Network Security Report

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All the code can be found at GitHub and in the zip file.

1. Setup

The following steps were taken to setup the three base machines, *server*, *router*, and *client*:

- The *Ubuntu Server 18.04.4 LTS* was downloaded from the Official Website.
- The image was then setup in virtualbox with the following properties as shown in Fig 1.
- The base machine was then cloned into 2 other machines for *server* and *client* purposes.
- The network configuration of *router*:

```
# The internal interface on clientnet
auto enp0s8
iface enp0s8 inet static
address 192.168.100.1
netmask 255.255.255.0
network 192.168.100.0
broadcast 192.168.100.255


# The internal interface on servernet
auto enp0s3
iface enp0s3 inet static
address 192.168.101.1
```

```
netmask 255.255.255.0
network 192.168.101.0
broadcast 192.168.101.255
```

- The network configuration of *client*:

```
# The internal interface on clientnet
auto enp0s8
iface enp0s8 inet static
address 192.168.100.2
netmask 255.255.255.0
network 192.168.100.0
broadcast 192.168.100.255
post-up route add -net 192.168.0.0 netmask 255.255.0.0 gw
    192.168.100.1 dev enp0s8
pre-down route del -net 192.168.0.0 netmask 255.255.0.0 gw
    192.168.100.1 dev enp0s8
```

- The network configuration of *server*:

```
# The internal interface on servernet
auto enp0s3
iface enp0s3 inet static
address 192.168.101.2
netmask 255.255.255.0
network 192.168.101.0
broadcast 192.168.101.255
post-up route add -net 192.168.0.0 netmask 255.255.0.0 gw
    192.168.101.1 dev enp0s3
pre-down route del -net 192.168.0.0 netmask 255.255.0.0 gw
    192.168.101.1 dev enp0s3
```

2. Testing

2.1. Part1

Firstly, the connections to all the machines were checked through the ***ping*** tool.

From the *router* machine:

```
# Testing ping on server
ssh server "ping router"
ssh server "ping client"

# Testing ping on client
ssh client "ping router"
ssh client "ping server"
```

Now, we can test if the apache services (port 80) running on the machines are accessible by:

```
# Testing ping on server
ssh server "curl router"
ssh server "curl client"

# Testing ping on client
ssh client "curl router"
ssh client "curl server"
```

Therefore, these tests show that the machines are all connected.

2.2. Part2

After executing ***part2.sh*** on the *server*, we execute:

```
# This command succeeds
ssh client "ping server"

# This command fails
ssh client "curl server"

# This command succeeds
ping client
```

2.3. Part3

After executing ***part3.sh*** on the *server*, we execute:

```
# This command fails
ssh client "ping server"
```

```
# This command succeeds
ssh client "ssh server"

# This command succeeds
ping client
```

2.4. Part4-2

After executing ***part4-2.sh*** on the *router*, we execute:

```
# This command succeeds
ssh client "ping server"

# This command fails
ssh client "curl server"

# This command succeeds
ssh server "ping client"
```

2.5. Part4-3

After executing ***part4-3.sh*** on the *router*, we execute:

```
# This command fails
ssh client "ping server"

# This command succeeds
ssh client "ssh server"

# This command succeeds
ssh server "ping client"
```

2.6. Part6

After executing ***part6.sh*** on the *router*, we execute:

```
# This command succeeds
ssh client "ping server"

# This command fails
ssh client "curl server"
```

```
# This command succeeds
ssh server "ping client"

# This command shows the stored logs
 journalctl -k | grep "IN=.*OUT=.*" | less
```

3. Conclusion

The firewall uses *iptables* command to create firewalls according to the various requirements given in the assignment.

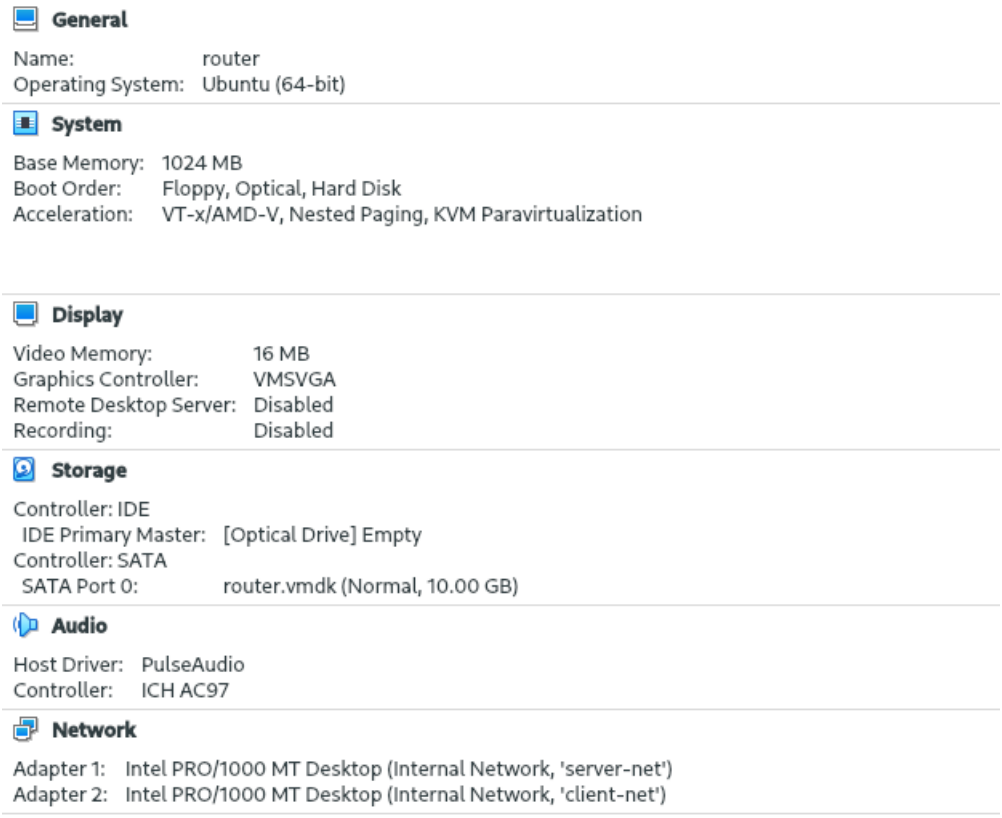
General
Name: router
Operating System: Ubuntu (64-bit)
System
Base Memory: 1024 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Primary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: router.vmdk (Normal, 10.00 GB)
Audio
Host Driver: PulseAudio
Controller: ICH AC97
Network
Adapter 1: Intel PRO/1000 MT Desktop (Internal Network, 'server-net')
Adapter 2: Intel PRO/1000 MT Desktop (Internal Network, 'client-net')

Figure 1