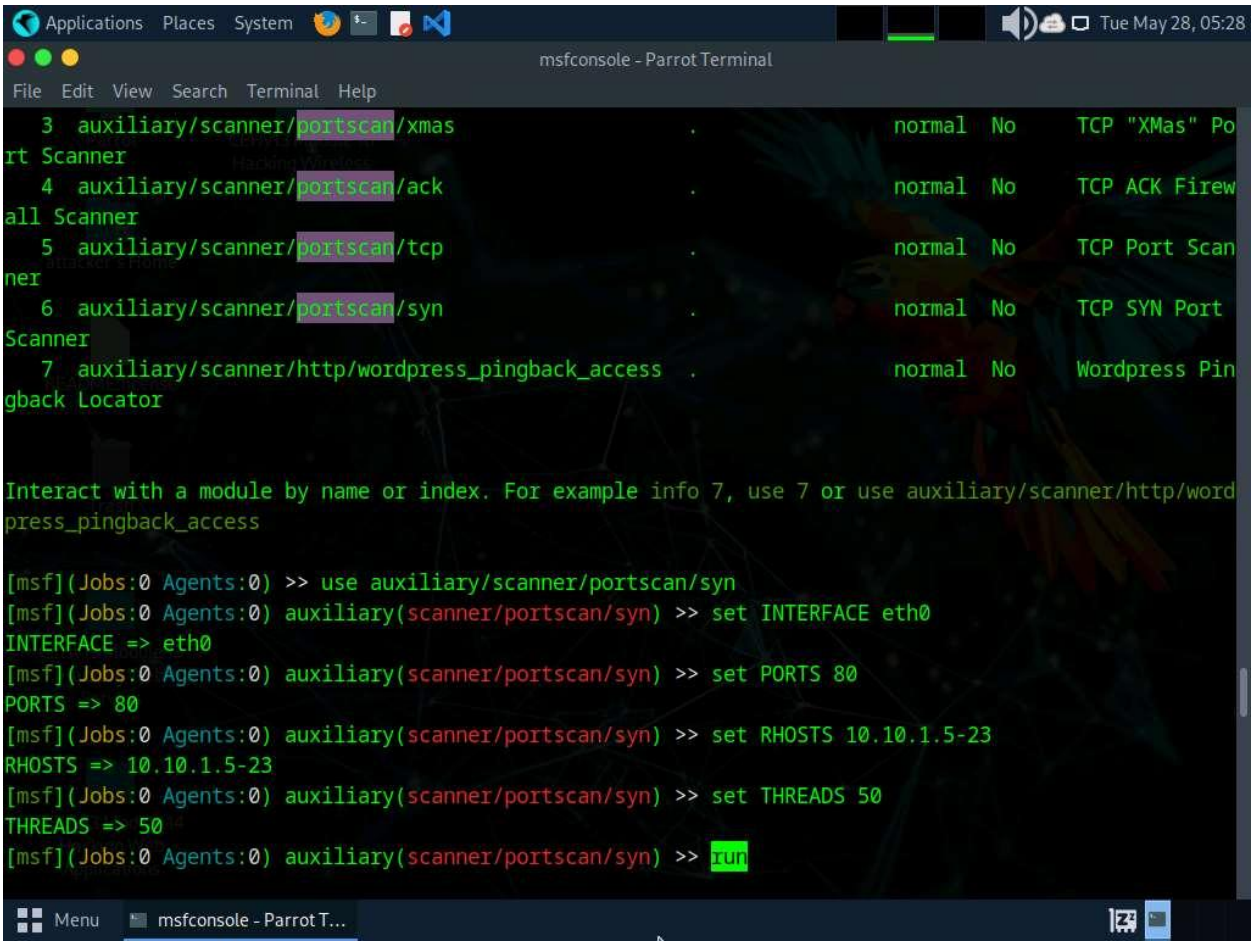
To do so, issue the below commands:

- **set INTERFACE eth0**
- **set PORTS 80**
- **set RHOSTS 10.10.1.5-23**
- **set THREADS 50**

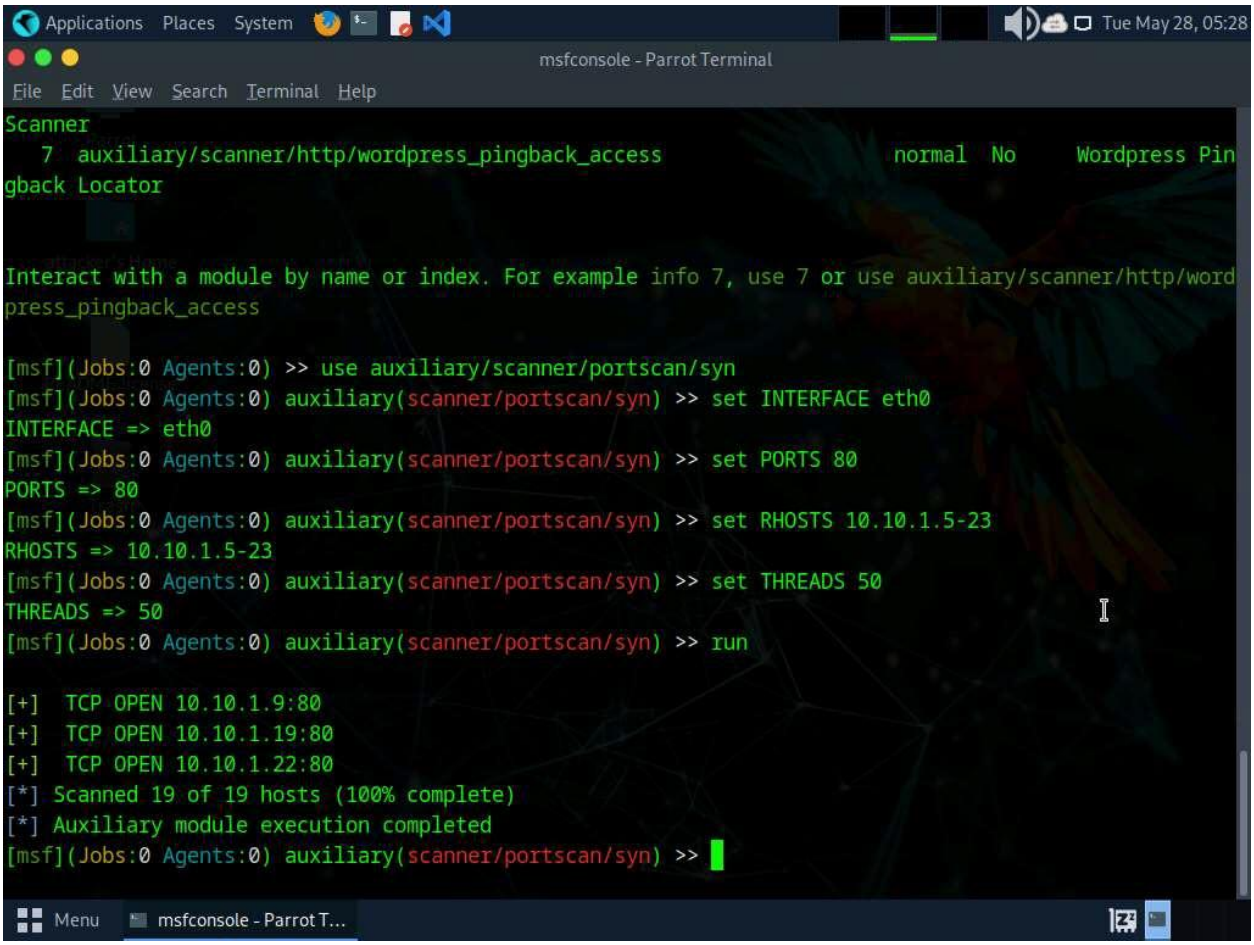
PORTS: specifies the ports to scan (e.g., 22-25, 80, 110-900), **RHOSTS**: specifies the target address range or CIDR identifier, and THREADS: specifies the number of concurrent threads (default 1).

9. After specifying the above values, type **run** and press **Enter**, to initiate the scan against the target IP address range.

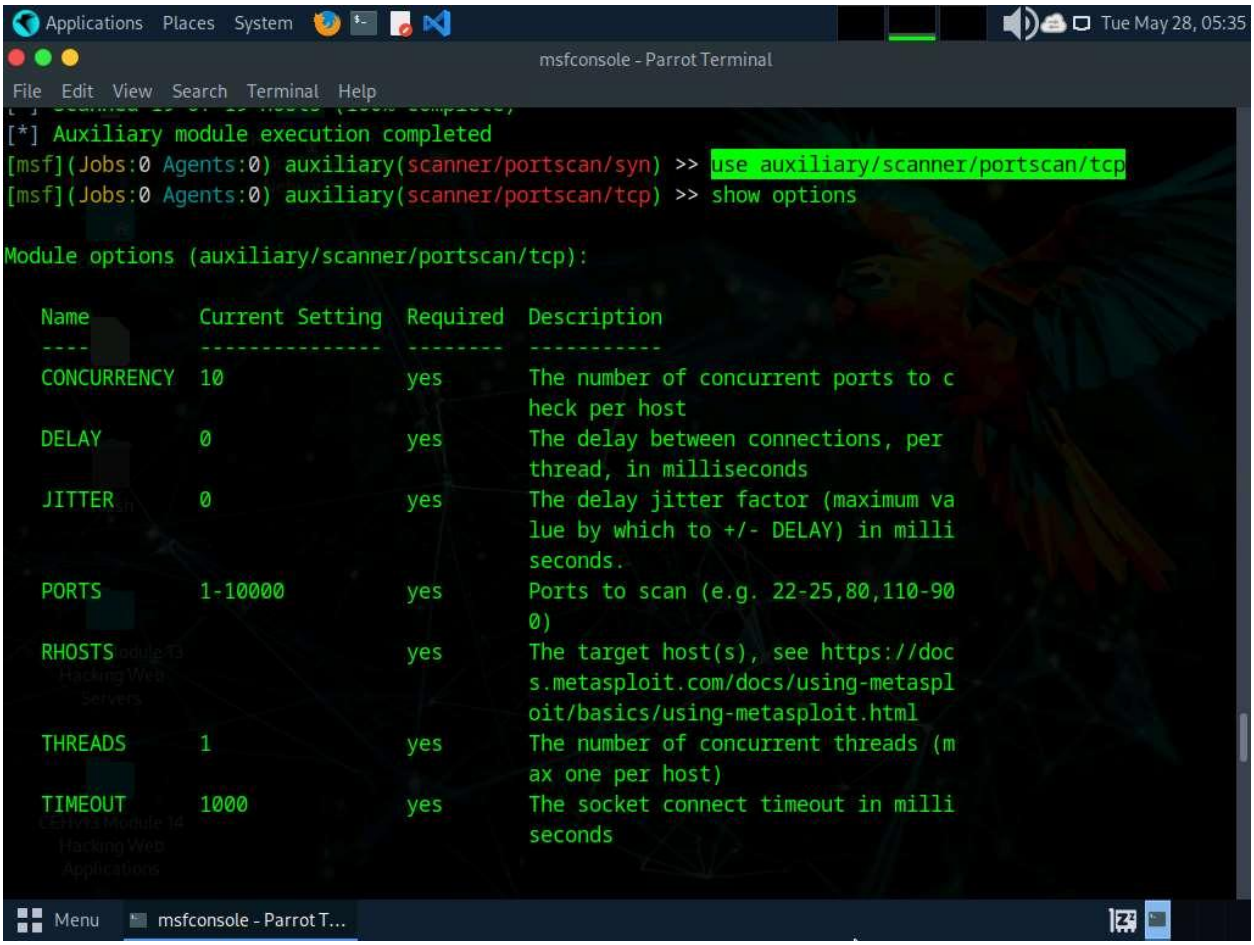
Similarly, you can also specify a range of ports to be scanned against the target IP address range.



10. The result appears, displaying open port 80 in active hosts, as shown in the screenshot.



11. Now, we will perform a TCP scan for open ports on the target systems.
12. To load the **auxiliary/scanner/portscan/tcp** module, type **use auxiliary/scanner/portscan/tcp** and press **Enter**. Run **show options** command to view module options.



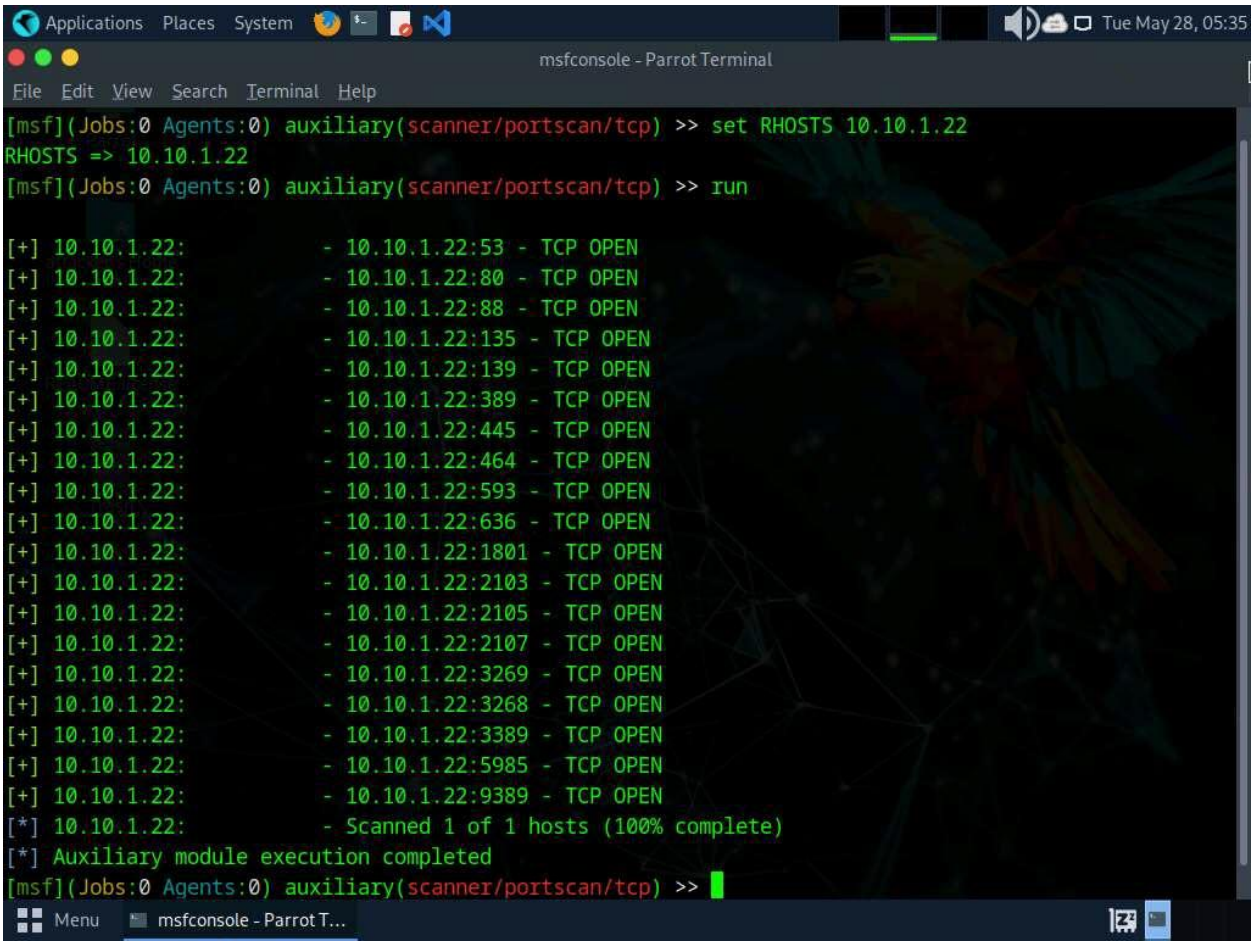
13. Type **set RHOSTS [Target IP Address]** and press **Enter**.

Here, we will perform a TCP scan for open ports on a single IP address (**10.10.1.22**), as scanning multiple IP addresses consumes much time.

14. Type **run** and press **Enter** to discover open TCP ports in the target system.

It will take approximately 20 minutes for the scan to complete.

15. The results appear, displaying all open TCP ports in the target IP address (**10.10.1.22**).



16. Now that we have determined the active hosts on the target network, we can further attempt to determine the OSes running on the target systems. As there are systems in our scan that have port 445 open, we will use the module scanner/smb/version to determine which version of Windows is running on a target and which Samba version is on a Linux host.

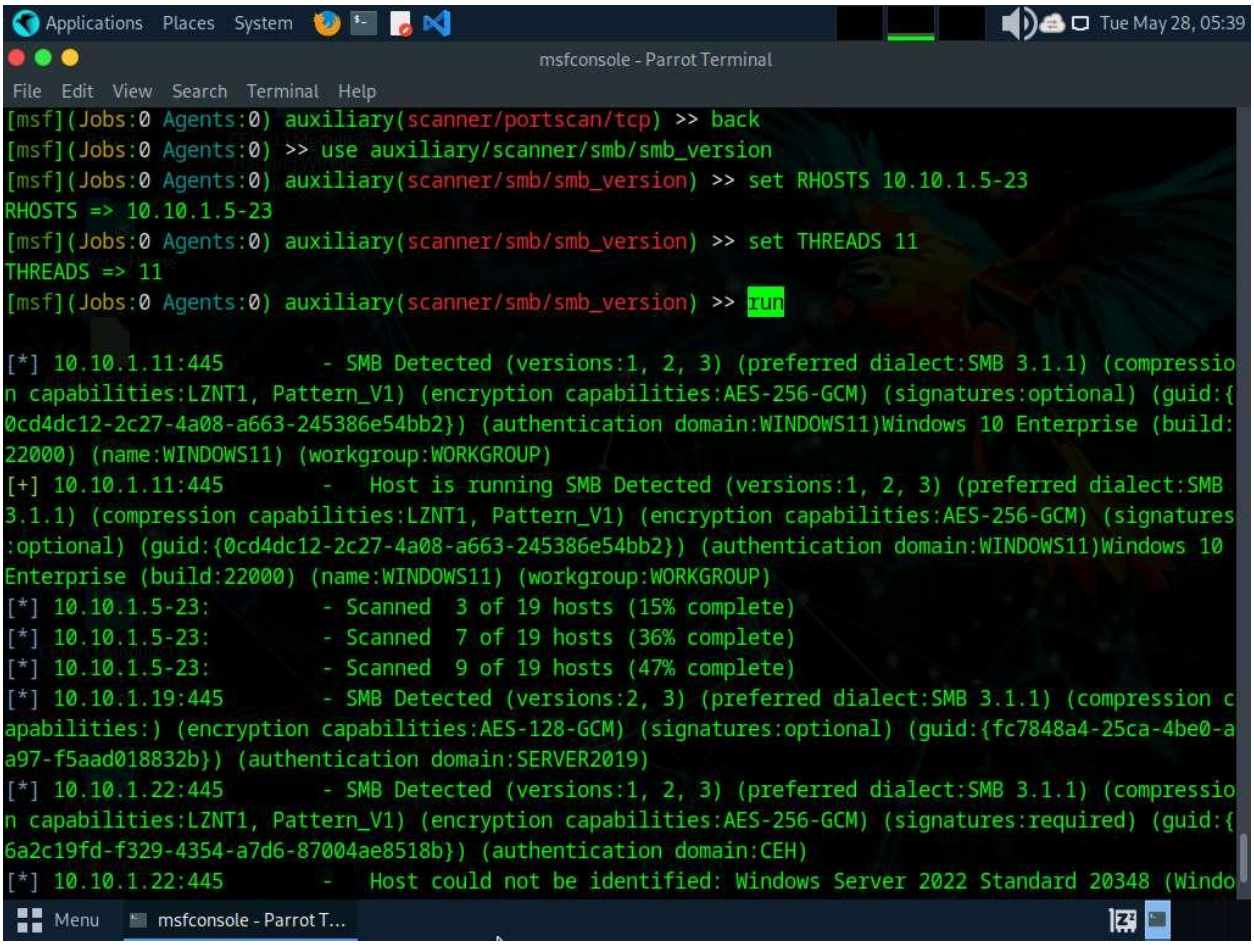
17. To do so, first type **back**, to revert to the msf command line. Then, type **use auxiliary/scanner/smb/smb_version** and hit **enter**.

18. We will use this module to run a SMB version scan against the target IP address range (**10.10.1.5-23**). To do so, issue the below commands:

    - **set RHOSTS 10.10.1.5-23**
    - **set THREADS 11**

19. Type **run** to discover SMB version in the target systems.

20. The result appears, displaying the OS details of the target hosts.



21. You can further explore various modules of Metasploit such as FTP module to identify the FTP version running in the target host.
22. This information can further be used to perform vulnerability analysis on the open services discovered in the target hosts.
23. This concludes the demonstration of gathering information on open ports, a list of services running on active hosts, and information related to OSes, amongst others.
24. Close all open windows and document all the acquired information.

Question 3.5.1.1

Use the Metasploit to scan the target machine. While using Metasploit auxiliary module “auxiliary/scanner/smb/smb_version”, enter the specified range of remote hosts (RHOSTS).