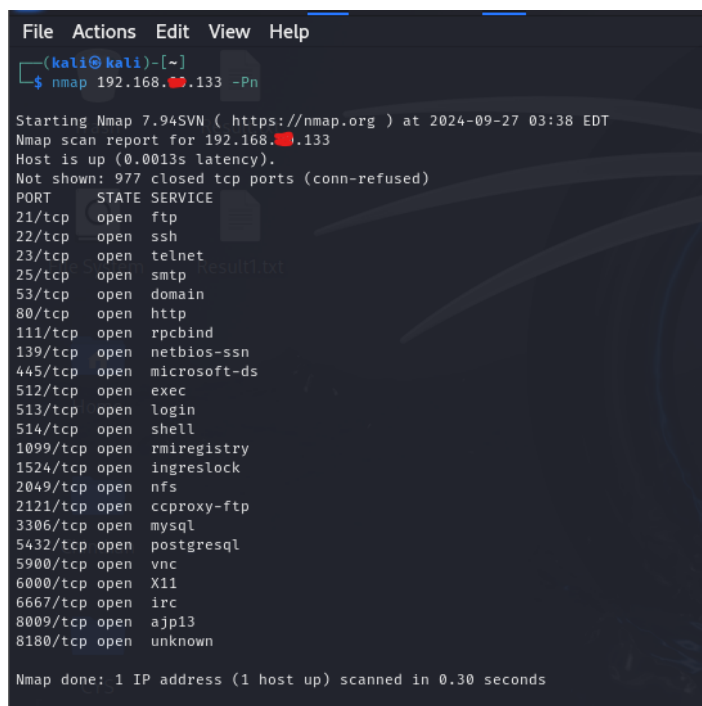


Network Scanning

NMAP:

- **nmap <ip-address> -Pn :**
 - **-Pn:** This flag tells Nmap to skip the ping check, assuming the host is up. Normally, Nmap tries to ping the target to see if it's online, but with -Pn, it skips that step and proceeds with the port scan directly.
 - This can be used for windows OS (Target machine) if host is up because normal nmap scanning (nmap <ip-address>) is blocked by the windows firewall.



```
File Actions Edit View Help
(kali@kali)-[~]
$ nmap 192.168.1.133 -Pn

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 03:38 EDT
Nmap scan report for 192.168.1.133
Host is up (0.0013s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT      STATE SERVICE
21/tcp    open  ftp
22/tcp    open  ssh
23/tcp    open  telnet
25/tcp    open  smtp
53/tcp    open  domain
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
512/tcp   open  exec
513/tcp   open  login
514/tcp   open  shell
1099/tcp  open  rmiregistry
1524/tcp  open  ingreslock
2049/tcp  open  nfs
2121/tcp  open  ccproxy-ftp
3306/tcp  open  mysql
5432/tcp  open  postgresql
5900/tcp  open  vnc
6000/tcp  open  X11
6667/tcp  open  irc
8009/tcp  open  ajp13
8180/tcp  open  unknown

Nmap done: 1 IP address (1 host up) scanned in 0.30 seconds
```

Different Types of Scanning Techniques:

- **Tcp connect scan (-sT): (nmap <ip-address> -sT)**
 - A TCP Connect Scan (-sT) is one of the most basic types of scans in network security. It works by attempting to make a full TCP connection with the target system.
 - SYN: The scanner sends a TCP SYN packet to the target port, initiating the connection.
 - SYN-ACK: If the port is open, the target responds with a SYN-ACK packet, acknowledging the request.

- **ACK:** The scanner sends an ACK packet, completing the connection. After this, the scanner immediately sends a RST (reset) packet to close the connection and move on to scan other ports.

```
(root@kali)-[/home/kali]
└─$ nmap 192.168.1.133 -sT

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:07 EDT
Nmap scan report for 192.168.1.133
Host is up (0.00072s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT      STATE SERVICE
21/tcp    open  ftp
22/tcp    open  ssh
23/tcp    open  telnet
25/tcp    open  smtp
53/tcp    open  domain
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
512/tcp   open  exec
513/tcp   open  login
514/tcp   open  shell
1099/tcp  open  rmiregistry
1524/tcp  open  ingreslock
2049/tcp  open  nfs
2121/tcp  open  ccproxy-ftp
3306/tcp  open  mysql
5432/tcp  open  postgresql
5900/tcp  open  vnc
6000/tcp  open  X11
6667/tcp  open  irc
8009/tcp  open  ajp13
8180/tcp  open  unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 0.38 seconds

(root@kali)-[/home/kali]
```

- **SYN scan (-sS): (nmap <ip-address> -sS)**

- A **SYN Scan (-sS)** is a popular and efficient scanning technique used to check the status of TCP ports. It's often referred to as **half-open scanning** because it doesn't complete the full TCP handshake, making it stealthier than a TCP Connect Scan.
- **SYN:** The scanner sends a TCP SYN packet to the target port, initiating a connection request.
- **SYN-ACK:** If the port is open, the target responds with a SYN-ACK (synchronization-acknowledgment) packet.
- **RST:** Instead of completing the handshake with an ACK packet, the scanner sends an RST (reset) packet to terminate the connection. This prevents a full connection from being established.

```

(root@kali)-[/home/kali]
└─$ nmap 192.168.80.133 -ss

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:09 EDT
Nmap scan report for 192.168.80.133
Host is up (0.0029s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE SERVICE
21/tcp    open  ftp
22/tcp    open  ssh
23/tcp    open  telnet
25/tcp    open  smtp
53/tcp    open  domain
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
512/tcp   open  exec
513/tcp   open  login
514/tcp   open  shell
1099/tcp  open  rmiregistry
1524/tcp  open  ingreslock
2049/tcp  open  nfs
2121/tcp  open  ccproxy-ftp
3306/tcp  open  mysql
5432/tcp  open  postgresql
5900/tcp  open  vnc
6000/tcp  open  X11
6667/tcp  open  irc
8009/tcp  open  ajp13
8180/tcp  open  unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 0.52 seconds

(root@kali)-[/home/kali]

```

- **UDP scan (-sU): (nmap <ip-address> -sU)**

- Scans UDP (User Datagram Protocol) ports to detect open services like DNS, SNMP, and others that use UDP.
- Unlike TCP, UDP is connectionless, making it harder to detect open ports reliably since there's no acknowledgment for open ports.
- Challenges: Often slower because there's no guaranteed response for open ports. Nmap may mark a port as "open|filtered" if it gets no response or "closed" if it receives an ICMP "port unreachable" message.
- Common Uses: Checking for services like DNS (53), SNMP (161), and DHCP (67, 68)

```

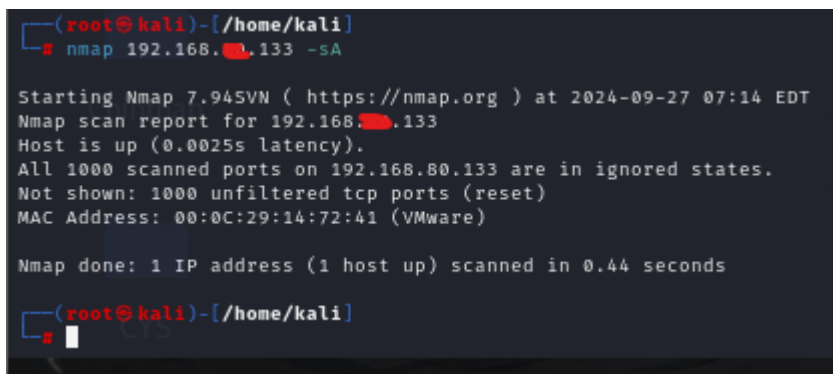
(kali@kali)-[~]
└─$ sudo nmap -sU 192.168.80.133
[sudo] password for kali:
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-26 22:09 EDT
Stats: 0:00:26 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 4.54% done; ETC: 22:19 (0:09:07 remaining)
Stats: 0:02:28 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 16.56% done; ETC: 22:24 (0:12:26 remaining)
Stats: 0:05:54 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 35.86% done; ETC: 22:26 (0:10:31 remaining)
Stats: 0:09:36 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 56.06% done; ETC: 22:26 (0:07:31 remaining)
Stats: 0:13:01 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 76.46% done; ETC: 22:26 (0:04:00 remaining)
Stats: 0:15:59 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 94.26% done; ETC: 22:26 (0:00:58 remaining)
Nmap scan report for 192.168.80.133
Host is up (0.00052s latency).
Not shown: 992 closed udp ports (port-unreach)
PORT      STATE SERVICE
53/udp    open  domain
68/udp    open|filtered dhcp
69/udp    open|filtered tftp
111/udp   open  rpcbind
137/udp   open  netbios-ns
138/udp   open|filtered netbios-dgm
2049/udp  open  nfs
34796/udp open  unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 1033.60 seconds

```

- **ACK scan (-sA): (nmap <ip-address> -sA)**

- A TCP ACK scan sends packets with the ACK flag set to determine if a port is filtered or unfiltered.
- This scan does not detect open ports directly but is used to identify firewall rules and whether ports are filtered (blocked) or unfiltered (allowed).
- Filtered: No response or an ICMP "destination unreachable" message.
- Unfiltered: Receives an RST (Reset) response.
- Common Uses: To check if a firewall allows traffic through certain ports but does not provide information on whether the port is actually open.
- These scans are used for identifying firewall and IDS devices.



```
(root@kali)-[/home/kali]
└─$ nmap 192.168.80.133 -sA

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:14 EDT
Nmap scan report for 192.168.80.133
Host is up (0.0025s latency).
All 1000 scanned ports on 192.168.80.133 are in ignored states.
Not shown: 1000 unfiltered tcp ports (reset)
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 0.44 seconds

(root@kali)-[/home/kali]
└─$
```

- **TCP FIN Scan (-sF): (nmap <ip-address> -sF)**

- The FIN scan sends a packet with the **FIN** (Finish) flag set, which normally signals the end of a TCP connection.
- Closed ports should respond with an **RST (Reset)** packet.
- Open ports typically **ignore the packet**, so no response is received.
- Stealthy because many firewalls and IDS/IPS systems do not log packets with only the FIN flag, making it less likely to trigger alarms.
- Some systems do not respond to this scan in a predictable manner, and it might not work well on newer operating systems like Windows.

```
(root@kali) ~/home/kali
# nmap 192.168.1.133 -sf

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:13 EDT
Nmap scan report for 192.168.1.133
Host is up (0.0011s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE      SERVICE
21/tcp    open|filtered ftp
22/tcp    open|filtered ssh
23/tcp    open|filtered telnet
25/tcp    open|filtered smtp
53/tcp    open|filtered domain
80/tcp    open|filtered http
111/tcp   open|filtered rpcbind
139/tcp   open|filtered netbios-ssn
445/tcp   open|filtered microsoft-ds
512/tcp   open|filtered exec
513/tcp   open|filtered login
514/tcp   open|filtered shell
1099/tcp  open|filtered rmiregistry
1524/tcp  open|filtered ingreslock
2049/tcp  open|filtered nfs
2121/tcp  open|filtered ccproxy-ftp
3306/tcp  open|filtered mysql
5432/tcp  open|filtered postgresql
5900/tcp  open|filtered vnc
6000/tcp  open|filtered x11
6667/tcp  open|filtered irc
8009/tcp  open|filtered ajp13
8180/tcp  open|filtered unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 1.78 seconds

(root@kali) ~/home/kali
```

- **TCP NULL Scan (-sN): (nmap <ip-address> -sN)**

- The NULL scan sends a completely **empty packet** with no flags set.
- Closed ports will respond with an **RST**.
- Open ports will **ignore** the packet.
- Stealthy and can bypass some firewalls that only look for SYN or ACK flags.
- Like the FIN scan, the NULL scan may not work effectively against certain systems (like Windows-based systems) because they might not respond in a standardized way.

```
(root@kali) ~/home/kali
# nmap 192.168.1.133 -sN

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:15 EDT
Nmap scan report for 192.168.1.133
Host is up (0.00087s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE      SERVICE
21/tcp    open|filtered ftp
22/tcp    open|filtered ssh
23/tcp    open|filtered telnet
25/tcp    open|filtered smtp
53/tcp    open|filtered domain
80/tcp    open|filtered http
111/tcp   open|filtered rpcbind
139/tcp   open|filtered netbios-ssn
445/tcp   open|filtered microsoft-ds
512/tcp   open|filtered exec
513/tcp   open|filtered login
514/tcp   open|filtered shell
1099/tcp  open|filtered rmiregistry
1524/tcp  open|filtered ingreslock
2049/tcp  open|filtered nfs
2121/tcp  open|filtered ccproxy-ftp
3306/tcp  open|filtered mysql
5432/tcp  open|filtered postgresql
5900/tcp  open|filtered vnc
6000/tcp  open|filtered x11
6667/tcp  open|filtered irc
8009/tcp  open|filtered ajp13
8180/tcp  open|filtered unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 1.66 seconds

(root@kali) ~/home/kali
```

- **TCP XMAS Scan (-sX): (nmap <ip-address> -sX)**

- The XMAS scan sends a packet with the FIN, PSF, and URG flags set, lighting up the TCP header like a Christmas tree, hence the name.
- Closed ports respond with an RST.
- Open ports ignore the packet, as they do in FIN and NULL scans.
- Stealthy and can slip through poorly configured firewalls.

- Similar to the FIN and NULL scans, it may not work effectively on systems like Windows.

```
(root@kali)-[/home/kali]
└─$ nmap 192.168.1.133 -sX

Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-09-27 07:16 EDT
Nmap scan report for 192.168.1.133
Host is up (0.0020s latency).
Not shown: 977 closed tcp ports (reset)
PORT      STATE SERVICE
21/tcp    open|filtered ftp
22/tcp    open|filtered ssh
23/tcp    open|filtered telnet
25/tcp    open|filtered smtp
53/tcp    open|filtered domain
80/tcp    open|filtered http
111/tcp   open|filtered rpcbind
139/tcp   open|filtered netbios-ssn
445/tcp   open|filtered microsoft-ds
512/tcp   open|filtered exec
513/tcp   open|filtered login
514/tcp   open|filtered shell
1099/tcp  open|filtered rmiregistry
1524/tcp  open|filtered ingreslock
2049/tcp  open|filtered nfs
2121/tcp  open|filtered ccproxy-ftp
3306/tcp  open|filtered mysql
5432/tcp  open|filtered postgresql
5900/tcp  open|filtered vnc
6000/tcp  open|filtered X11
6667/tcp  open|filtered irc
8009/tcp  open|filtered ajp13
8180/tcp  open|filtered unknown
MAC Address: 00:0C:29:14:72:41 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 1.80 seconds

(root@kali)-[/home/kali]
```

All these requires Root Privileges.

WIRESHARK

- Wireshark is a popular network protocol analyzer used to capture, analyze, and troubleshoot network traffic.
- Wireshark can be used when network scanners (like Nmap) are blocked or defended by firewalls.
- Bypassing Scanner Limitations
- Packet Analysis of Allowed Traffic
- Firewall and IDS Behavior Detection
- Traffic Inspection Without Triggering Alerts
- Identifying Anomalies

Toolbars:

1. Main Toolbar

The main toolbar gives you easy access to commonly used features like capturing packets, stopping the capture, saving files, and opening captures.

- **Start Capture:** Begins packet capture.
- **Stop Capture:** Stops an ongoing packet capture.
- **Open:** Opens a previously saved capture file.
- **Save:** Saves the current capture.
- **Restart:** Restarts the capture process without having to stop and then start again.
- **Find:** Allows you to search for specific packets.
- **Preferences:** Opens the settings menu.
- **Help:** Opens Wireshark documentation.

2. Display Filter Toolbar

This is one of the most used toolbars in Wireshark, allowing you to create filters to view specific network traffic based on protocols, addresses, or packet content.

- **Filter Box:** Enter display filters here (e.g., `ip.addr == 192.168.1.1`).
- **Apply:** Applies the display filter.
- **Clear:** Clears the current filter.
- **Expression:** Opens a dialog to help build complex filters.

3. Packet List Toolbar

This toolbar is available when viewing captured packets and provides buttons to navigate through the packet list.

- **First Packet:** Jumps to the first packet.
- **Previous Packet:** Moves to the previous packet.

- **Next Packet:** Moves to the next packet.
- **Last Packet:** Jumps to the last packet.

4. Packet Details Toolbar

When selecting individual packets, this toolbar allows you to navigate and manipulate the detailed information of a packet.

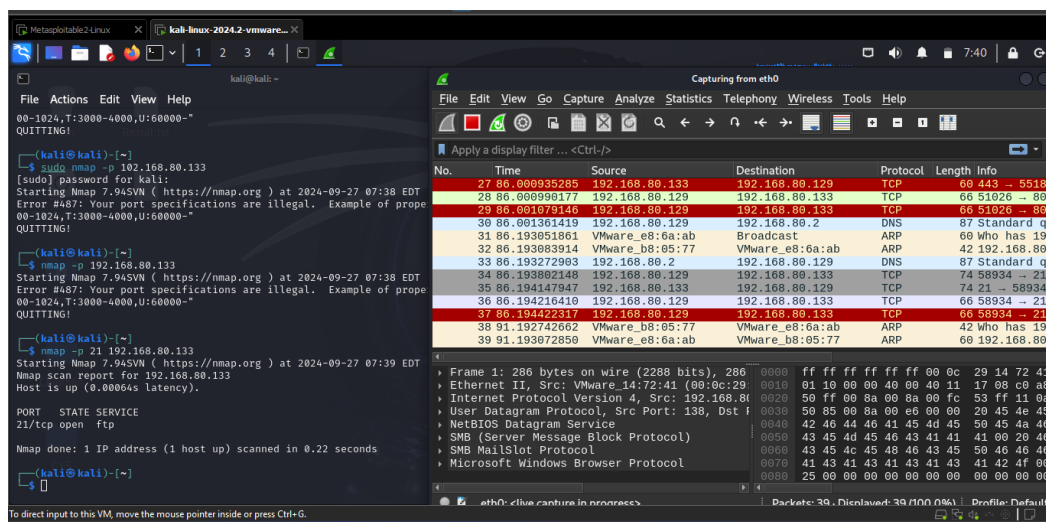
- **Expand All:** Expands all the layers of a packet.
- **Collapse All:** Collapses all the layers of a packet.

5. Status Bar

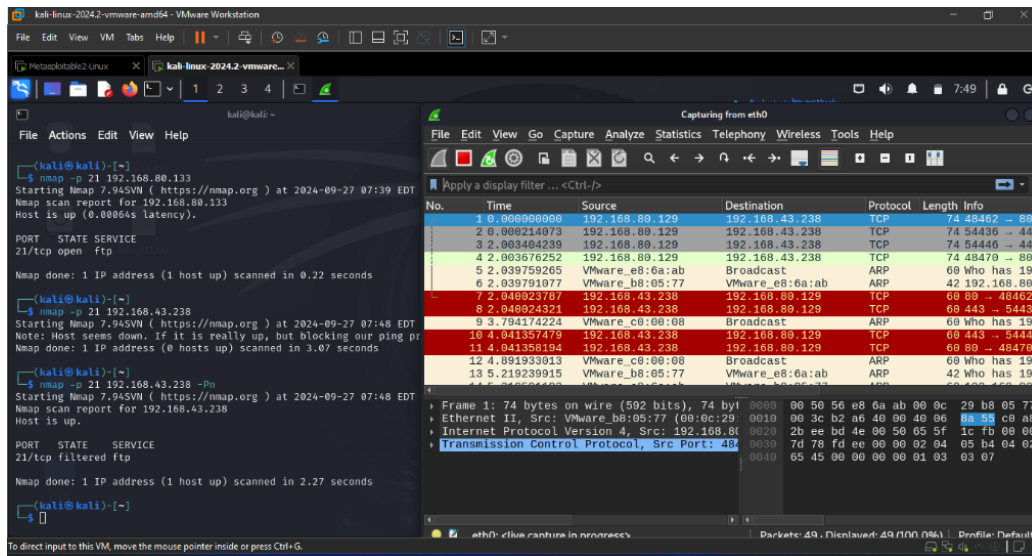
Though not technically a toolbar, the status bar at the bottom provides quick information about the capture such as the number of packets, elapsed capture time, and the applied filter.

You can customize the layout of toolbars by navigating to View > Layout in Wireshark.

- **nmap -p <port-number> <ip-address>**



- When command is typed on the terminal, it captured the packet of TCP handshake of the respective port.



- The above command worked on windows OS.

THANK YOU

Wireshark Functions/operations are continued in Next Documentation Part