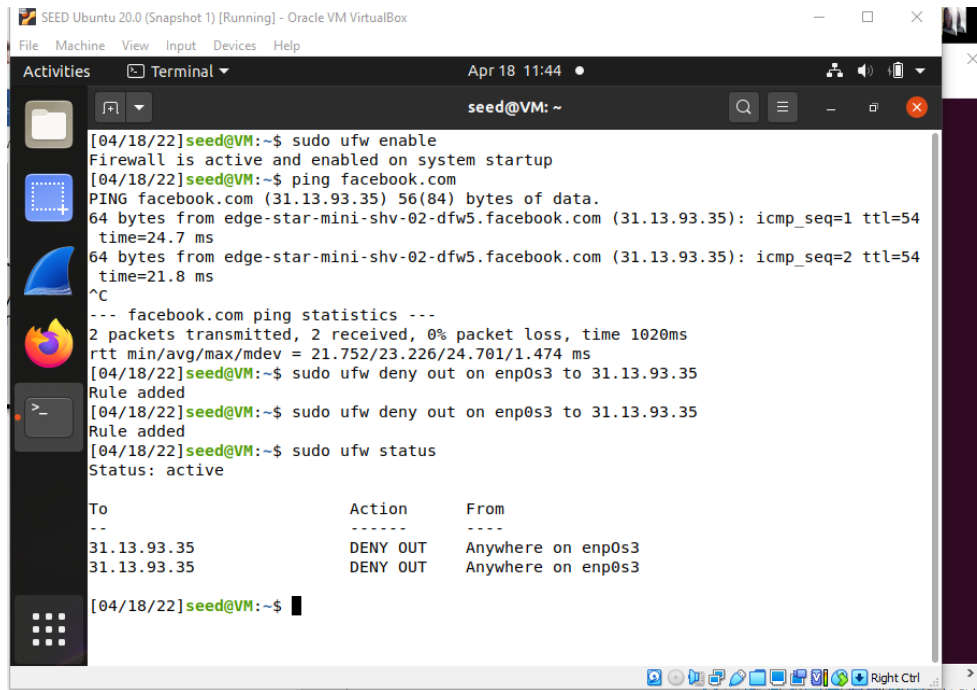


## 1. Setting up Firewall

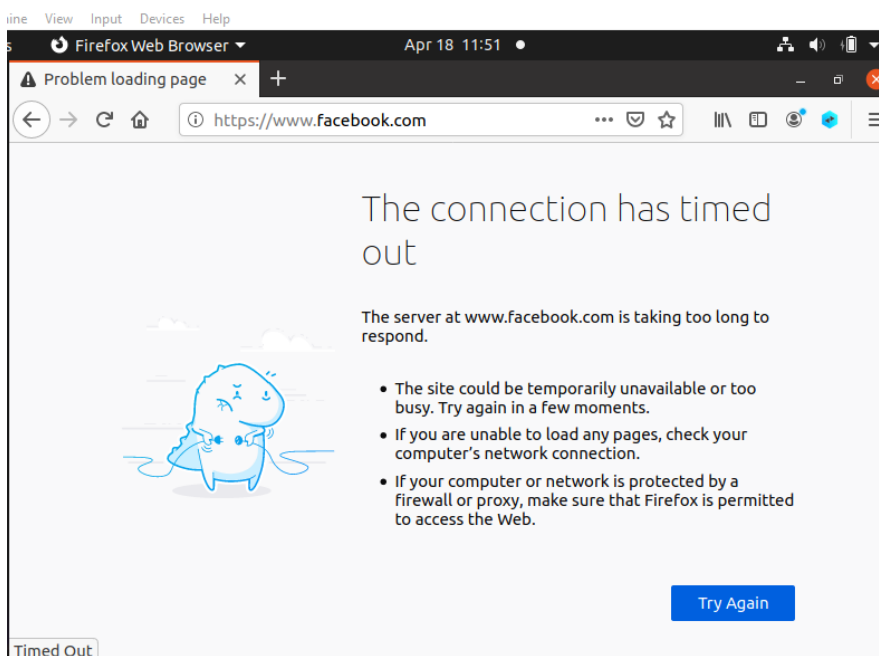


```
SEED Ubuntu 20.0 (Snapshot 1) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 18 11:44
seed@VM: ~
[04/18/22]seed@VM:~$ sudo ufw enable
Firewall is active and enabled on system startup
[04/18/22]seed@VM:~$ ping facebook.com
PING facebook.com (31.13.93.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-dfw5.facebook.com (31.13.93.35): icmp_seq=1 ttl=54
time=24.7 ms
64 bytes from edge-star-mini-shv-02-dfw5.facebook.com (31.13.93.35): icmp_seq=2 ttl=54
time=21.8 ms
^C
--- facebook.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1020ms
rtt min/avg/max/mdev = 21.752/23.226/24.701/1.474 ms
[04/18/22]seed@VM:~$ sudo ufw deny out on enp0s3 to 31.13.93.35
Rule added
[04/18/22]seed@VM:~$ sudo ufw deny out on enp0s3 to 31.13.93.35
Rule added
[04/18/22]seed@VM:~$ sudo ufw status
Status: active

To Action From
---
31.13.93.35 DENY OUT Anywhere on enp0s3
31.13.93.35 DENY OUT Anywhere on enp0s3

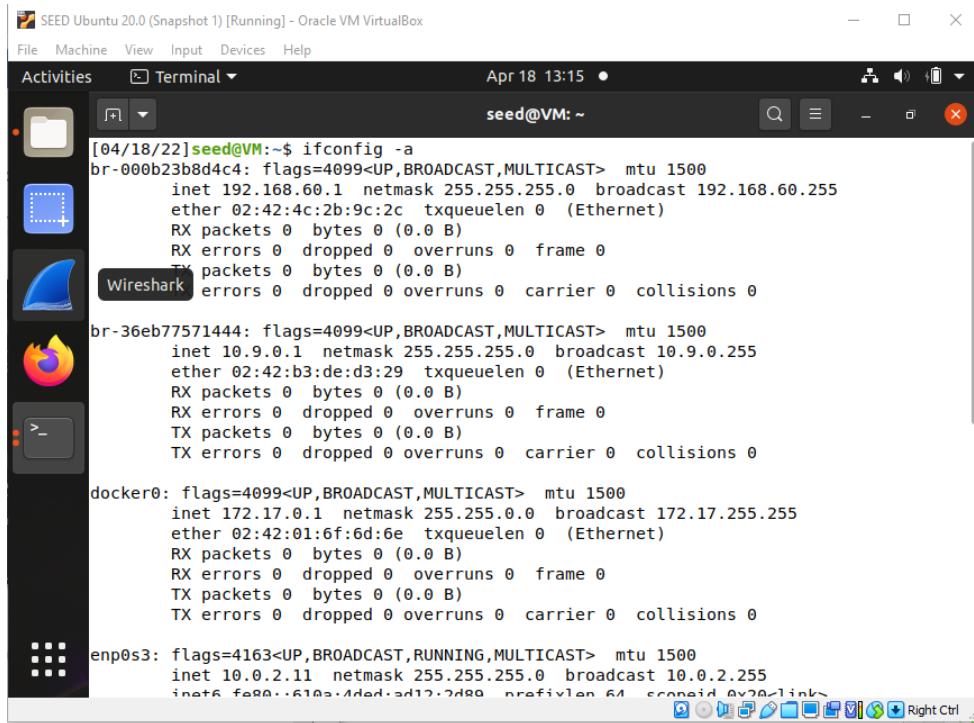
[04/18/22]seed@VM:~$
```

- Using the ufw command
- Blocking Facebook.com website using the ufw deny out command.



- Site not reachable after blocking

## 2. Bypassing Firewall using VPN – Ubuntu 16.0 – Server; Ubuntu 20.0 - Client



```
SEED Ubuntu 20.0 (Snapshot 1) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 18 13:15 seed@VM: ~
[04/18/22]seed@VM:~$ ifconfig -a
br-000b23b8d4c4: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.60.1 netmask 255.255.255.0 broadcast 192.168.60.255
    ether 02:42:4c:2b:9c:2c txqueuelen 0 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

br-36eb77571444: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 10.9.0.1 netmask 255.255.255.0 broadcast 10.9.0.255
    ether 02:42:b3:de:d3:29 txqueuelen 0 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

docker0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 172.17.0.1 netmask 255.255.0.0 broadcast 172.17.255.255
    ether 02:42:01:6f:6d:6e txqueuelen 0 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.11 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::618a:4ded:ad12:2d89 prefixlen 64 scopeid 0x20<link>
```

- Running VPN on server

```
SEED Ubuntu 20.0 (Snapshot 1) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 18 13:15
seed@VM: ~
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.11 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::610a:4ded:ad12:2d89 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:87:02:de txqueuelen 1000 (Ethernet)
    RX packets 180 bytes 57045 (57.0 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 214 bytes 29020 (29.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 169 bytes 13983 (13.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 169 bytes 13983 (13.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

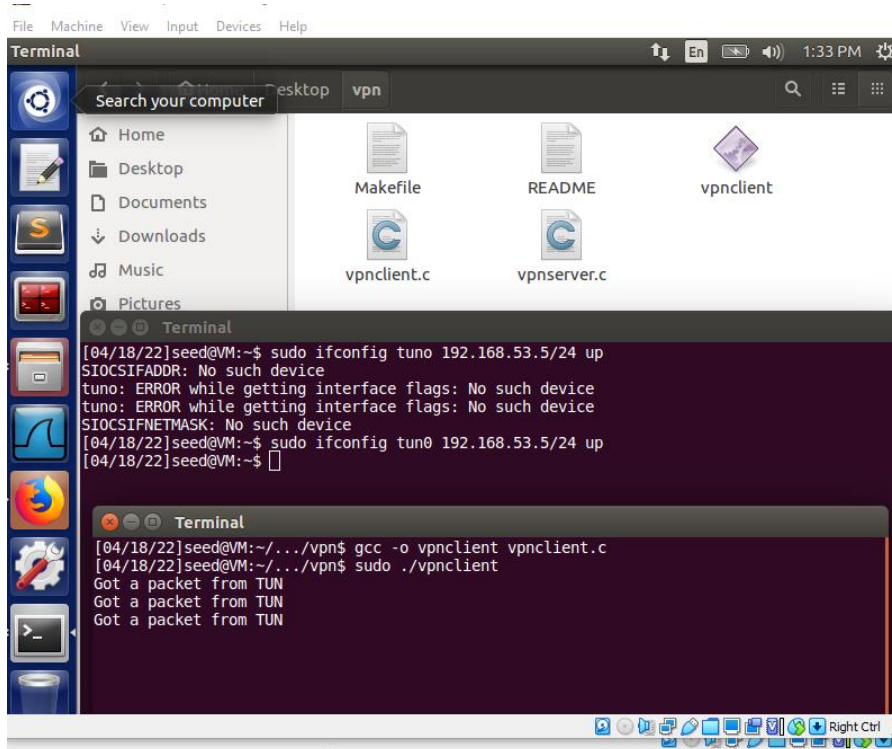
tun0: flags=4240<POINTOPOINT,NOARP,MULTICAST> mtu 1500
    unspec 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00 txqueuelen 500 (UNSPEC)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[04/18/22]seed@VM:~$
```

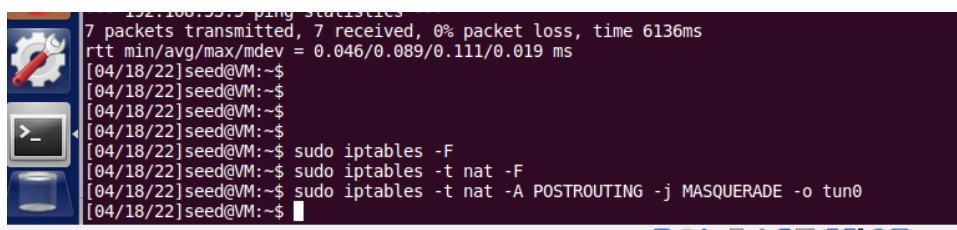
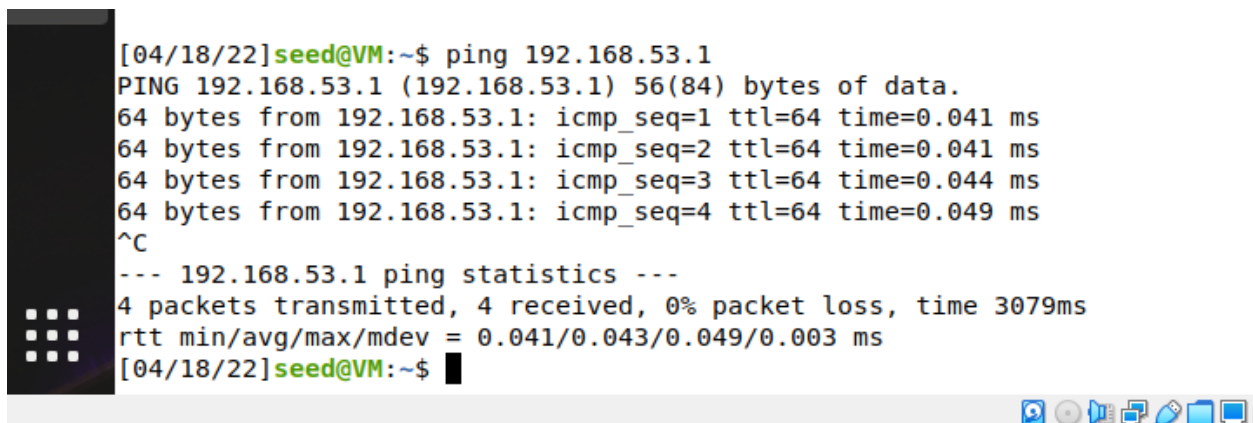
```
SEED Ubuntu 20.0 (Snapshot 1) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 18 13:44
seed@VM: ~
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[04/18/22]seed@VM:~$ sudo ifconfig tun0 192.168.53.1/24 up
[04/18/22]seed@VM:~$ sudo sysctl net.ipv4.ip_forward=1
sysctl: cannot stat /proc/sys/net/ipv4/ip: No such file or directory
sysctl: cannot stat /proc/sys/forward: No such file or directory
[04/18/22]seed@VM:~$ sudo sysctl net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
[04/18/22]seed@VM:~$
[04/18/22]seed@VM:~$
[04/18/22]seed@VM:~$
[04/18/22]seed@VM:~$ sudo route add .net 192.168.53.0/24 tun0
.net: Unknown host
[04/18/22]seed@VM:~$ sudo route add -net 192.168.53.0/24 tun0
[04/18/22]seed@VM:~$ route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default _gateway 0.0.0.0 UG 100 0 0 enp0s3
10.0.2.0 0.0.0.0 255.255.255.0 U 100 0 0 enp0s3
10.9.0.0 0.0.0.0 255.255.255.0 U 0 0 0 br-36eb7757144
4
link-local 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s3
172.17.0.0 0.0.0.0 255.255.0.0 U 0 0 0 docker0
192.168.53.0 0.0.0.0 255.255.255.0 U 0 0 0 tun0
192.168.53.0 0.0.0.0 255.255.255.0 U 0 0 0 tun0
192.168.60.0 0.0.0.0 255.255.255.0 U 0 0 0 br-000b23b8d4c
4
[04/18/22]seed@VM:~$
```

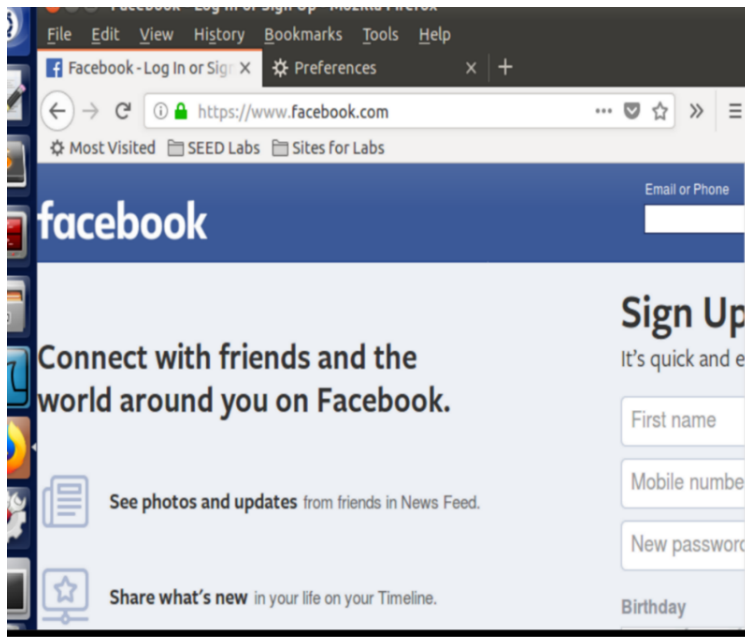
- Enabling IP forwarding on client
- Setting up routing on client



- Running VPN on Server



- Setting up NAT on Server



- Testing to see if blocked site – facebook.com can be reached from client.