Lab Assignment 10

Aim: To study and configure Firewalls using IP tables

LO Attainment **: LO6**

Firewall:

A firewall is a system designed to prevent unauthorized access to or from a private network. You can implement a firewall in either hardware or software form, or a combination of both. Generally the firewall has two network interfaces: one for the external side of the network, one for the internal side. Its purpose is to control what traffic is allowed to traverse from one side to the other. As the most basic level, firewalls can block traffic intended for particular IP addresses or server ports.

TCP network traffic moves around a network in packets, which are containers that consist of a packet header—this contains control information such as source and destination addresses, and packet sequence information—and the data (also known as a payload). While the control information in each packet helps to ensure that its associated data gets delivered properly, the elements it contains also provides firewalls a variety of ways to match packets against firewall rules.

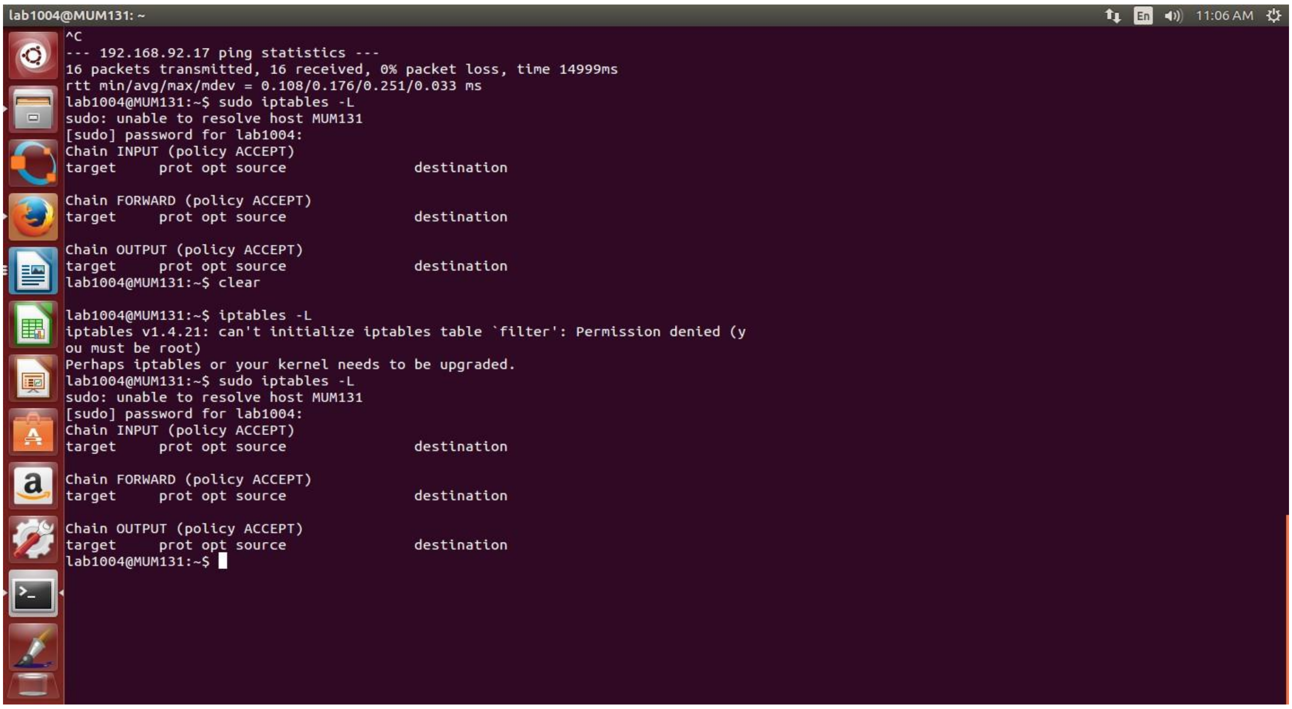
Types of Firewalls

Three basic types of network firewalls: packet filtering (stateless), stateful, and application layer.

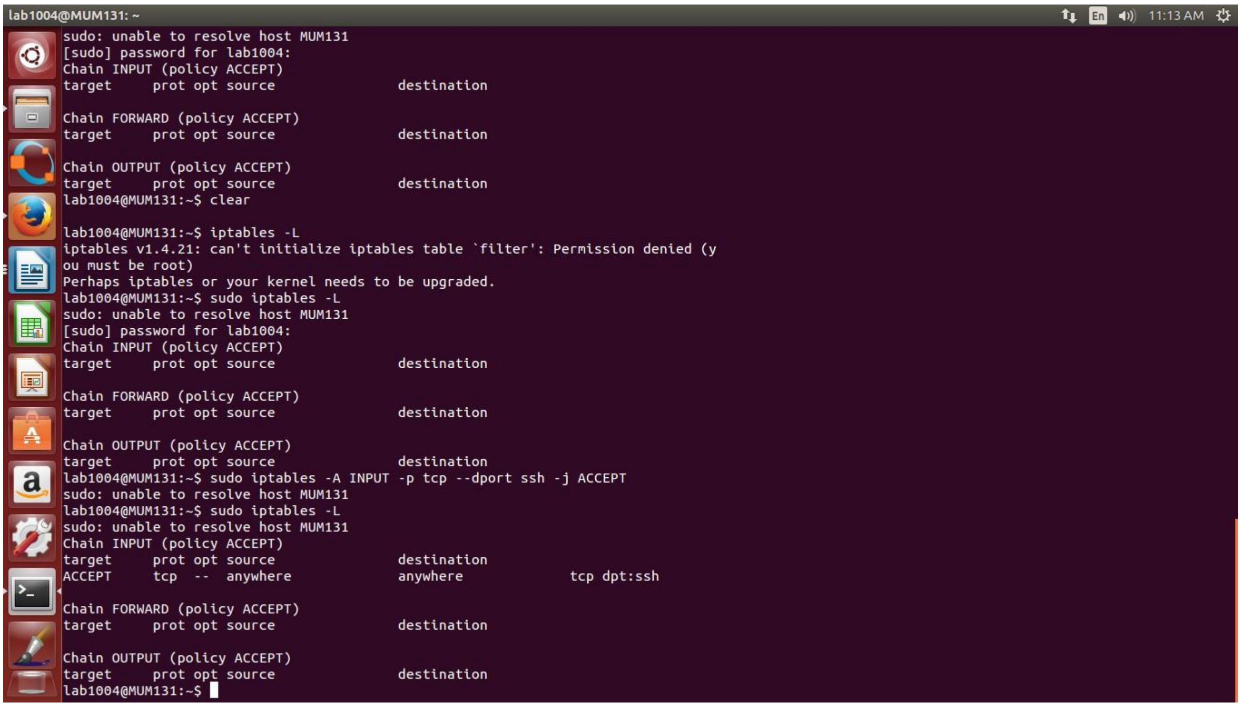
Packet filtering, or stateless, firewalls work by inspecting individual packets in isolation. As such, they are unaware of connection state and can only allow or deny packets based on individual packet headers.

Stateful firewalls are able to determine the connection state of packets, which makes them much more flexible than stateless firewalls. They work by collecting related packets until the connection state can be determined before any firewall rules are applied to the traffic.

Application firewalls go one step further by analyzing the data being transmitted, which allows network traffic to be matched against firewall rules that are specific to individual services or applications. These are also known as proxy-based firewalls.



```
^C
--- 192.168.92.17 ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 14999ms
rtt min/avg/max/mdev = 0.108/0.176/0.251/0.033 ms
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
[sudo] password for lab1004:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ clear

lab1004@MUM131:~$ iptables -L
iptables v1.4.21: can't initialize iptables table `filter': Permission denied (y
ou must be root)
Perhaps iptables or your kernel needs to be upgraded.
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
[sudo] password for lab1004:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ 
```



```
sudo: unable to resolve host MUM131
[sudo] password for lab1004:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ clear

lab1004@MUM131:~$ iptables -L
iptables v1.4.21: can't initialize iptables table `filter': Permission denied (y
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lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
[sudo] password for lab1004:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -A INPUT -p tcp --dport ssh -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ 
```
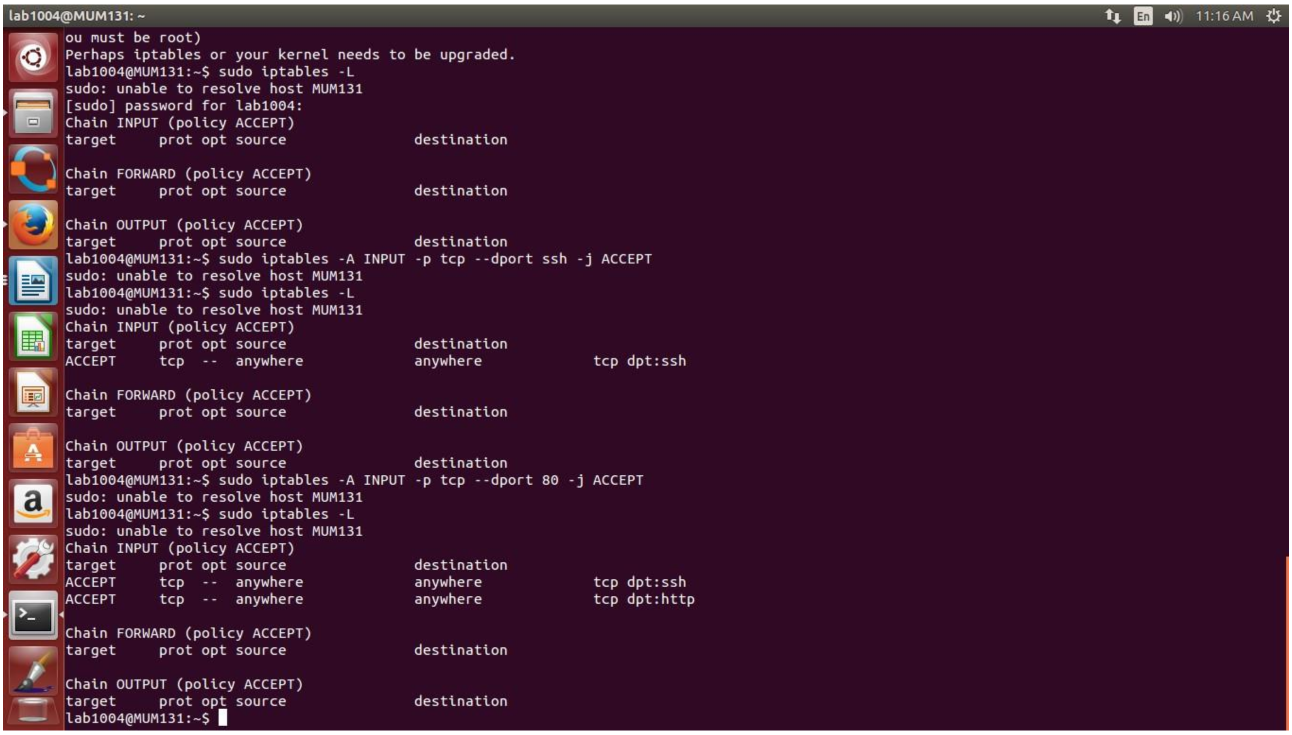
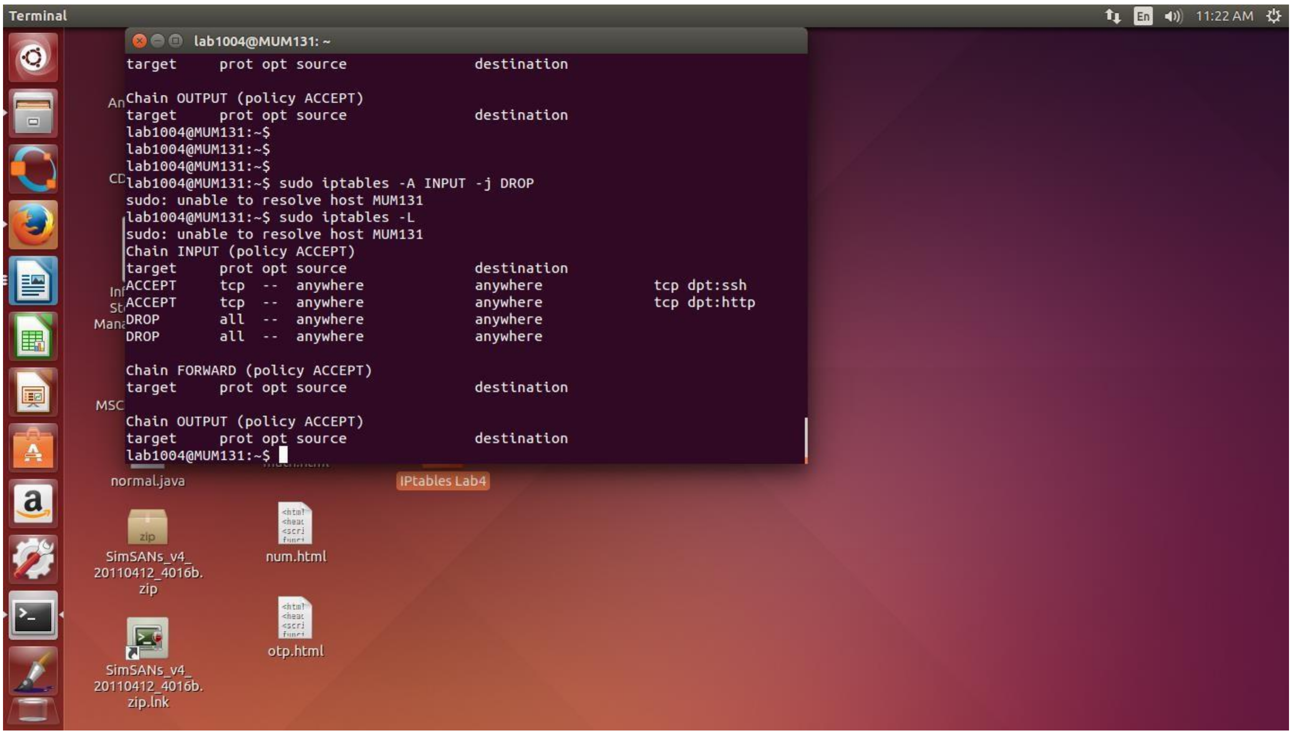
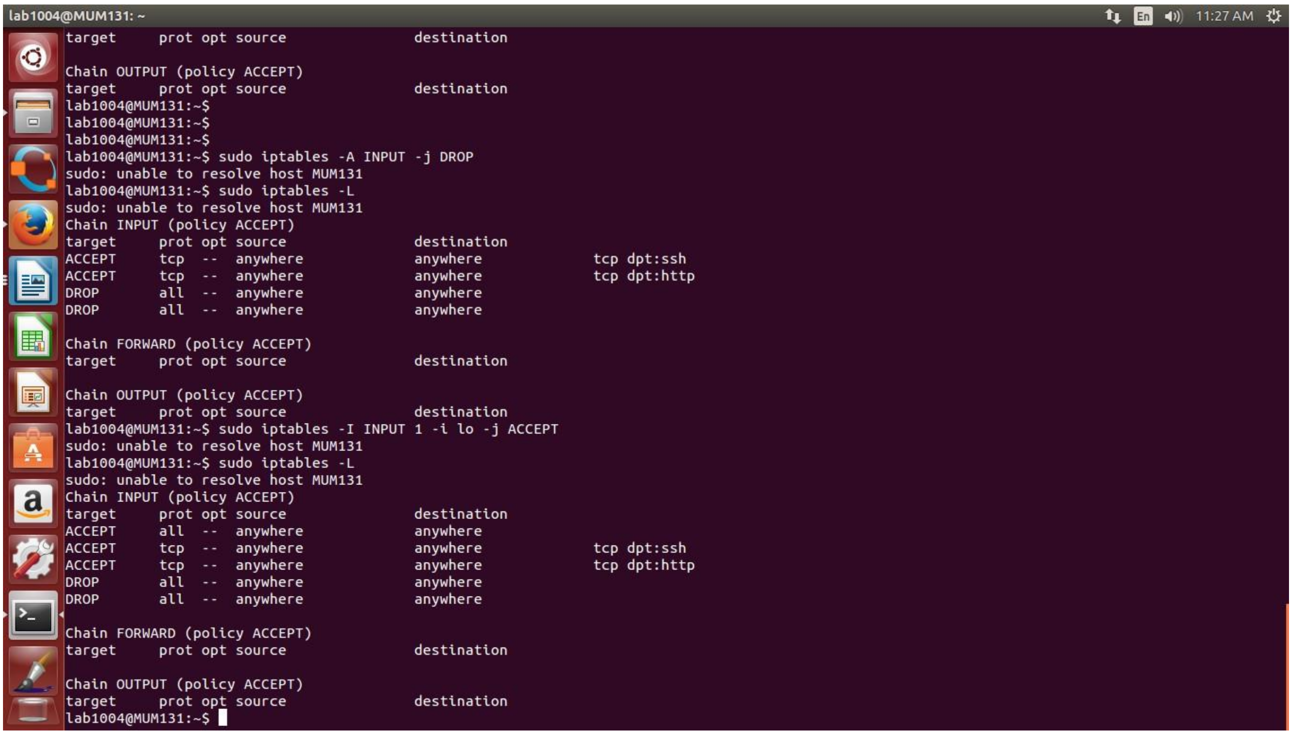



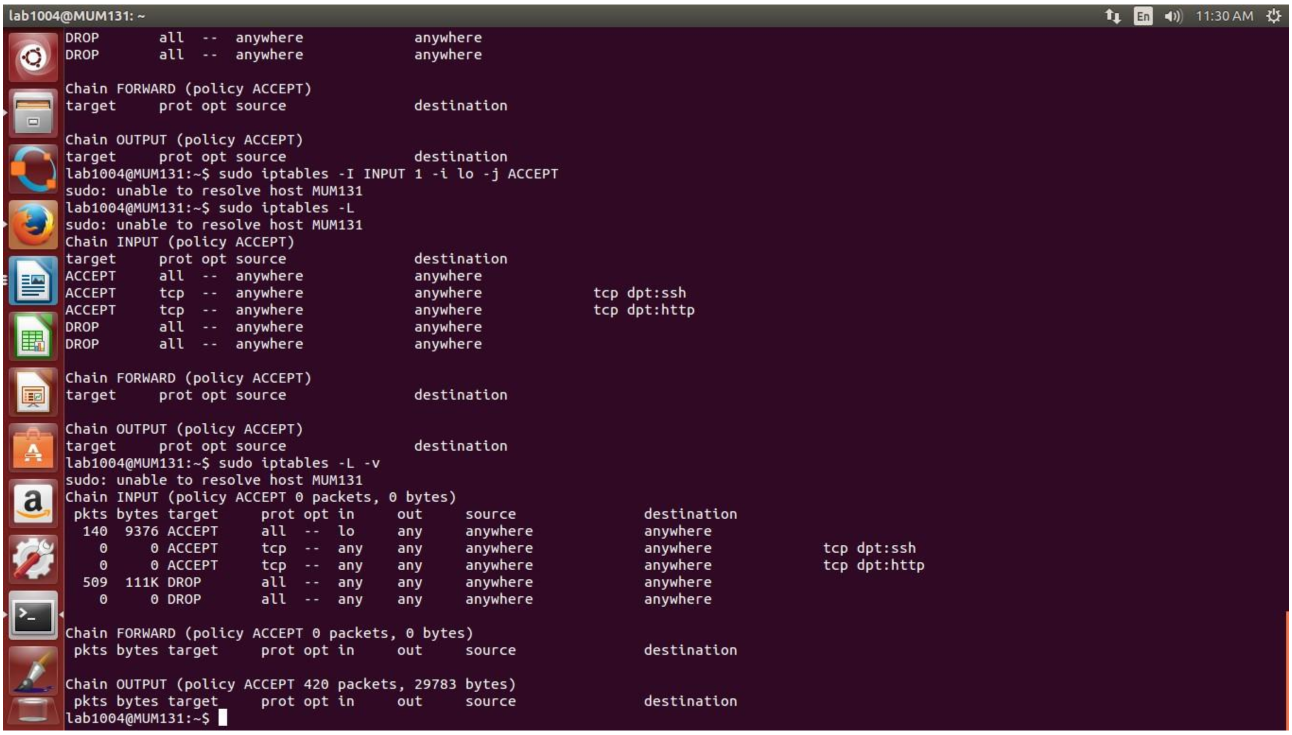
```
ou must be root)
Perhaps iptables or your kernel needs to be upgraded.
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
[sudo] password for lab1004:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -A INPUT -p tcp --dport ssh -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
```



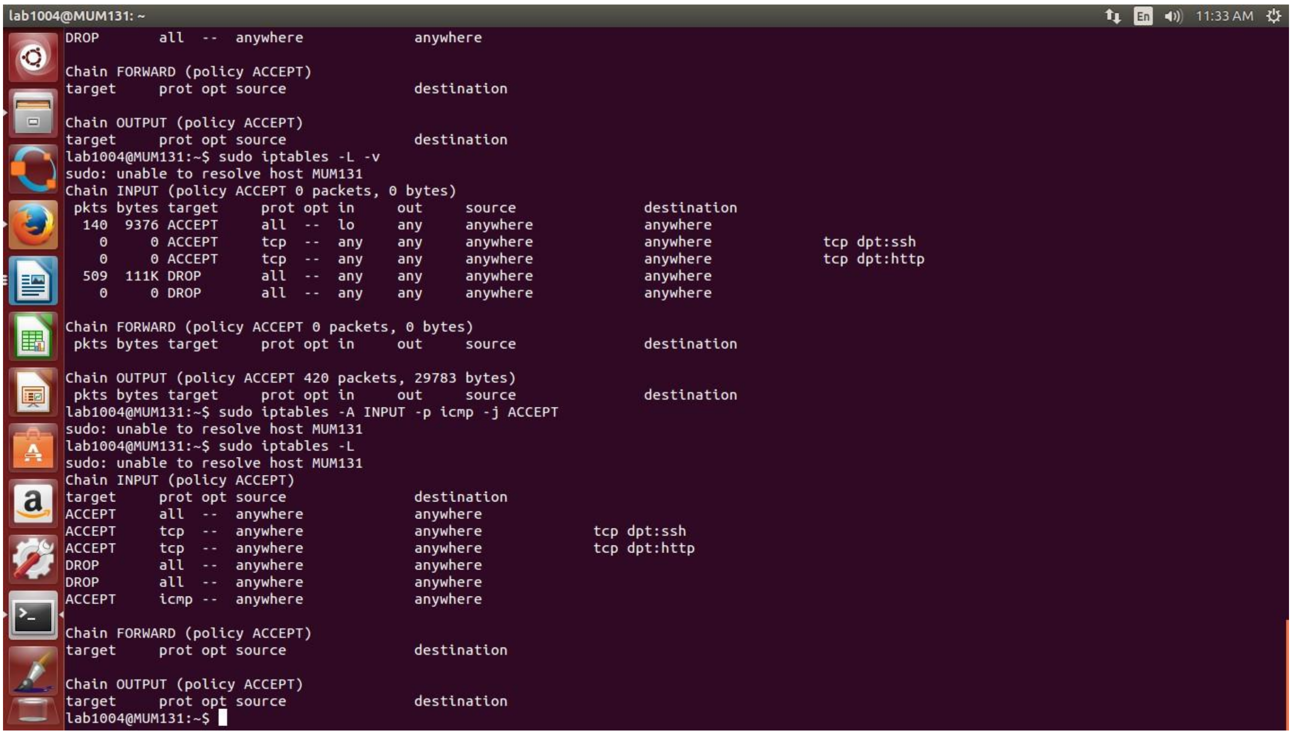
```
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
lab1004@MUM131:~$
lab1004@MUM131:~$
lab1004@MUM131:~$ sudo iptables -A INPUT -j DROP
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
```



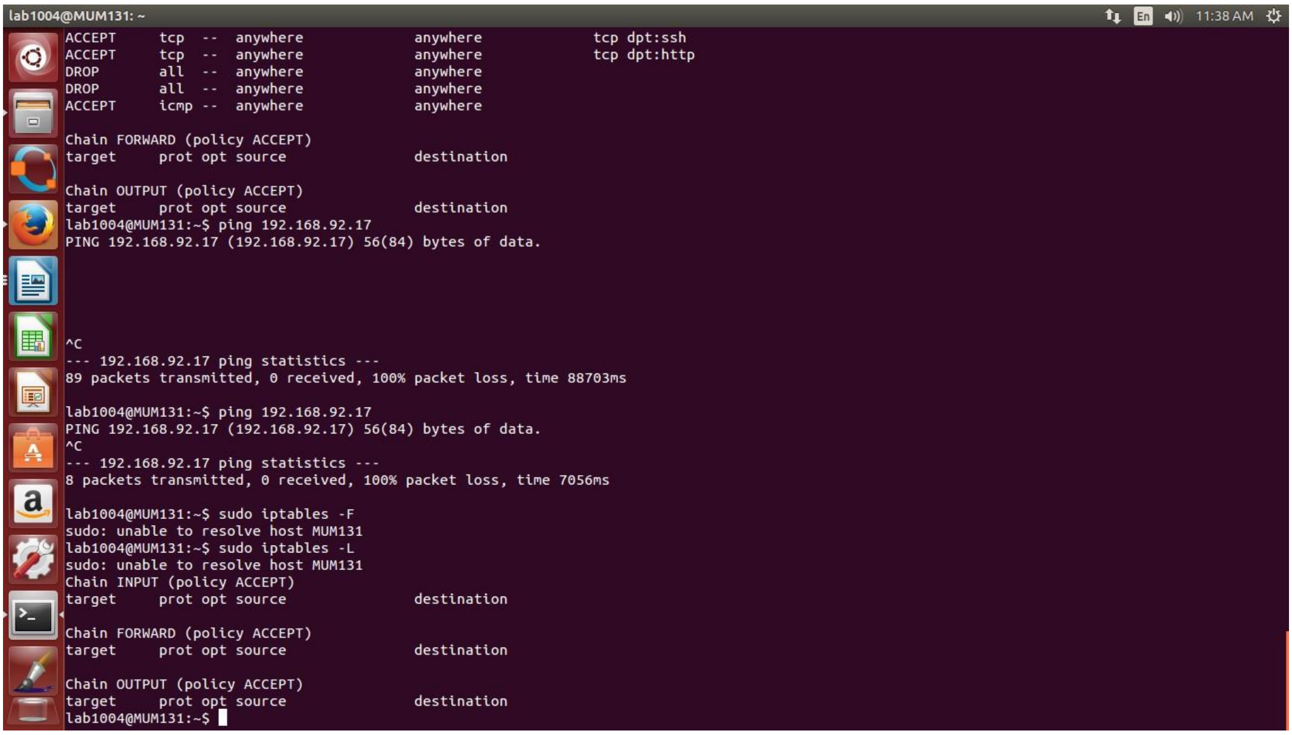
```
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
lab1004@MUM131:~$
lab1004@MUM131:~$
lab1004@MUM131:~$ sudo iptables -A INPUT -j DROP
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -I INPUT 1 -i lo -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     all  --  anywhere             anywhere
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ 
```



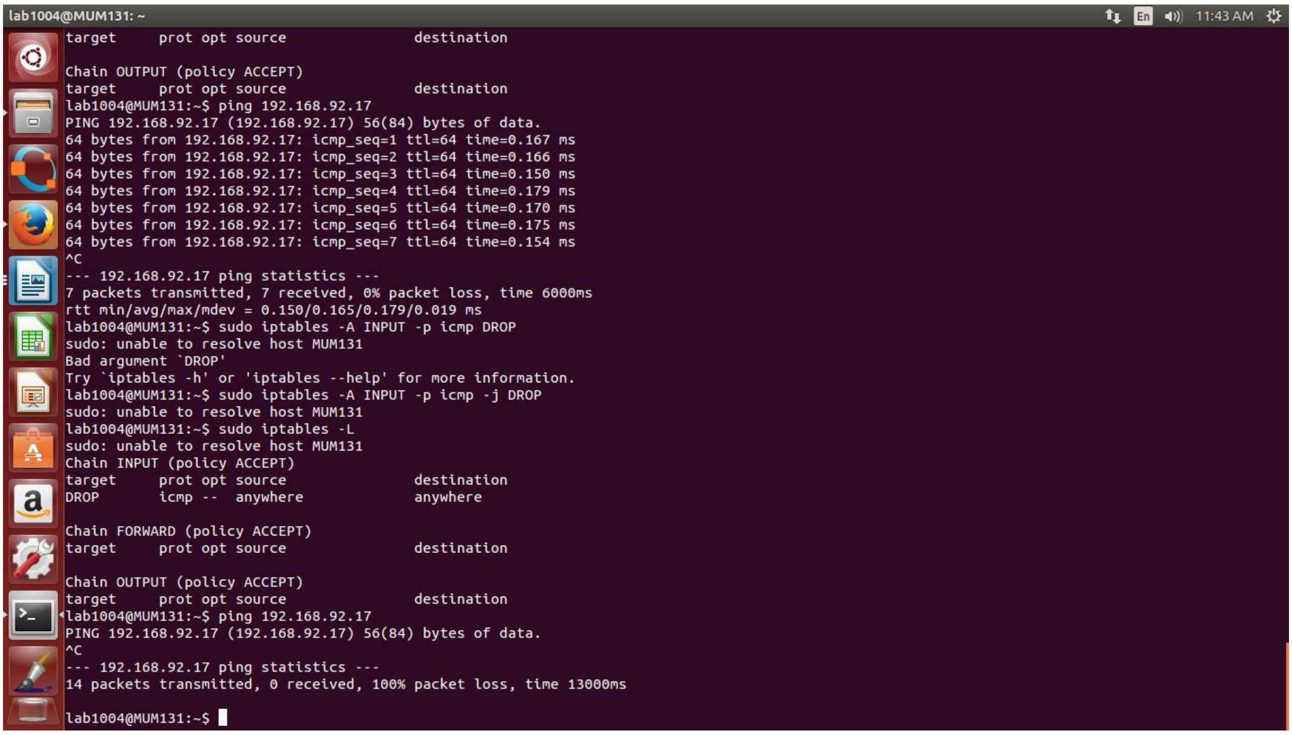
```
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -I INPUT 1 -i lo -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     all  --  anywhere             anywhere
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -L -v
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
  140  9376 ACCEPT     all  --  lo     any     anywhere             anywhere
    0     0 ACCEPT     tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
    0     0 ACCEPT     tcp  --  any    any     anywhere             anywhere             tcp dpt:http
  509  111K DROP       all  --  any    any     anywhere             anywhere
    0     0 DROP       all  --  any    any     anywhere             anywhere

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 420 packets, 29783 bytes)
 pkts bytes target     prot opt in     out     source               destination
lab1004@MUM131:~$ 
```



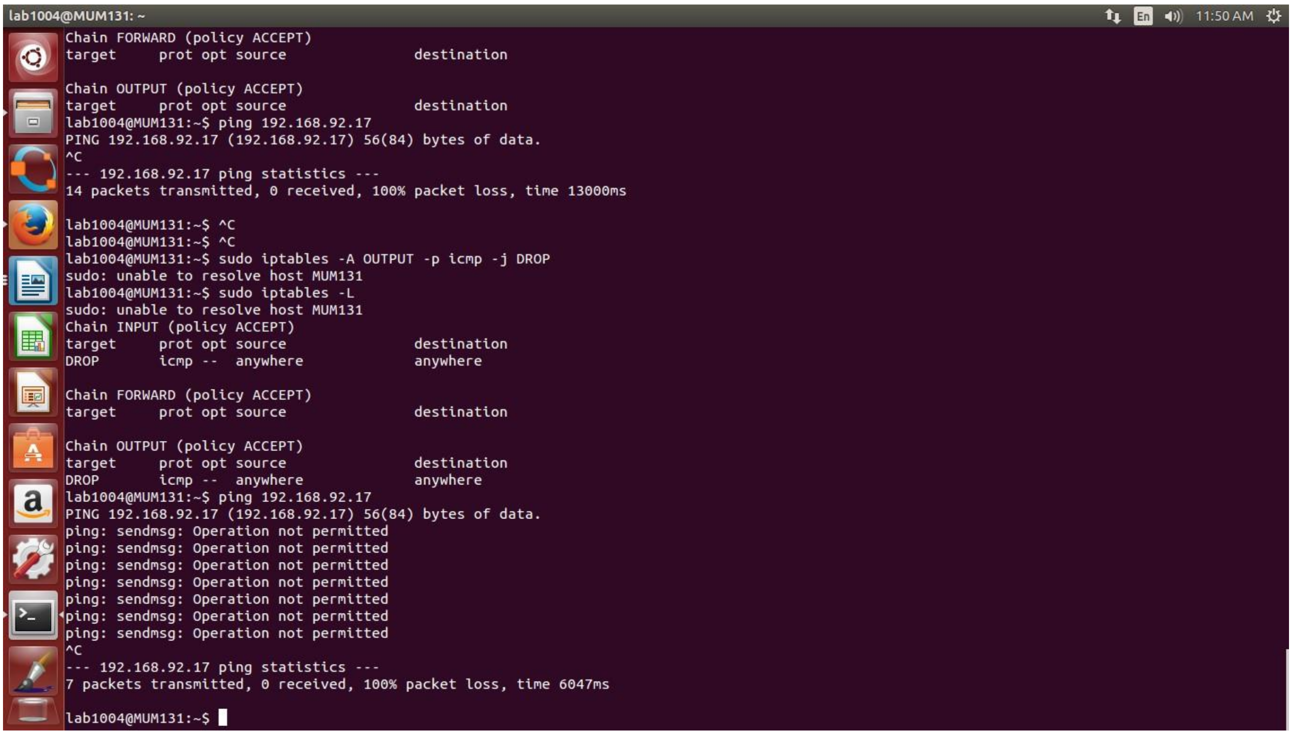
```
DROP       all  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -L -v
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
  140  9376 ACCEPT     all  --  lo     any     anywhere             anywhere
    0     0 ACCEPT     tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
    0     0 ACCEPT     tcp  --  any    any     anywhere             anywhere             tcp dpt:http
  509  111K DROP       all  --  any    any     anywhere             anywhere
    0     0 DROP       all  --  any    any     anywhere             anywhere

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 420 packets, 29783 bytes)
 pkts bytes target     prot opt in     out     source               destination
lab1004@MUM131:~$ sudo iptables -A INPUT -p icmp -j ACCEPT
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
ACCEPT     all  --  anywhere             anywhere
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere
ACCEPT     icmp --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
```



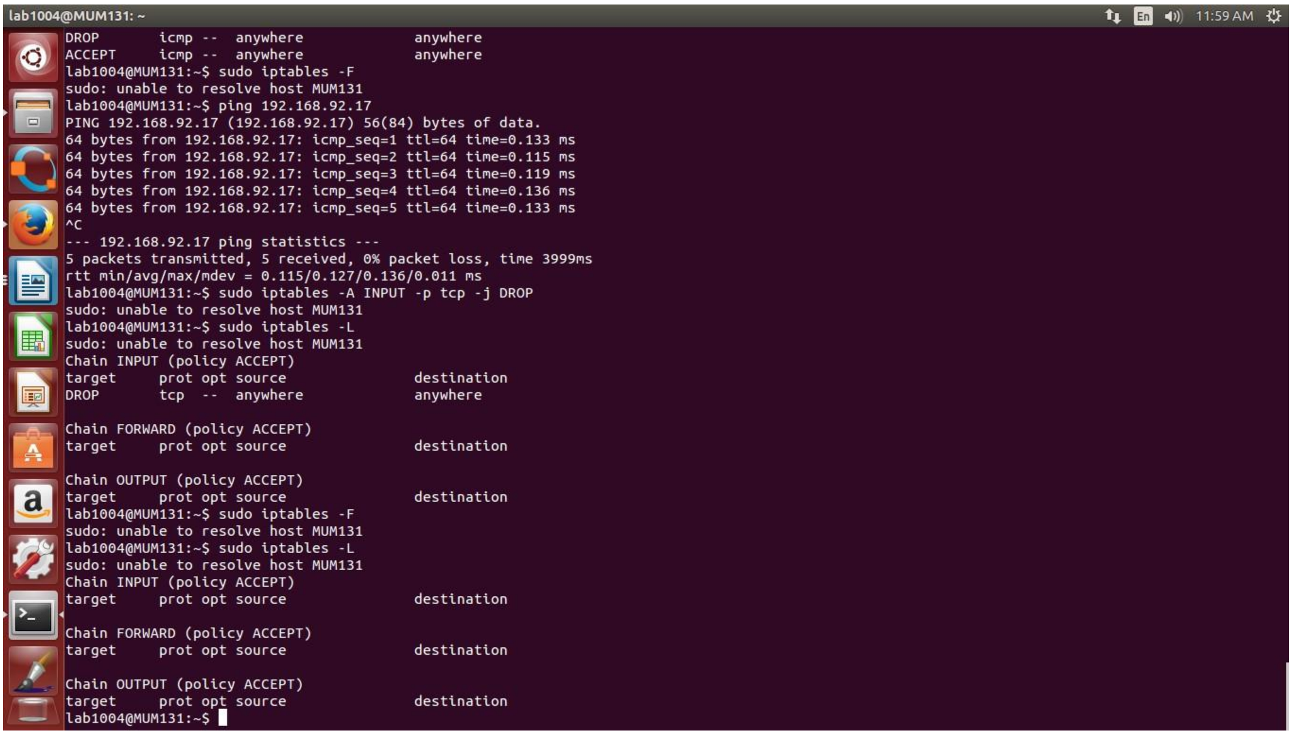
```
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:ssh
ACCEPT     tcp  --  anywhere             anywhere             tcp dpt:http
DROP       all  --  anywhere             anywhere
DROP       all  --  anywhere             anywhere
ACCEPT     icmp --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.





^C
--- 192.168.92.17 ping statistics ---
89 packets transmitted, 0 received, 100% packet loss, time 88703ms

lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
^C
--- 192.168.92.17 ping statistics ---
8 packets transmitted, 0 received, 100% packet loss, time 7056ms

lab1004@MUM131:~$ sudo iptables -F
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$
```



```
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
64 bytes from 192.168.92.17: icmp_seq=1 ttl=64 time=0.167 ms
64 bytes from 192.168.92.17: icmp_seq=2 ttl=64 time=0.166 ms
64 bytes from 192.168.92.17: icmp_seq=3 ttl=64 time=0.150 ms
64 bytes from 192.168.92.17: icmp_seq=4 ttl=64 time=0.179 ms
64 bytes from 192.168.92.17: icmp_seq=5 ttl=64 time=0.170 ms
64 bytes from 192.168.92.17: icmp_seq=6 ttl=64 time=0.175 ms
64 bytes from 192.168.92.17: icmp_seq=7 ttl=64 time=0.154 ms
^C
--- 192.168.92.17 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6000ms
rtt min/avg/max/mdev = 0.150/0.165/0.179/0.019 ms
lab1004@MUM131:~$ sudo iptables -A INPUT -p icmp DROP
sudo: unable to resolve host MUM131
Bad argument `DROP'
Try `iptables -h' or 'iptables --help' for more information.
lab1004@MUM131:~$ sudo iptables -A INPUT -p icmp -j DROP
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       icmp --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
^C
--- 192.168.92.17 ping statistics ---
14 packets transmitted, 0 received, 100% packet loss, time 13000ms

lab1004@MUM131:~$ 
```



```
Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
^C
--- 192.168.92.17 ping statistics ---
14 packets transmitted, 0 received, 100% packet loss, time 13000ms

lab1004@MUM131:~$ ^C
lab1004@MUM131:~$ ^C
lab1004@MUM131:~$ sudo iptables -A OUTPUT -p icmp -j DROP
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       icmp --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
DROP       icmp --  anywhere             anywhere
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
^C
--- 192.168.92.17 ping statistics ---
7 packets transmitted, 0 received, 100% packet loss, time 6047ms

lab1004@MUM131:~$ 
```



```
DROP       icmp --  anywhere             anywhere
ACCEPT     icmp --  anywhere             anywhere
lab1004@MUM131:~$ sudo iptables -F
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ ping 192.168.92.17
PING 192.168.92.17 (192.168.92.17) 56(84) bytes of data.
64 bytes from 192.168.92.17: icmp_seq=1 ttl=64 time=0.133 ms
64 bytes from 192.168.92.17: icmp_seq=2 ttl=64 time=0.115 ms
64 bytes from 192.168.92.17: icmp_seq=3 ttl=64 time=0.119 ms
64 bytes from 192.168.92.17: icmp_seq=4 ttl=64 time=0.136 ms
64 bytes from 192.168.92.17: icmp_seq=5 ttl=64 time=0.133 ms
^C
--- 192.168.92.17 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3999ms
rtt min/avg/max/mdev = 0.115/0.127/0.136/0.011 ms
lab1004@MUM131:~$ sudo iptables -A INPUT -p tcp -j DROP
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       tcp  --  anywhere             anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ sudo iptables -F
sudo: unable to resolve host MUM131
lab1004@MUM131:~$ sudo iptables -L
sudo: unable to resolve host MUM131
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
lab1004@MUM131:~$ 
```

Conclusion :-

We have successfully learned and implemented the concept of firewalls, we learned to see content of iptables ,get more details of the table, append new rules for packet filteration, droping and blocking the packets of specific protocol, etc.