3. Scanning Networks

HACKER SCHOOL™

ETHICAL HACKING

Designed by Freepik

Theory

Scanning

Scanning is a process of identifying network and service-related information by communicating with the target. Scanning helps in identifying IP/Hostnames, Ports, Services running on ports, Live hosts, Vulnerable services running on the target network.

Types of Scanning

Different number of scanning procedures are used with the objective to identify hosts, ports, and services in the target network. One of the most common types scanning methods that are available.

Network Scanning

During the network scanning process, attackers gather a list of IP addresses of computers that are live on the target network. The job of the attacker will be easy if he/she can analyze the network structure and services running on each machine.

List of Network Scanners

- Angry IP Scanner
- Advanced IP Scanner
- Netdiscover
- Autoscan
- hping3
- Nmap

List of Network Scan Methods

- Ping Sweep
- Arp Scan

What Are Ports and Port Numbers

Ports are virtual entry points to any digital device; devices can communicate with one to another using port, there are virtually 65535 ports available in every device, those can be identified with port numbers, ranging from 0 to 65535.

0	1023	Well known ports
1024	49135	Random ports
49136	65535	Experimental ports

Port Scanning

Port scanning is a technique where the attacker will send communication probes to targets to see how the target is responding to them, based on the response attacker will determine what ports are open and several other port details, like service running on the port numbers, and OS the target is running.

List of Port scanners

- Nmap
- SuperScan
- Strobe
- Zenmap

List of Port Scan methods

- SYN Scan/Stealth Scan/
- TCP Connect Scan
- ACK Scan
- XMAS Scan
- FIN Scan
- NULL Scan
- OS Detection Scan
- Script Scan
- UDP Scan
- Service Detection Scan

Few Well-Known Ports

Application	Port Number(s)	Application	Port Number(s)
FTP	20–21	DNS	53
Telnet	23	IRC	194
SMTP	25	POP3	110
DNS	53	SNMP	161
HTTP	80	HTTPS	443
SSH	22	NetBIOS	139
TFTP	69	SQL	156

For details on other port numbers and services refer RFC-1700

Live Host identification scan

Identifying the turned-on computers by sending ICMP packets or ARP packets or some other kind of packets is called Live Host Identification Scan.

ICMP

ICMP stands for Internet Control Messaging Protocol; this is widely used for internet communication troubleshooting or to generate errors related to IP operations, this will send packets to the target machine and will see whether the packets are delivered or not.

TCP

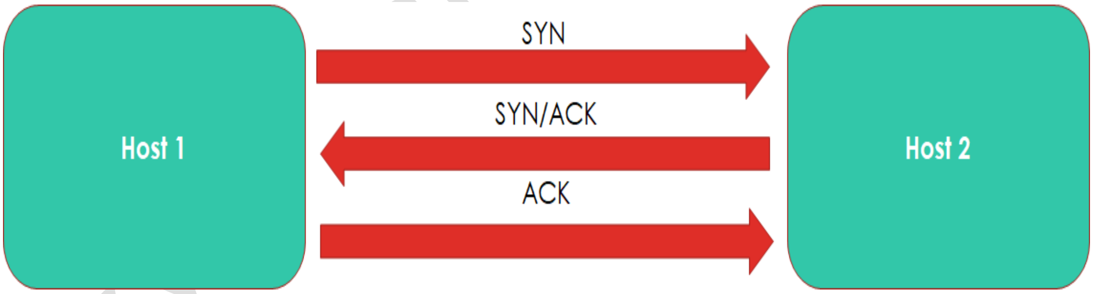
Transmission Control Protocol (TCP), which is a widely used protocol for data transmission over a network. This protocol establishes a reliable connection between two hosts before transmitting data, to ensure that data transmitted over the network reaches the destination without fail. TCP also known as a connection-oriented protocol, establishes a reliable connection between sender and receiver. TCP provides error and flow control mechanisms which help in orderly transmission of data and retransmission of lost packets.

UDP

UDP stands for User Datagram Protocol, which is connectionless protocol, mostly used for connections that can tolerate data loss. UDP is used by applications on the internet that offer voice and video communications, which can suffer some data loss without adversely affecting the quality. UDP does not provide error and flow control mechanisms because of which it does not require a connection before transmitting data over the network.

TCP 3-way Handshake

To start a proper TCP conversation, the sender and receiver perform 3-way handshake before exchanging data over the network. It is a process used by two hosts to agree upon some protocol stack to start sharing data. Following image represents the process of 3-way handshake.



TCP COMMUNICATION FLAGS

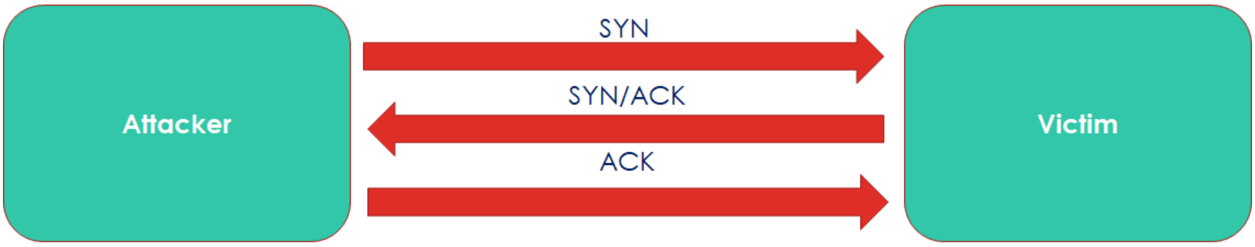
1. **SYN** (Synchronize): SYN flags will be used to initiate a data transfer of the start of a communication process.
2. **ACK** (Acknowledgement): ACK flags will be used to send the receipt of successful packet transmission.
3. **FIN** (Finish): FIN flags will be used to close or finish an existed packet transmission. No more packets to be received.
4. **RST** (Reset): RST flags will be used to terminate or reset a connection.
5. **URG** (Urgent): Data in this flagged packet should be processed immediately.
6. **PSH** (Push): Sends all buffered data immediately.

Types of Port Scanning Techniques

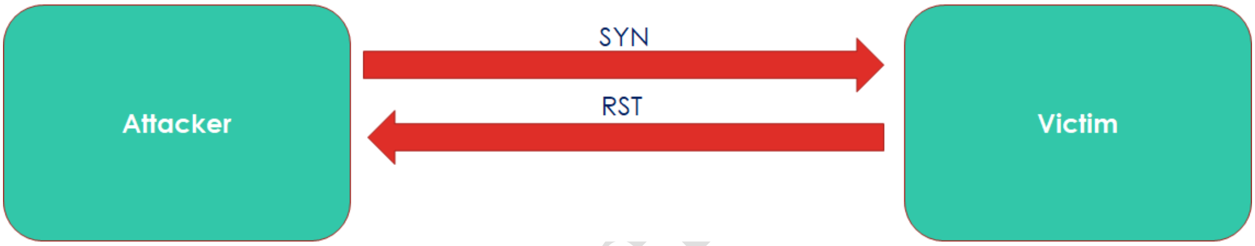
- **TCP Connect Scan / Full Open Scan**

  Nmap directly communicates with the operating system to establish a connection with the target machine and port by issuing the connect system call.

Port Is Open



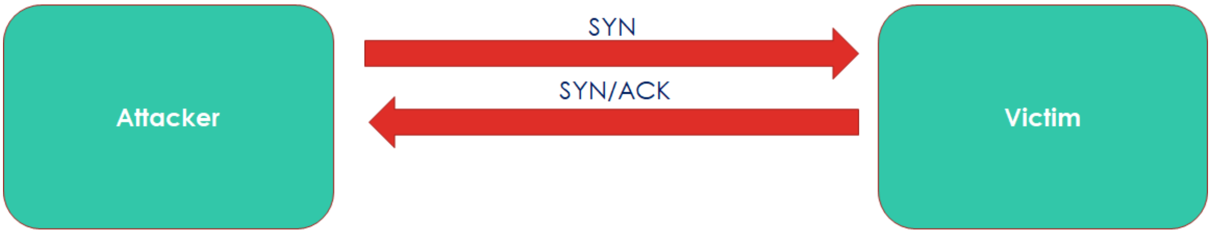
Port Is Closed



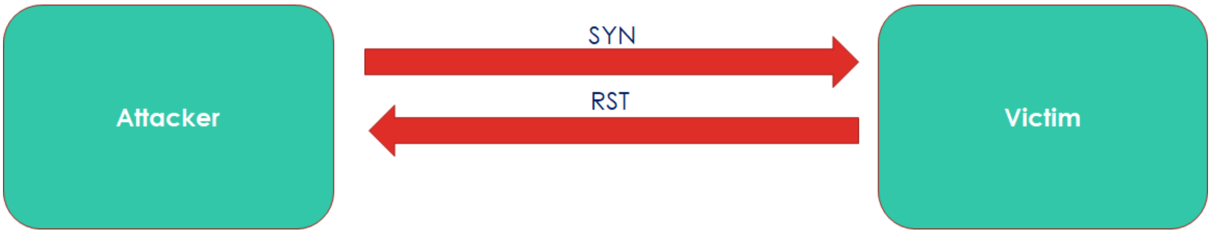
- **SYN Scan / Half-Open Scan / Stealth Scan**

  SYN scan is the most popular scan option. It can scan thousands of ports in a short period on a fast network not hampered by restrictive firewalls.

Port Is Open

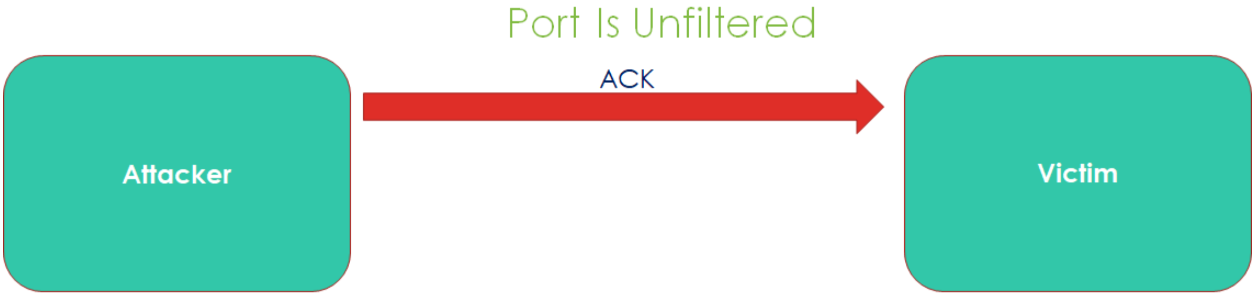


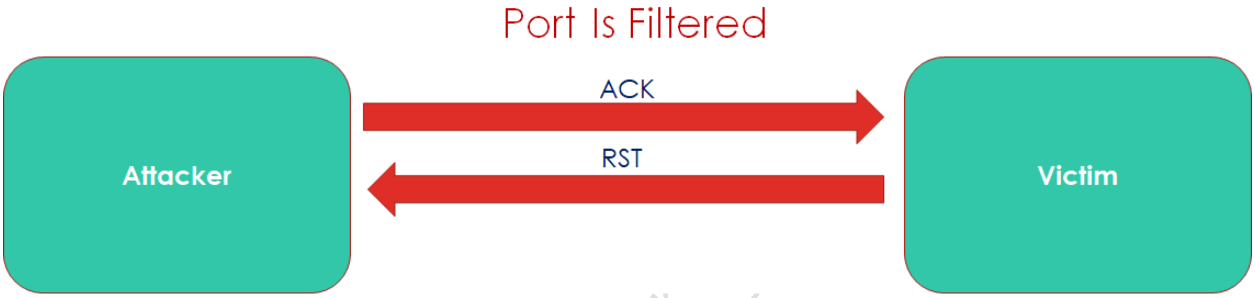
Port Is Closed



- **ACK Scan/Firewall Detection**

This scan is different from others scanning operations discussed before; it never determines open ports. It is used to identify firewall rules, determining the type of firewall and identify filtered ports.





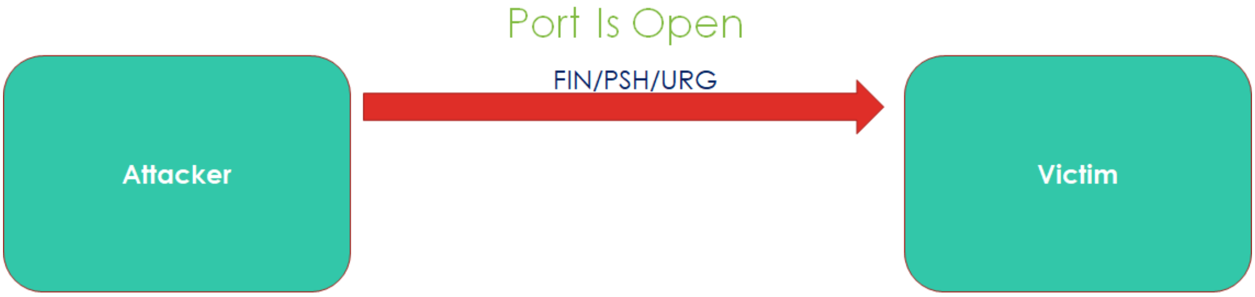
- **XMAS Scan**

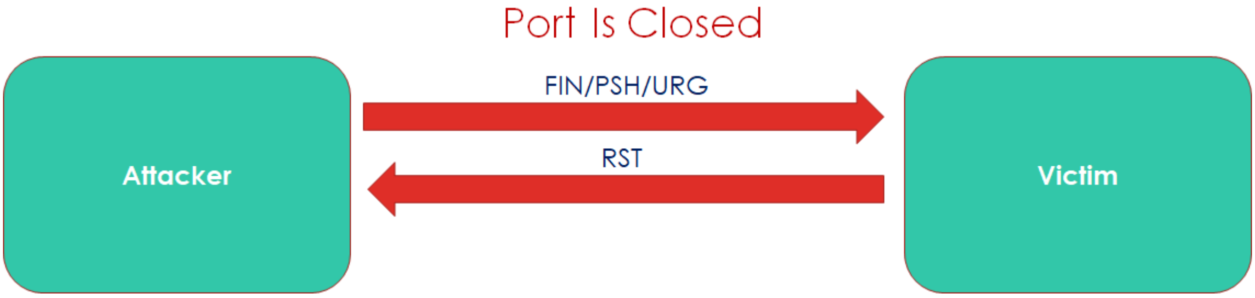
The Xmas-Tree scan sends a TCP packet with the following flags:

URG — Indicates that the data is urgent and should be processed immediately

PSH — Forces data to a buffer

FIN — Used when finishing a TCP session

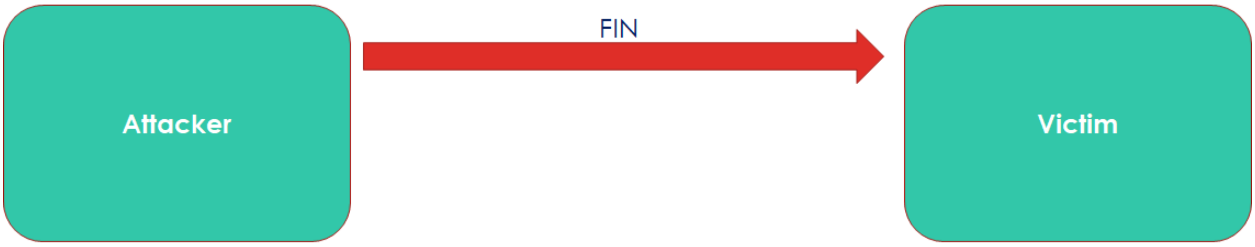




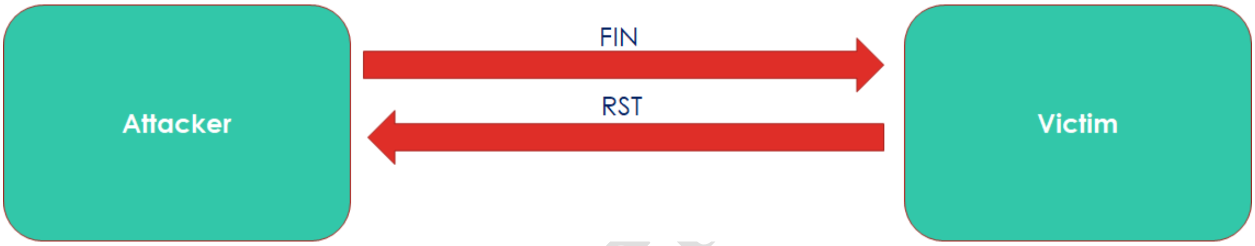
- **FIN Scan**

FIN scan, which attempts to close a connection that isn't open. The operating system generates an error if service is not running on target port. If a service is listening, the operating system will silently drop the incoming packet. Therefore, no response indicates a listening service at the port.

Port Is Open



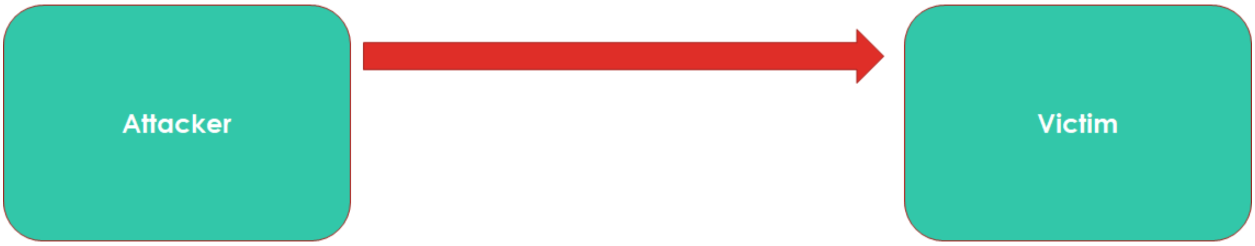
Port Is Closed



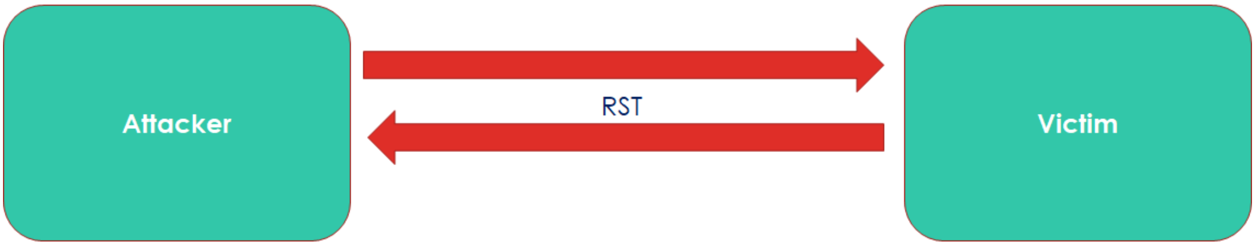
- **NULL Scan**

A data packet with zero flag values will be sent to a TCP port. (In a regular TCP communication, at least one bit or flag is set). In TCP connect / SYN scans, a response indicates an open port, but in a NULL scan, a response indicates a closed port.

Port Is Open



Port Is Closed



Importance of Scanning

Scanning will provide an exact outline of the network structure of the target workspace. It is beneficial for hacking target servers or individual computers. Scanning will provide a blueprint of entire network and details about devices running on the network, information related to network topology and helps in deciding what operating system is running on target computers.

Countermeasures

- Block ICMP and UDP inbound.
- Disable unused ports with support of policy settings.
- Block internal IP addresses from coming inbound.
- Change system and application banners to counter software detection attacks.
- Always use a genuine operating system, update it frequently.
- Use IDS & IPS to detect and prevent attacks.
- Use “duckduckgo” or “StartPage” search engine to protect privacy.

Ddos-attack
BOOM
PC
Password Hacking
Hacking Mail
Protection
PC
PETYA A
Virus Attack

Practicals

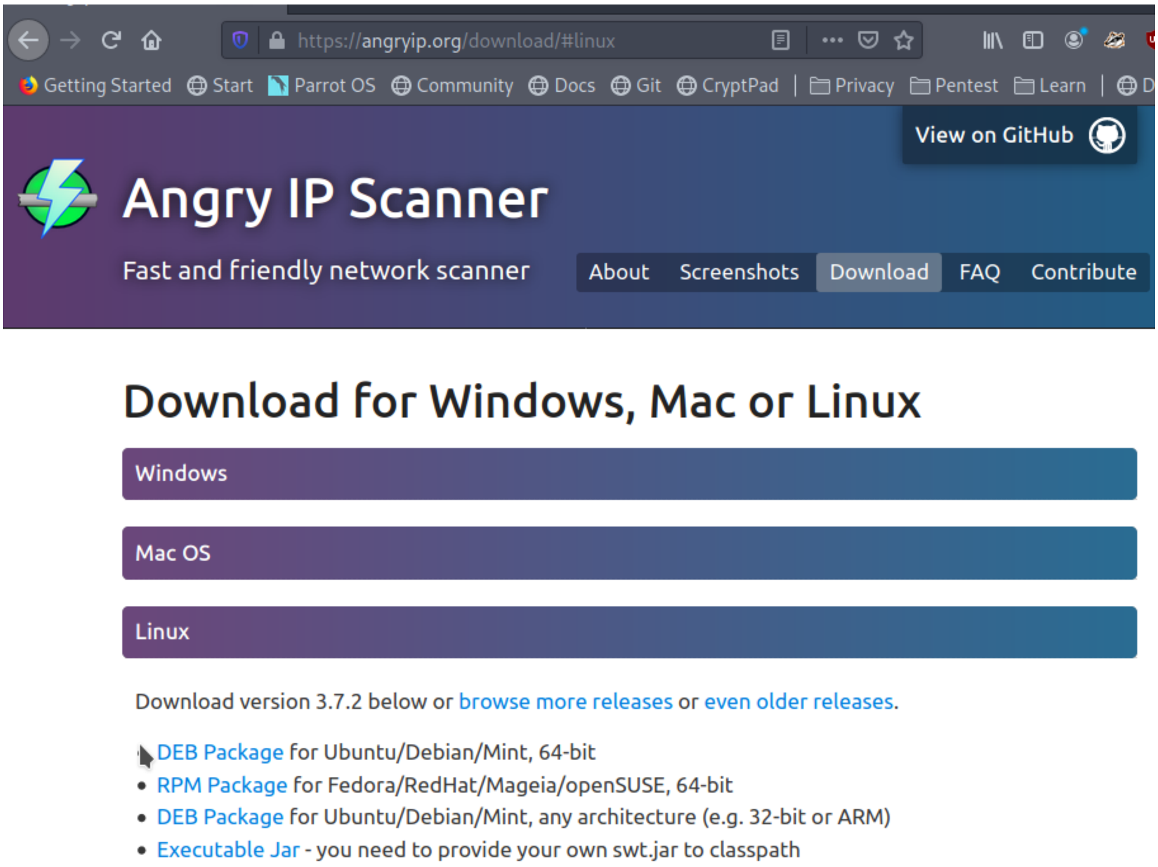
INDEX

THIS DOCUMENT INCLUDES ADDITIONAL PRCTICALS WHICH MAY OR MAY NOT BE COVERED DURING CLASSROOM TRAINING. FOR MORE DETAILS APPROACH LAB COORDINATORS

Practical 1: Network Scanning with Angry IP Scanner

Description: In this practical we will discuss how to install Angry IP scanner and how to perform scanning using this tool. It is a graphical tool that is used to perform scanning on a range of Private IPs or Public IPs using different protocols. It is also useful to perform port scanning on IPs and we can export results to a file for report purposes.

Step 1: To download Angry IP scanner, visit following link https://angryip.org/download/ And download a suitable package, for Parrot Linux download **.deb** package (based on your installation 32 bit or 64bit)

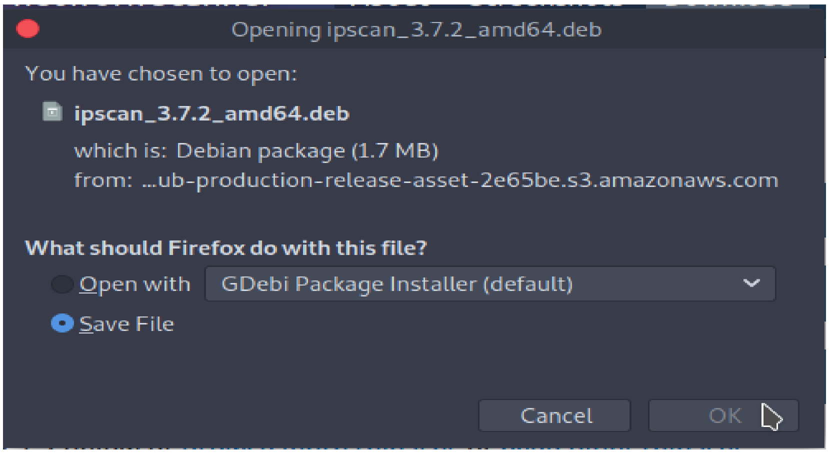


Download for Windows, Mac or Linux

Download version 3.7.2 below or browse more releases or even older releases.

- DEB Package for Ubuntu/Debian/Mint, 64-bit
- RPM Package for Fedora/RedHat/Mageia/openSUSE, 64-bit
- DEB Package for Ubuntu/Debian/Mint, any architecture (e.g. 32-bit or ARM)
- Executable Jar - you need to provide your own swt.jar to classpath

Step 2: Save the file if it is asking



Opening ipscan_3.7.2_amd64.deb

You have chosen to open:

ipscan_3.7.2_amd64.deb

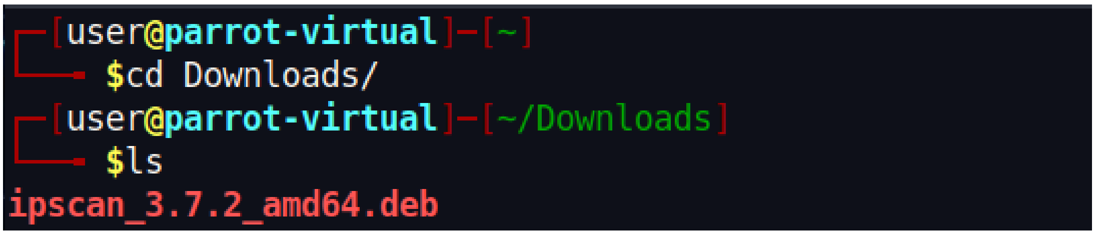
which is: Debian package (1.7 MB)
from: ...ub-production-release-asset-2e65be.s3.amazonaws.com

What should Firefox do with this file?

○ Open with GDebi Package Installer (default)

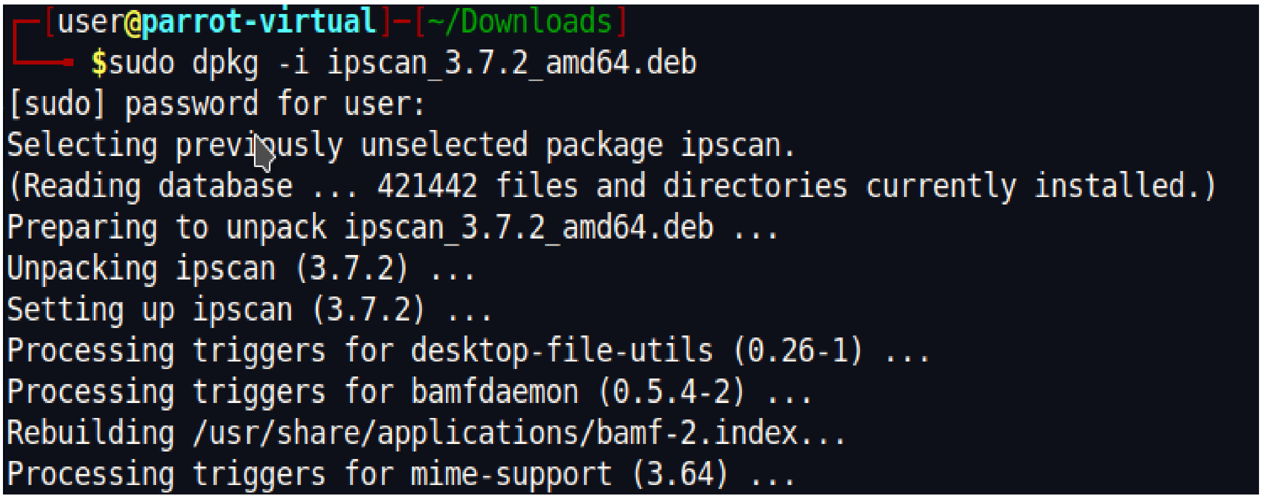
● Save File

Step 3: Then open a terminal and go to **Downloads** location (/root/Downloads/)



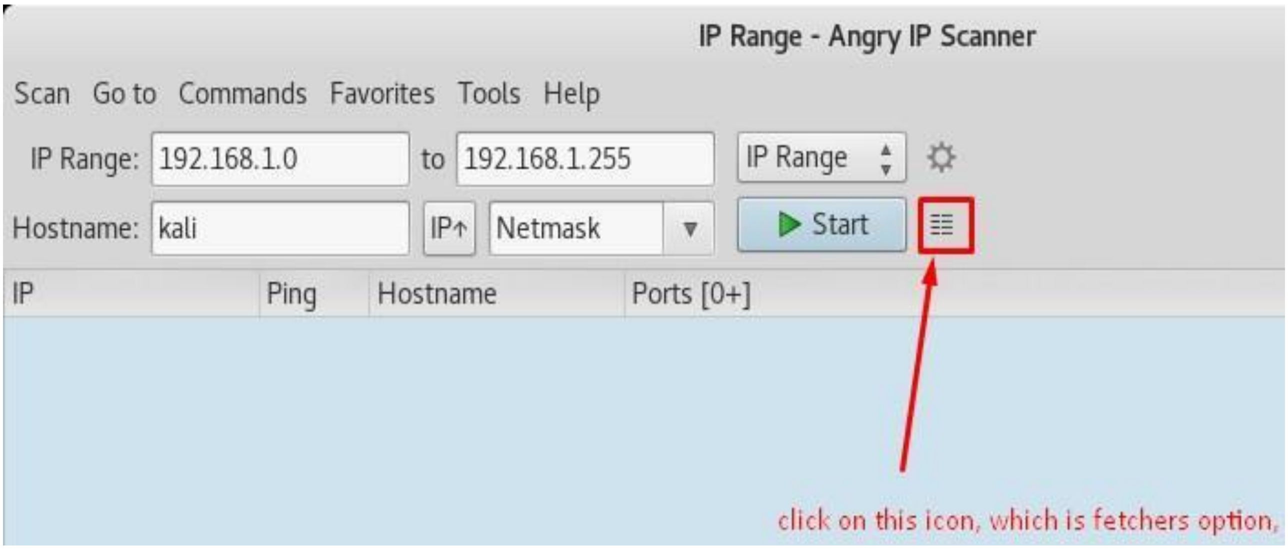
```
┌─[user@parrot-virtual]─[~]
└──╼ $cd Downloads/
┌─[user@parrot-virtual]─[~/Downloads]
└──╼ $ls
ipscan_3.7.2_amd64.deb
```

Step 4: we can see the downloaded file in the **Downloads** directory; we can install it by executing the following command



```
┌─[user@parrot-virtual]─[~/Downloads]
└──╼ $sudo dpkg -i ipscan_3.7.2_amd64.deb
[sudo] password for user:
Selecting previously unselected package ipscan.
(Reading database ... 421442 files and directories currently installed.)
Preparing to unpack ipscan_3.7.2_amd64.deb ...
Unpacking ipscan (3.7.2) ...
Setting up ipscan (3.7.2) ...
Processing triggers for desktop-file-utils (0.26-1) ...
Processing triggers for bamfdaemon (0.5.4-2) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for mime-support (3.64) ...
```

Step 5: After installation, search for **Angry IP scanner** in installed applications and start Angry IP scanner. The application looks as shown below. Follow the steps to perform scanning and discover devices.

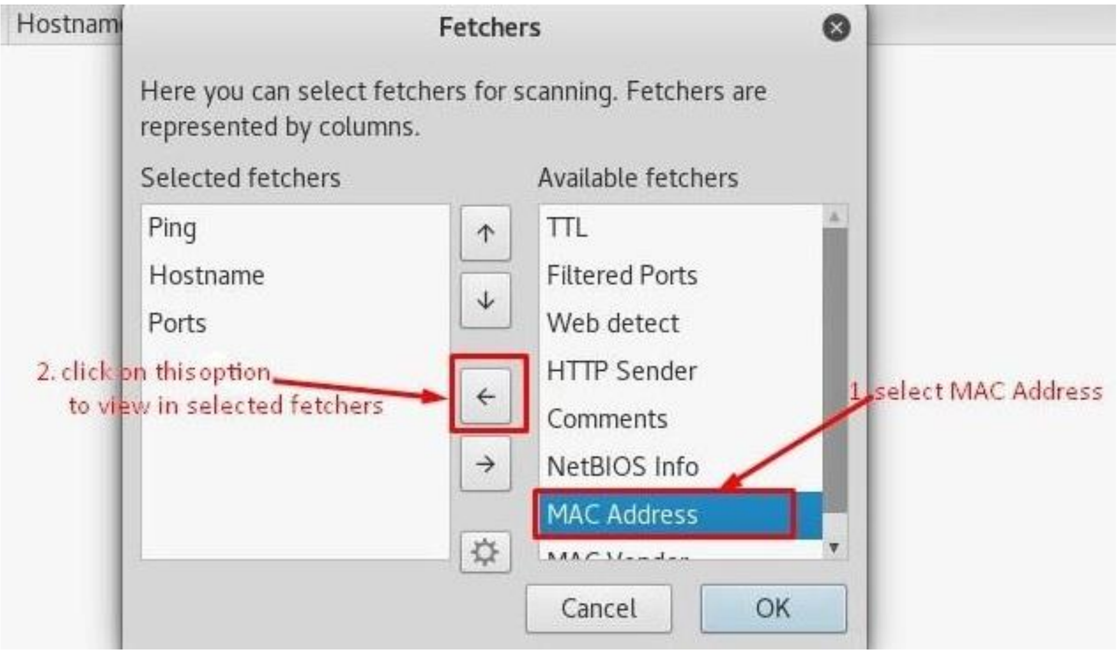


IP Range - Angry IP Scanner

IP Range: 192.168.1.0 to 192.168.1.255

Hostname: kali

click on this icon, which is fetchers option,



Fetchers

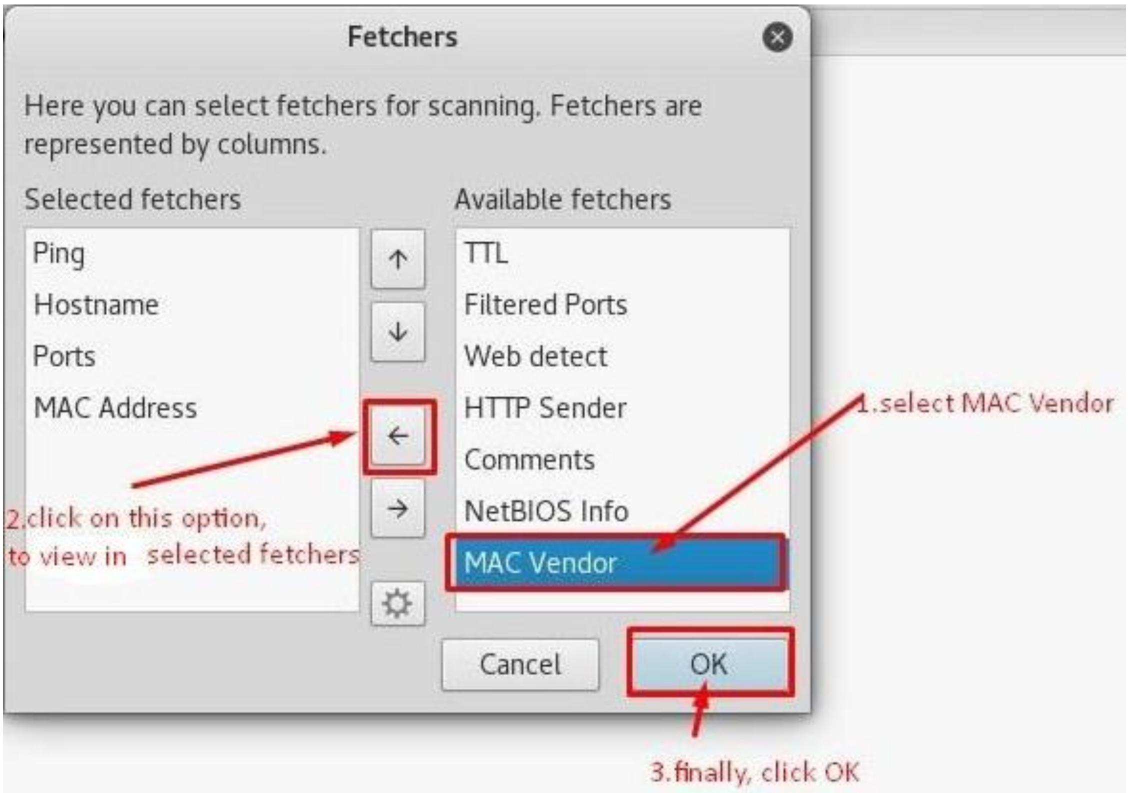
Here you can select fetchers for scanning. Fetchers are represented by columns.

Selected fetchers: Ping, Hostname, Ports

Available fetchers: TTL, Filtered Ports, Web detect, HTTP Sender, Comments, NetBIOS Info, MAC Address, MAC Vendor

1.select MAC Address

2. click on this option to view in selected fetchers



Fetchers

Here you can select fetchers for scanning. Fetchers are represented by columns.

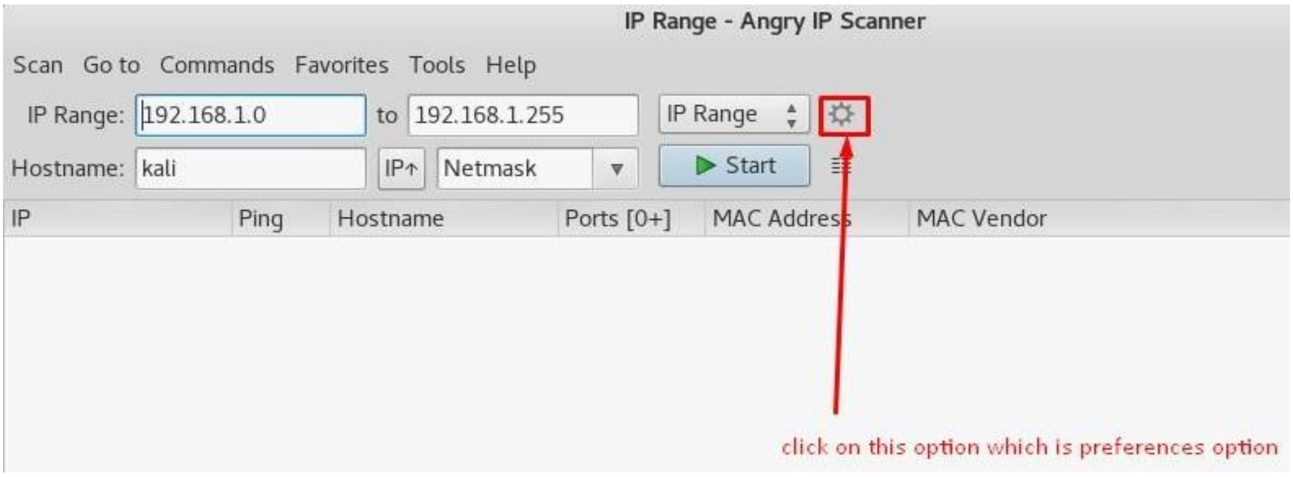
Selected fetchers: Ping, Hostname, Ports, MAC Address

Available fetchers: TTL, Filtered Ports, Web detect, HTTP Sender, Comments, NetBIOS Info, MAC Vendor

1.select MAC Vendor

2.click on this option, to view in selected fetchers

3.finally, click OK



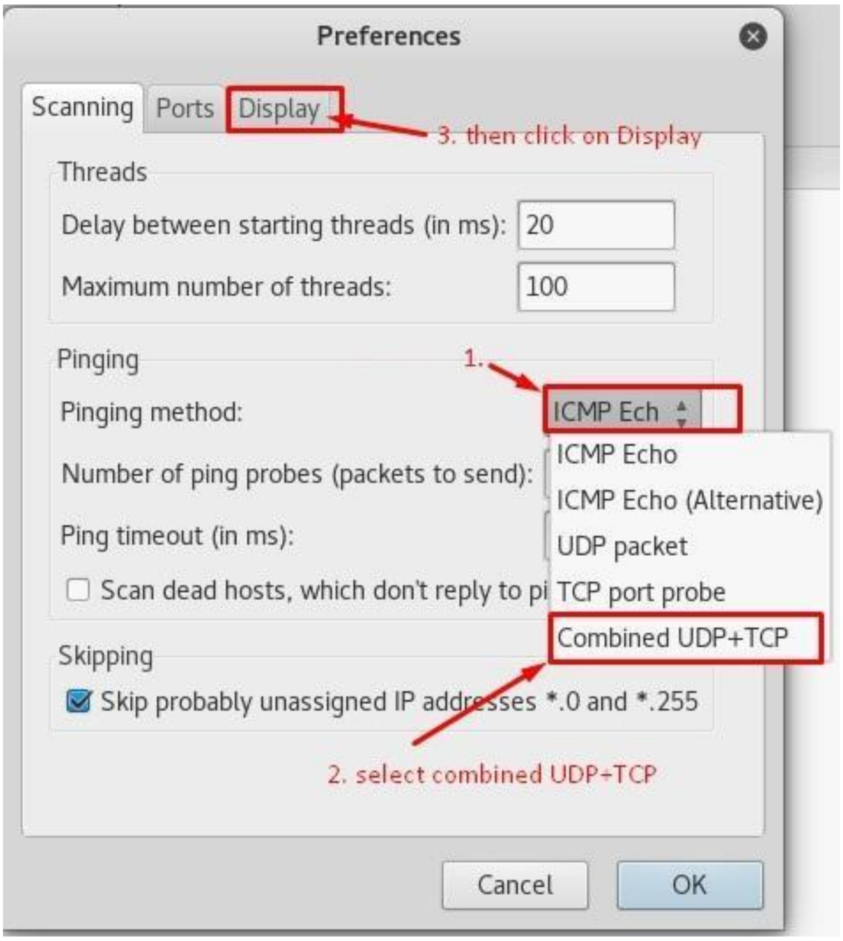
IP Range - Angry IP Scanner

IP Range: 192.168.1.0 to 192.168.1.255

Hostname: kali

IP	Ping	Hostname	Ports [0+]	MAC Address	MAC Vendor

click on this option which is preferences option



Preferences

Scanning | Ports | Display

3. then click on Display

Threads

Delay between starting threads (in ms): 20

Maximum number of threads: 100

Pinging

1.

Pinging method: ICMP Ech

- ICMP Echo
- ICMP Echo (Alternative)
- UDP packet
- TCP port probe
- Combined UDP+TCP

Number of ping probes (packets to send):

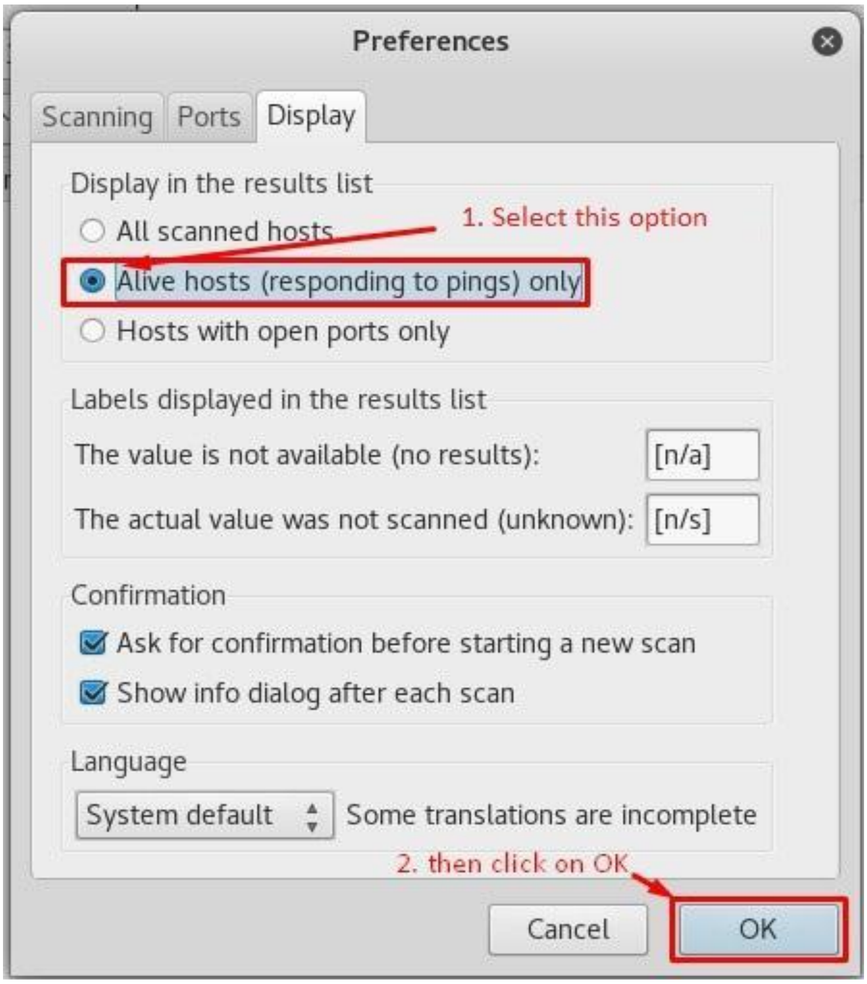
Ping timeout (in ms):

□ Scan dead hosts, which don't reply to pi

Skipping

☑ Skip probably unassigned IP addresses *.0 and *.255

2. select combined UDP+TCP



Preferences

Scanning | Ports | Display

Display in the results list

○ All scanned hosts

● Alive hosts (responding to pings) only

○ Hosts with open ports only

1. Select this option

Labels displayed in the results list

The value is not available (no results): [n/a]

The actual value was not scanned (unknown): [n/s]

Confirmation

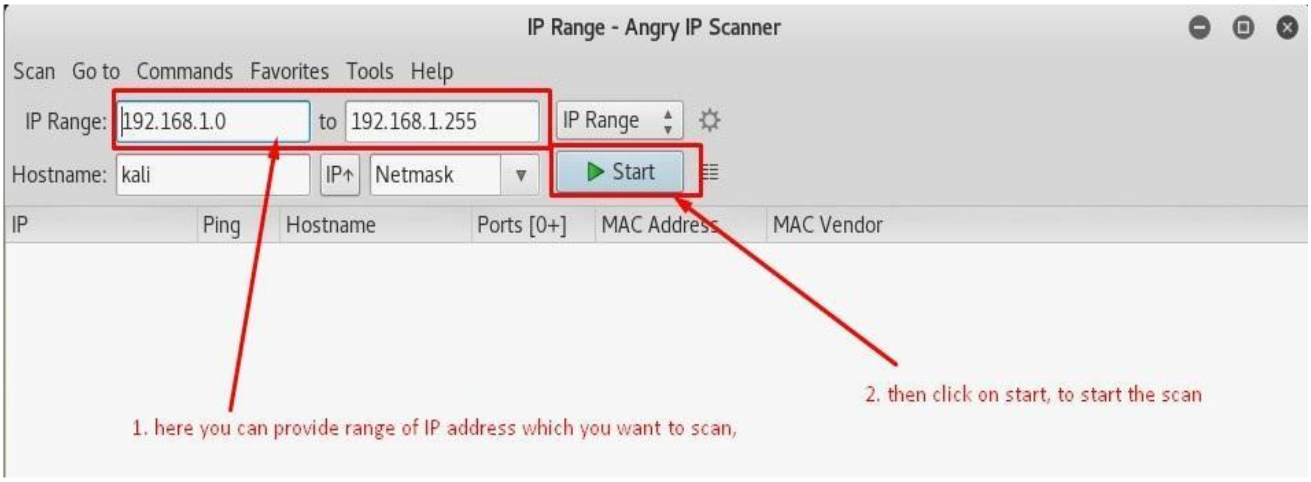
☑ Ask for confirmation before starting a new scan

☑ Show info dialog after each scan

Language

System default — Some translations are incomplete

2. then click on OK

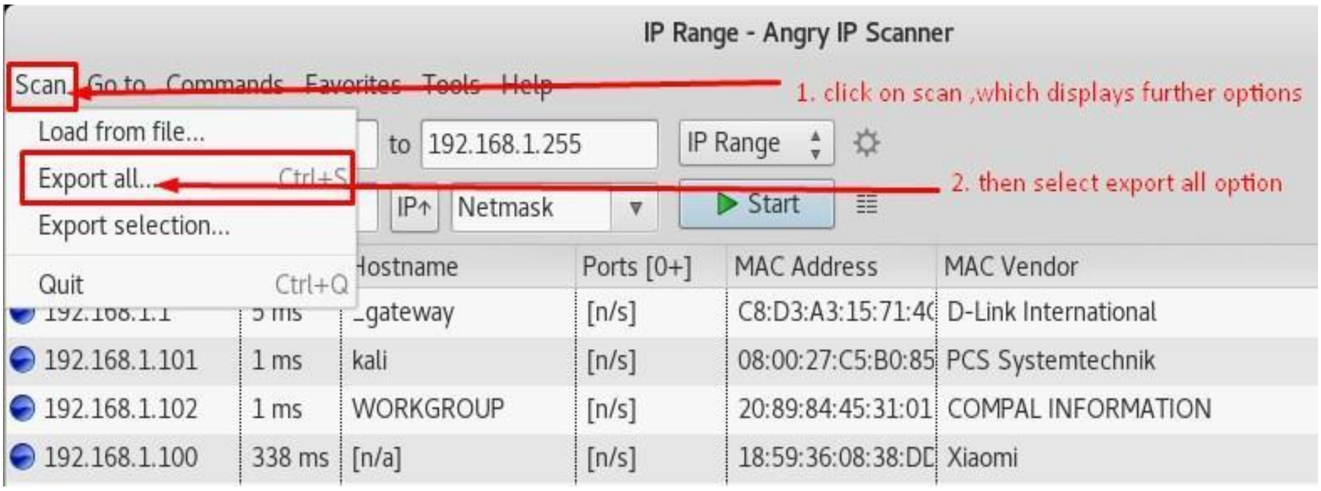

IP Range - Angry IP Scanner
Scan Go to Commands Favorites Tools Help
IP Range:
to
IP Range
Hostname:
IP↑
Netmask
Start
IP Ping Hostname Ports [0+] MAC Address MAC Vendor

IP Range: 192.168.1.0 to 192.168.1.255

Hostname: kali

1. here you can provide range of IP address which you want to scan,

2. then click on start, to start the scan

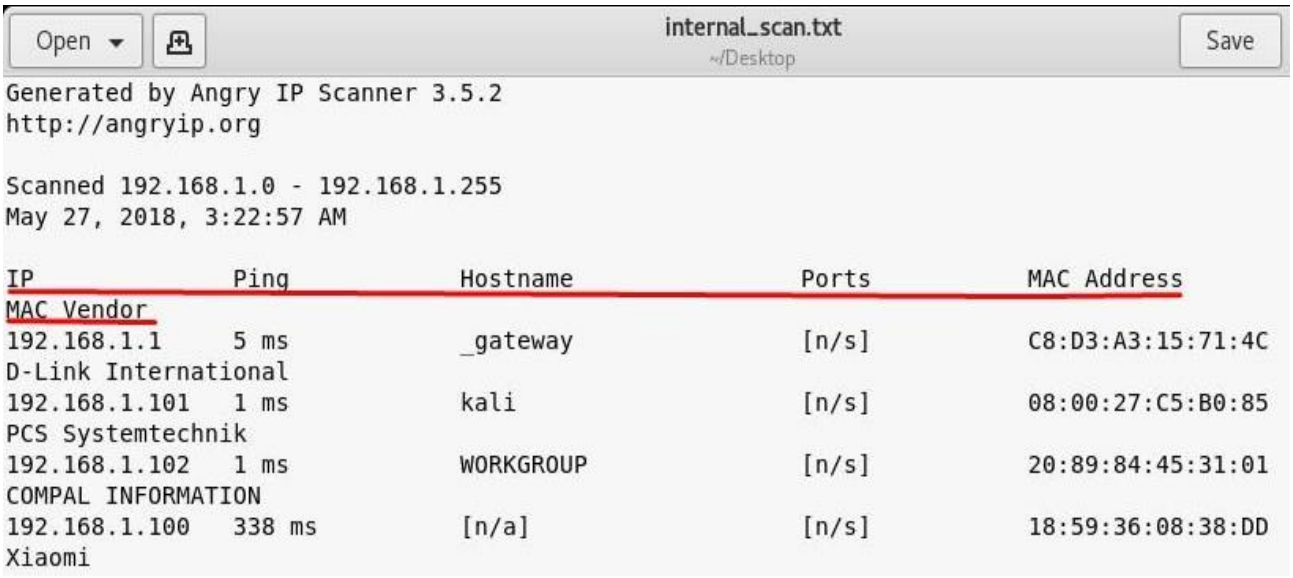


1. click on scan ,which displays further options

2. then select export all option

IP	Ping	Hostname	Ports [0+]	MAC Address	MAC Vendor
192.168.1.1	5 ms	_gateway	[n/s]	C8:D3:A3:15:71:4(	D-Link International
192.168.1.101	1 ms	kali	[n/s]	08:00:27:C5:B0:85	PCS Systemtechnik
192.168.1.102	1 ms	WORKGROUP	[n/s]	20:89:84:45:31:01	COMPAL INFORMATION
192.168.1.100	338 ms	[n/a]	[n/s]	18:59:36:08:38:DD	Xiaomi

Step 5: Export the scan results to a text file. We can use this output file to feed it to another VA tools or port scanner tools.



```
Generated by Angry IP Scanner 3.5.2
http://angryip.org

Scanned 192.168.1.0 - 192.168.1.255
May 27, 2018, 3:22:57 AM

IP              Ping            Hostname                Ports           MAC Address
MAC Vendor
192.168.1.1     5 ms            _gateway                [n/s]           C8:D3:A3:15:71:4C
D-Link International
192.168.1.101   1 ms            kali                    [n/s]           08:00:27:C5:B0:85
PCS Systemtechnik
192.168.1.102   1 ms            WORKGROUP               [n/s]           20:89:84:45:31:01
COMPAL INFORMATION
192.168.1.100   338 ms          [n/a]                   [n/s]           18:59:36:08:38:DD
Xiaomi
```

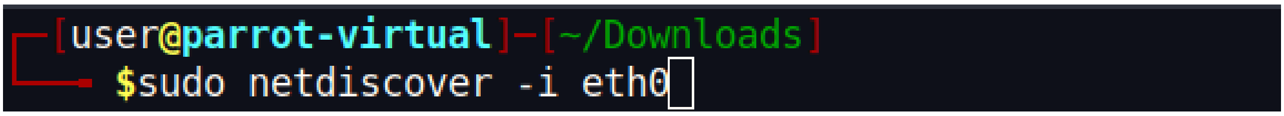
Practical 2: Network Scanning With netdiscover

Description: Netdiscover is another terminal based network scanner used to perform scanning on local networks. It uses arp protocol to perform scanning. Major drawback in this tool is if a group of people perform at the same time it won't give correct results.

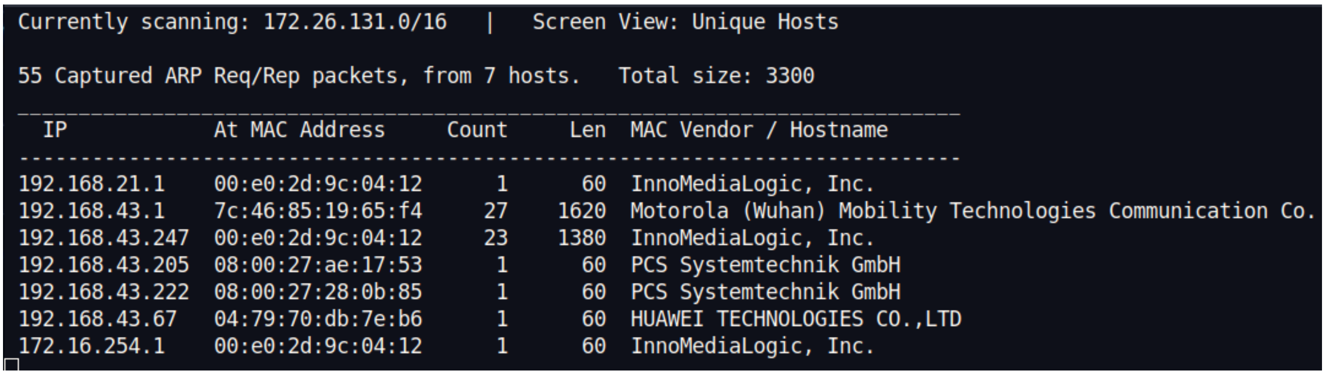
Prerequisites: Netdiscover tool installed in your system

Step 1: In Parrot Linux terminal type the following command **netdiscover –i <interface name>**

- for example: **netdiscover –i eth0**



```
┌─[user@parrot-virtual]─[~/Downloads]
└──╼ $sudo netdiscover -i eth0
```



```
 Currently scanning: 172.26.131.0/16   |   Screen View: Unique Hosts

 55 Captured ARP Req/Rep packets, from 7 hosts.   Total size: 3300
 _____________________________________________________________________________
   IP            At MAC Address     Count     Len  MAC Vendor / Hostname
 -----------------------------------------------------------------------------
 192.168.21.1    00:e0:2d:9c:04:12      1      60  InnoMediaLogic, Inc.
 192.168.43.1    7c:46:85:19:65:f4     27    1620  Motorola (Wuhan) Mobility Technologies Communication Co.
 192.168.43.247  00:e0:2d:9c:04:12     23    1380  InnoMediaLogic, Inc.
 192.168.43.205  08:00:27:ae:17:53      1      60  PCS Systemtechnik GmbH
 192.168.43.222  08:00:27:28:0b:85      1      60  PCS Systemtechnik GmbH
 192.168.43.67   04:79:70:db:7e:b6      1      60  HUAWEI TECHNOLOGIES CO.,LTD
 172.16.254.1    00:e0:2d:9c:04:12      1      60  InnoMediaLogic, Inc.
```

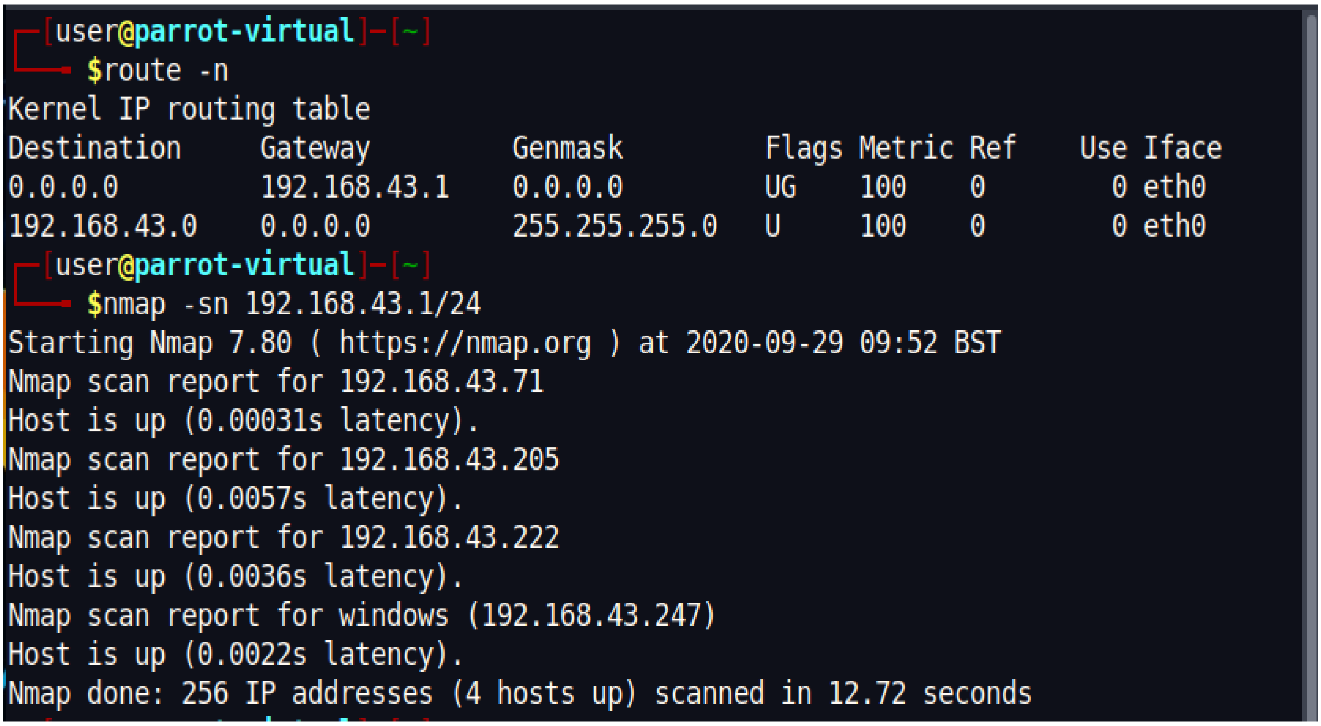
Practical 3: Ping Sweeping with nmap

Description: Nmap is an open source scanning tool that performs scanning on large networks and gives results within less time. In this practical we use nmap to network scanning over a range of IP addresses, it can scan both private and public IPs. we can save the results in different file formats also.

Prerequisites: nmap tool installed in your system

Step 1: In Parrot Linux terminal type the following command

- **nmap –sn 192.168.1.1/24**



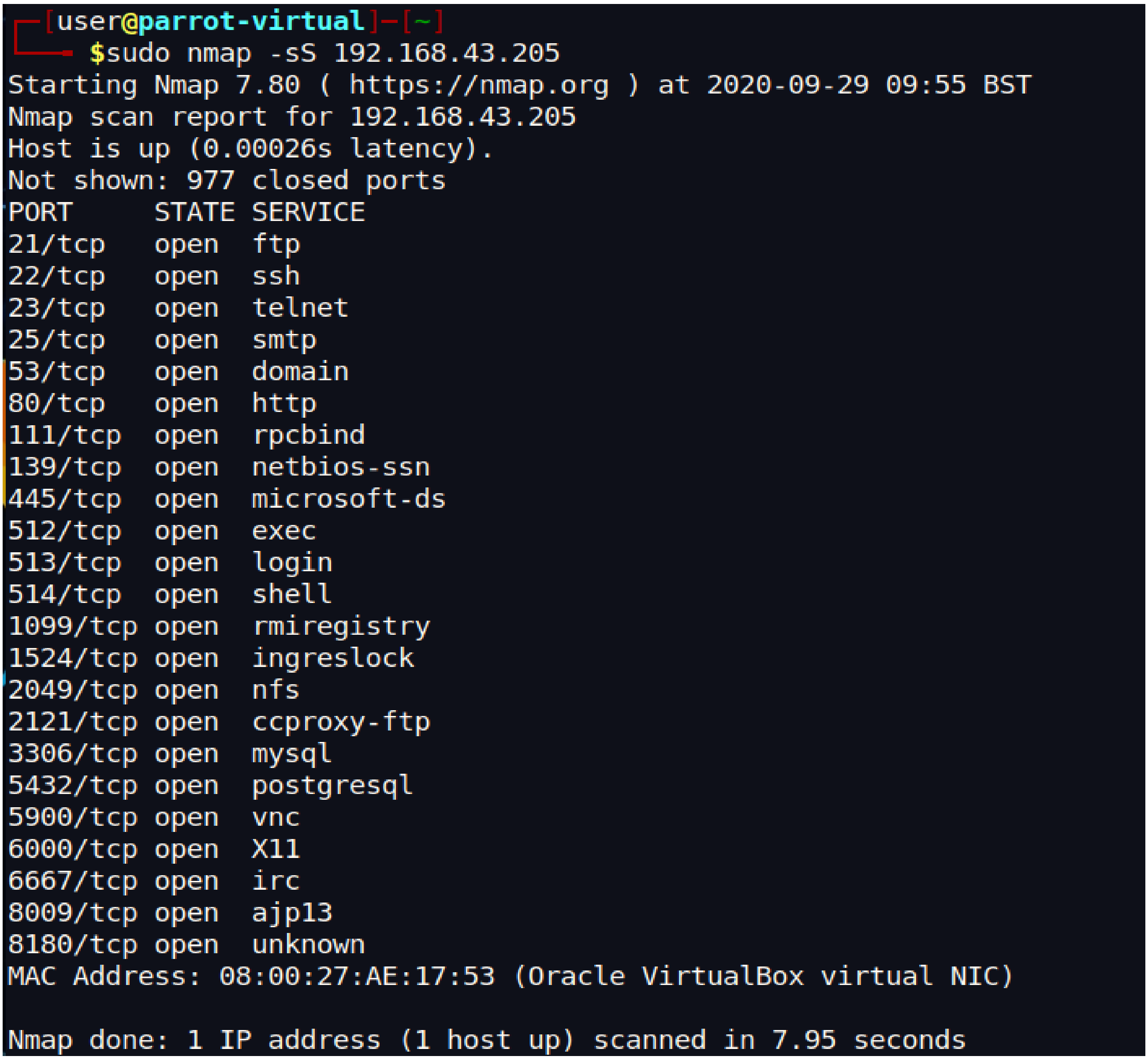
```
┌─[user@parrot-virtual]─[~]
└──╼ $route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.43.1    0.0.0.0         UG    100    0        0 eth0
192.168.43.0    0.0.0.0         255.255.255.0   U     100    0        0 eth0
┌─[user@parrot-virtual]─[~]
└──╼ $nmap -sn 192.168.43.1/24
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 09:52 BST
Nmap scan report for 192.168.43.71
Host is up (0.00031s latency).
Nmap scan report for 192.168.43.205
Host is up (0.0057s latency).
Nmap scan report for 192.168.43.222
Host is up (0.0036s latency).
Nmap scan report for windows (192.168.43.247)
Host is up (0.0022s latency).
Nmap done: 256 IP addresses (4 hosts up) scanned in 12.72 seconds
```

Practical 4: Port Scanning with nmap

Description: Nmap is a multi-purpose tool, we can perform different actions using this tool. In this practical we will explore different options nmap have to perform port scanning on the target IPs and different scanning customizations. Using nmap we can get which ports are open in target IP, what are the services running on ports and it's versions, target OS details, firewall detection etc.

Scan 1: Regular Scan (SYN stealth scan or half open scan)

- **Syntax**: nmap <target IP or domain>
  - **Ex**: nmap 192.168.0.137
  - nmap –sS example.com

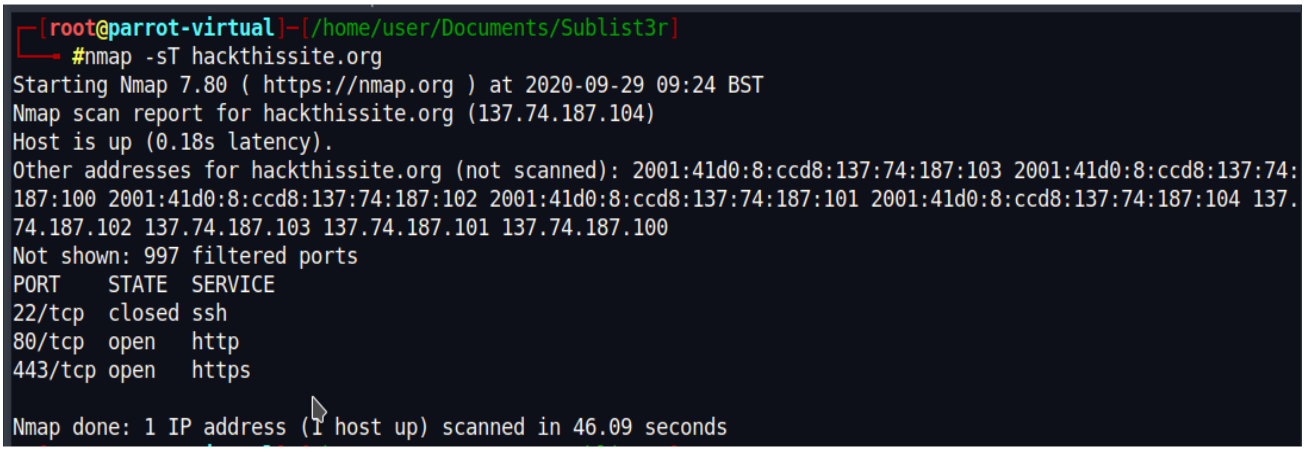


```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sS 192.168.43.205
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 09:55 BST
Nmap scan report for 192.168.43.205
Host is up (0.00026s latency).
Not shown: 977 closed ports
PORT     STATE SERVICE
21/tcp   open  ftp
22/tcp   open  ssh
23/tcp   open  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: 08:00:27:AE:17:53 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 7.95 seconds
```

Note: Even if we take a domain name, nmap will not scan the website, it will scan the computer (server) hosting that website.

Scan 2: TCP connect scan (Full Connect Scan)

- **Syntax**: nmap –sT <target IP or domain>
    - **Example**: nmap –sT example.com
    - nmap –sT 192.168.0.137



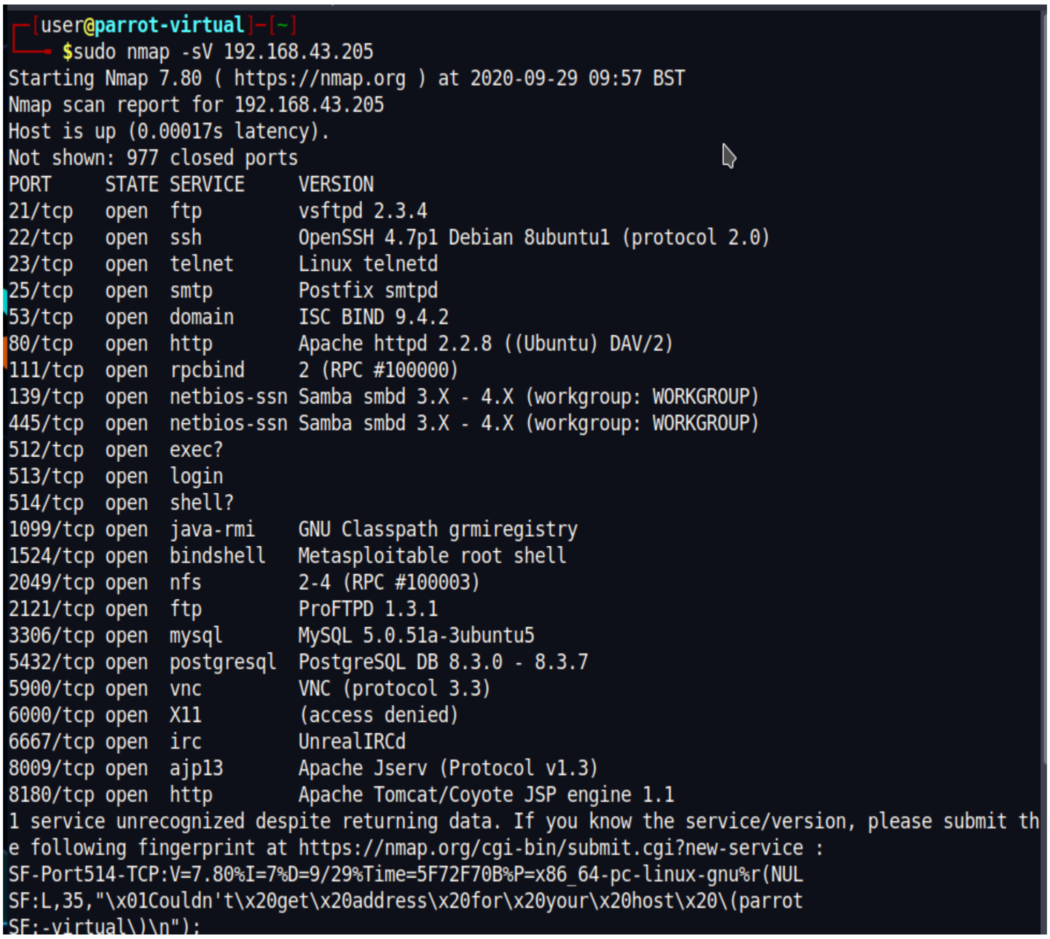
```
┌─[root@parrot-virtual]─[/home/user/Documents/Sublist3r]
└──╼ #nmap -sT hackthissite.org
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 09:24 BST
Nmap scan report for hackthissite.org (137.74.187.104)
Host is up (0.18s latency).
Other addresses for hackthissite.org (not scanned): 2001:41d0:8:ccd8:137:74:187:103 2001:41d0:8:ccd8:137:74:
187:100 2001:41d0:8:ccd8:137:74:187:102 2001:41d0:8:ccd8:137:74:187:101 2001:41d0:8:ccd8:137:74:187:104 137.
74.187.102 137.74.187.103 137.74.187.101 137.74.187.100
Not shown: 997 filtered ports
PORT    STATE  SERVICE
22/tcp  closed ssh
80/tcp  open   http
443/tcp open   https

Nmap done: 1 IP address (1 host up) scanned in 46.09 seconds
```

Note: If you get any error saying host may be down or disabled ICMP try adding –Pn to the command

- **Example:** nmap –sT –Pn example.com

Scan 3: Service Detection scan or Version Detection scan

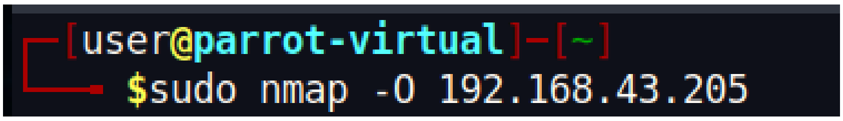
- **Example**: nmap –sV example.com
- nmap –sV 192.168.0.137



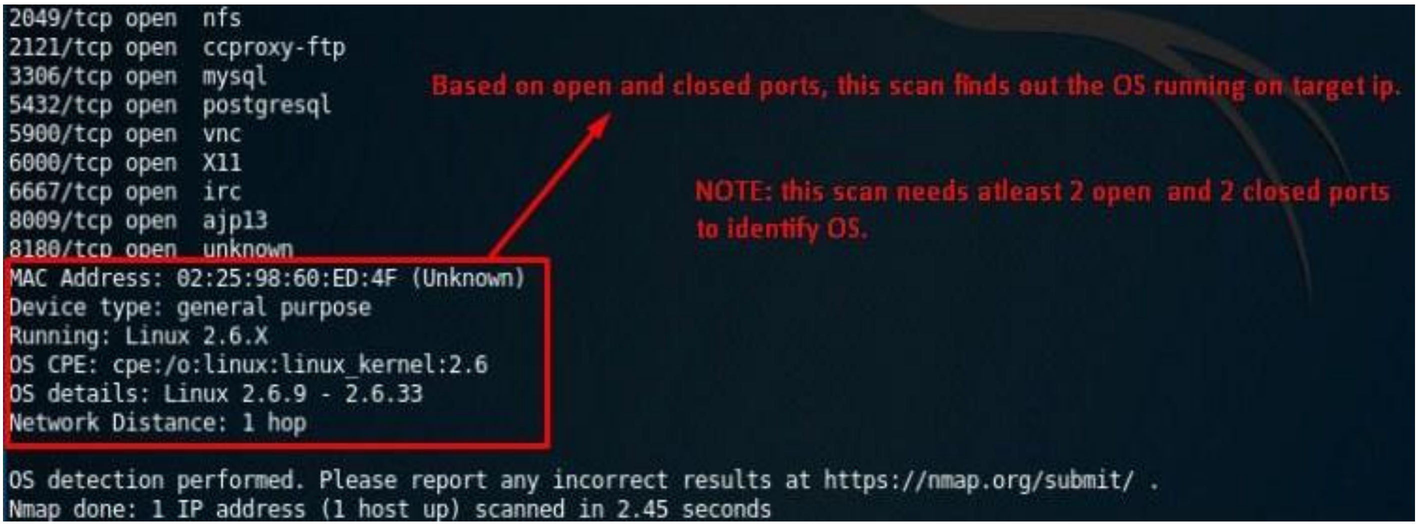
```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sV 192.168.43.205
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 09:57 BST
Nmap scan report for 192.168.43.205
Host is up (0.00017s latency).
Not shown: 977 closed ports
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
53/tcp   open  domain      ISC BIND 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp  open  rpcbind     2 (RPC #100000)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp  open  exec?
513/tcp  open  login
514/tcp  open  shell?
1099/tcp open  java-rmi    GNU Classpath grmiregistry
1524/tcp open  bindshell   Metasploitable root shell
2049/tcp open  nfs         2-4 (RPC #100003)
2121/tcp open  ftp         ProFTPD 1.3.1
3306/tcp open  mysql       MySQL 5.0.51a-3ubuntu5
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open  vnc         VNC (protocol 3.3)
6000/tcp open  X11         (access denied)
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
1 service unrecognized despite returning data. If you know the service/version, please submit th
e following fingerprint at https://nmap.org/cgi-bin/submit.cgi?new-service :
SF-Port514-TCP:V=7.80%I=7%D=9/29%Time=5F72F70B%P=x86_64-pc-linux-gnu%r(NUL
SF:L,35,"\x01Couldn't\x20get\x20address\x20for\x20your\x20host\x20\(parrot
SF:-virtual\)\n");
```

Scan 4: OS Detection Scan

- **Syntax**: nmap –O <target IP or domain>
  - **Example**: nmap –O example.com
  - nmap –O 192.168.0.137



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -O 192.168.43.205
```



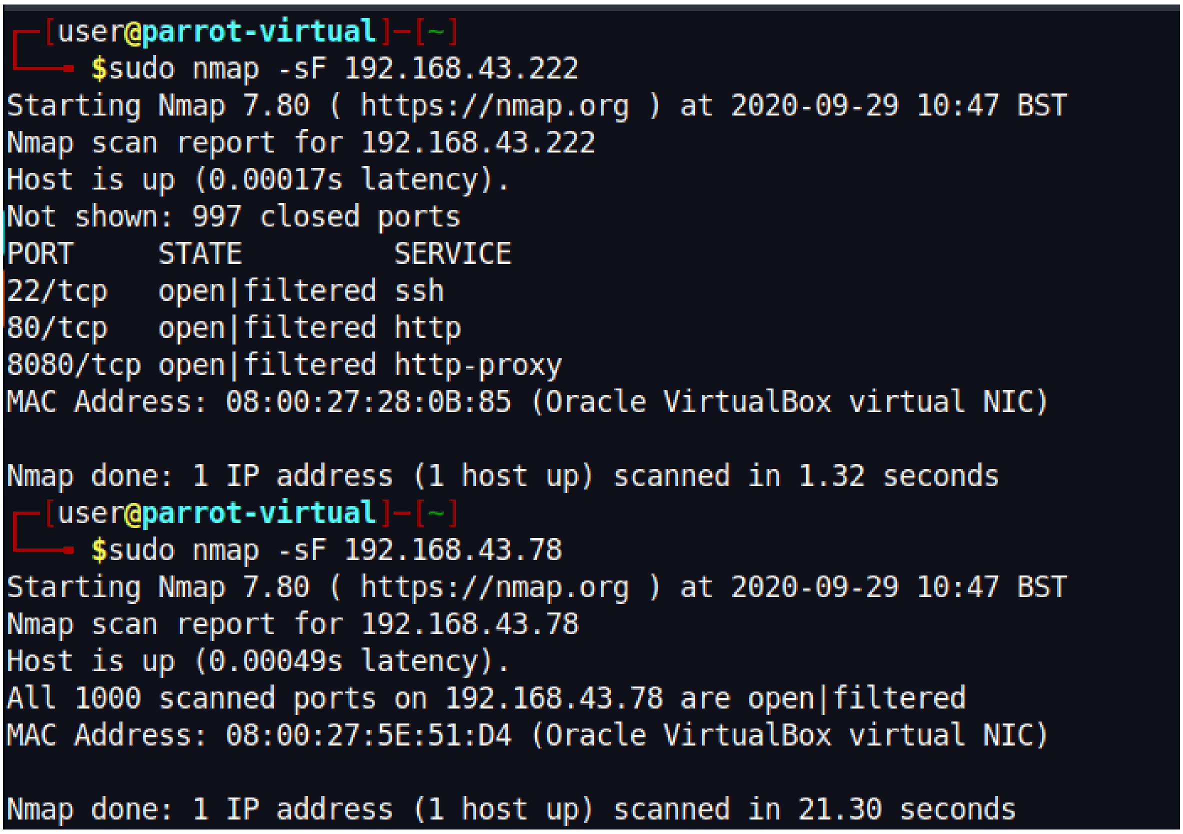
```
2049/tcp open  nfs
2121/tcp open  ccproxy-ftp
3306/tcp open  mysql
5432/tcp open  postgresql
5900/tcp open  vnc
6000/tcp open  X11
6667/tcp open  irc
8009/tcp open  ajp13
8180/tcp open  unknown
MAC Address: 02:25:98:60:ED:4F (Unknown)
Device type: general purpose
Running: Linux 2.6.X
OS CPE: cpe:/o:linux:linux_kernel:2.6
OS details: Linux 2.6.9 - 2.6.33
Network Distance: 1 hop

OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 2.45 seconds
```

Based on open and closed ports, this scan finds out the OS running on target ip.

NOTE: this scan needs atleast 2 open and 2 closed ports to identify OS.

Scan 5: FIN scan (FIN Flag)

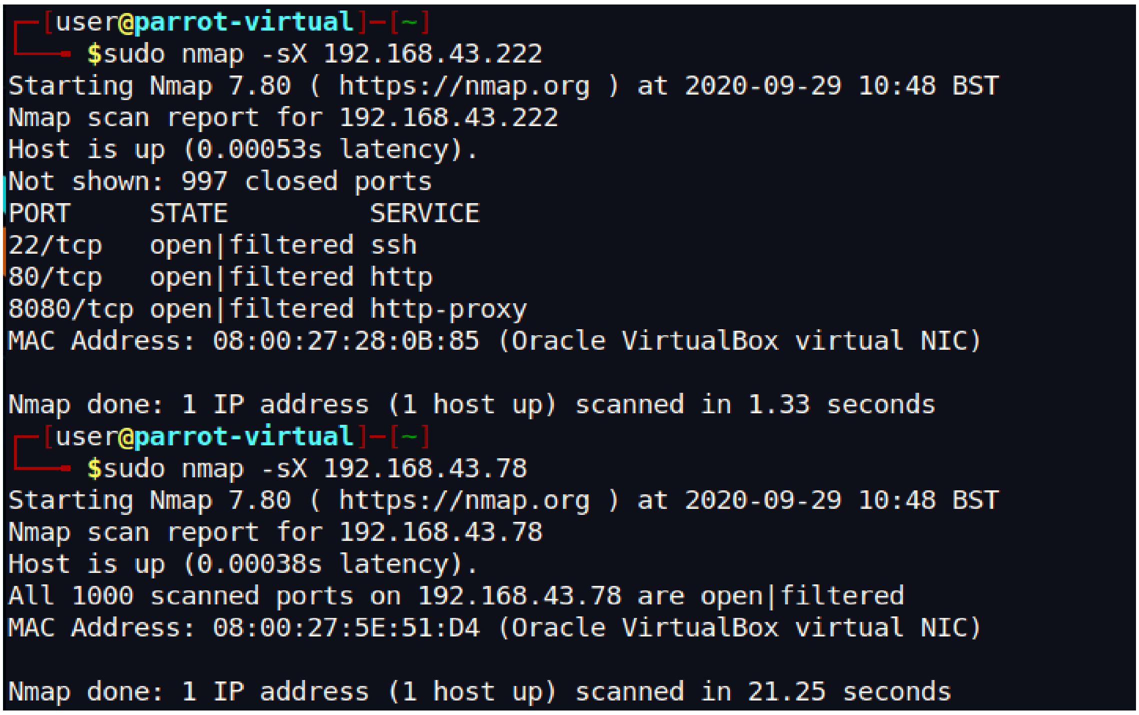
- **Syntax**: nmap –sF <target IP or domain>
  - **Example**: nmap –sF example.com
  - nmap –sF 192.168.0.137 –v



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sF 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 10:47 BST
Nmap scan report for 192.168.43.222
Host is up (0.00017s latency).
Not shown: 997 closed ports
PORT     STATE         SERVICE
22/tcp   open|filtered ssh
80/tcp   open|filtered http
8080/tcp open|filtered http-proxy
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 1.32 seconds
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sF 192.168.43.78
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 10:47 BST
Nmap scan report for 192.168.43.78
Host is up (0.00049s latency).
All 1000 scanned ports on 192.168.43.78 are open|filtered
MAC Address: 08:00:27:5E:51:D4 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 21.30 seconds
```

Scan 6: XMAS scan (FIN, PSH, URG Flags)

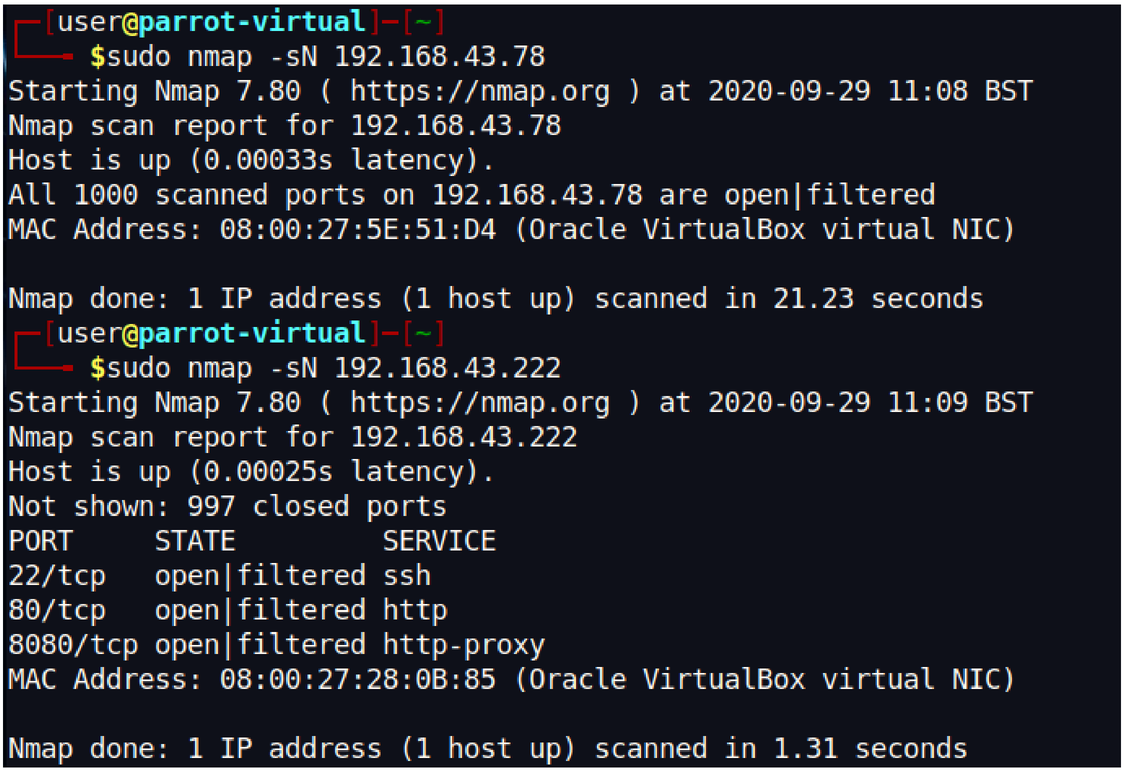
- **Syntax**: nmap –sX <target IP or domain>
    - **Ex: nmap –sX example.com**
    - **nmap –sX 192.168.0.137 –v**



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sX 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 10:48 BST
Nmap scan report for 192.168.43.222
Host is up (0.00053s latency).
Not shown: 997 closed ports
PORT     STATE         SERVICE
22/tcp   open|filtered ssh
80/tcp   open|filtered http
8080/tcp open|filtered http-proxy
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 1.33 seconds
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sX 192.168.43.78
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 10:48 BST
Nmap scan report for 192.168.43.78
Host is up (0.00038s latency).
All 1000 scanned ports on 192.168.43.78 are open|filtered
MAC Address: 08:00:27:5E:51:D4 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 21.25 seconds
```

Scan 7: NULL scan (No Flags)

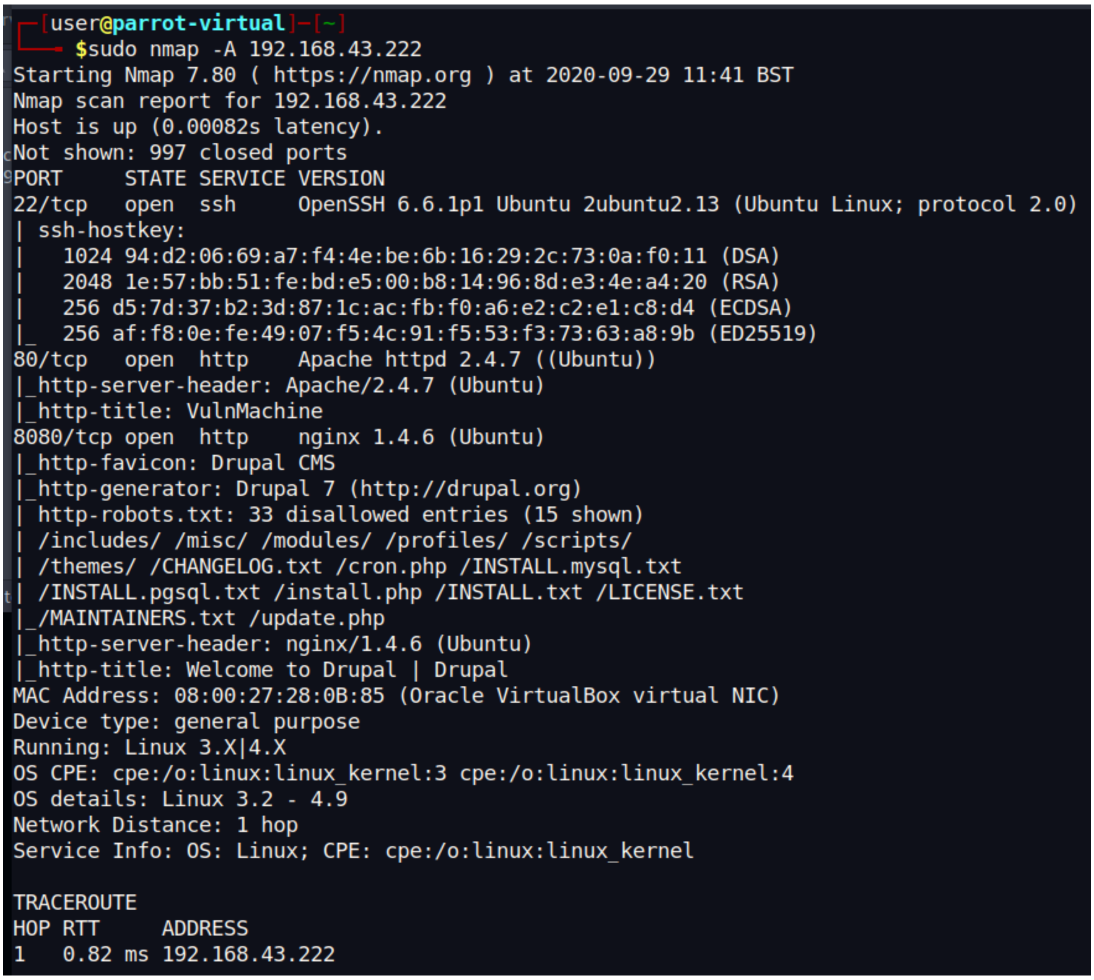
- **Syntax**: nmap –sN <target IP or domain>
    - **Ex**: nmap –sN example.com
    - nmap –sN 192.168.0.137 –v



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sN 192.168.43.78
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:08 BST
Nmap scan report for 192.168.43.78
Host is up (0.00033s latency).
All 1000 scanned ports on 192.168.43.78 are open|filtered
MAC Address: 08:00:27:5E:51:D4 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 21.23 seconds
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sN 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:09 BST
Nmap scan report for 192.168.43.222
Host is up (0.00025s latency).
Not shown: 997 closed ports
PORT     STATE         SERVICE
22/tcp   open|filtered ssh
80/tcp   open|filtered http
8080/tcp open|filtered http-proxy
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 1.31 seconds
```

Scan 8: Aggressive scan

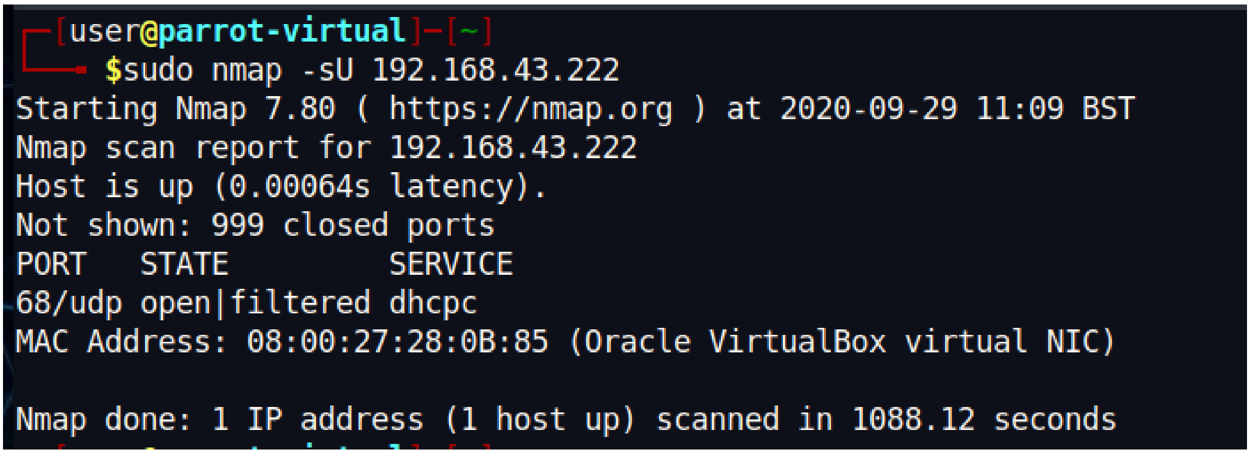
- **Syntax**: nmap –A <target IP of domain>
  - **Ex**: nmap –A example.com
  - nmap –A 192.168.0.137 –v
- You can add **–v** at the end of any command to see the verbose (in detailed) information



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -A 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:41 BST
Nmap scan report for 192.168.43.222
Host is up (0.00082s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE VERSION
22/tcp   open  ssh     OpenSSH 6.6.1p1 Ubuntu 2ubuntu2.13 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   1024 94:d2:06:69:a7:f4:4e:be:6b:16:29:2c:73:0a:f0:11 (DSA)
|   2048 1e:57:bb:51:fe:bd:e5:00:b8:14:96:8d:e3:4e:a4:20 (RSA)
|   256 d5:7d:37:b2:3d:87:1c:ac:fb:f0:a6:e2:c2:e1:c8:d4 (ECDSA)
|_  256 af:f8:0e:fe:49:07:f5:4c:91:f5:53:f3:73:63:a8:9b (ED25519)
80/tcp   open  http    Apache httpd 2.4.7 ((Ubuntu))
|_http-server-header: Apache/2.4.7 (Ubuntu)
|_http-title: VulnMachine
8080/tcp open  http    nginx 1.4.6 (Ubuntu)
|_http-favicon: Drupal CMS
|_http-generator: Drupal 7 (http://drupal.org)
| http-robots.txt: 33 disallowed entries (15 shown)
| /includes/ /misc/ /modules/ /profiles/ /scripts/
| /themes/ /CHANGELOG.txt /cron.php /INSTALL.mysql.txt
| /INSTALL.pgsql.txt /install.php /INSTALL.txt /LICENSE.txt
|_/MAINTAINERS.txt /update.php
|_http-server-header: nginx/1.4.6 (Ubuntu)
|_http-title: Welcome to Drupal | Drupal
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)
Device type: general purpose
Running: Linux 3.X|4.X
OS CPE: cpe:/o:linux:linux_kernel:3 cpe:/o:linux:linux_kernel:4
OS details: Linux 3.2 - 4.9
Network Distance: 1 hop
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE
HOP RTT     ADDRESS
1   0.82 ms 192.168.43.222
```

Scan 9: UDP port scan

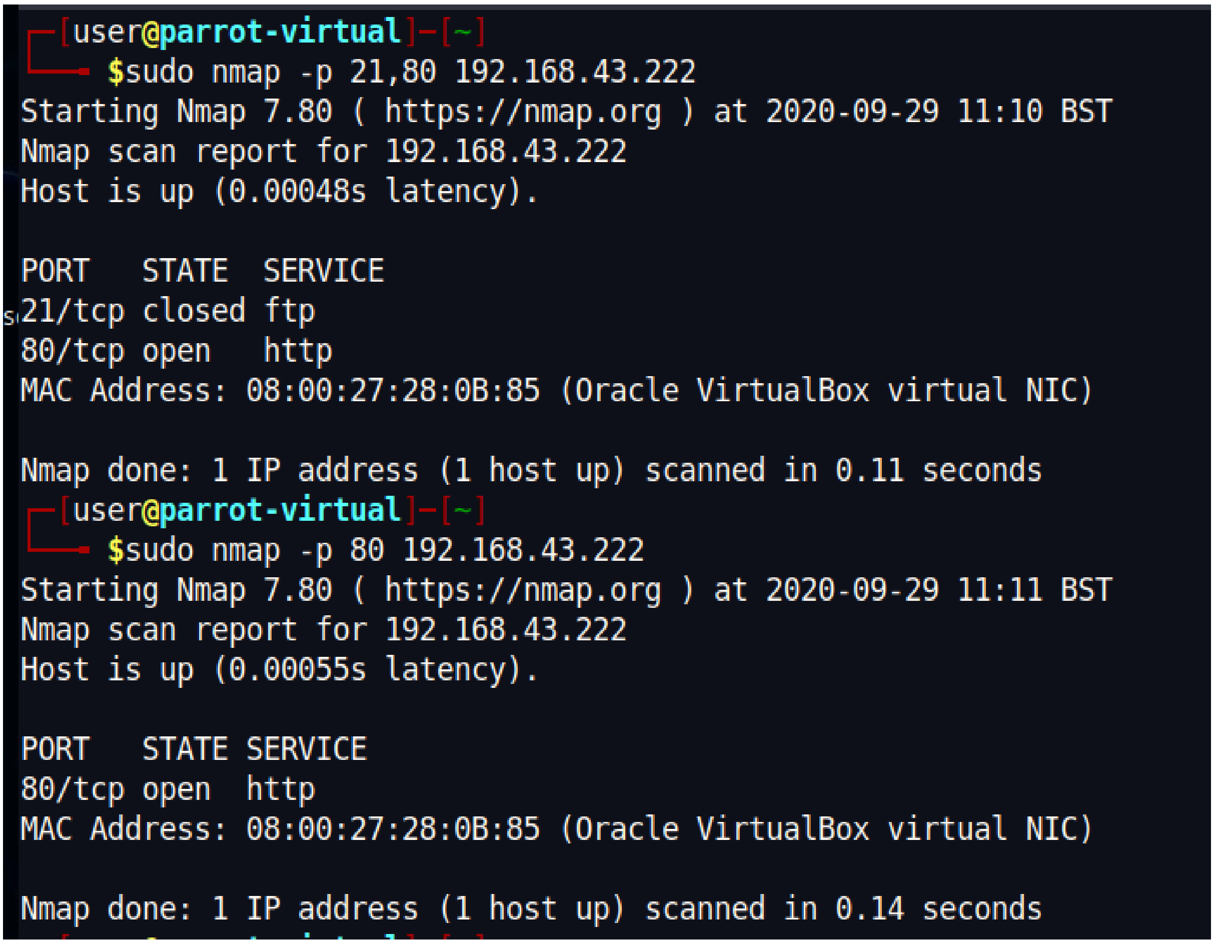
- **Syntax**: nmap –sU <target IP or domain>
  - **Example**: nmap –sU example.com
  - nmap –sU 192.168.0.137



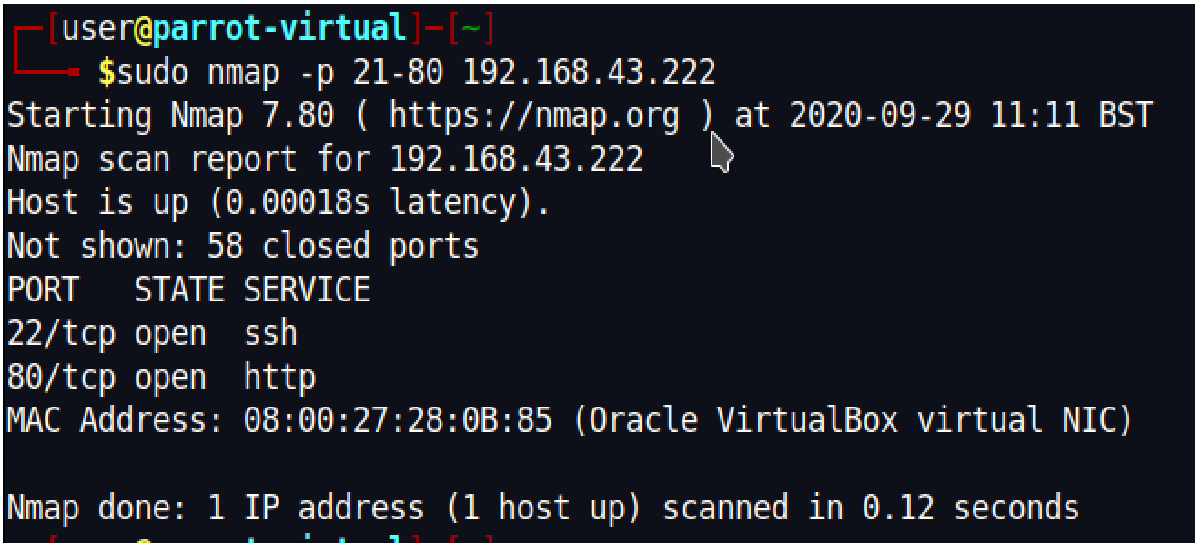
```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -sU 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:09 BST
Nmap scan report for 192.168.43.222
Host is up (0.00064s latency).
Not shown: 999 closed ports
PORT   STATE         SERVICE
68/udp open|filtered dhcpc
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 1088.12 seconds
```

Scan 10: Custom port scanning

- **Syntax**: nmap –p <port range> <target IP or domain>
  - **Ex**: nmap –p 80 example.com
  - nmap 192.168.0.137 –p 80-85
  - nmap 49.204.90.43 –p 80,81,85,21,443



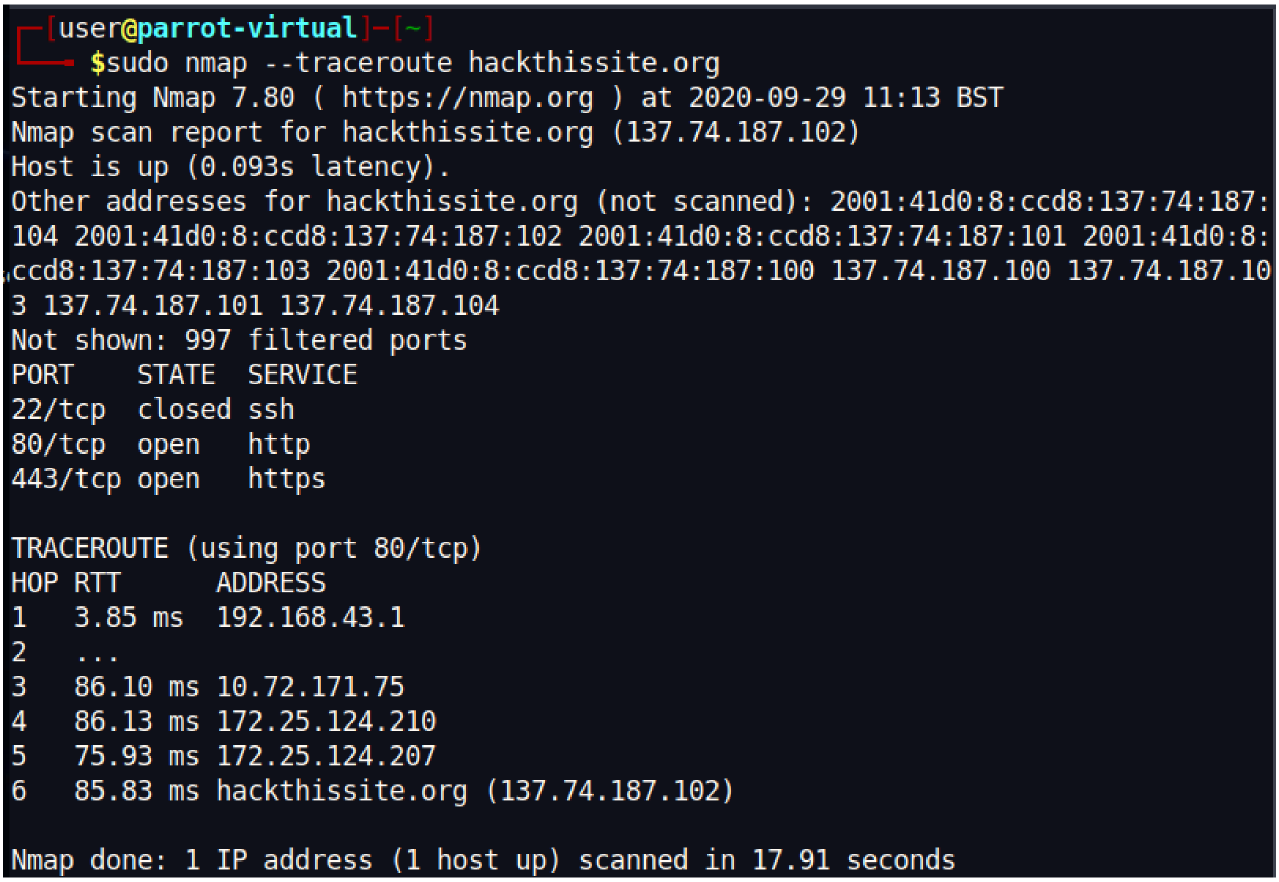
```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -p 21,80 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:10 BST
Nmap scan report for 192.168.43.222
Host is up (0.00048s latency).

PORT   STATE  SERVICE
21/tcp closed ftp
80/tcp open   http
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.11 seconds
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -p 80 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:11 BST
Nmap scan report for 192.168.43.222
Host is up (0.00055s latency).

PORT   STATE SERVICE
80/tcp open  http
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.14 seconds
```



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap -p 21-80 192.168.43.222
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:11 BST
Nmap scan report for 192.168.43.222
Host is up (0.00018s latency).
Not shown: 58 closed ports
PORT   STATE SERVICE
22/tcp open  ssh
80/tcp open  http
MAC Address: 08:00:27:28:0B:85 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.12 seconds
```

Scan 11: Traceroute scan with nmap

- **Syntax:** nmap --traceroute <target IP or domain>
    - **Ex:** nmap --traceroute example.com
    - nmap --traceroute 192.168.0.137 –v



```
┌─[user@parrot-virtual]─[~]
└──╼ $sudo nmap --traceroute hackthissite.org
Starting Nmap 7.80 ( https://nmap.org ) at 2020-09-29 11:13 BST
Nmap scan report for hackthissite.org (137.74.187.102)
Host is up (0.093s latency).
Other addresses for hackthissite.org (not scanned): 2001:41d0:8:ccd8:137:74:187:
104 2001:41d0:8:ccd8:137:74:187:102 2001:41d0:8:ccd8:137:74:187:101 2001:41d0:8:
ccd8:137:74:187:103 2001:41d0:8:ccd8:137:74:187:100 137.74.187.100 137.74.187.10
3 137.74.187.101 137.74.187.104
Not shown: 997 filtered ports
PORT    STATE  SERVICE
22/tcp  closed ssh
80/tcp  open   http
443/tcp open   https

TRACEROUTE (using port 80/tcp)
HOP RTT      ADDRESS
1   3.85 ms  192.168.43.1
2   ...
3   86.10 ms 10.72.171.75
4   86.13 ms 172.25.124.210
5   75.93 ms 172.25.124.207
6   85.83 ms hackthissite.org (137.74.187.102)

Nmap done: 1 IP address (1 host up) scanned in 17.91 seconds
```