Assignment #1

Simple Personal Linux Firewall

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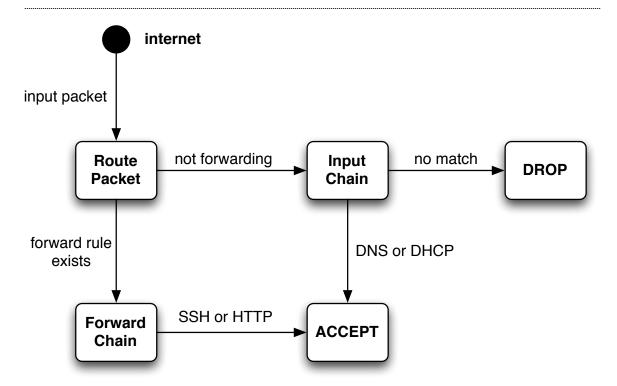
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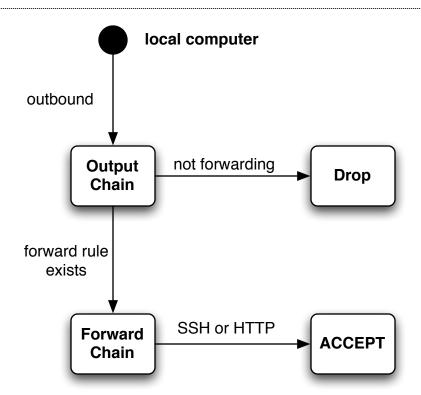
OVERVIEW

This assignment was for the purpose of creating a simple Linux firewall where everything would be blocked with the exception of SSH and HTTP traffic. To do this, I had to first create a default DROP policy and then selectively open the needed ports, which also included DHCP and DNS. Additionally, I needed make sure that the firewall allowed communication via established connections.

DESIGN WORK

Inbound Traffic





TESTING

Rule #	Test Description	Tool Used	Expected Results	Pass/Fail
1	Permit inbound/ outbound SSH packets.	Remotely access the SSH server	The iptables -L -n -v -x audit should show the traffic.	Pass. Detailed results are attached.
2	Permit inbound/ outbound HTTP packets.	hping3 & opening a browser session.	hping2 should show a response on port 80 and and the iptables -L -n -v -x audit should show the traffic.	Pass. Detailed results are attached.
3	Drop traffic to port 80 from source port < 1024	hping3	hping2 should not show any response and the iptables -L -n -v -x audit should NOT show the traffic.	Pass. Detailed results are attached.
4	Drop all incoming packets from/to port 0.	hping3	hping2 should not show any response and the iptables -L -n -v -x audit should show the dropped traffic.	Pass. Detailed results are attached.
5	Drop all incoming packets that have both the SYN and FIN bits set together.	hping3	hping2 should not show any response and the iptables -L -n -v -x audit should show the dropped traffic.	Pass. Detailed results are attached.
6	Allow outbound DNS & DHCP packets	nslookup	Should return results for any particular domain and the iptables -L -n -v -x audit should show the traffic.	Pass. Detailed results are attached.
7	Drop all inbound traffic except for SSH and HTTP traffic.	zenmap	Through scanning all 65535 ports, we should only see the SSH and HTTP services open. Additionally, the iptables -L -n -v -x audit should show dropped traffic.	Pass. Detailed results are attached.

Before the test:

```
Chain inbound-acct (5 references)
             bytes target
0 ACCEPT
                              prot opt in
                                               out
                                                                            destination
    pkts
                                                       source
                             tcp -- *
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp spts:1024:65535 dpt:80
              456 ACCEPT
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp dpt:22
Chain outbound-acct (5 references)
             bytes target
                              prot opt in
                                                                            destination
                             tcp: SICON
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                              tcp spt:80
       0
               0 ACCEPT
       Ø
               0 ACCEPT
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                              tcp dpt:80
              380 ACCEPT
                                                                          0.0.0.0/0
                                                     0.0.0.0/0
                                                                                              tcp spt:22
                             tcp
               0 ACCEPT
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                              tcp dpt:22
                             tcp
```

After the test:

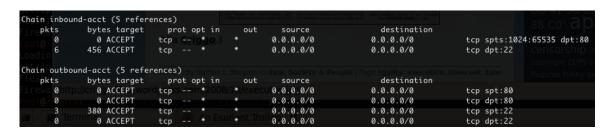
```
Chain inbound-acct (5 references)
                             prot opt in
tcp -- *
tcp -- *
             bytes target
0 ACCEPT
   pkts
                                                out
                                                         source
                                                                               destination
                                                                                                   tcp spts:1024:65535 dpt:80
      0
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
             2904 ACCEPT
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
                                                                                                   tcp dpt:22
Chain outbound-acct (5 references)
    pkts
              bytes target
                               prot opt in
                                                         source
                                                                               destination
                                                                                                  tcp spt:80
                0 ACCEPT
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
                0 ACCEPT
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
                                                                                                   tcp dpt:80
      29
            30804 ACCEPT
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
                                                                                                  tcp spt:22
                              tcp
                Ø ACCEPT
                                                       0.0.0.0/0
                                                                             0.0.0.0/0
                                                                                                  tcp dpt:22
```

Test Case #2

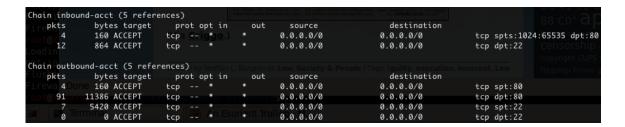
```
## hping2 192.168.1.185 -p 80 -s 1241 -S - Sections Text Rox Shape HPING 192.168.1.185 (eth0 192.168.1.185): S set, 40 headers + 0 data bytes len=46 ip=192.168.1.185 ttl=64 DF id=0 sport=80 flags=RA seq=0 win=0 rtt=2.1 ms len=46 ip=192.168.1.185 ttl=64 DF id=0 sport=80 flags=RA seq=2 win=0 rtt=242.0 ms len=46 ip=192.168.1.185 ttl=64 DF id=0 sport=80 flags=RA seq=2 win=0 rtt=163.8 ms len=46 ip=192.168.1.185 ttl=64 DF id=0 sport=80 flags=RA seq=3 win=0 rtt=85.4 ms0 len=46 ip=192.168.1.185 ttl=64 DF id=0 sport=80 flags=RA seq=3 win=0 rtt=85.4 ms0 len=46 ip=192.168.1.185 hping statistic ---

4 packets tramitted, 4 packets received, 0% packet loss round-trip min/avg/max = 2.1/123.3/242.0 ms len=46 ip=192.168.1.185 hping statistic ---
```

Before the test:



After the test:

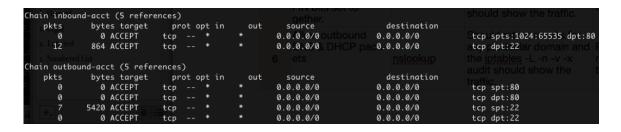


Test Case #3

```
strumpet ~ # hping2 192.168.1.185 -p 80 -s 1000 -S
HPING 192.168.1.185 (eth0 192.168.1.185): S set, 40 headers + 0 data bytes
^C
--- 192.168.1.185 hping statistic ---
4 packets tramitted, 0 packets received, 100% packet loss
round-trip min/avg/max = 0.0/0.0/0.0 ms
```

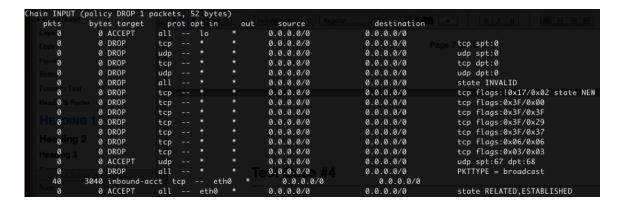
Before the test:

Charles I down a down	1 t 65 6				
Chain inbound	d-acct (5 refer	ences)			
pkts	bytes target	prot opt in	out source	destination	
0	0 ACCEPT	tcp *	* Befø.0.0.0/0st	0.0.0.0/0	tcp spts:1024:65535 dpt:80
a. Let6 red	456 ACCEPT	tcp *	* 0.0.0.0/0	0.0.0.0/0	tcp dpt:22
I. Numbered I					
Chain outbour	nd-acct (5 refe	rences)			
pkts	bytes target	prot opt in	out source	destination	
0	0 ACCEPT	tcp *	* Afteo.0.0.0/0:	0.0.0.0/0	tcp spt:80
Ø	0 ACCEPT	tcp *	* 0.0.0.0/0	0.0.0.0/0	tcp dpt:80
3	380 ACCEPT	tcp *	* 0.0.0.0/0	0.0.0.0/0	tcp spt:22
0	0 ACCEPT	tcp *	* 0.0.0.0/0	0.0.0.0/0	tcp dpt:22



```
root@XenoTux:~$ hping3 192.168.227.130 -- s 0 -- d 22 -- S
HPING 192.168.227.130 (eth1 192.168.227.130): S set, 40 headers + 22 data bytes
AC Body Bullot
--- 192.168.227.130 hping statistic ---
9 packets transmitted, 0 packets received, 100% packet loss
round-trip min/avg/max = 0.0/0.0/0.0 ms
root@XenoTux:~$ hping3 192.168.227.130 -s 1234 -- d 0 -S
HPING 192.168.227.130 (eth1 192.168.227.130): S set, 40 headers + 0 data bytes
AC --- 192.168.227.130 hping statistic ---
5 packets transmitted, 0 packets received, 100% packet loss
round-trip min/avg/max = 0.0/0.0/0.0 ms
root@XenoTux:~$
```

Before the test:



```
nain INPUT (policy DROP 1 packets, 52 bytes)
                                              out
                                                                            destination
            bytes target
                             prot opt in
  pkts
                                                      source
             Ø ACCEPT
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
             62 DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp spt:0
             Ø DROP
                           udp
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                              udp spt:0
    13
            696 DROP
                           tcp
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp dpt:0
              Ø DROP
                                                                          0.0.0.0/0
                                                    0.0.0.0/0
                                                                                              udp dpt:0
                           udp
              Ø DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               state INVALID
              Ø DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp flags:!0x17/0x02 state NEW
              Ø DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp flags:0x3F/0x00
                                                                                               tcp flags:0x3F/0x3F
              Ø DROP
                           tcp
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp flags:0x3F/0x29
              Ø DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                           tcp
                                                                          0.0.0.0/0
                                                                                               tcp flags:0x3F/0x37
              Ø DROP
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
              Ø DROP
                                                    0.0.0.0/0
                                                                                               tcp flags:0x06/0x06
              Ø DROP
                           tcp
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                               tcp flags:0x03/0x03
              Ø ACCEPT
                           udp
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                                                              udp spt:67 dpt:68
                                                                                              PKTTYPE = broadcast
            274 DROP
                           all
                                                    0.0.0.0/0
                                                                          0.0.0.0/0
                                                       0.0.0.0/0
                                                                            0.0.0.0/0
              0 ACCEPT
                                                                                               state RELATED, ESTABLISHED
```

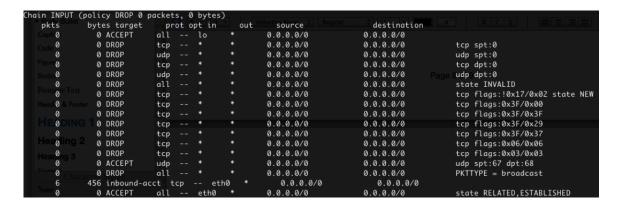
```
strumpet ~ # hping2 192.168.1.185v-p 22.-sc1274c-Sn-F Sections Texts

HPING 192.168.1.185 (eth0 192.168.1.185): SF set, 40 headers + 0 data bytes

AC Body Bullet
--- 192.168.1.185 hping statistic ---
4 packets tramitted, 0 packets received, 100% packet loss

round-trip min/avg/max = 0.0/0.0/0.0 ms
```

Before the test:



```
(policy DROP 0 packets, 0 bytes)
pkts
          bytes target
0 ACCEPT
                                             out
                                                      source
                                                                             destination
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
  0
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
            Ø DROP
                          tcp
                                                                                                tcp spt:0
            Ø DROP
                          udp
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                udp spt:0
            Ø DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                tcp dpt:0
            Ø DROP
                          udp
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                udp dpt:0
          280 DROP
                                                                           0.0.0.0/0
                                                                                                state INVALID
tcp flags:!0x17/0x02 state NEW
                                                    0.0.0.0/0
            Ø DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                          tcp
            Ø DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                tcp flags:0x3F/0x00
                          tcp
            Ø DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                tcp flags:0x3F/0x3F
            Ø DROP
                          tcp
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                tcp flags:0x3F/0x29
            Ø DROP
                                                                                                tcp flags:0x3F/0x37
   0
                          tcp
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
            Ø DROP
                                                                           0.0.0.0/0
                                                                                                tcp flags:0x06/0x06
                                                    0.0.0.0/0
                          tcp
            Ø DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                tcp flags:0x03/0x03
            0 ACCEPT
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                udp spt:67 dpt:68
          823 DROP
                                                    0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                PKTTYPE = broadcast
          812 inbound-acct tcp -- eth0 *
0 ACCEPT all -- eth0 *
                                                      0.0.0.0/0
                                                                             0.0.0.0/0
                                                                           0.0.0.0/0
                                                                                                state RELATED, ESTABLISHED
                                                    0.0.0.0/0
```

```
Proot@XenoTux:/home/ironix/Assignment #1/Source$ (nslookup yahoo.com Server: 192.168.1.1
Address: Bullet 192.168.1.1#53
Caption
Non-authoritative answer:
Name: yahoo.com
Address: 209.191.93.53
Name: yahoo.com
Address: 69.147.114.224
Name: yahoo.com
Address: 69.147.114.224
Address: 209.131.36.159
```

Before the test:

```
hain OUTPUT (policy DROP 0 packets, 0 bytes)
             bytes target
                              prot opt in
                                                                            destination
                                              out
                                                      source
                                                     127.0.0.1 0.0.0.0/0
               Ø ACCEPT
                                                                          0.0.0.0/0
     0
               Ø ACCEPT
                                                                          0.0.0.0/0
     0
                                                                          0.0.0.0/0
     0
               Ø ACCEPT
                            udp
                                                     0.0.0.0/0
                                                                                              udp dpt:68 state NEW
                                                                                              tcp dpt:53 state NEW
               0 ACCEPT
                            tcp
                                                     0.0.0.0/0
                                                                          0.0.0.0/0
     0
                                                                          0.0.0.0/0
                                                                                              udp dpt:53 state NEW
               0 ACCEPT
                                                     0.0.0.0/0
     0
                            udp
            1880 outbound-acct tcp
                                                                              0.0.0.0/0
                                                        0.0.0.0/0
```

```
Chain OUTPUT (policy DROP 0 packets, 0 bytes)

pkts <sup>ING 2</sup> bytes target prot opt in
                                  prot opt in
                                                     out
                                                              source
                                                                                      destination
                                                                                   0.0.0.0/0
                 Ø ACCEPT
                                                           127.0.0.1
       0
                                all
                 Ø ACCEPT
                                                           0.0.0.0/0
       0
       0
                 0 ACCEPT
                                udp
                                                           0.0.0.0/0
                                                                                    0.0.0.0/0
                                                                                                          udp dpt:68 state NEW
                 0 ACCEPT
                                tcp
                                                           0.0.0.0/0
                                                                                   0.0.0.0/0
                                                                                                          tcp dpt:53 state NEW
                                                                                                          udp dpt:53 state NEW
                55 ACCEPT
                                                           0.0.0.0/0
                                                                                    0.0.0.0/0
                                udp
              4028 outbound-acct tcp
                                                                0.0.0.0/0
                                                                                       0.0.0.0/0
```

Only the SSH and HTTP ports were discovered during the scan.

```
Starting Nmap 5.00 ( http://nmap.org ) at 2010-01-28 10:17 PST
NSE: Loaded 30 scripts for scanning.
Initiating ARP Ping Scan at 10:17
Scanning 192.168.227.130 [1 port]
Completed ARP Ping Scan at 10:17, 0.07s elapsed (1 total hosts)
Initiating Parallel DNS resolution of 1 host. at 10:17
Completed Parallel DNS resolution of 1 host. at 10:17, 0.01s elapsed
Initiating SYN Stealth Scan at 10:17
Scanning 192.168.227.130 [65535 ports]
Discovered open port 22/tcp on 192.168.227.130
Discovered open port 80/tcp on 192.168.227.130
SYN Stealth Scan Timing: About 19.82% done; ETC: 10:19 (0:02:05 remaining)
SYN Stealth Scan Timing: About 47.97% done; ETC: 10:19 (0:01:06 remaining)
Completed SYN Stealth Scan at 10:19, 104.88s elapsed (65535 total ports)
Initiating Service scan at 10:19
Scanning 2 services on 192.168.227.130
Completed Service scan at 10:19, 6.01s elapsed (2 services on 1 host)
Initiating OS detection (try #1) against 192.168.227.130
Retrying OS detection (try #2) against 192.168.227.130
NSE: Script scanning 192.168.227.130.
NSE: Starting runlevel 1 scan
Initiating NSE at 10:19
Completed NSE at 10:19, 0.10s elapsed
NSE: Script Scanning completed.
Host 192.168.227.130 is up (0.00049s latency).
Interesting ports on 192.168.227.130:
Not shown: 65533 filtered ports
PORT
       STATE SERVICE VERSION
                    OpenSSH 5.1p1 Debian Gubuntu2 (protocol 2.0)
22/tcp open ssh
I ssh-hostkey: 1024 d3:55:2c:2f:96:74:f3:d8:d1:37:86:7c:ce:82:31:33 (DSA)
I_ 2048 39:af:2d:6c:5a:80:89:99:ab:12:65:0c:e2:ca:eb:35 (RSA)
80/tcp open http
                     Apache httpd 2.2.12 ((Ubuntu))
I_ html-title: Site doesn't have a title (text/html).
MAC Address: 00:0C:29:25:96:01 (VMware)
```

Before the test:

