Advanced Network Reconnaissance with Nmap

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Mission #1

Penetrate SCO's Firewall to discern all the open TCP ports on Docsrv.Caldera.Com

SYN Scan against DocSRV

```
# nmap -sS -T4 docsrv.caldera.com
Starting Nmap 3.97Shmoo ( http://www.insecure.org/nmap/ )
Interesting ports on docsrv.caldera.com (216.250.128.247):
(The 1669 ports scanned but not shown below are in state:
filtered)
PORT    STATE  SERVICE
80/tcp  open   http
113/tcp closed auth
507/tcp open   crs

Nmap finished: 1 IP address (1 host up) scanned in 24.490
seconds
```

FIN Scan against DocSRV

```
# nmap -sF -T4 docsrv.caldera.com
Starting Nmap 3.97Shmoo ( http://www.insecure.org/nmap/ )
Interesting ports on docsrv.caldera.com (216.250.128.247):
(The 1632 ports scanned but not shown below are in state:
closed)
PORT      STATE          SERVICE
7/tcp     open|filtered echo
9/tcp     open|filtered discard
11/tcp    open|filtered systat
13/tcp    open|filtered daytime
15/tcp    open|filtered netstat
19/tcp    open|filtered chargen
21/tcp    open|filtered ftp
22/tcp    open|filtered ssh
23/tcp    open|filtered telnet
25/tcp    open|filtered smtp
37/tcp    open|filtered time
79/tcp    open|filtered finger
80/tcp    open|filtered http
[many ports cut]
135/tcp   open|filtered auth
```

ACK Scan against DocSRV

```
# nmap -sA -T4 docsrv.caldera.com
Starting Nmap 3.97Shmoo
Interesting ports on docsrv.caldera.com
(216.250.128.247):
(The 1669 ports scanned but not shown below are in
state: UNfiltered)
PORT      STATE    SERVICE
135/tcp   filtered msrpc
1434/tcp  filtered ms-sql-m
32777/tcp filtered sometimes-rpc17

Nmap finished: 1 IP address (1 host up) scanned in
3.134 seconds
```

Window Scan against DocSRV

```
# nmap -sW -p- -T4 docsrv.caldera.com
Starting Nmap 3.97Shmoo ( http://www.insecure.org/nmap/ )
Interesting ports on docsrv.caldera.com (216.250.128.247):
(The 65479 ports scanned but not shown below are in state: closed)
PORT      STATE    SERVICE
7/tcp     open     echo
9/tcp     open     discard
11/tcp    open     systat
13/tcp    open     daytime
15/tcp    open     netstat
19/tcp    open     chargen
21/tcp    open     ftp
22/tcp    open     ssh
23/tcp    open     telnet
25/tcp    open     smtp
37/tcp    open     time
79/tcp    open     finger
80/tcp    open     http
110/tcp   open     pop3
111/tcp   open     rpcbind
135/tcp   filtered msrpc
143/tcp   open     imap
```

Mission #2

Sneak past all of the Nmap-related Snort IDS Rules

Nmap-Specific Snort Rules

```
~/snortrules-pr-2.4/rules>egrep -i 'alert.*nmap' *.rules
icmp.rules:alert icmp $EXTERNAL_NET any -> $HOME_NET any
(msg:"ICMP PING NMAP"; dsize:0; itype:8;
reference:arachnids,162; classtype:attempted-recon;
sid:469; rev:3;)
scan.rules:alert tcp $EXTERNAL_NET any -> $HOME_NET any
(msg:"SCAN nmap XMAS"; flow:stateless; flags:FPU,12;
reference:arachnids,30; classtype:attempted-recon;
sid:1228; rev:7;)
web-attacks.rules:alert tcp $EXTERNAL_NET any ->
$HTTP_SERVERS $HTTP_PORTS (msg:"WEB-ATTACKS nmap command
attempt"; flow:to_server,established; content:"nmap%20";
nocase; classtype:web-application-attack; sid:1361; rev:5;)
deleted.rules:alert tcp $EXTERNAL_NET any -> $HOME_NET any
(msg:"SCAN nmap TCP"; ack:0; flags:A,12; flow:stateless;
reference:arachnids,28; classtype:attempted-recon; sid:628;
rev:7;)
deleted.rules:alert tcp $EXTERNAL_NET any -> $HOME_NET any
(msg:"SCAN nmap fingerprint attempt"; flags:SFPU;
flow:stateless; reference:arachnids,05;
classtype:attempted-recon; sid:629; rev:6;)
```

Flow-portscan – Fixed Window

```
~/snort-2.2.0/etc> grep 'scanner-
fixed' snort.conf
#         scanner-fixed-threshold 15 \
#         scanner-fixed-window 15 \
```

Defeating Fixed Window Scan Detection

```
# foreach target (205.217.153.53
205.217.153.54 205.217.153.55)
foreach? nmap --scan_delay 1075 --
max_retries 0 -max_hostrgoup 1 -P0
-p21,22,23,25,53 $target
foreach? usleep 1075000
foreach? end
```

Flow-portscan – Sliding Window

```
~/snort-2.2.0/etc> grep scanner-sliding
snort.conf
#    scanner-sliding-threshold 40 \
#    scanner-sliding-window 20 \
#    scanner-sliding-scale-factor 0.50 \
```

Defeating Snort Sliding & Fixed Window Detection

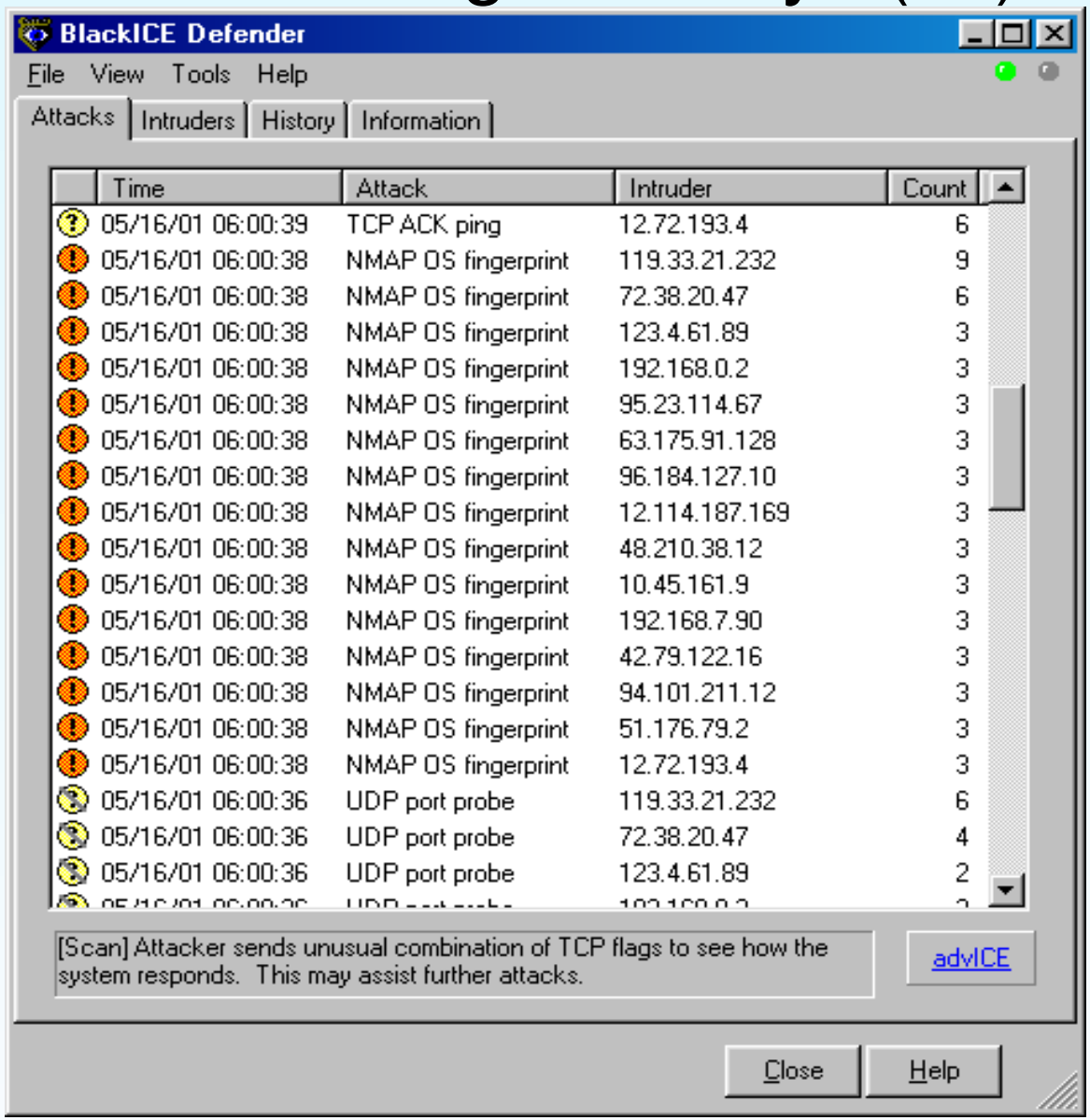
```
felix~# foreach target (205.217.153.53
205.217.153.54 205.217.153.55)
foreach? nmap -min_parallelism 15 --
max_retries 0 -P0 -p21,22,23,25,53
$target
foreach? usleep 23000000
foreach? end
```

Another Option: Just Exploit the Thing

Try the Snort Back Orifice Pre-processor Exploit:

http://www.frsirt.com/exploits/20051025.THC snortbo.c.php

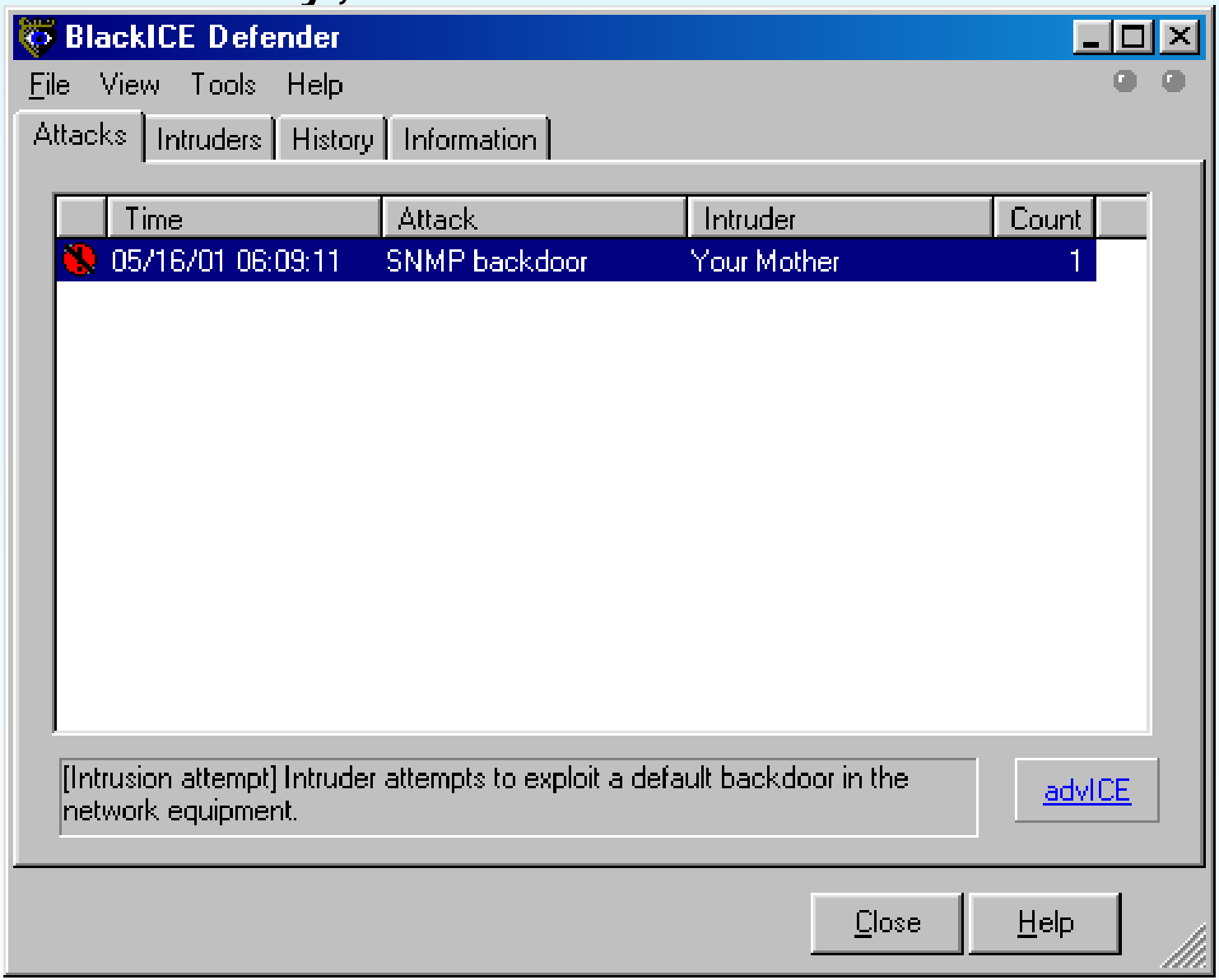
Don't Forget Decoys (-D)



Also Don't Forget

- Exotic scan flags (--scanflags)
- Source port manipulation (-g)
- Ipv6 (-6)
- IPID Idle Scanning (-sI)
- Fragmentation (-f, --mtu)
- Proxies
- Source Routing
- Etc.

Finally, Have Some Fun With It



Single Service Discovery

Mission #3

Locate webserver(s) on the Playboy.Com network offering free images

Step 1: Find Network to Scan

```
Step 1: Find the network to scan

core~> whois -h whois.arin.net n playboy
[...]
OrgName:     Playboy
OrgID:       PLAYBO
Address:     680 N. Lake Shore Drive
City:        Chicago
StateProv:   IL
PostalCode: 60611
Country:     US

NetRange:    216.163.128.0 - 216.163.143.255
CIDR:        216.163.128.0/20 [...]
```

Initial Try

```
nmap -P0 -p80 -oG pb.gnmap
216.163.128.0/20
Starting nmap 3.81
[...]
Nmap run completed -- 4096 IP
addresses (4096 hosts up) scanned in
1236.309 seconds
```

Help Nmap Out with Timing Information

```
> host www.playboy.com
www.playboy.com has address 209.247.228.201

Mail servers (host -t mx playboy.com):
 mx.la.playboy.com. 10 216.163.128.15
 mx.chi.playboy.com. 5 216.163.143.4
```

Ping Known Hosts for RTT Estimates

```
> ping -c5 mx.chi.playboy.com
PING mx.chi.playboy.com (216.163.143.4) 56(84) bytes
of data.
--- mx.chi.playboy.com ping statistics ---
5 packets transmitted, 0 received, 100% packet loss,
time 4000ms

> ping -c5 mx.la.playboy.com
PING mx.la.playboy.com (216.163.128.15) 56(84) bytes
of data.
--- mx.la.playboy.com ping statistics ---
5 packets transmitted, 0 received, 100% packet loss,
time 4011ms
```

Perhaps TCP Ping Will Work Better

```
# hping2 --syn -p 25 -c 5 mx.chi.playboy.com
HPING mx.chi.playboy.com (eth0 216.163.143.4)
46 bytes from 216.163.143.4: flags=SA
46 bytes from 216.163.143.4: flags=SA
[cut]
--- mx.chi.playboy.com hping statistic ---
5 packets transmitted, 5 packets received
round-trip min/avg/max = 56.8/58.0/61.8 ms

# hping2 --syn -p 25 -c 5 mx.la.playboy.com
HPING mx.la.playboy.com (eth0 216.163.128.15)
46 bytes from 216.163.128.15: flags=SA
46 bytes from 216.163.128.15: flags=SA
[cut]
--- mx.la.playboy.com hping statistic ---
5 packets transmitted, 5 packets received
round-trip min/avg/max = 15.4/15.8/16.4 ms
```

Designing a Faster Scan

```
nmap -T4 --max_rtt_timeout
200 --initial_rtt_timeout 150
--min_hostgroup 512 -P0 -p80
-oG pb2.gnmap
216.163.128.0/20
```

Re-Launch the Scan

```
# nmap -T4 --max_rtt_timeout 200
--initial_rtt_timeout 150 --
min_hostgroup 512 -P0 -p80 -oG
pb2.gnmap 216.163.128.0/20
Starting nmap 3.81
[...]
Nmap run completed -- 4096 IP
addresses (4096 hosts up) scanned
in 868.714 seconds
```

Upgrade to 3.97Shmoo + --max_retries

```
# nmap -T4 --max_rtt_timeout 200
--initial_rtt_timeout 150 --
min_hostgroup 512 --max_retries 0
-P0 -p80 -oG pb3.gnmap
216.163.128.0/20
Starting nmap 3.97Shmoo
[...]
Nmap run completed -- 4096 IP
addresses (4096 hosts up) scanned
in 289.579 seconds
```

Under 5 Minutes!

Skip DNS

```
# nmap -T4 --max_rtt_timeout 200
--initial_rtt_timeout 150 --
min_hostgroup 512 -max_retries 0
-n -P0 -p80 -oG pb3.gnmap
216.163.128.0/20
Starting nmap 3.97Shmoo
[...]
Nmap run completed -- 4096 IP
addresses (4096 hosts up) scanned
in 46.052 seconds
```

Time for the Results!

```
> grep 80/open pb3.gnmap | awk '{print $2}'
216.163.129.20 216.163.136.21 216.163.136.22
216.163.136.27 216.163.136.29 216.163.136.30
216.163.136.31 216.163.137.3  216.163.137.4
216.163.137.5  216.163.137.6  216.163.137.7
216.163.137.8  216.163.137.9  216.163.137.10
216.163.137.11 216.163.137.12 216.163.137.13
216.163.137.14 216.163.137.15 216.163.137.16
216.163.137.17 216.163.137.18 216.163.137.19
216.163.137.20 216.163.137.21 216.163.137.22
216.163.137.23 216.163.137.25 216.163.137.26
216.163.137.27 216.163.140.20 216.163.143.11
```

Add Version Detection (-sV)

```
######## mydoom backdoor PROBE ###########
Probe TCP mydoom q|\\x0d\\x0d|
ports 3127-3198
match mydoom m|\\x04\\x5b\\0\\0\\0\\0\\0\\0|
p/mydoom/ v/v012604/
```

Nmap 3.97Shmoo

- Download the goods from http://www.insecure.org/presentations/Shmoo06/
- Features Since 3.95:
  - Runtime Interaction
  - Parallel reverse DNS
  - Corrupt TCP/UDP checksum option (--badsum)
  - --max_retries

Features Since 3.50

- ARP Scanning and Spoofing
- Rewrote core port scanning engine
- Diet Nmap
- Brand new man page/reference guide, in 7 languages so far
- Huge version detection DB update (from 1,000 to 3,000 signatures)
- Version detection now gathers OS, device type, and hostname

Features Since 3.50 (Cont'd)

- Version detection rarity (--version_light, --version_all, --version_intensity)
- Massive OS detection update (grew more than 50% to 1,684 fingerprints)
- Dramatic Windows performance improvements – now sends via NDIS driver.
- MAC Address Printing
- 'l33t ASCII art in configurator
- XSL stylesheet for HTML output

Features Since 3.50 (Cont'd)

- open|filtered and closed|filtered states
- Completion time estimates
- NmapFE ported to GTK2

Top Nmap Contributors Since 3.50

Adam Kerrison, Adam Morgan, Adriano Monteiro Marques, Alan Bishoff, Alan William Somers, Albert Chin, Alok Tangoankar, Amy Hennings, Anders Thulin, Andreia Gaita, Andy Lutomirski, Annalee Newitz, Arturo Buanzo Busleiman, Bart Dopheide, Beirne Konarski, Ben Harris, Bill Dale, Bill Petersen, Bill Pollock, Bo Jiang, Brian Hatch, Chad Loder, Chris Gibson, Christophe, Craig Humphrey, Curtis Doty, Dana Epp, Dirk Mueller, Doug Hoyte, Dragos Ruiu, Dug Song, Duilio J. Protti, Eric S. Raymond, Felix Gröbert, Florian Ebner, Fyodor Yarochkin, Ganga Bhavani, Gisle Vanem, Glyn Geoghegan, Greg A. Woods, Greg Darke, Greg Taleck, Gwenole Beauchesne, HD Moore, Jedi/Sector One, Jeff Nathan, Jesse Burns, Jim Carras, Jim Harrison, Jonathan Dieter, José Domingos, Justin Cranford, Justin M Cacak, Krok, KX, Lamont Jones, Lance Spitzner, Laurent Estieux, Lionel Cons, Lucien Raven, MadHat, Marius Strobl, Mark-David McLaughlin, Mark Ruef, Martin Macok, Matthieu Verbert, Matt Selsky, Max Schubert, Meethune Bhowmick, Mephisto, Mike Basinger, Mike Hatz, Murphy, Netris, Okan Demirmen, Ole Morten Grodaas, Oliver Eikemeier, Pascal Trouvin, Paul Tarjan, Petr Salinger, Petter Reinholdtsen, pijn trein, Ping Huang, Piotr Sobolewski, Priit Laes, Princess Nadia, Raven Alder, Richard Birkett, Richard Moore, Robert E. Lee, Rob Foehl, Ronak Sutaria, Royce Williams, Ruediger Rissmann, Saint Xavier, Saravanan, Scott Mansfield, Sebastian Wolfgarten, Seth Master, Shahid Khan, Simon Burr, Simple Nomad, Sina Bahram, Solar Designer, Srivatsan, Stephane Loeuillet, Stephen Bishop, Steve Christensen, Steve Martin, Thorsten Holz, Tom Duffy, Tom Rune Flo, Tom Sellers, Tony Golding, van Hauser, vlad902, William McVey, Zhao Lei

Questions?

Any questions about Nmap, Network Reconnaissance, or anything else?