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TASK 3

SECURING A WIFI NETWORK

1. Executive Summary

   a. Objective of the Test

   To conduct a Wi-Fi security assessment on my home network, checking for weak passwords, open ports, and unauthorized devices.

   b. Tools Used

   Wireshark – Network traffic capture and analysis.

   Nmap – Network scanning and port enumeration.

   Router Admin Interface – For manual configuration checks and client listings.

   c. Summary of Key Findings

   Wi-Fi password was found to be strong (WPA2).

   Nmap revealed 4 devices with closed ports but a default login page exposed (default credentials).

   No unknown device was found connected to the network.

   No sign of brute-force attempts or DoS activity based on Wireshark traffic.

2. Methodology

   a. Step-by-Step Testing Process

   i. Device Discovery with Nmap

   ```
   sudo nmap -sn 192.168.1.0/24
   ```

   ii. Port Scanning:

   ```
   sudo nmap -sV 192.168.1.(ip address)
   ```

   Ran this on each IP found to identify open ports and services.

   iii. Unauthorized Devices:

   Compared Nmap device list with known devices.

   Cross-checked against the router's admin page.

   iv. Wireshark Analysis:

   Captured network traffic using wireshark and observed protocols used such as HTTP, MDNS, UPnP.

   Looked for insecure traffic or signs of malware.

   v. Router Configuration Review:

   Logged into the router settings via 192.168.1.1.

   Verified encryption WPA2.

Checked for default admin credentials.

3. Vulnerability Findings
   a. Lack of Segmentation
      i. Description: All devices were in the same flat network (no VLANs or guest isolation).
      ii. Severity: Low
      iii. Evidence: Nmap showed full access between all IPs.
      iv. Risk: A compromised device can access others.
      v. Mitigation:
         Use guest networks for IoT and visitors.
         Enable client isolation where possible.

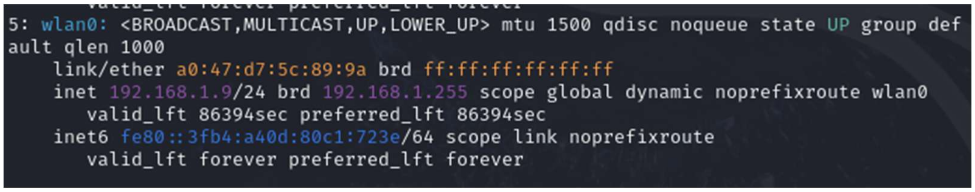
4. Overall Risk Rating

Severity	Count
High	0
Medium	0
Low	1

5. Recommendations
   i. Change Wi-Fi default password and audit connected devices weekly.
   ii. Update router and device firmware regularly.
   iii. Set up guest network for IoT and visitor devices.
   iv. Perform regular Nmap scans for rogue devices or services.

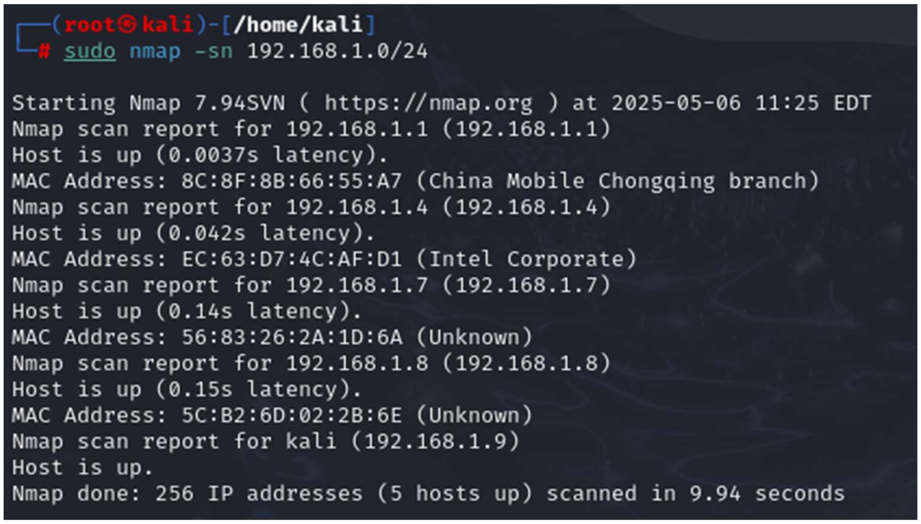
6. Appendix

Screenshots.



```
      valid_lft forever preferred_lft forever
5: wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group def
ault qlen 1000
    link/ether a0:47:d7:5c:89:9a brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.9/24 brd 192.168.1.255 scope global dynamic noprefixroute wlan0
       valid_lft 86394sec preferred_lft 86394sec
    inet6 fe80::3fb4:a40d:80c1:723e/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

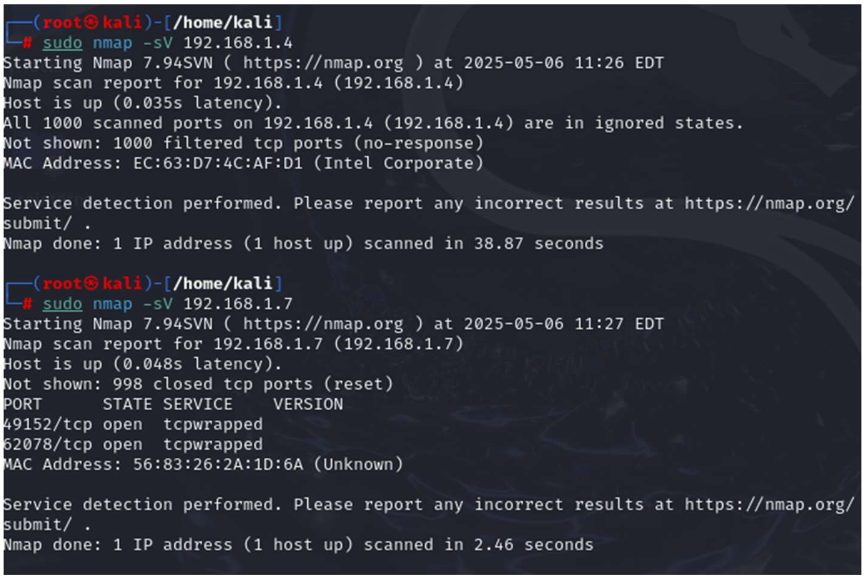
IP address given by the WiFi Adapter



```
┌──(root㉿kali)-[/home/kali]
└─# sudo nmap -sn 192.168.1.0/24

Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-06 11:25 EDT
Nmap scan report for 192.168.1.1 (192.168.1.1)
Host is up (0.0037s latency).
MAC Address: 8C:8F:8B:66:55:A7 (China Mobile Chongqing branch)
Nmap scan report for 192.168.1.4 (192.168.1.4)
Host is up (0.042s latency).
MAC Address: EC:63:D7:4C:AF:D1 (Intel Corporate)
Nmap scan report for 192.168.1.7 (192.168.1.7)
Host is up (0.14s latency).
MAC Address: 56:83:26:2A:1D:6A (Unknown)
Nmap scan report for 192.168.1.8 (192.168.1.8)
Host is up (0.15s latency).
MAC Address: 5C:B2:6D:02:2B:6E (Unknown)
Nmap scan report for kali (192.168.1.9)
Host is up.
Nmap done: 256 IP addresses (5 hosts up) scanned in 9.94 seconds
```

Active devices on my WiFi Network

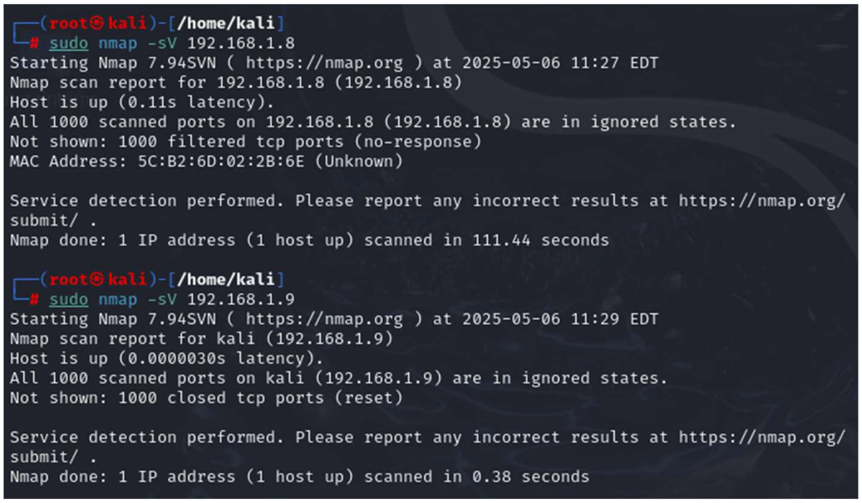


```
┌──(root㉿kali)-[/home/kali]
└─# sudo nmap -sV 192.168.1.4
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-06 11:26 EDT
Nmap scan report for 192.168.1.4 (192.168.1.4)
Host is up (0.035s latency).
All 1000 scanned ports on 192.168.1.4 (192.168.1.4) are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: EC:63:D7:4C:AF:D1 (Intel Corporate)

Service detection performed. Please report any incorrect results at https://nmap.org/
submit/ .
Nmap done: 1 IP address (1 host up) scanned in 38.87 seconds

┌──(root㉿kali)-[/home/kali]
└─# sudo nmap -sV 192.168.1.7
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-06 11:27 EDT
Nmap scan report for 192.168.1.7 (192.168.1.7)
Host is up (0.048s latency).
Not shown: 998 closed tcp ports (reset)
PORT      STATE SERVICE    VERSION
49152/tcp open  tcpwrapped
62078/tcp open  tcpwrapped
MAC Address: 56:83:26:2A:1D:6A (Unknown)

Service detection performed. Please report any incorrect results at https://nmap.org/
submit/ .
Nmap done: 1 IP address (1 host up) scanned in 2.46 seconds
```



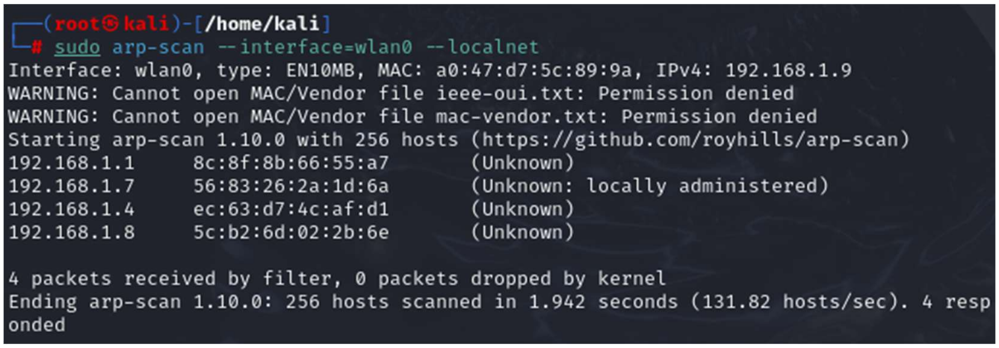
```
┌──(root㉿kali)-[/home/kali]
└─# sudo nmap -sV 192.168.1.8
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-06 11:27 EDT
Nmap scan report for 192.168.1.8 (192.168.1.8)
Host is up (0.11s latency).
All 1000 scanned ports on 192.168.1.8 (192.168.1.8) are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: 5C:B2:6D:02:2B:6E (Unknown)

Service detection performed. Please report any incorrect results at https://nmap.org/
submit/ .
Nmap done: 1 IP address (1 host up) scanned in 111.44 seconds

┌──(root㉿kali)-[/home/kali]
└─# sudo nmap -sV 192.168.1.9
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-06 11:29 EDT
Nmap scan report for kali (192.168.1.9)
Host is up (0.0000030s latency).
All 1000 scanned ports on kali (192.168.1.9) are in ignored states.
Not shown: 1000 closed tcp ports (reset)

Service detection performed. Please report any incorrect results at https://nmap.org/
submit/ .
Nmap done: 1 IP address (1 host up) scanned in 0.38 seconds
```

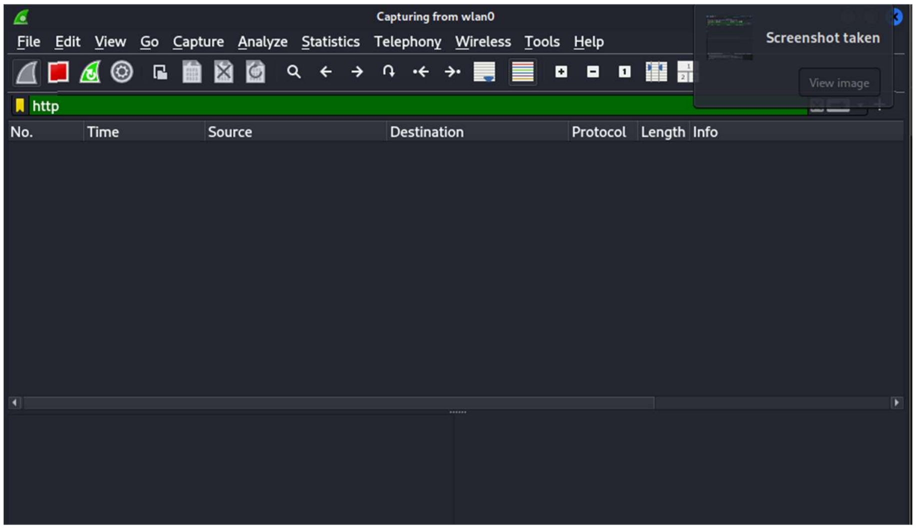
Individual scanning of open ports and services on devices on the network.



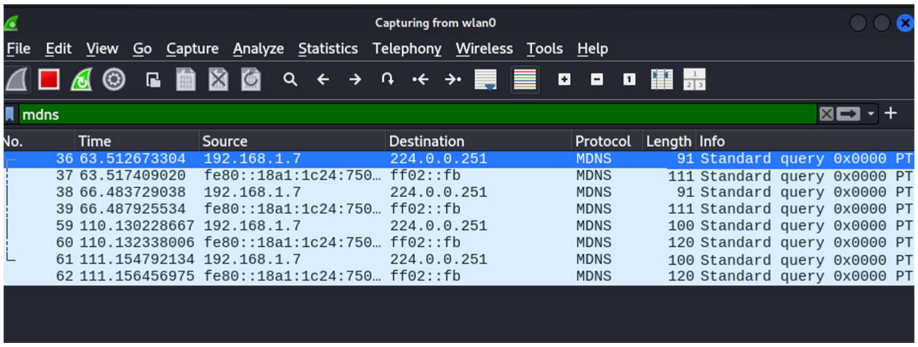
```
┌──(root㉿kali)-[/home/kali]
└─# sudo arp-scan --interface=wlan0 --localnet
Interface: wlan0, type: EN10MB, MAC: a0:47:d7:5c:89:9a, IPv4: 192.168.1.9
WARNING: Cannot open MAC/Vendor file ieee-oui.txt: Permission denied
WARNING: Cannot open MAC/Vendor file mac-vendor.txt: Permission denied
Starting arp-scan 1.10.0 with 256 hosts (https://github.com/royhills/arp-scan)
192.168.1.1     8c:8f:8b:66:55:a7       (Unknown)
192.168.1.7     56:83:26:2a:1d:6a       (Unknown: locally administered)
192.168.1.4     ec:63:d7:4c:af:d1       (Unknown)
192.168.1.8     5c:b2:6d:02:2b:6e       (Unknown)

4 packets received by filter, 0 packets dropped by kernel
Ending arp-scan 1.10.0: 256 hosts scanned in 1.942 seconds (131.82 hosts/sec). 4 resp
onded
```

Scanning my local subnet for active IP/MAC addresses using arp-scan

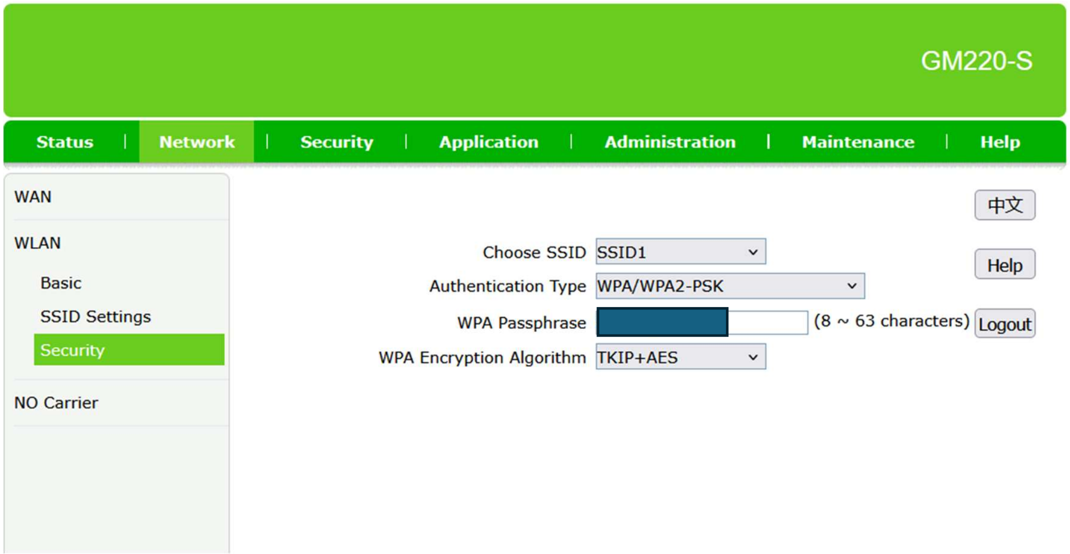


```
http
No.     Time     Source     Destination     Protocol  Length  Info
```



```
mdns
No.       Time         Source                  Destination   Protocol  Length Info
       36 63.512673304  192.168.1.7            224.0.0.251   MDNS         91 Standard query 0x0000 PT
       37 63.517409020  fe80::18a1:1c24:750…   ff02::fb      MDNS        111 Standard query 0x0000 PT
       38 66.483729038  192.168.1.7            224.0.0.251   MDNS         91 Standard query 0x0000 PT
       39 66.487925534  fe80::18a1:1c24:750…   ff02::fb      MDNS        111 Standard query 0x0000 PT
       59 110.130228667 192.168.1.7            224.0.0.251   MDNS        100 Standard query 0x0000 PT
       60 110.132338006 fe80::18a1:1c24:750…   ff02::fb      MDNS        120 Standard query 0x0000 PT
       61 111.154792134 192.168.1.7            224.0.0.251   MDNS        100 Standard query 0x0000 PT
       62 111.156456975 fe80::18a1:1c24:750…   ff02::fb      MDNS        120 Standard query 0x0000 PT
```

Filtering protocols, HTTP – viewing if any unencrypted traffic is visible and MDNS – from smart devices.


GM220-S
Status | Network | Security | Application | Administration | Maintenance | Help
WAN
WLAN
Basic
SSID Settings
Security
NO Carrier
中文
Help
Logout

Choose SSID: SSID1

Authentication Type: WPA/WPA2-PSK

WPA Passphrase: [redacted] (8 ~ 63 characters)

WPA Encryption Algorithm: TKIP+AES

Admin Interface on router