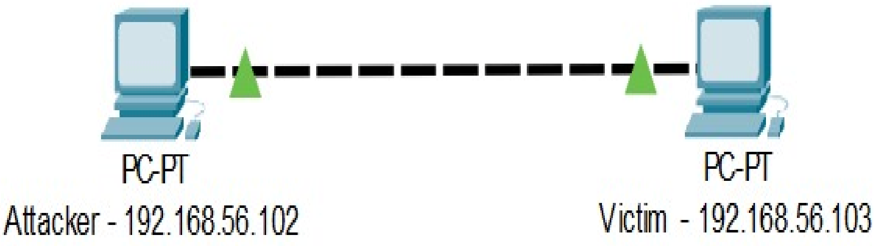
SOC Lab: To Investigate and Simulate Attacks

Lab Setup:

1. **Network Topology**



2. **Installation Steps**

- I downloaded and installed VirtualBox to create a virtual environment for my attack simulation, within the VirtualBox I set the operating systems using their ISO and image file.

Kali Linux – It's Linux distribution designed for penetration testing. In this setup it will be used to simulate the attacker machine.

Windows 10 – It's A widely-used operating system. In the setup it will serve as the target machine to mimic a real-world user environment.

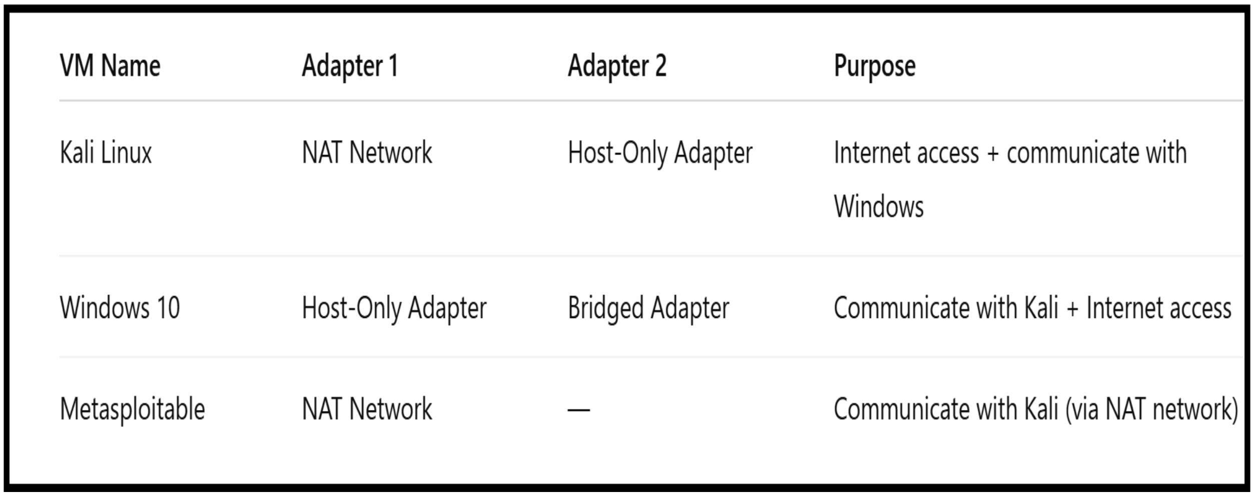
Metasploitable – It’s a tool designed for testing and practicing exploitation techniques.

Below are the officially download links for each component mentioned above:

- VirtualBox: https://www.virtualbox.org/wiki/Downloads
- Kali Linux and ISO: https://www.kali.org/get-kali/
- Windows 10 and ISO: https://www.microsoft.com/software-download/windows10
- Metasploitable 2 VM Image: https://sourceforge.net/projects/metasploitable/

3. VM Configuration

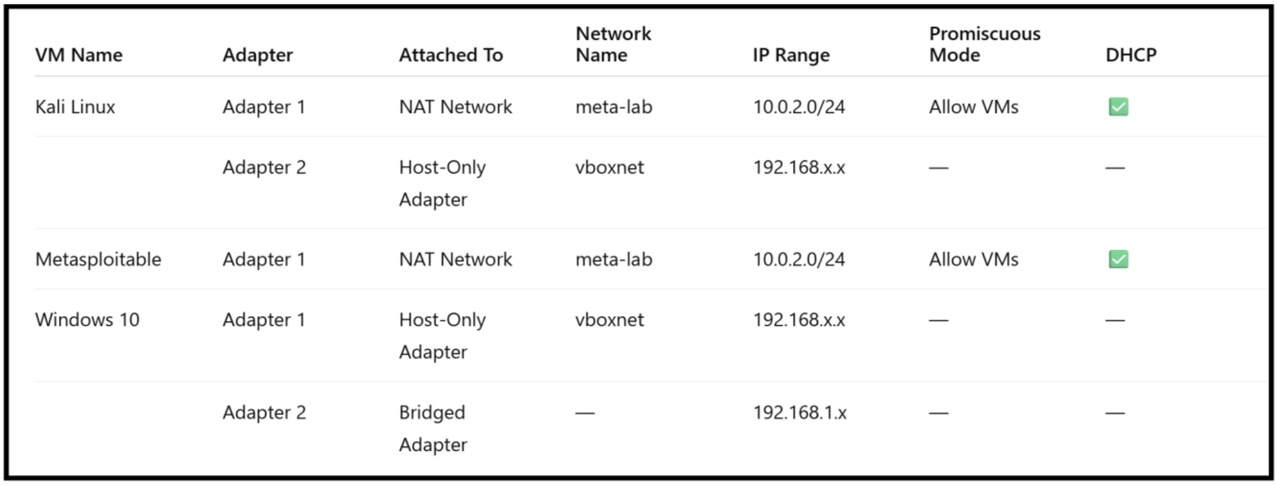
After installing the virtual machines, I configured the network settings for each VM by enabling and adjusting the network adapters. The configuration details are illustrated in the image below.



VM Name	Adapter 1	Adapter 2	Purpose
Kali Linux	NAT Network	Host-Only Adapter	Internet access + communicate with Windows
Windows 10	Host-Only Adapter	Bridged Adapter	Communicate with Kali + Internet access
Metasploitable	NAT Network	—	Communicate with Kali (via NAT network)

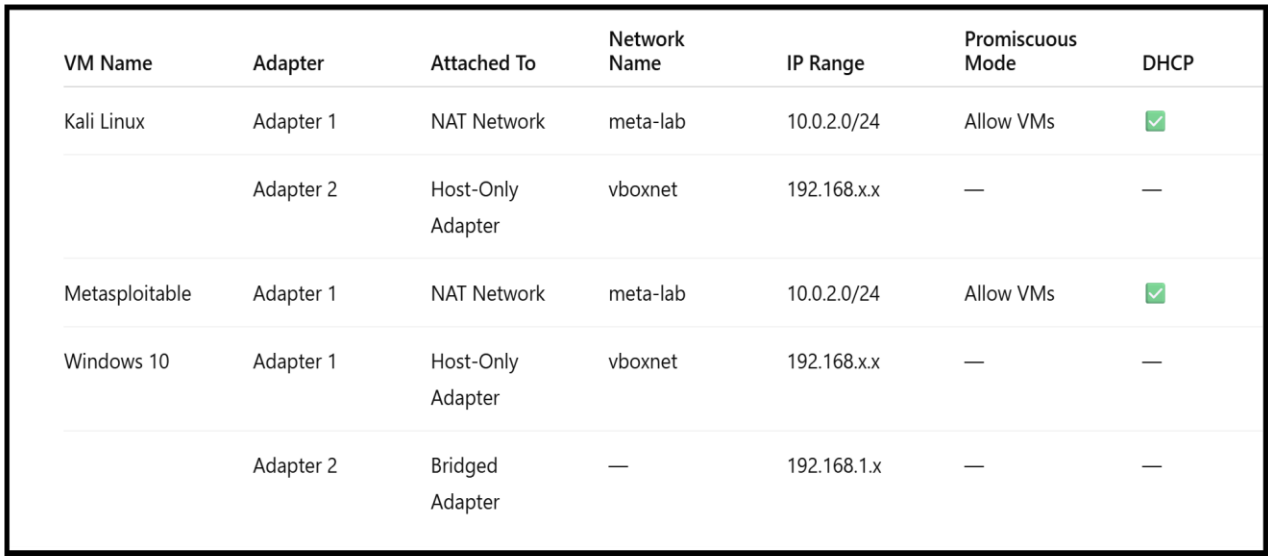
For my vulnerable machine (Metasploitable), I needed to ensure that Kali Linux and Metasploitable could communication effectively within the virtual environment. And to achieve this, I created a custom NAT network using the VirtualBox Network Manager.

I named the network "meta-lab", set the ipv4 prefix to 10.0.2.0/24 and enabled DHCP to allow automatic Ip addressing. Next, I attached the "meta-lab" network to Adapter 1 of both Kali Linux and Metasploitable, enabling a communication between the two machines. The final configuration is shown in the image below.



VM Name	Adapter	Attached To	Network Name	IP Range	Promiscuous Mode	DHCP
Kali Linux	Adapter 1	NAT Network	meta-lab	10.0.2.0/24	Allow VMs	☑
	Adapter 2	Host-Only Adapter	vboxnet	192.168.x.x	—	—
Metasploitable	Adapter 1	NAT Network	meta-lab	10.0.2.0/24	Allow VMs	☑
Windows 10	Adapter 1	Host-Only Adapter	vboxnet	192.168.x.x	—	—
	Adapter 2	Bridged Adapter	—	192.168.1.x	—	—

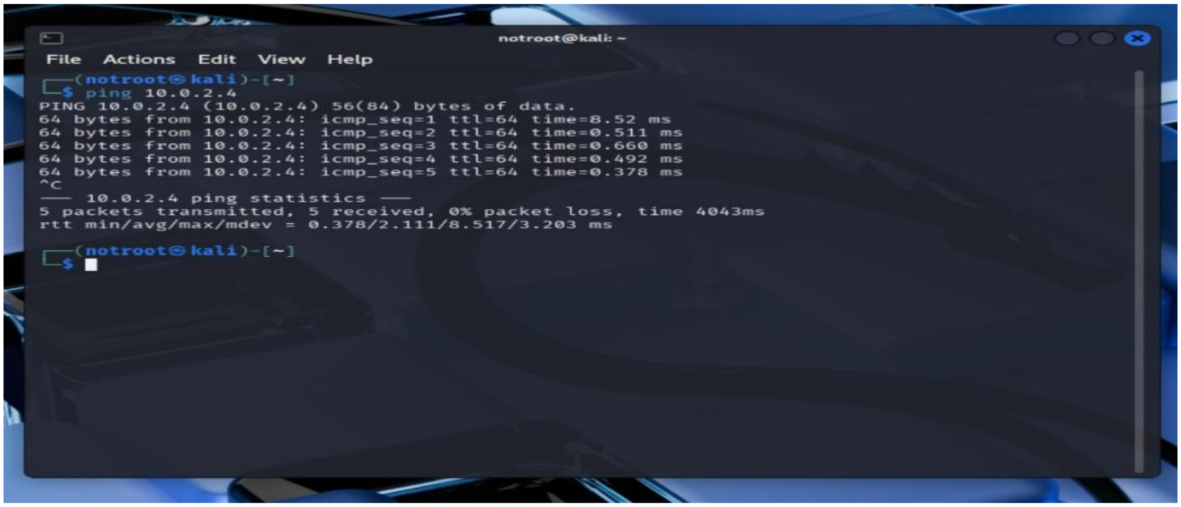
The image below shows the network interfaces of each virtual machine, including their adapter settings and assigned networks.



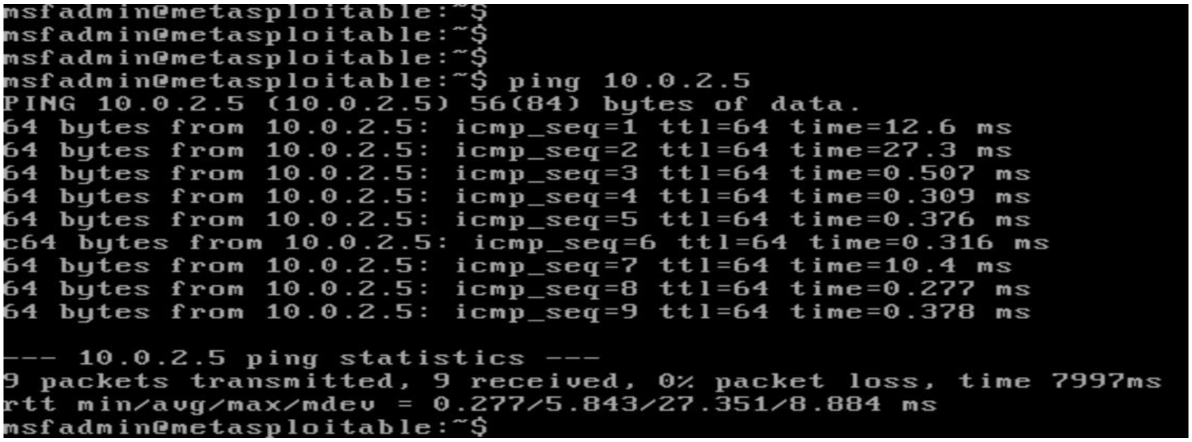
VM Name	Adapter	Attached To	Network Name	IP Range	Promiscuous Mode	DHCP
Kali Linux	Adapter 1	NAT Network	meta-lab	10.0.2.0/24	Allow VMs	☑
	Adapter 2	Host-Only Adapter	vboxnet	192.168.x.x	—	—
Metasploitable	Adapter 1	NAT Network	meta-lab	10.0.2.0/24	Allow VMs	☑
Windows 10	Adapter 1	Host-Only Adapter	vboxnet	192.168.x.x	—	—
	Adapter 2	Bridged Adapter	—	192.168.1.x	—	—

The next step was to verify network connectivity between the virtual machines. I ensured that:

- Kali Linux can ping Metaspoloitable, and Metaspoloitable can also ping Kali Linux successfully.

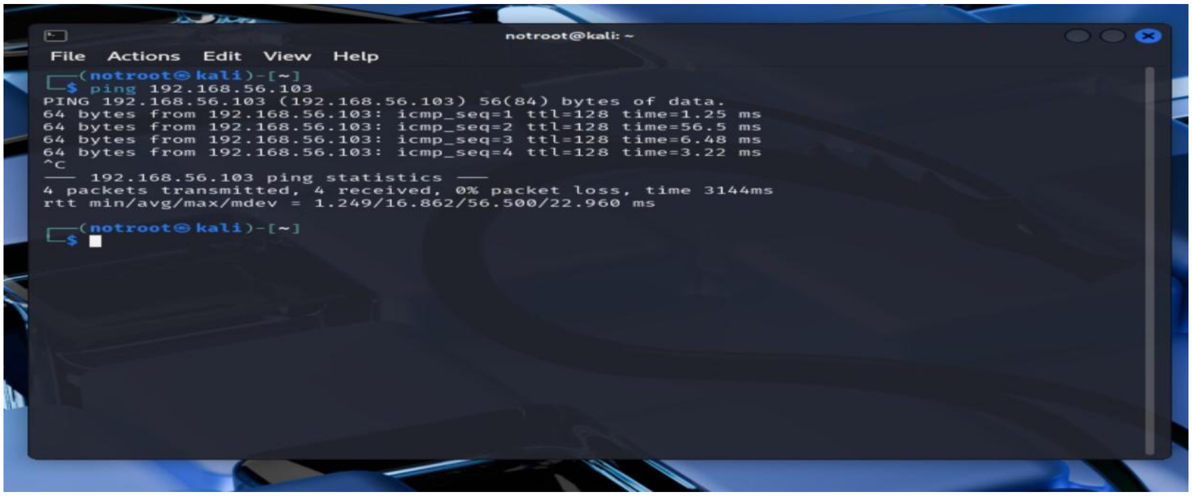


```
┌──(notroot㉿kali)-[~]
└─$ ping 10.0.2.4
PING 10.0.2.4 (10.0.2.4) 56(84) bytes of data.
64 bytes from 10.0.2.4: icmp_seq=1 ttl=64 time=8.52 ms
64 bytes from 10.0.2.4: icmp_seq=2 ttl=64 time=0.511 ms
64 bytes from 10.0.2.4: icmp_seq=3 ttl=64 time=0.660 ms
64 bytes from 10.0.2.4: icmp_seq=4 ttl=64 time=0.492 ms
64 bytes from 10.0.2.4: icmp_seq=5 ttl=64 time=0.378 ms
^C
—— 10.0.2.4 ping statistics ——
5 packets transmitted, 5 received, 0% packet loss, time 4043ms
rtt min/avg/max/mdev = 0.378/2.111/8.517/3.203 ms

┌──(notroot㉿kali)-[~]
└─$ 
```

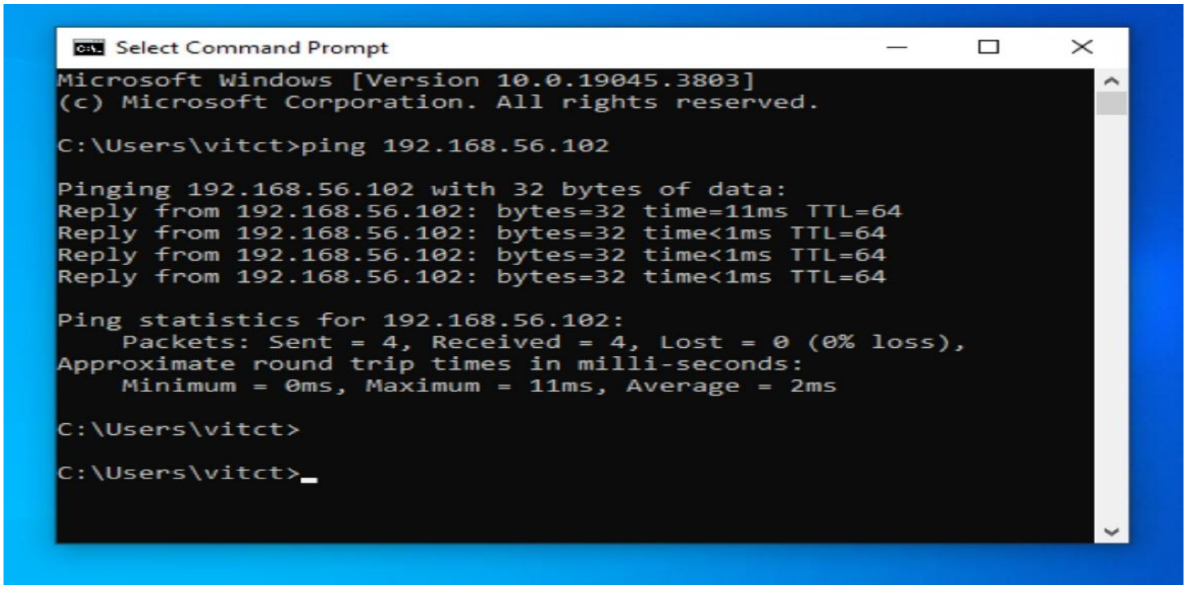


```
msfadmin@metasploitable:~$
msfadmin@metasploitable:~$
msfadmin@metasploitable:~$
msfadmin@metasploitable:~$ ping 10.0.2.5
PING 10.0.2.5 (10.0.2.5) 56(84) bytes of data.
64 bytes from 10.0.2.5: icmp_seq=1 ttl=64 time=12.6 ms
64 bytes from 10.0.2.5: icmp_seq=2 ttl=64 time=27.3 ms
64 bytes from 10.0.2.5: icmp_seq=3 ttl=64 time=0.507 ms
64 bytes from 10.0.2.5: icmp_seq=4 ttl=64 time=0.309 ms
64 bytes from 10.0.2.5: icmp_seq=5 ttl=64 time=0.376 ms
c64 bytes from 10.0.2.5: icmp_seq=6 ttl=64 time=0.316 ms
64 bytes from 10.0.2.5: icmp_seq=7 ttl=64 time=10.4 ms
64 bytes from 10.0.2.5: icmp_seq=8 ttl=64 time=0.277 ms
64 bytes from 10.0.2.5: icmp_seq=9 ttl=64 time=0.378 ms

--- 10.0.2.5 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 7997ms
rtt min/avg/max/mdev = 0.277/5.843/27.351/8.884 ms
msfadmin@metasploitable:~$
```

- Kali Linux can ping Windows 10, and Windows 10 can also ping Kali Linux successfully.



```
┌──(notroot㉿kali)-[~]
└─$ ping 192.168.56.103
PING 192.168.56.103 (192.168.56.103) 56(84) bytes of data.
64 bytes from 192.168.56.103: icmp_seq=1 ttl=128 time=1.25 ms
64 bytes from 192.168.56.103: icmp_seq=2 ttl=128 time=56.5 ms
64 bytes from 192.168.56.103: icmp_seq=3 ttl=128 time=6.48 ms
64 bytes from 192.168.56.103: icmp_seq=4 ttl=128 time=3.22 ms
^C
—— 192.168.56.103 ping statistics ——
4 packets transmitted, 4 received, 0% packet loss, time 3144ms
rtt min/avg/max/mdev = 1.249/16.862/56.500/22.960 ms

┌──(notroot㉿kali)-[~]
└─$ 
```



```
Microsoft Windows [Version 10.0.19045.3803]
(c) Microsoft Corporation. All rights reserved.

C:\Users\vitct>ping 192.168.56.102

Pinging 192.168.56.102 with 32 bytes of data:
Reply from 192.168.56.102: bytes=32 time=11ms TTL=64
Reply from 192.168.56.102: bytes=32 time<1ms TTL=64
Reply from 192.168.56.102: bytes=32 time<1ms TTL=64
Reply from 192.168.56.102: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.56.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\Users\vitct>

C:\Users\vitct>
```

The screenshots are taken from VirtualBox, to show the successful communication between the virtual machines.