Week 3: Network Scanning, Footprinting and Enumeration

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1.Identifying Target IP Range:

- Objective: Determine the target IP range for scanning
- Command: ip a | grep inet
- Analysis: Identifies the network subnet for scanning

2.Performing Ping Scan :

- Objective: Identify active hosts within the target IP range.
- Command: nmap -sn 44.228.249.3
- Analysis: Displays active devices on the network using ICMP packets.

3. Performing Port Scanning:

- Objective: Identify open ports on the active hosts
- Command: nmap -p- 44.228.249.3
- Analysis: Scans all 65,535 ports to detect open ones.

4. Service Enumeration:

- Objective: Detect the version of services running on open ports.
- Command: nmap -sV 44.228.249.3
- Analysis: Identifies service versions and helps in vulnerability detection.

5. Banner Grabbing:

- Objective: Extract banners from open ports
- Command: nmap --script=banner 44.228.249.3
- Analysis: Provides software details that may contain vulnerabilities.

6. OS Fingerprinting:

- Objective: Identify the operating system of the target.
- Command: nmap -O 44.228.249.3
- Analysis: Determines if the target is Windows, Linux, or another OS.

7. Footprinting:

- Objective: Domain Gathering Information
- Command: dig testphp.vulnweb.com
  (or)
- Command: nslookup teestphp.vulnweb.com
- Analysis: Provides domain owner details and DNS records.

8. Vulnerability Assessment:

- Objective: To find the vulnerability using nmap
- Command: nmap --script=vuln 44.228.249.3
- Analysis: Identifies security flaws and misconfigurations.

9. Comparing Nmap with Other Open Source Tools:

- Nmap - it is used for Scanning, Enumeration, Vulnerability Analysis
- Nikto - it is used for Web vulnerability scanner
- OpenVAS – it is used for full vulnerability assessment
- Metasploit – it is used for Exploit and penetration testing
- Masscan - it is used for high speed network scanning

10. **Performing 5 More Active Scans and Analysis:**

Scan 1: TCP SYN Scan:

- Command: nmap -sS 44.228.249.3
- Analysis: Stealth scan to detect open TCP ports.

Scan 2: UDP Scan:

- Command: nmap -sU 44.228.249.3
- Analysis: Identifies UDP-based services like DNS and SNMP.

Scan 3: Aggressive Scan:

- Command: nmap -A 44.228.249.3
- Analysis: Performs multiple scans in one command.

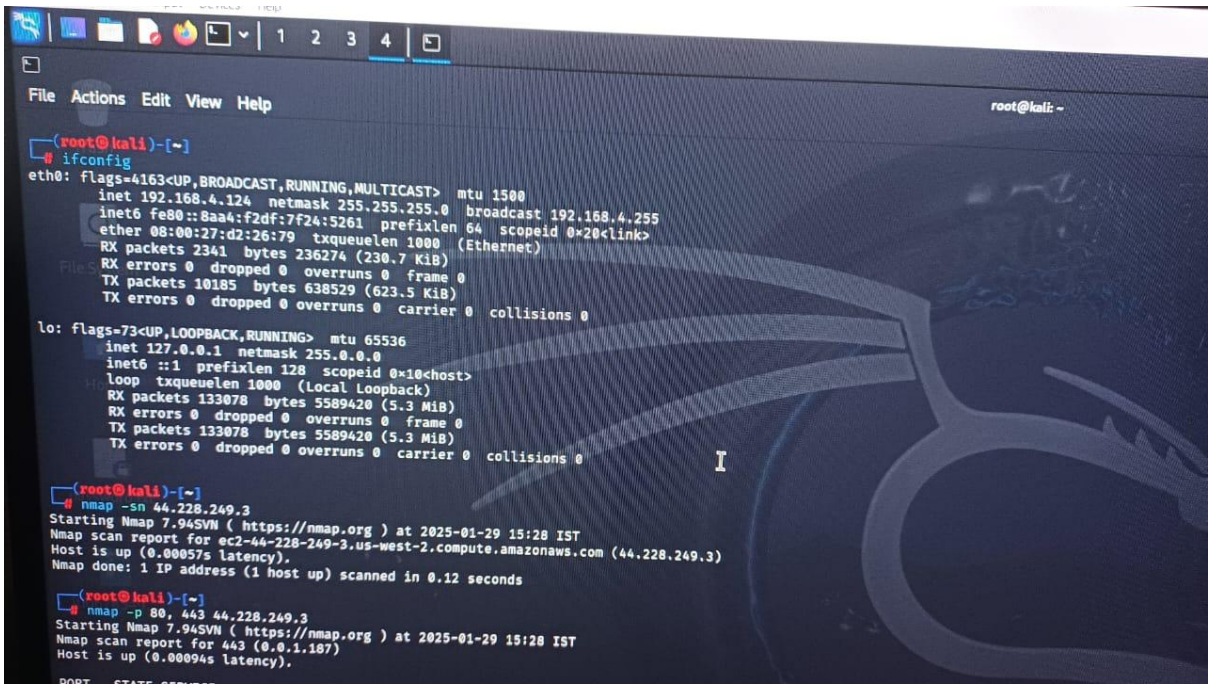
Scan 4: Evading Firewalls with Fragmentation:

- Command: nmap -f 44.228.249.3
- Analysis: Helps bypass intrusion detection systems.

Scan 5: Spoofing Source IP for Anonymous Scanning

- Command: nmap -S 192.168.4.124 44.228.249.3
- Analysis: Hides the real scanner identity.

<u>Screenshots:</u>



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File  Actions  Edit  View  Help                                   root@kali: ~

┌──(root㉿kali)-[~]
└─# nmap -sn 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:28 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.00057s latency).
Nmap done: 1 IP address (1 host up) scanned in 0.12 seconds

┌──(root㉿kali)-[~]
└─# nmap -p 80, 443 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:28 IST
Nmap scan report for 443 (0.0.1.187)
Host is up (0.00094s latency).

PORT   STATE SERVICE
80/tcp open  http

Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0011s latency).

PORT   STATE SERVICE
80/tcp open  http

Nmap done: 2 IP addresses (2 hosts up) scanned in 0.36 seconds

┌──(root㉿kali)-[~]
└─# nmap -p 443 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:29 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.00057s latency).

PORT    STATE SERVICE
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 0.16 seconds

┌──(root㉿kali)-[~]
└─# nmap -p- 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:29 IST
Stats: 0:00:37 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan
SYN Stealth Scan Timing: About 18.93% done; ETC: 15:32 (0:02:38 remaining)
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0011s latency).
Not shown: 65532 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https
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80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 135.05 seconds

┌──(root㉿kali)-[~]
└─# nmap -sV 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:32 IST
Stats: 0:00:42 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.24% done; ETC: 15:33 (0:00:00 remaining)
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.00096s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE    VERSION
80/tcp  open  http-proxy DansGuardian HTTP proxy
81/tcp  open  http-proxy DansGuardian HTTP proxy
443/tcp open  https?

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 49.22 seconds

┌──(root㉿kali)-[~]
└─# nmap --script=banner 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:33 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0011s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 21.05 seconds

┌──(root㉿kali)-[~]
└─# nmap -O 44.228.249.3
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Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 49.22 seconds

┌──(root㉿kali)-[~]
└─# nmap --script=banner 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:33 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0011s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 21.05 seconds

┌──(root㉿kali)-[~]
└─# nmap -O 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:34 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0014s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose|storage-misc
Running (JUST GUESSING): Linux 4.X|5.X|2.6.X|3.X (97%), Synology DiskStation Manager 5.X (91%)
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5 cpe:/o:linux:linux_kernel:2.6.32 cpe:/o:linux:linux_kernel:3 cpe:/a:synology:diskstation_manager:5
Aggressive OS guesses: Linux 4.15 - 5.8 (97%), Linux 5.0 - 5.4 (97%), Linux 5.0 - 5.5 (95%), Linux 5.4 (91%), Linux 2.6.32 (91%), Linux 3.10 - 4.11 (91%), Linux 3
5644 (91%), Linux 2.6.32 - 3.10 (90%)
No exact OS matches for host (test conditions non-ideal).

OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 11.70 seconds

┌──(root㉿kali)-[~]
└─# whois testphp.vulneb.com
No match for "TESTPHP.VULNEB.COM".
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The Registry database contains ONLY .COM, .NET, .EDU domains and
Registrars.

┌──(root㉿kali)-[~]
└─# nslookup testphp.vulnweb.com
Server:         8.8.8.8
Address:        8.8.8.8#53

Non-authoritative answer:
Name:   testphp.vulnweb.com
Address: 44.228.249.3

┌──(root㉿kali)-[~]
└─# dig testphp.vulnweb.com

; <<>> DiG 9.20.1-1-Debian <<>> testphp.vulnweb.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 16891
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;testphp.vulnweb.com.           IN      A

;; ANSWER SECTION:
testphp.vulnweb.com.    2601    IN      A       44.228.249.3

;; Query time: 28 msec
;; SERVER: 8.8.8.8#53(8.8.8.8) (UDP)
;; WHEN: Wed Jan 29 15:38:52 IST 2025
;; MSG SIZE  rcvd: 64
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File  Actions  Edit  View  Help
;testphp.vulnweb.com.           IN      A

;; ANSWER SECTION:
testphp.vulnweb.com.    2601    IN      A       44.228.249.3

;; Query time: 28 msec
;; SERVER: 8.8.8.8#53(8.8.8.8) (UDP)
;; WHEN: Wed Jan 29 15:38:52 IST 2025
;; MSG SIZE  rcvd: 64

┌──(root㉿kali)-[~]
└─# nmap --script=vuln 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:39 IST
Pre-scan script results:
| broadcast-avahi-dos:
|   Discovered hosts:
|     224.0.0.251
|   After NULL UDP avahi packet DoS (CVE-2011-1002).
|_  Hosts are all up (not vulnerable).
Stats: 0:01:22 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
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Stats: 0:07:39 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.67% done; ETC: 15:47 (0:00:01 remaining)
Stats: 0:08:41 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.67% done; ETC: 15:48 (0:00:02 remaining)
Stats: 0:10:58 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.67% done; ETC: 15:50 (0:00:02 remaining)

┌──(root㉿kali)-[~]
└─# nmap -sS 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:50 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0020s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 5.38 seconds

┌──(root㉿kali)-[~]
└─# nmap -sU  44.228.149.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:51 IST
Stats: 0:00:54 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 15.75% done; ETC: 15:57 (0:04:54 remaining)
Stats: 0:03:05 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 30.85% done; ETC: 16:01 (0:06:55 remaining)
Stats: 0:04:31 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 35.20% done; ETC: 16:04 (0:08:19 remaining)
Stats: 0:05:20 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 37.40% done; ETC: 16:05 (0:08:56 remaining)
```

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File  Actions  Edit  View  Help                                   root@kali: ~

┌──(root㉿kali)-[~]
└─# nmap -A 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:55 IST
Stats: 0:01:25 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.53% done; ETC: 15:56 (0:00:00 remaining)
Stats: 0:01:25 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 99.53% done; ETC: 15:56 (0:00:00 remaining)
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.0016s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE    VERSION
80/tcp  open  http-proxy DansGuardian HTTP proxy
|_http-server-header: squid/5.9
| http-open-proxy: Potentially OPEN proxy.
|_Methods supported: HEAD CONNECTION
|_http-title: Problem loading page
81/tcp  open  http-proxy DansGuardian HTTP proxy
|_http-server-header: squid/5.9
| http-open-proxy: Potentially OPEN proxy.
|_Methods supported: HEAD CONNECTION
443/tcp open  https?
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose|storage-misc
Running (JUST GUESSING): Linux 4.X|5.X|2.6.X|3.X (97%), Synology DiskStation Manager 5.X (89%)
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5 cpe:/o:linux:linux_kernel:2.6.32 cpe:/o:linux:linux_kernel:3 cpe:/a:synology:diskstation_manager:5.2
Aggressive OS guesses: Linux 4.15 - 5.8 (97%), Linux 5.0 - 5.4 (97%), Linux 5.0 - 5.5 (94%), Linux 2.6.32 (91%), Linux 3.10 - 4.11 (91%), Linux 3.2 - 4.9 (91%), Linux 3.4 - 3.
%), Linux 2.6.39 (90%)
No exact OS matches for host (test conditions non-ideal).
Network Distance: 1 hop

TRACEROUTE (using port 443/tcp)
HOP RTT     ADDRESS
1   1.96 ms ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)

OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 222.25 seconds

┌──(root㉿kali)-[~]
└─# nmap -f 44.228.249.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:59 IST
Stats: 0:01:19 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan
SYN Stealth Scan Timing: About 27.00% done; ETC: 16:04 (0:03:31 remaining)
Stats: 0:02:55 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan
SYN Stealth Scan Timing: About 61.00% done; ETC: 16:04 (0:01:52 remaining)
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.27s latency).
All 1000 scanned ports on ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3) are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)

Nmap done: 1 IP address (1 host up) scanned in 284.19 seconds

┌──(root㉿kali)-[~]
└─# nmap -S 192.168.1.100 44.228.249.3
WARNING: If -S is being used to fake your source address, you may also have to use -e <interface> and -Pn .  If you are using it to specify your real source address, you can ign
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 16:05 IST
Could not figure out what device to send the packet out on with the source address you gave me!  If you are trying to sp00f your scan, this is normal, just give the -e eth0 or -
 find it kind of fishy.
QUITTING!

┌──(root㉿kali)-[~]
└─# nmap -S 192.168.4.124  44.228.249.3
WARNING: If -S is being used to fake your source address, you may also have to use -e <interface> and -Pn .  If you are using it to specify your real source address, you can ignor
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 16:07 IST
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.00094s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
81/tcp  open  hosts2-ns
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 5.77 seconds
```

```
Nmap done: 1 IP address (1 host up) scanned in 5.38 seconds

┌──(root㉿kali)-[~]
└─# nmap -sU  44.228.149.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-01-29 15:51 IST
Stats: 0:00:54 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 15.75% done; ETC: 15:57 (0:04:54 remaining)
Stats: 0:03:05 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 30.85% done; ETC: 16:01 (0:06:55 remaining)
Stats: 0:04:31 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 35.20% done; ETC: 16:04 (0:08:19 remaining)
Stats: 0:05:20 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 37.40% done; ETC: 16:05 (0:08:56 remaining)
Stats: 0:08:51 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 46.65% done; ETC: 16:10 (0:10:08 remaining)
Stats: 0:11:34 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 53.90% done; ETC: 16:12 (0:09:54 remaining)
Stats: 0:20:05 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 76.55% done; ETC: 16:17 (0:06:09 remaining)
Stats: 0:20:10 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 76.70% done; ETC: 16:17 (0:06:08 remaining)
Stats: 0:24:20 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 87.70% done; ETC: 16:19 (0:03:25 remaining)
Stats: 0:24:21 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 87.75% done; ETC: 16:19 (0:03:24 remaining)
Stats: 0:26:20 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 92.85% done; ETC: 16:19 (0:02:02 remaining)
Stats: 0:27:42 elapsed; 0 hosts completed (1 up), 1 undergoing UDP Scan
UDP Scan Timing: About 96.55% done; ETC: 16:20 (0:00:59 remaining)
Nmap scan report for ec2-44-228-149-3.us-west-2.compute.amazonaws.com (44.228.149.3)
Host is up (0.00075s latency).
Not shown: 998 open|filtered udp ports (no-response)
PORT    STATE  SERVICE
80/udp  closed http
443/udp closed https

Nmap done: 1 IP address (1 host up) scanned in 1741.59 seconds
┌──(root㉿kali)-[~]
```

Conclusion:

The tasks performed provided insights into identifying active hosts, open ports, service versions, and vulnerabilities within a network. The comparison with other tools further reinforced the effectiveness of Nmap in network security analysis. The findings can be used to strengthen security measures and mitigate potential threats.
