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COMP 8006

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Assignment 01 Report

Design

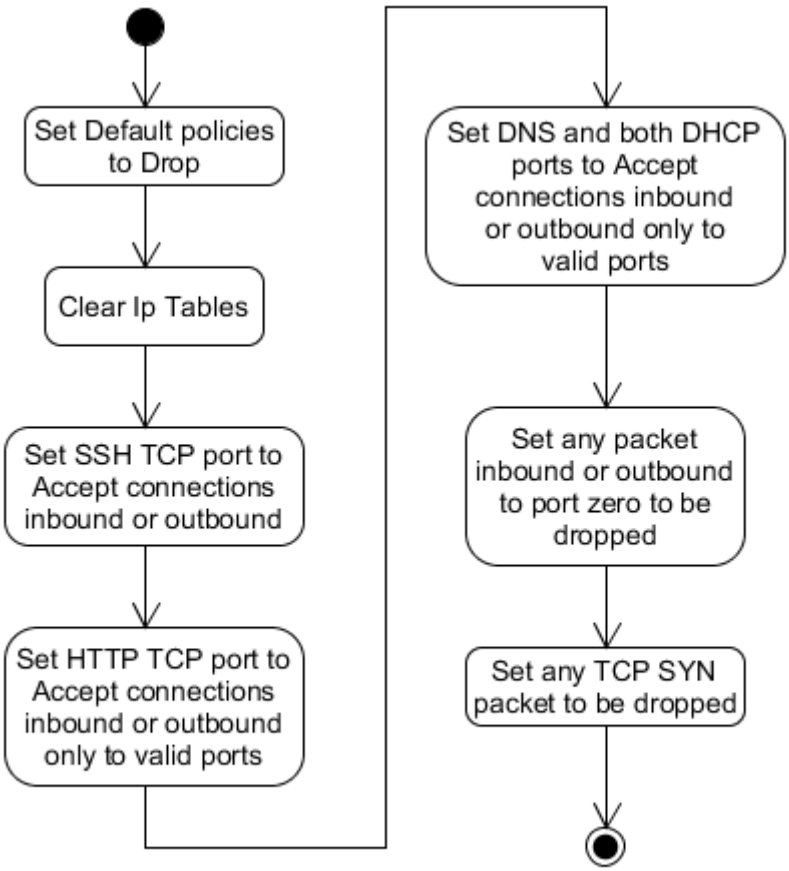


Figure 1 Design work of the shell script

Instructions

How to set the firewall. In the UNIX terminal:

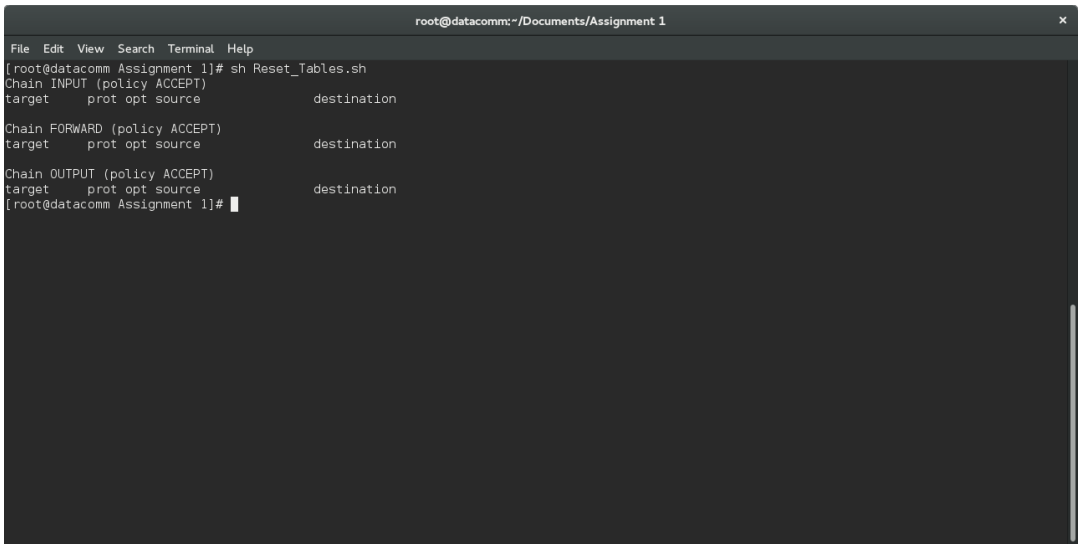
1. Localize the folder which contains the scripts Reset_Tables.sh and C8006_Assignment_1.sh
2. Execute the Reset_Tables.sh script by either:
    a. sh Reset_Tables.sh
    b. bash Reset_Tables.sh
3. Execute the firewall script by either:
    a. sh C8006_Assignment_1.sh
    b. bash C8006_Assignment_1.sh

Tests

For testing the firewall, I used 2 machines: One machine with the Firewall (192.168.0.16) and the other one without it (192.168.0.15). For the captures I will add a (FW) to the captures of the Firewall Machine and (T) to the one attempting connections with the Firewall Machine.

1. Start

First, I set the default policies to a default state of accepting everything by using a shellscript called Reset_Tables.sh

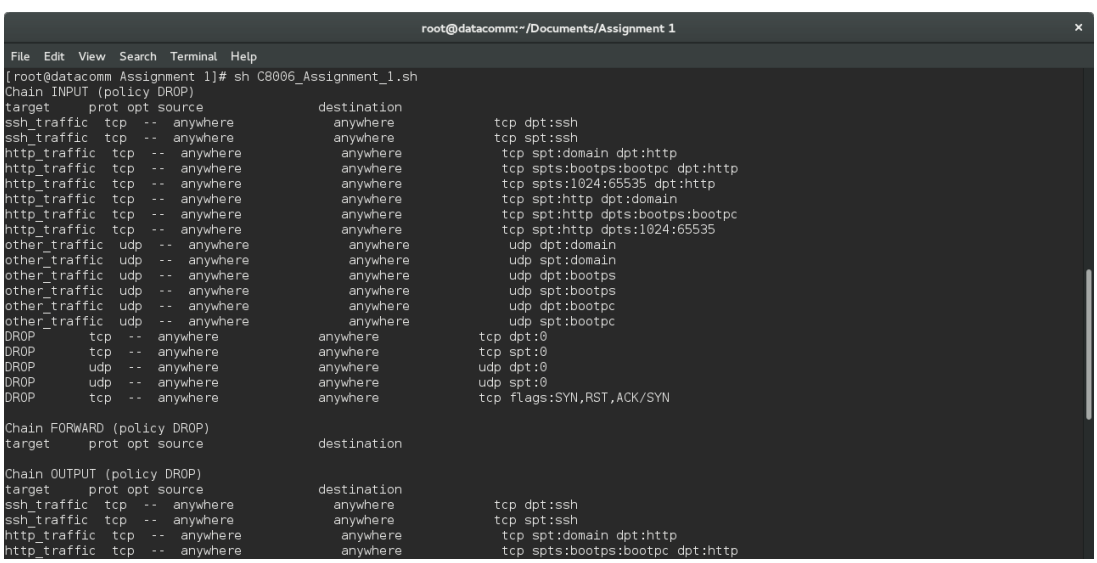


```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
[root@datacomm Assignment 1]# sh Reset_Tables.sh
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
[root@datacomm Assignment 1]#
```

Figure 2 Reset Tables on firewall Machine (FW)

2. Running the script to set up the firewall

I create the firewall and display the created ip tables.



```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
[root@datacomm Assignment 1]# sh C8006_Assignment_1.sh
Chain INPUT (policy DROP)
target     prot opt source               destination
ssh_traffic  tcp  --  anywhere             anywhere             tcp dpt:ssh
ssh_traffic  tcp  --  anywhere             anywhere             tcp spt:ssh
http_traffic  tcp  --  anywhere             anywhere             tcp spt:domain dpt:http
http_traffic  tcp  --  anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
http_traffic  tcp  --  anywhere             anywhere             tcp spts:1024:65535 dpt:http
http_traffic  tcp  --  anywhere             anywhere             tcp spt:http dpt:domain
http_traffic  tcp  --  anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
http_traffic  tcp  --  anywhere             anywhere             tcp spt:http dpts:1024:65535
other_traffic  udp  --  anywhere             anywhere             udp dpt:domain
other_traffic  udp  --  anywhere             anywhere             udp spt:domain
other_traffic  udp  --  anywhere             anywhere             udp dpt:bootps
other_traffic  udp  --  anywhere             anywhere             udp spt:bootps
other_traffic  udp  --  anywhere             anywhere             udp dpt:bootpc
other_traffic  udp  --  anywhere             anywhere             udp spt:bootpc
DROP       tcp  --  anywhere             anywhere             tcp dpt:0
DROP       tcp  --  anywhere             anywhere             tcp spt:0
DROP       udp  --  anywhere             anywhere             udp dpt:0
DROP       udp  --  anywhere             anywhere             udp spt:0
DROP       tcp  --  anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain FORWARD (policy DROP)
target     prot opt source               destination

Chain OUTPUT (policy DROP)
target     prot opt source               destination
ssh_traffic  tcp  --  anywhere             anywhere             tcp dpt:ssh
ssh_traffic  tcp  --  anywhere             anywhere             tcp spt:ssh
http_traffic  tcp  --  anywhere             anywhere             tcp spt:domain dpt:http
http_traffic  tcp  --  anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
```

Figure 3 Setting up the Firewall (FW)

3. Review the current state of the accounting chains

```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
    4  2416 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    1   328 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

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

Chain OUTPUT (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
    0     0 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
    1   328 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain http_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     all  --  any    any     anywhere             anywhere

Chain other_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
    6  3072 ACCEPT     all  --  any    any     anywhere             anywhere
```

Figure 4 Checking the State of the Chains (FW)

4. SSH port Test

For this test I try to connect from the machine that has the firewall on to the machine without the firewall. It Succeeds as it lets me connect to the other machine.

```
root@datacomm:~
File  Edit  View  Search  Terminal  Help
Chain OUTPUT (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
    0     0 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
    1   328 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain http_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     all  --  any    any     anywhere             anywhere

Chain other_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
    6  3072 ACCEPT     all  --  any    any     anywhere             anywhere

Chain ssh_traffic (4 references)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     all  --  any    any     anywhere             anywhere
[root@datacomm Assignment 1]# ssh 192.168.0.15
The authenticity of host '192.168.0.15 (192.168.0.15)' can't be established.
ECDSA key fingerprint is SHA256:veCWBVZ9cXZO/WbE3LT8oh20OSSyfLvDbR9WjTpIXO0.
ECDSA key fingerprint is MD5:0e:ed:ea:96:53:54:ed:81:3d:8d:e2:3c:6e:ac:b2:fe.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.0.15' (ECDSA) to the list of known hosts.
root@192.168.0.15's password:
Last login: Mon Jan 25 12:38:53 2016
[root@datacomm ~]#
```

Figure 5 SSH Connection (FW)

Now I try to connect to the machine with the firewall using the machine without a firewall. It lets me connect to it meaning that the port is open.

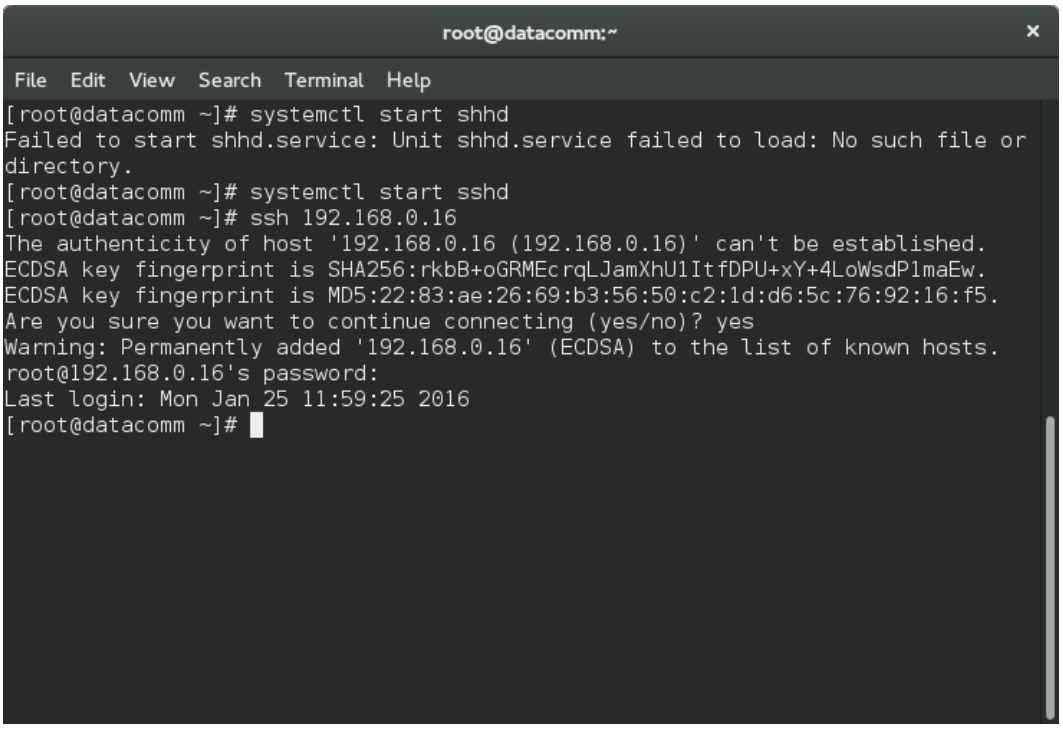


Figure 6 SSH Connection to the Firewall Machine (T)

Then I check the accounting chains to review that it got added to the chain. And we can see that the ssh operations right now got added to the chain.

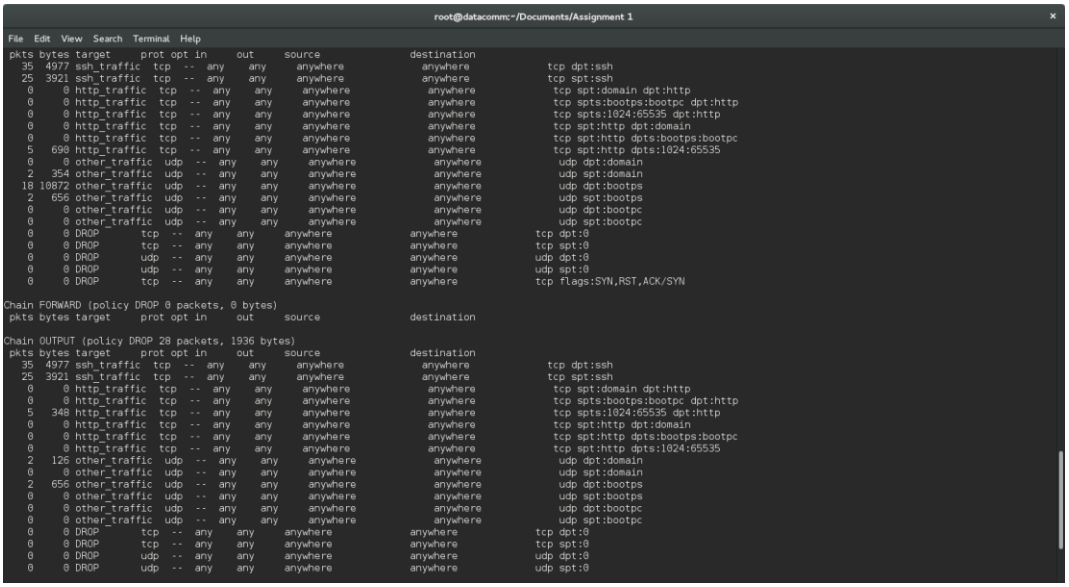
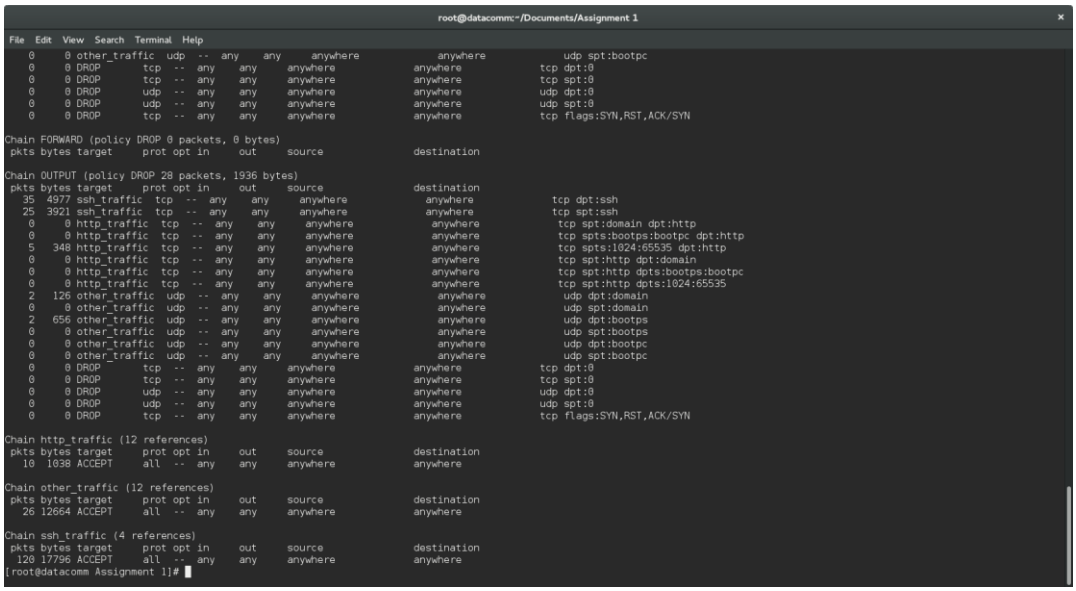


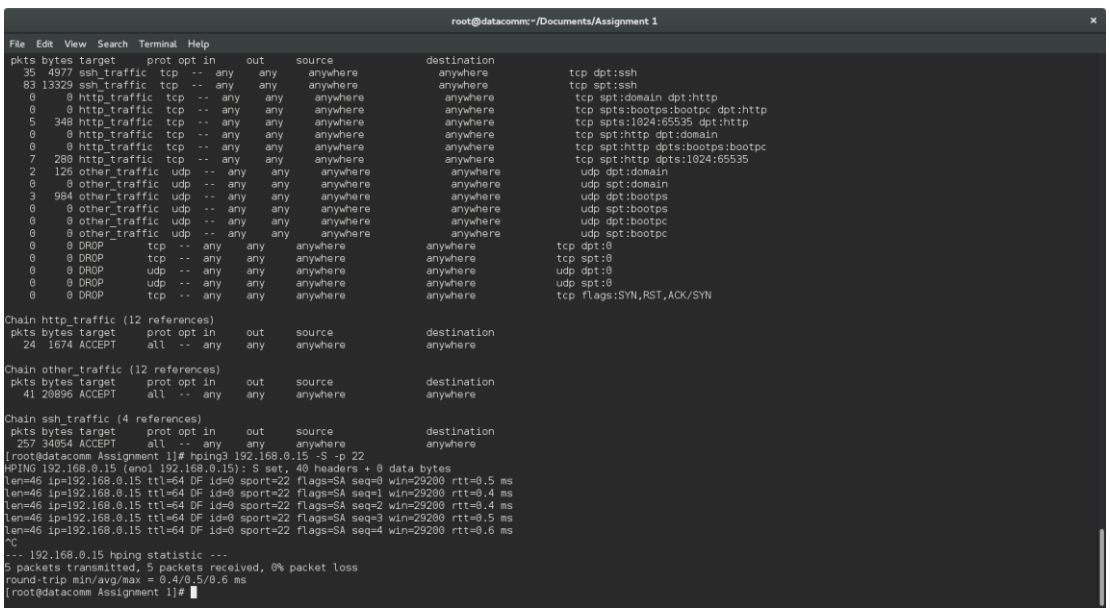
Figure 7 State of the chains after the SSH Connection part 1 (FW)



```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

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

Chain OUTPUT (policy DROP 28 packets, 1936 bytes)
 pkts bytes target     prot opt in     out     source               destination
   35  4977 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
   25  3921 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
    5   348 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
    2   126 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
    2   656 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain http_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
   10  1038 ACCEPT     all  --  any    any     anywhere             anywhere

Chain other_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
   26 12664 ACCEPT     all  --  any    any     anywhere             anywhere

Chain ssh_traffic (4 references)
 pkts bytes target     prot opt in     out     source               destination
  120 17796 ACCEPT     all  --  any    any     anywhere             anywhere
[root@datacomm Assignment 1]#
```

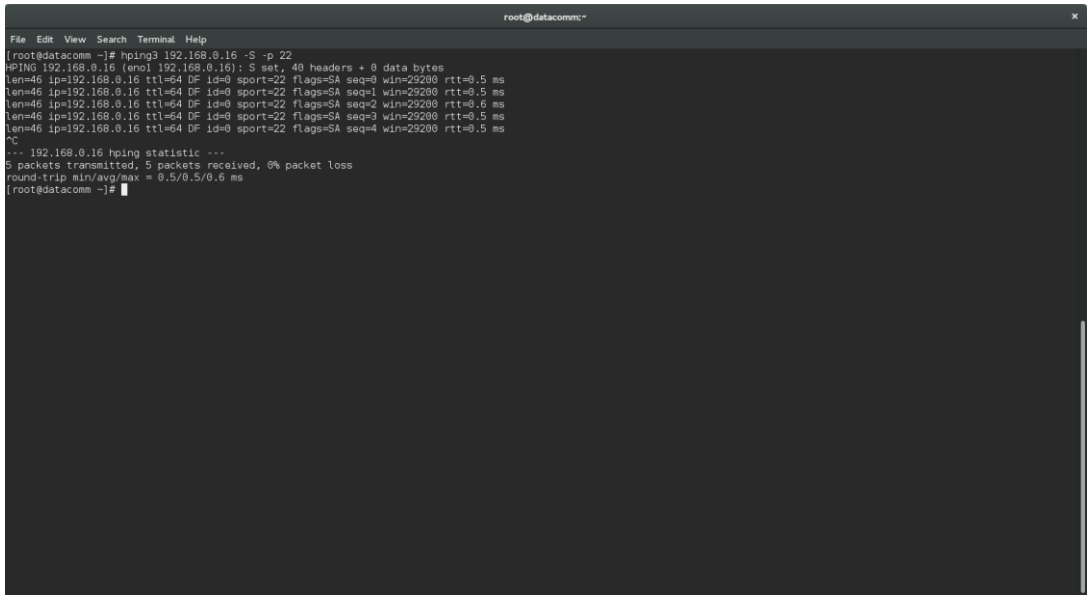
Figure 8 State of the chains after the SSH Connection part 2 (FW)

Now I use hping3 to test the SSH connection between both machines. It works as it shows a 0% loss, reconfirming the previously done test.



```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
 pkts bytes target     prot opt in     out     source               destination
   35  4977 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
   83 13329 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
    5   348 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
    7   280 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
    2   126 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
    3   984 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain http_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
   24  1674 ACCEPT     all  --  any    any     anywhere             anywhere

Chain other_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
   41 20896 ACCEPT     all  --  any    any     anywhere             anywhere

Chain ssh_traffic (4 references)
 pkts bytes target     prot opt in     out     source               destination
  257 34054 ACCEPT     all  --  any    any     anywhere             anywhere
[root@datacomm Assignment 1]# hping3 192.168.0.15 -S -p 22
HPING 192.168.0.15 (eno1 192.168.0.15): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.15 ttl=64 DF id=0 sport=22 flags=SA seq=0 win=29200 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=0 sport=22 flags=SA seq=1 win=29200 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=0 sport=22 flags=SA seq=2 win=29200 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=0 sport=22 flags=SA seq=3 win=29200 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=0 sport=22 flags=SA seq=4 win=29200 rtt=0.6 ms
^C
--- 192.168.0.15 hping statistic ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.4/0.5/0.6 ms
[root@datacomm Assignment 1]#
```

Figure 9 Use hping3 to test the SSH port (FW)

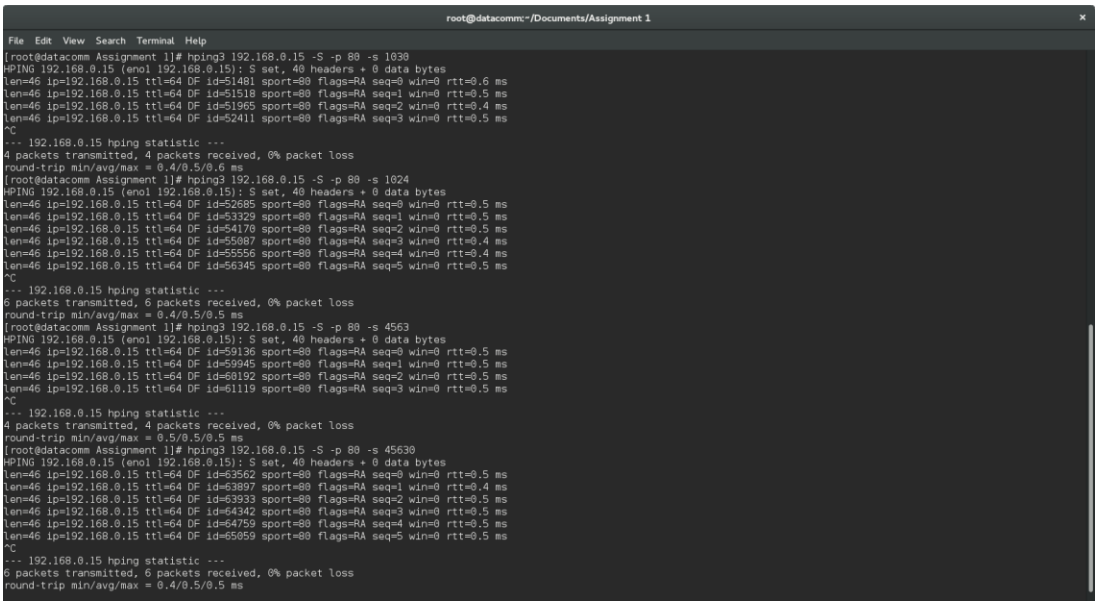


```
root@datacomm:~
File  Edit  View  Search  Terminal  Help
[root@datacomm ~]# hping3 192.168.0.16 -S -p 22
HPING 192.168.0.16 (eno1 192.168.0.16): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.16 ttl=64 DF id=0 sport=22 flags=SA seq=0 win=29200 rtt=0.5 ms
len=46 ip=192.168.0.16 ttl=64 DF id=0 sport=22 flags=SA seq=1 win=29200 rtt=0.5 ms
len=46 ip=192.168.0.16 ttl=64 DF id=0 sport=22 flags=SA seq=2 win=29200 rtt=0.6 ms
len=46 ip=192.168.0.16 ttl=64 DF id=0 sport=22 flags=SA seq=3 win=29200 rtt=0.5 ms
len=46 ip=192.168.0.16 ttl=64 DF id=0 sport=22 flags=SA seq=4 win=29200 rtt=0.5 ms
^C
--- 192.168.0.16 hping statistic ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.5/0.5/0.6 ms
[root@datacomm ~]#
```

Figure 10 Use hping3 to test the SSH port (T)

5. HTTP port test

For the HTTP port test first we are going to test the connectivity of http from ports above 1024, since we allow those ports, they work as they show a 0% packet loss.



```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
[root@datacomm Assignment 1]# hping3 192.168.0.15 -S -p 80 -s 1030
HPING 192.168.0.15 (eno1 192.168.0.15): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.15 ttl=64 DF id=51481 sport=80 flags=RA seq=0 win=0 rtt=0.6 ms
len=46 ip=192.168.0.15 ttl=64 DF id=51518 sport=80 flags=RA seq=1 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=51965 sport=80 flags=RA seq=2 win=0 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=52411 sport=80 flags=RA seq=3 win=0 rtt=0.5 ms
^C
--- 192.168.0.15 hping statistic ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.4/0.5/0.6 ms
[root@datacomm Assignment 1]# hping3 192.168.0.15 -S -p 80 -s 1024
HPING 192.168.0.15 (eno1 192.168.0.15): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.15 ttl=64 DF id=52685 sport=80 flags=RA seq=0 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=53329 sport=80 flags=RA seq=1 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=54178 sport=80 flags=RA seq=2 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=55087 sport=80 flags=RA seq=3 win=0 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=55556 sport=80 flags=RA seq=4 win=0 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=56345 sport=80 flags=RA seq=5 win=0 rtt=0.5 ms
^C
--- 192.168.0.15 hping statistic ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 0.4/0.5/0.5 ms
[root@datacomm Assignment 1]# hping3 192.168.0.15 -S -p 80 -s 4563
HPING 192.168.0.15 (eno1 192.168.0.15): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.15 ttl=64 DF id=59136 sport=80 flags=RA seq=0 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=59945 sport=80 flags=RA seq=1 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=60192 sport=80 flags=RA seq=2 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=61119 sport=80 flags=RA seq=3 win=0 rtt=0.5 ms
^C
--- 192.168.0.15 hping statistic ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.5/0.5/0.5 ms
[root@datacomm Assignment 1]# hping3 192.168.0.15 -S -p 80 -s 45630
HPING 192.168.0.15 (eno1 192.168.0.15): S set, 40 headers + 0 data bytes
len=46 ip=192.168.0.15 ttl=64 DF id=63562 sport=80 flags=RA seq=0 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=63897 sport=80 flags=RA seq=1 win=0 rtt=0.4 ms
len=46 ip=192.168.0.15 ttl=64 DF id=63933 sport=80 flags=RA seq=2 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=64342 sport=80 flags=RA seq=3 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=64759 sport=80 flags=RA seq=4 win=0 rtt=0.5 ms
len=46 ip=192.168.0.15 ttl=64 DF id=65059 sport=80 flags=RA seq=5 win=0 rtt=0.5 ms
^C
--- 192.168.0.15 hping statistic ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 0.4/0.5/0.5 ms
```

Figure 11 Use hping3 to test HTTP port from a port above 1024 (FW)

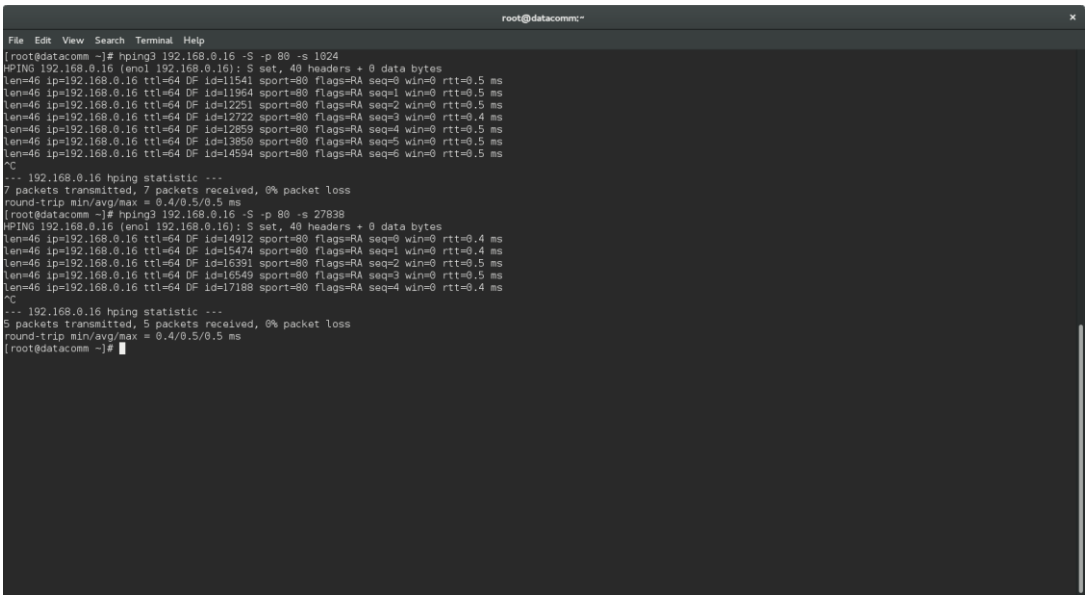


Figure 12 Use hping3 to test HTTP port from a port above 1024 (T)

For the second test, .we are going to test the connectivity of http from ports below 1024, since we blocked those ports, they don't work. And either we get a 100% loss since those ports are blocked or we don't have permission to do the operation.

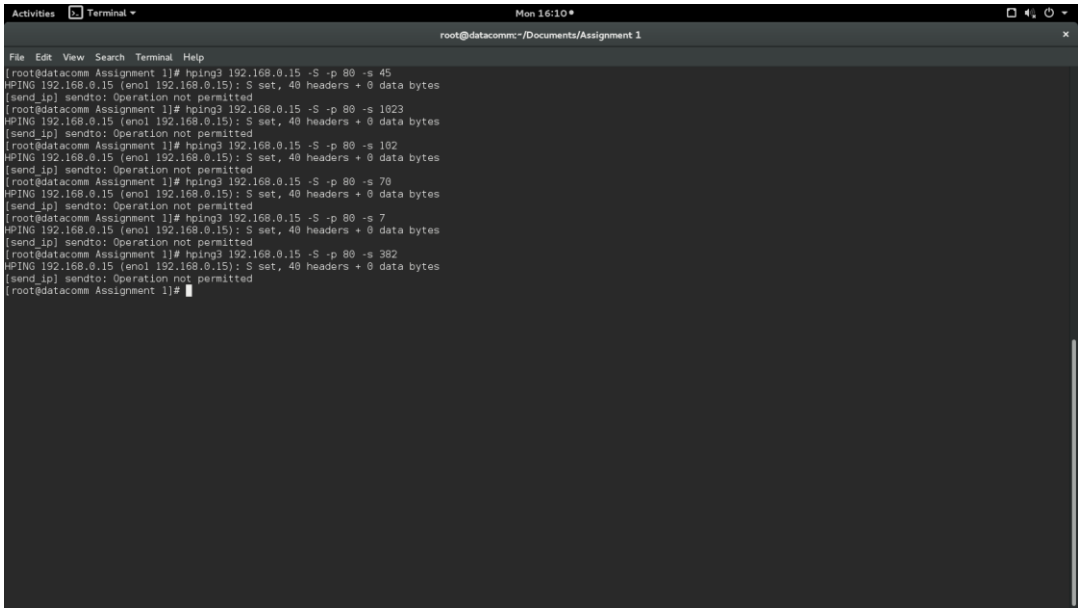


Figure 13 Use hping3 to test HTTP port from a port below 1024 (FW)

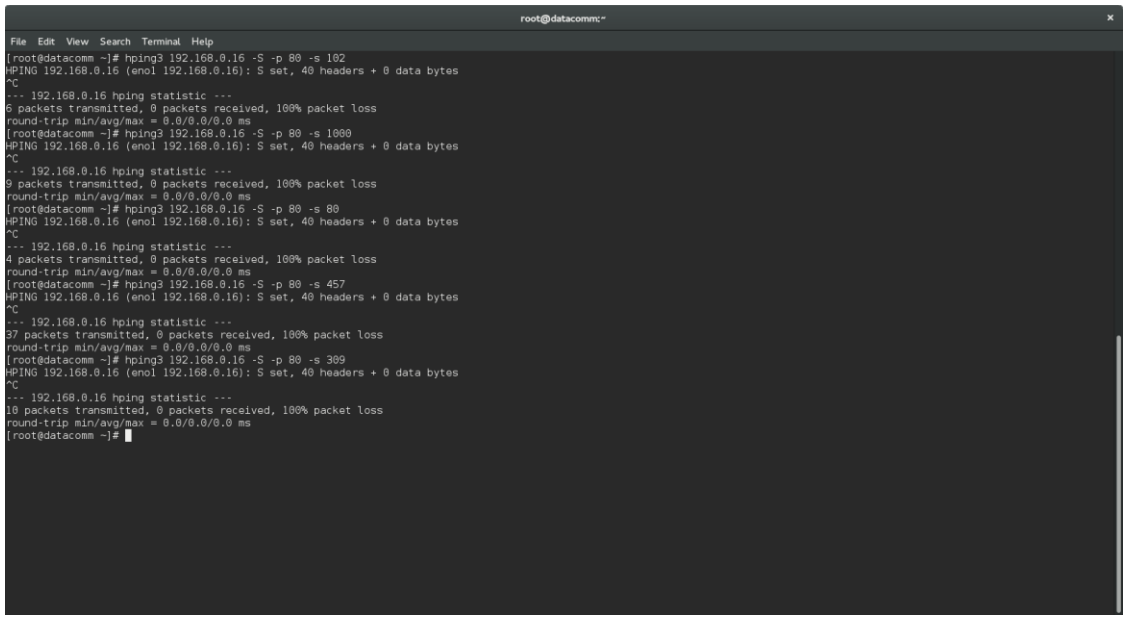


Figure 14 Figure 13 Use hping3 to test HTTP port from a port below 1024 (T)

Lastly we are going to test going to a website, in this case cnn.com since it uses the http protocol, and it works fine.

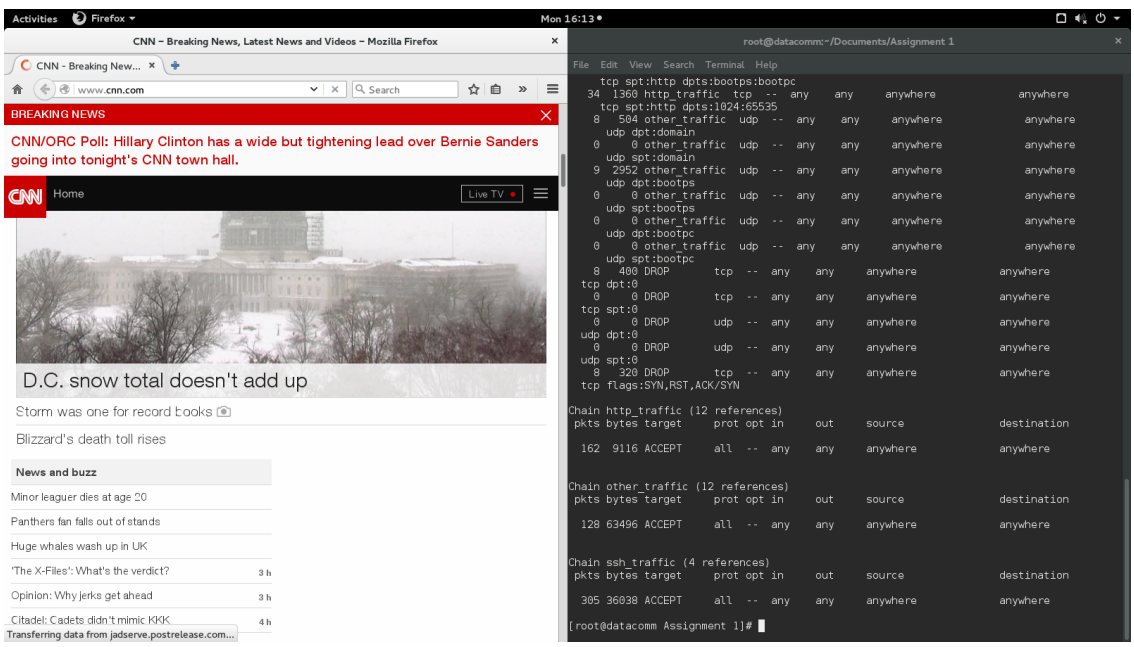


Figure 15 Website visit

When we check the accounting chains, we can see all the transmissions to HTTP ports, every HTTP successful traffic is added to the http traffic account chain. In addition we can see that we are blocking any SYN related message that is not authorized.

```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
Chain INPUT (policy DROP 16 packets, 3574 bytes)
 pkts bytes target     prot opt in     out     source               destination
  124 12227 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
   36  4405 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
   34  1436 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
 1945 2146K http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
  113 17120 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
  100 59296 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
   10  3280 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
   16   640 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
 2082 91264 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

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

Chain OUTPUT (policy DROP 40 packets, 2848 bytes)
 pkts bytes target     prot opt in     out     source               destination
   57  5857 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
   88 13549 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
 1766  205K http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
   34  1360 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
  115  7449 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
   10  3280 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    8   400 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
```

Figure 16 Chain after visiting a website part 1 (FW)

```
root@datacomm:~/Documents/Assignment 1
File  Edit  View  Search  Terminal  Help
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
   16   640 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
 2082 91264 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

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

Chain OUTPUT (policy DROP 40 packets, 2848 bytes)
 pkts bytes target     prot opt in     out     source               destination
   57  5857 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp dpt:ssh
   88 13549 ssh_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:ssh
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:domain dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:bootps:bootpc dpt:http
 1766  205K http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spts:1024:65535 dpt:http
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpt:domain
    0     0 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:bootps:bootpc
   34  1360 http_traffic  tcp  --  any    any     anywhere             anywhere             tcp spt:http dpts:1024:65535
  115  7449 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:domain
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:domain
   10  3280 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootps
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp dpt:bootpc
    0     0 other_traffic  udp  --  any    any     anywhere             anywhere             udp spt:bootpc
    8   400 DROP       tcp  --  any    any     anywhere             anywhere             tcp dpt:0
    0     0 DROP       tcp  --  any    any     anywhere             anywhere             tcp spt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp dpt:0
    0     0 DROP       udp  --  any    any     anywhere             anywhere             udp spt:0
   68  3920 DROP       tcp  --  any    any     anywhere             anywhere             tcp flags:SYN,RST,ACK/SYN

Chain http_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
 3779 2353K ACCEPT     all  --  any    any     anywhere             anywhere

Chain other_traffic (12 references)
 pkts bytes target     prot opt in     out     source               destination
  348 90425 ACCEPT     all  --  any    any     anywhere             anywhere

Chain ssh_traffic (4 references)
 pkts bytes target     prot opt in     out     source               destination
  305 36038 ACCEPT     all  --  any    any     anywhere             anywhere
[root@datacomm Assignment 1]#
```

Figure 17 Chain after visiting a website part 2 (FW)

6. Port 0 test

For the port 0 test we use hping3 to try reaching the port. It doesn't work as the results show that either we don't have permission to do it or there was a 100% packet loss.

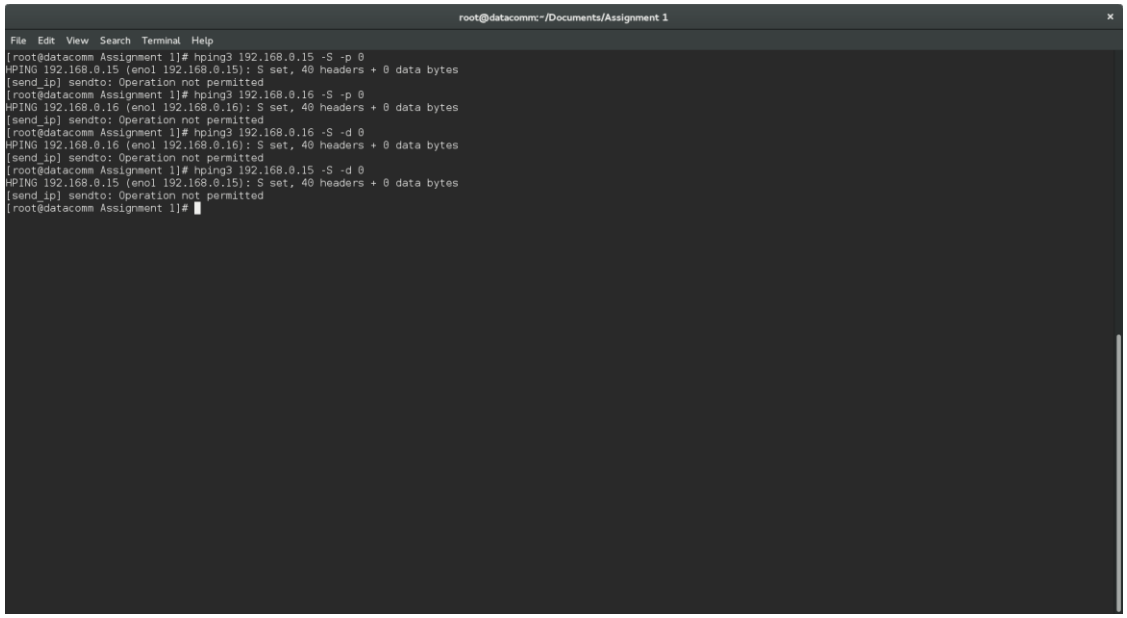


Figure 18 Use hping3 to test the port 0 (FW)

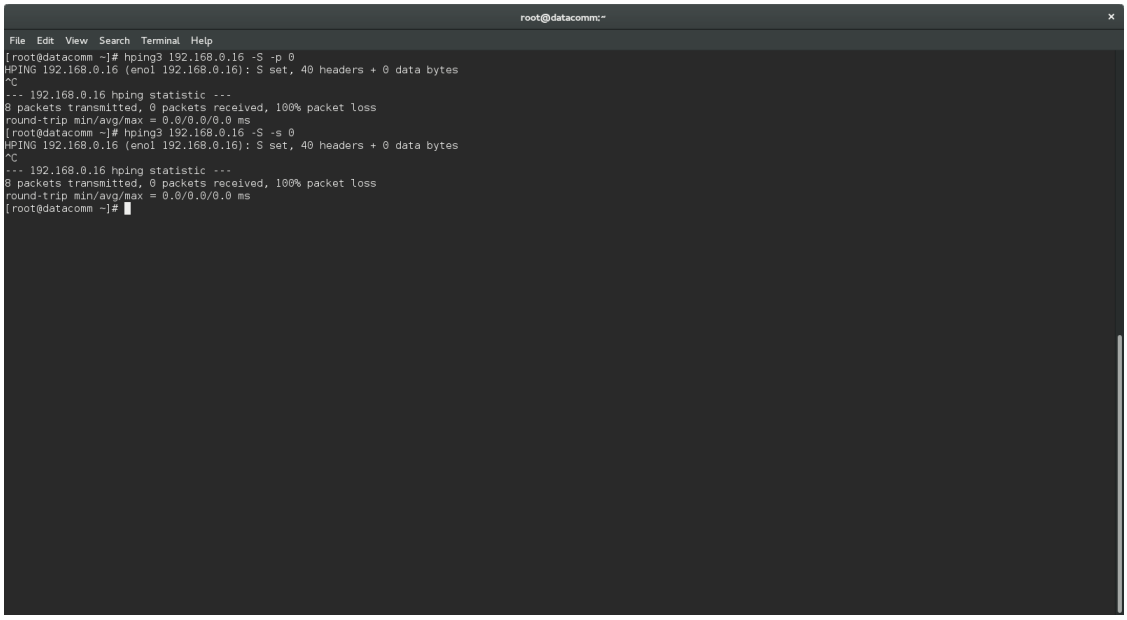


Figure 19 Use hping3 to test the port 0 (T)

Here we can see the results of the port 0 attempts, and we can notice that the packets were dropped.

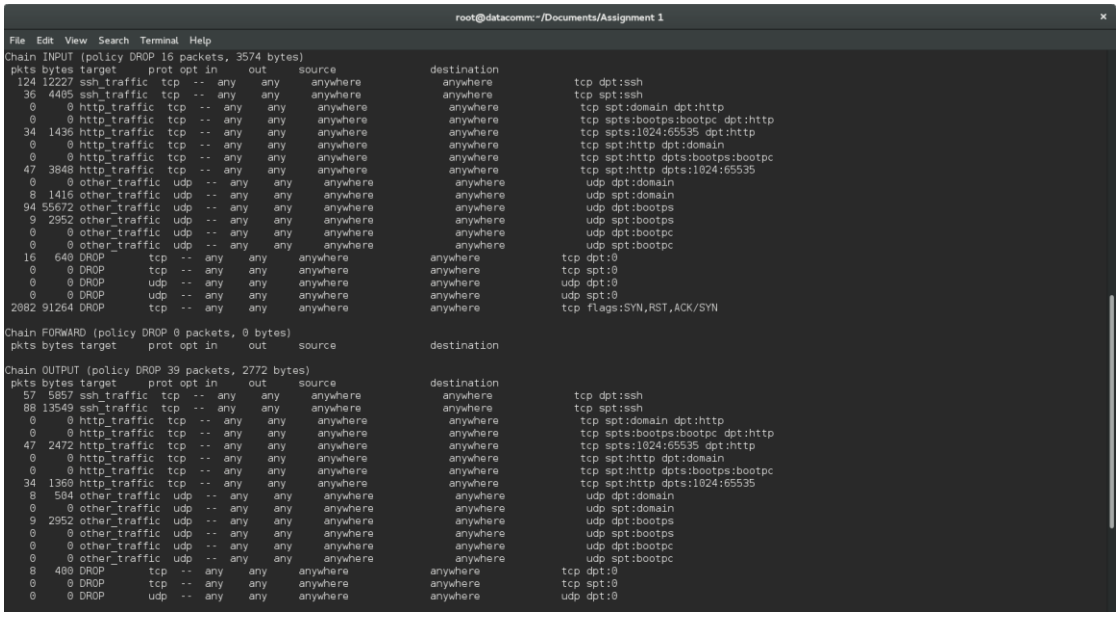


Figure 20 Results after port 0 test

7. Nmap

Additionally to these tests, we can use Nmap to see which ports are open. We can see that Nmap is detecting both port 80 and 22, but in this case port 80 is shown closed as I wasn't running a web server but otherwise is detected.

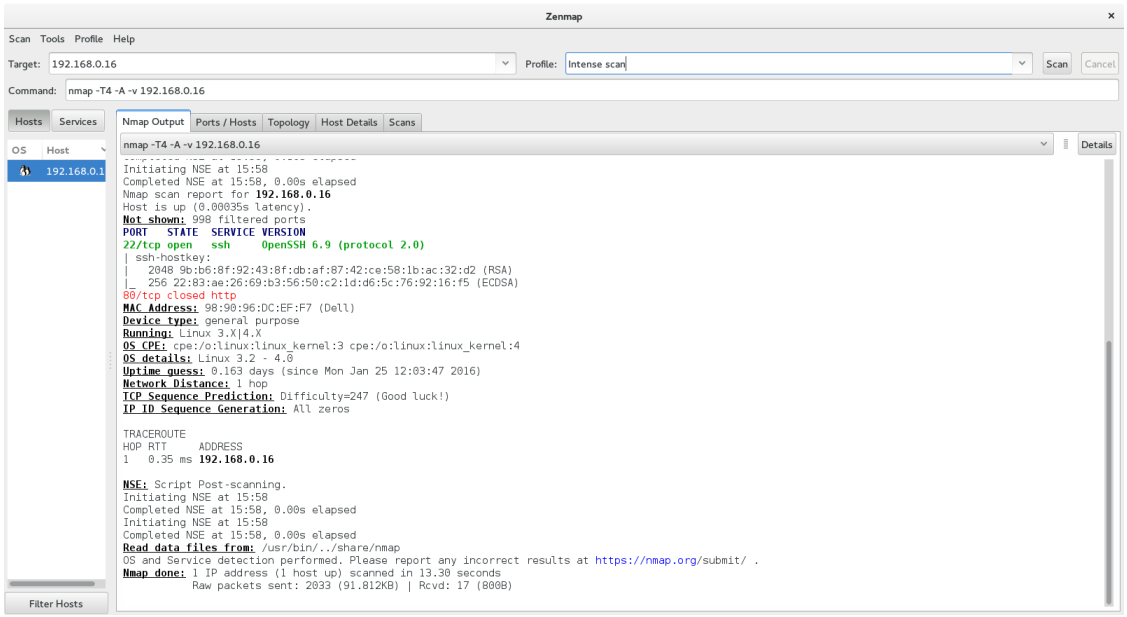


Figure 21 Nmap results (T)