Nmap Basic port Scan

In this room, you explore the fundamentals of port scanning using Nmap—one of the most indispensable tools in network reconnaissance. You'll dive into different scan techniques like TCP Connect (-sT), TCP SYN (-sS), and UDP (-sU) scans, and learn how to interpret port states. Let's get started!

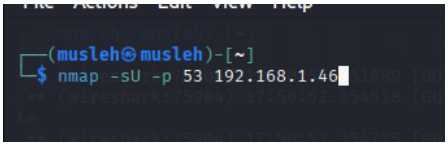
***note I will be using metasploitable2 as a target for scanning for flexibility and better explanation.**

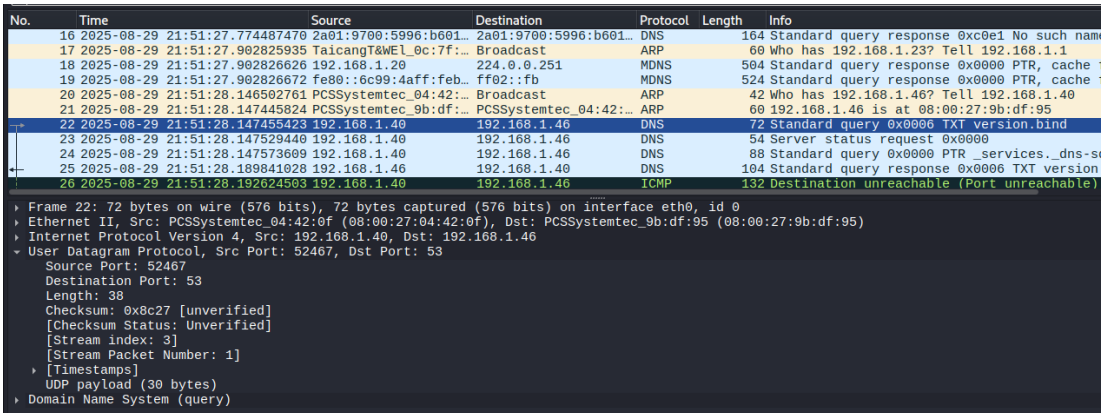
Task 2: TCP and UDP Ports

Which service uses UDP port 53 by default?

Answer: DNS

Explanation: UDP port 53 is reserved for the Domain Name System, used for resolving hostnames to IP addresses.

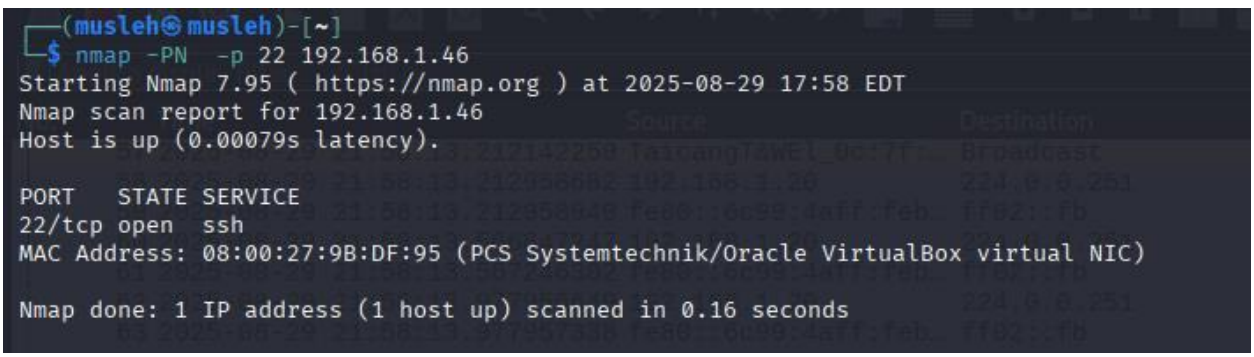


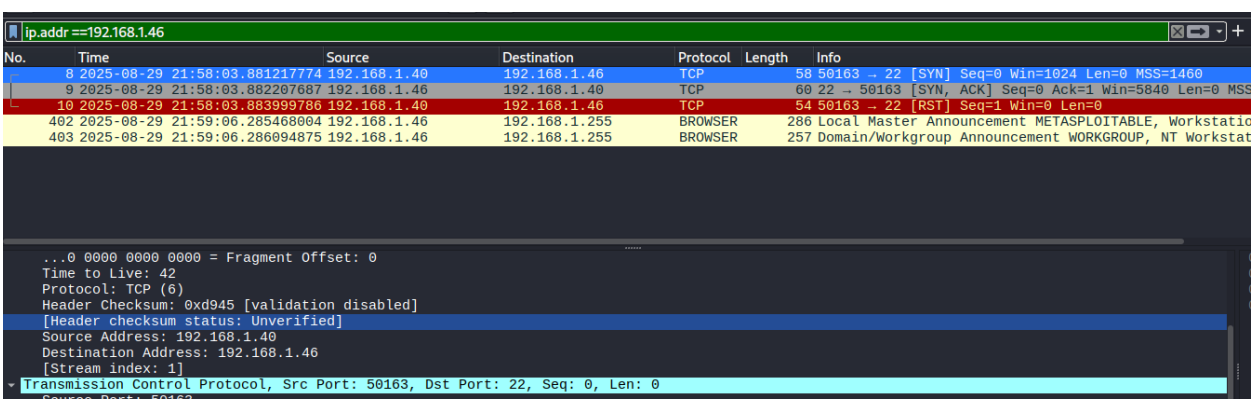


Which service uses TCP port 22 by default?

Answer: SSH

Explanation: TCP port 22 is used by Secure Shell (SSH) for encrypted remote connections.





How many port states does Nmap consider?

Answer: 6

Explanation:

Nmap categorizes ports as open, closed, filtered, unfiltered, open|filtered, closed|filtered. This helps pentesters understand network accessibility.

Which port state is most interesting to a pentester?

Answer: Open

Explanation:

Open ports indicate active services that can potentially be exploited.

Task 3: TCP Flags

What 3 letters represent the Reset flag?

Answer: RST

Explanation: The RST flag immediately terminates or rejects a TCP connection.

Which flag needs to be set to initiate a TCP connection?

Answer: SYN

Explanation:

SYN is the first step of the TCP three-way handshake, signaling the initiation of a connection.

Task 4: TCP Connect Scan

Which port was closed before but now open?

Answer: 110

Explanation:

Port 110, commonly used by POP3 (email retrieval), became available between scans.

What does Nmap guess the service is?

Answer: POP3

Explanation:

Nmap identifies the running service based on standard port assignments.

```
root@ip-10-10-212-74:~#  nmap -sT 10.10.54.201
Starting Nmap 7.80 ( https://nmap.org ) at 2025-08-29 23:29 BST
Stats: 0:00:00 elapsed; 0 hosts completed (0 up), 1 undergoing ARP Ping Scan
ARP Ping Scan Timing: About 100.00% done; ETC: 23:29 (0:00:00 remaining)
Nmap scan report for ip-10-10-54-201.eu-west-1.compute.internal (10.10.54.201)
Host is up (0.0010s latency).
Not shown: 992 closed ports
PORT    STATE SERVICE
22/tcp  open  ssh
25/tcp  open  smtp
80/tcp  open  http
110/tcp open  pop3
111/tcp open  rpcbind
143/tcp open  imap
993/tcp open  imaps
995/tcp open  pop3s
MAC Address: 02:DC:C7:0A:48:41 (Unknown)
```

Task 5: TCP SYN Scan

- **Let's show the difference between normal tcp scan and syn scan**

1- syn scan :

```
┌──(musleh㉿musleh)-[~]
└─$ nmap -sS 192.168.1.46
Starting Nmap 7.95 ( https://nmap.org ) at 2025-08-29 18:35 EDT
Nmap scan report for 192.168.1.46
Host is up (0.00041s latency).
Not shown: 977 closed tcp ports (reset)
```

2095	2025-08-29 22:35:13.378980052	192.168.1.46	192.168.1.40	TCP	60	1309 → 55614 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
2096	2025-08-29 22:35:13.379044097	192.168.1.40	192.168.1.46	TCP	58	55614 → 8090 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
2097	2025-08-29 22:35:13.379228543	192.168.1.46	192.168.1.40	TCP	60	8090 → 55614 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
2098	2025-08-29 22:35:13.379298785	192.168.1.40	192.168.1.46	TCP	58	55614 → 9290 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
2099	2025-08-29 22:35:13.379495855	192.168.1.40	192.168.1.46	TCP	58	55614 → 6839 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
2100	2025-08-29 22:35:13.379672224	192.168.1.46	192.168.1.40	TCP	60	9290 → 55614 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
2101	2025-08-29 22:35:13.379672312	192.168.1.46	192.168.1.40	TCP	60	6839 → 55614 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
2102	2025-08-29 22:35:13.379741964	192.168.1.40	192.168.1.46	TCP	58	55614 → 5002 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
2103	2025-08-29 22:35:13.379948324	192.168.1.40	192.168.1.46	TCP	58	55614 → 5986 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
2104	2025-08-29 22:35:13.380126353	192.168.1.46	192.168.1.40	TCP	60	5002 → 55614 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0

*** as you can see nmap send a syn message then receive a syn ack then it send back rst ack to end up the connection**

2- full tcp connection :

```
┌──(musleh㉿musleh)-[~]
└─$ nmap -sT -p 22 192.168.1.46
Starting Nmap 7.95 ( https://nmap.org ) at 2025-08-29 18:43 EDT
Nmap scan report for 192.168.1.46
Host is up (0.00087s latency).

PORT   STATE SERVICE
22/tcp open  ssh
MAC Address: 08:00:27:9B:DF:95 (PCS Systemtechnik/Oracle VirtualBox virtual NIC)
```

No.	Time	Source	Destination	Protocol	Length	Info
41	2025-08-29 22:43:46.456160461	192.168.1.40	192.168.1.46	TCP	74	53574 → 22 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_
42	2025-08-29 22:43:46.457271920	192.168.1.46	192.168.1.40	TCP	74	22 → 53574 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=
43	2025-08-29 22:43:46.457344599	192.168.1.40	192.168.1.46	TCP	66	53574 → 22 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=18
44	2025-08-29 22:43:46.457725113	192.168.1.40	192.168.1.46	TCP	66	53574 → 22 [RST, ACK] Seq=1 Ack=1 Win=64256 Len=0 TSv

*** here as we can see it establishes a full connection then send a rst/ack to stop the connection**

What is the new open port?

Answer: 6667

Explanation:

TCP SYN scan reveals port 6667 is open

What service name does Nmap guess?

Answer: IRC

Explanation:

Nmap uses its service detection database to identify services running on standard ports.

Task 6: UDP Scan

What UDP port is now open?

Answer: 53

Explanation:

UDP port 53 is open for DNS services; UDP scanning is slower due to its connectionless

-sU (UDP scan): Scans UDP ports, which are connectionless, so Nmap may need to send multiple probes to determine if a port is open or filtered.

-F (fast mode): Scans only the most common ports instead of the full range, making the scan quicker.

-v (verbose): Provides detailed output during the scan, showing progress and host responses.

What service does Nmap name it?

Answer: Domain

Explanation:

Nmap labels UDP port 53 as "domain," which corresponds to DNS.

Task 7: Fine-Tuning Scope and Performance

*** keep those in your mind :**

paranoid (0)

sneaky (1)

polite (2)

normal (3)

aggressive (4)

insane (5)

those are the options for -T argument from T(0-5) which stands for scaning timing .

Option to scan TCP ports between 5000 and 5500?

Answer: -p5000-5500

Explanation:

Specifies a custom range of ports to scan instead of default ports.

```
┌──(musleh㉿musleh)-[~]
└─$ nmap -sS -p 5000-5500 192.168.1.46
Starting Nmap 7.95 ( https://nmap.org ) at 2025-08-29 19:06 EDT
Nmap scan report for 192.168.1.46
Host is up (0.00067s latency).
Not shown: 500 closed tcp ports (reset)
PORT     STATE SERVICE
5432/tcp open  postgresql
MAC Address: 08:00:27:9B:DF:95 (PCS Systemtechnik/Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 6.88 seconds
```

Ensure Nmap runs at least 64 probes simultaneously?

Answer: --min-parallelism=64

Explanation:

Adjusts concurrency to speed up scans by sending multiple probes at once.

Option to make Nmap very slow and 'paranoid'?

Answer: -T0

Explanation:

Sets the timing template to the slowest setting to evade IDS/IPS detection.

Summary

This room teaches core Nmap techniques:

TCP Connect Scan (-sT): Full handshake, straightforward but easily detectable.

TCP SYN Scan (-sS): Half-open scan, stealthier since it never completes the handshake.

UDP Scan (-sU): Slower, used for connectionless services like DNS.

Port States: Nmap classifies ports to guide further enumeration.

Fine-tuning flags: Options like -p, --min-parallelism, and -T0 allow control over scope and speed.