Nmap: Scanning the Internet

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Black Hat Inaugural Webcast; June 26, 2008

Planning the Big Scan

- Determining IP addresses to scan
- P2P Scanning?
- Legal Issues
- Firewalls
- Performance

Scan Results

- Scans are still running
- Some tentative results already available, and can improve scan performance.

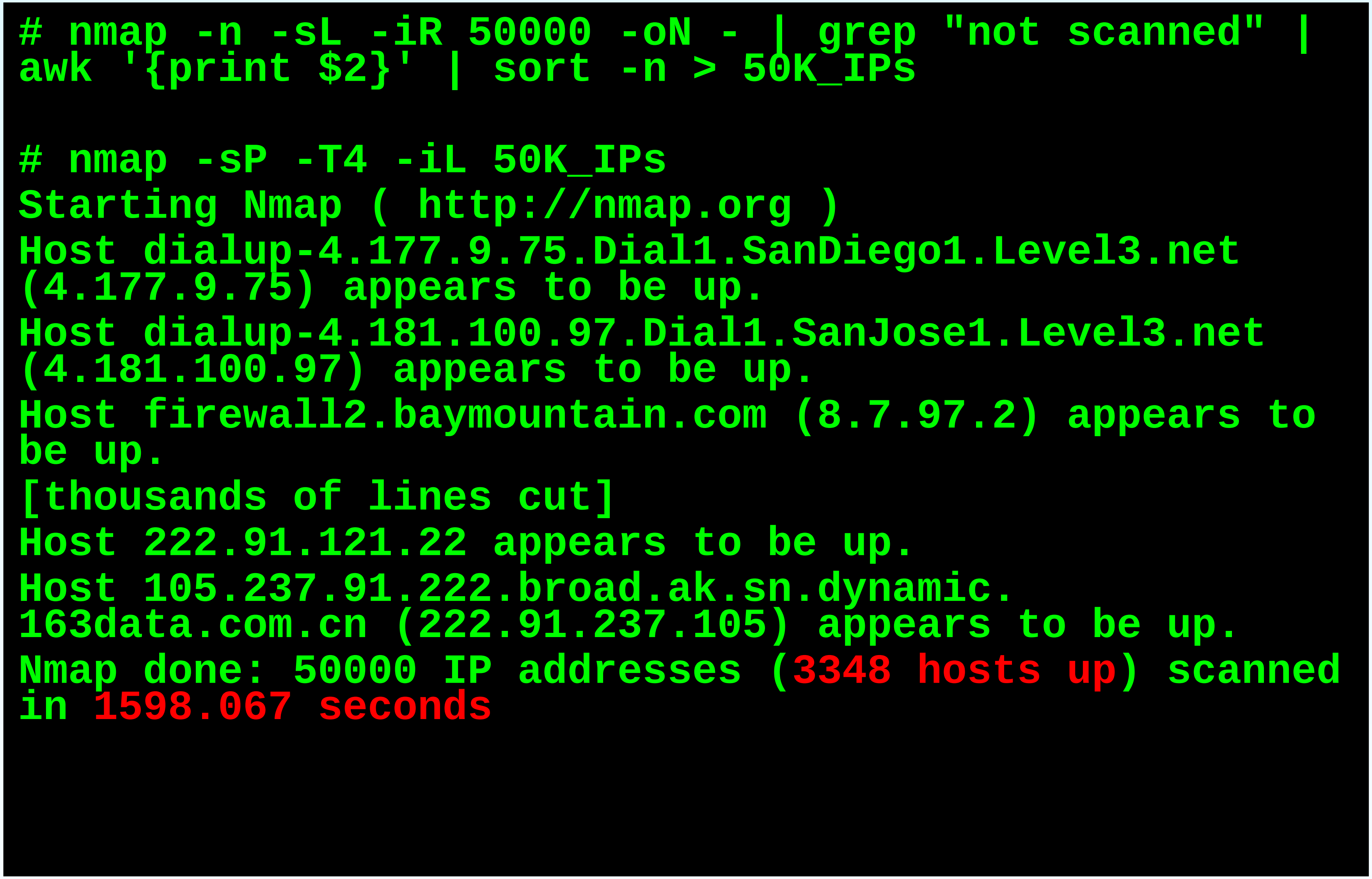
Best TCP Ports for Host Discovery

- Echo request, and even Nmap default discovery scans are insufficient for Internet scanning.
- Adding more TCP SYN and ACK probes can help, but which ports work the best?

Top 10 TCP Host Discovery Port Table

- 80/http
- 25/smtp
- 22/ssh
- 443/https
- 21/ftp
- 113/auth
- 23/telnet
- 53/domain
- 554/rtsp
- 3389/ms-term-server

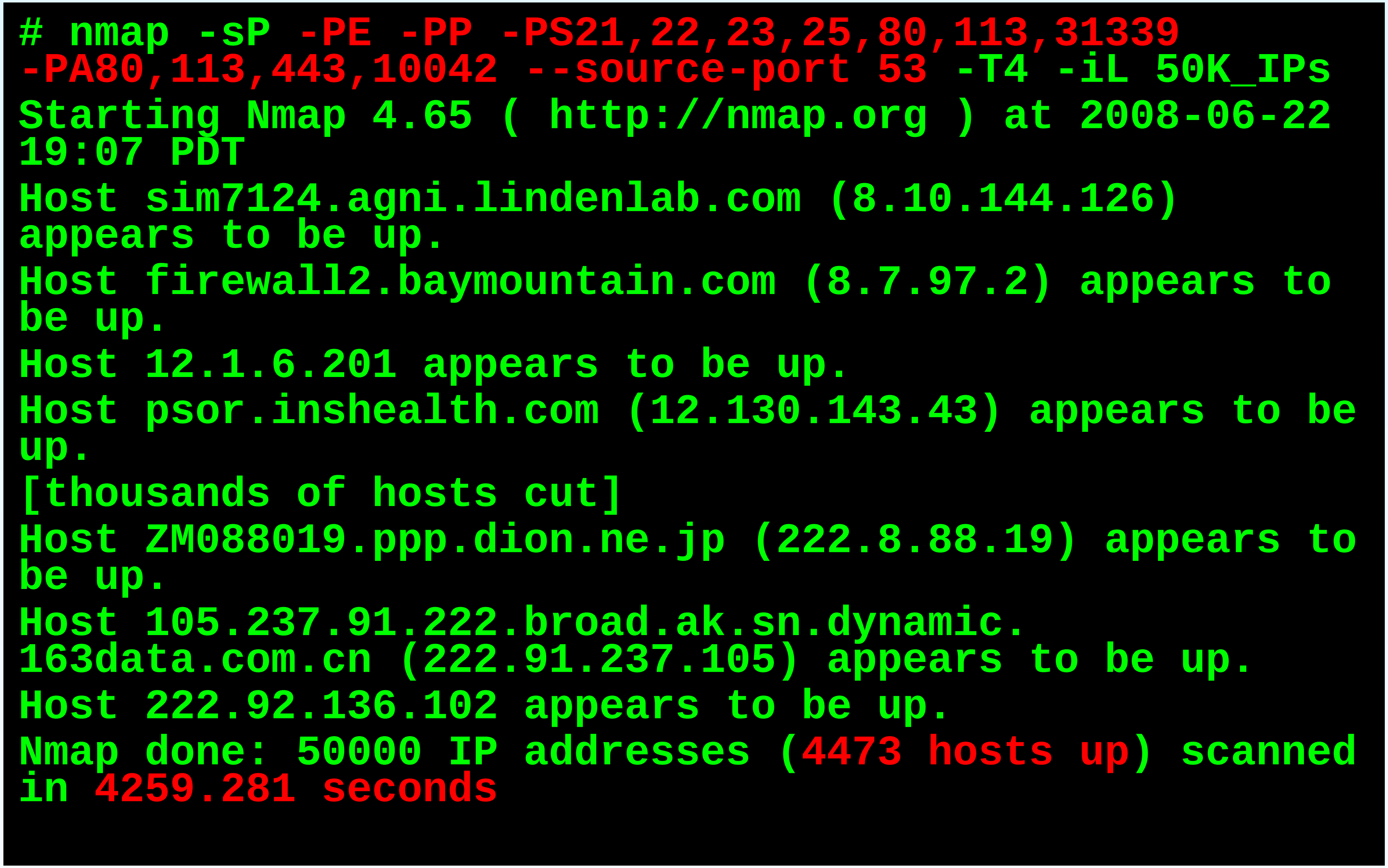
Default Host Discovery Effectiveness



```
# nmap -n -sL -iR 50000 -oN - | grep "not scanned" |
awk '{print $2}' | sort -n > 50K_IPs

# nmap -sP -T4 -iL 50K_IPs
Starting Nmap ( http://nmap.org )
Host dialup-4.177.9.75.Dial1.SanDiego1.Level3.net
(4.177.9.75) appears to be up.
Host dialup-4.181.100.97.Dial1.SanJose1.Level3.net
(4.181.100.97) appears to be up.
Host firewall2.baymountain.com (8.7.97.2) appears to
be up.
[thousands of lines cut]
Host 222.91.121.22 appears to be up.
Host 105.237.91.222.broad.ak.sn.dynamic.
163data.com.cn (222.91.237.105) appears to be up.
Nmap done: 50000 IP addresses (3348 hosts up) scanned
in 1598.067 seconds
```

Enhanced Host Discovery Effectiveness



```
# nmap -sP -PE -PP -PS21,22,23,25,80,113,31339
-PA80,113,443,10042 --source-port 53 -T4 -iL 50K_IPs
Starting Nmap 4.65 ( http://nmap.org ) at 2008-06-22
19:07 PDT
Host sim7124.agni.lindenlab.com (8.10.144.126)
appears to be up.
Host firewall2.baymountain.com (8.7.97.2) appears to
be up.
Host 12.1.6.201 appears to be up.
Host psor.inshealth.com (12.130.143.43) appears to be
up.
[thousands of hosts cut]
Host ZM088019.ppp.dion.ne.jp (222.8.88.19) appears to
be up.
Host 105.237.91.222.broad.ak.sn.dynamic.
163data.com.cn (222.91.237.105) appears to be up.
Host 222.92.136.102 appears to be up.
Nmap done: 50000 IP addresses (4473 hosts up) scanned
in 4259.281 seconds
```

Enhanced Discovery Results

- Enhanced discovery:
  - took 71 minutes vs. 27 (up 167%)
  - Found 1,125 more live hosts (up 34%)

Top Open TCP & UDP Ports

- Will be available by Black Hat USA
- Substantial reduction of current default 1703 TCP ports, 1480 UDP
- --top-ports feature available now, but no data to use it.

Nmap News!

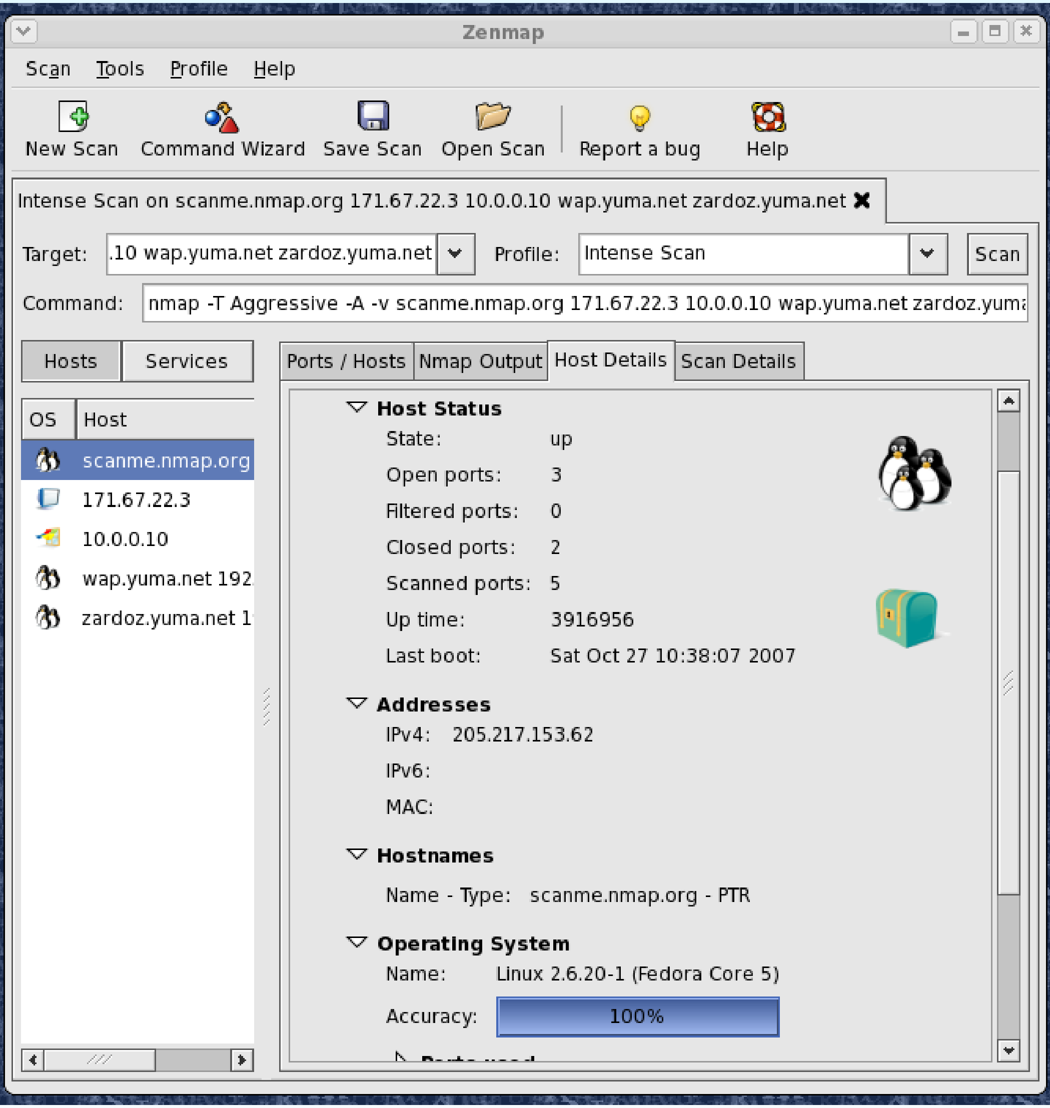
Nmap Scripting Engine (NSE)

```
# nmap -A -T4 scanme.nmap.org
Starting Nmap ( http://nmap.org )
Interesting ports on scanme.nmap.org (64.13.134.52):
Not shown: 1709 filtered ports
PORT    STATE  SERVICE VERSION
22/tcp  open   ssh     OpenSSH 4.3 (protocol 2.0)
25/tcp  closed smtp
53/tcp  open   domain  ISC BIND 9.3.4
70/tcp  closed gopher
80/tcp  open   http    Apache httpd 2.2.2 ((Fedora))
|_ HTML title: Site doesn't have a title.
113/tcp closed auth
Device type: general purpose
Running: Linux 2.6.X
OS details: Linux 2.6.20-1 (Fedora Core 5)
Uptime: 40.425 days (since Tue May 13 12:46:59 2008)
Nmap done: 1 IP address scanned in 30.567 seconds
Raw packets sent: 3464 (154KB) | Rcvd: 60 (3KB)
```

Fixed-rate packet sending

```
nmap –min-rate 500 scanme.nmap.org
```

Zenmap GUI



Intense Scan on scanme.nmap.org 171.67.22.3 10.0.0.10 wap.yuma.net zardoz.yuma.net

Target: .10 wap.yuma.net zardoz.yuma.net

Profile: Intense Scan

Command: nmap -T Aggressive -A -v scanme.nmap.org 171.67.22.3 10.0.0.10 wap.yuma.net zardoz.yuma

OS	Host
	scanme.nmap.org
	171.67.22.3
	10.0.0.10
	wap.yuma.net 192
	zardoz.yuma.net 1

Host Status

State: up
Open ports: 3
Filtered ports: 0
Closed ports: 2
Scanned ports: 5
Up time: 3916956
Last boot: Sat Oct 27 10:38:07 2007

Addresses

IPv4: 205.217.153.62
IPv6:
MAC:

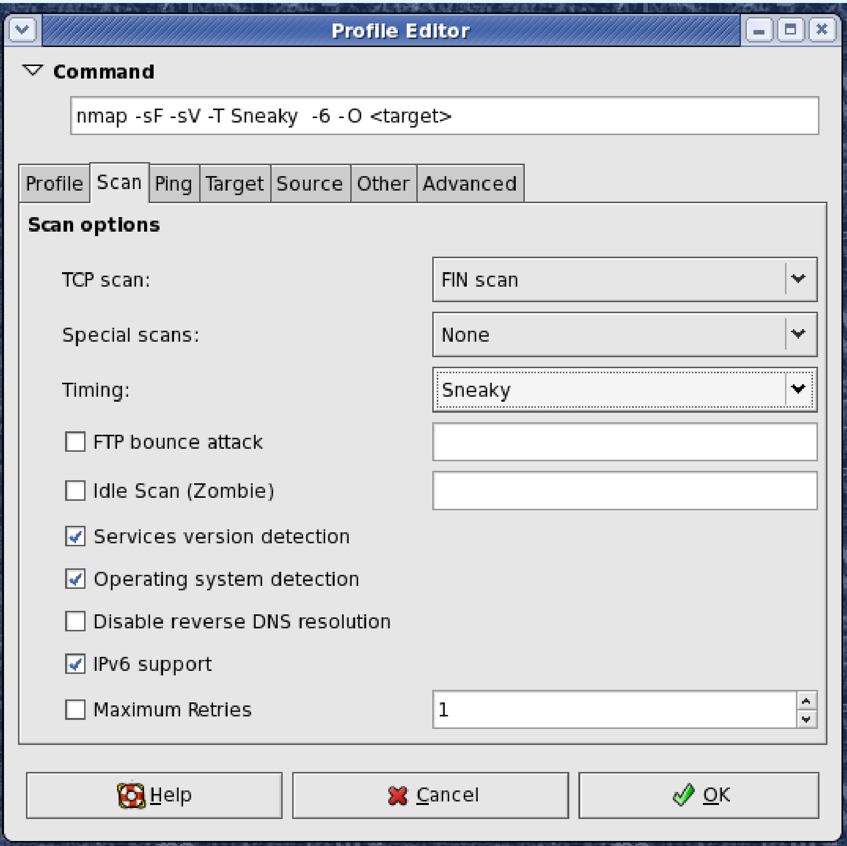
Hostnames

Name - Type: scanme.nmap.org - PTR

Operating System

Name: Linux 2.6.20-1 (Fedora Core 5)
Accuracy: 100%

Ports used



Command

nmap -sF -sV -T Sneaky -6 -O <target>

Scan options

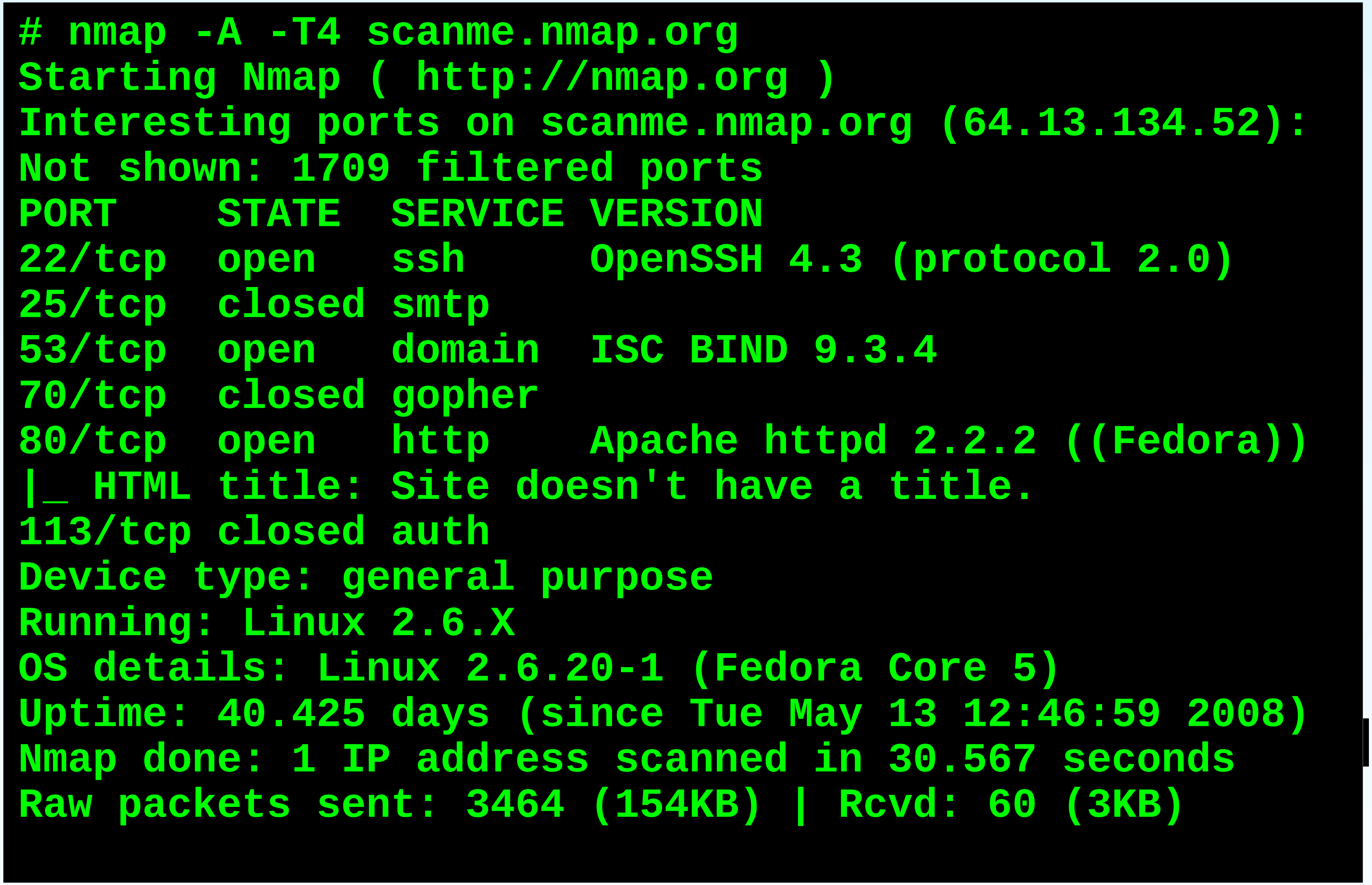
TCP scan: FIN scan
Special scans: None
Timing: Sneaky
☐ FTP bounce attack
☐ Idle Scan (Zombie)
☑ Services version detection
☑ Operating system detection
☐ Disable reverse DNS resolution
☑ IPv6 support
☐ Maximum Retries 1

2nd Generation OS Detection

```
# nmap -A -T4 scanme.nmap.org
[...]
Device type: general purpose
Running: Linux 2.6.X
OS details: Linux 2.6.20-1 (Fedora Core 5)
```

More info: http://nmap.org/book/osdetect.html

Version Detection



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Uptime: 40.425 days (since Tue May 13 12:46:59 2008)
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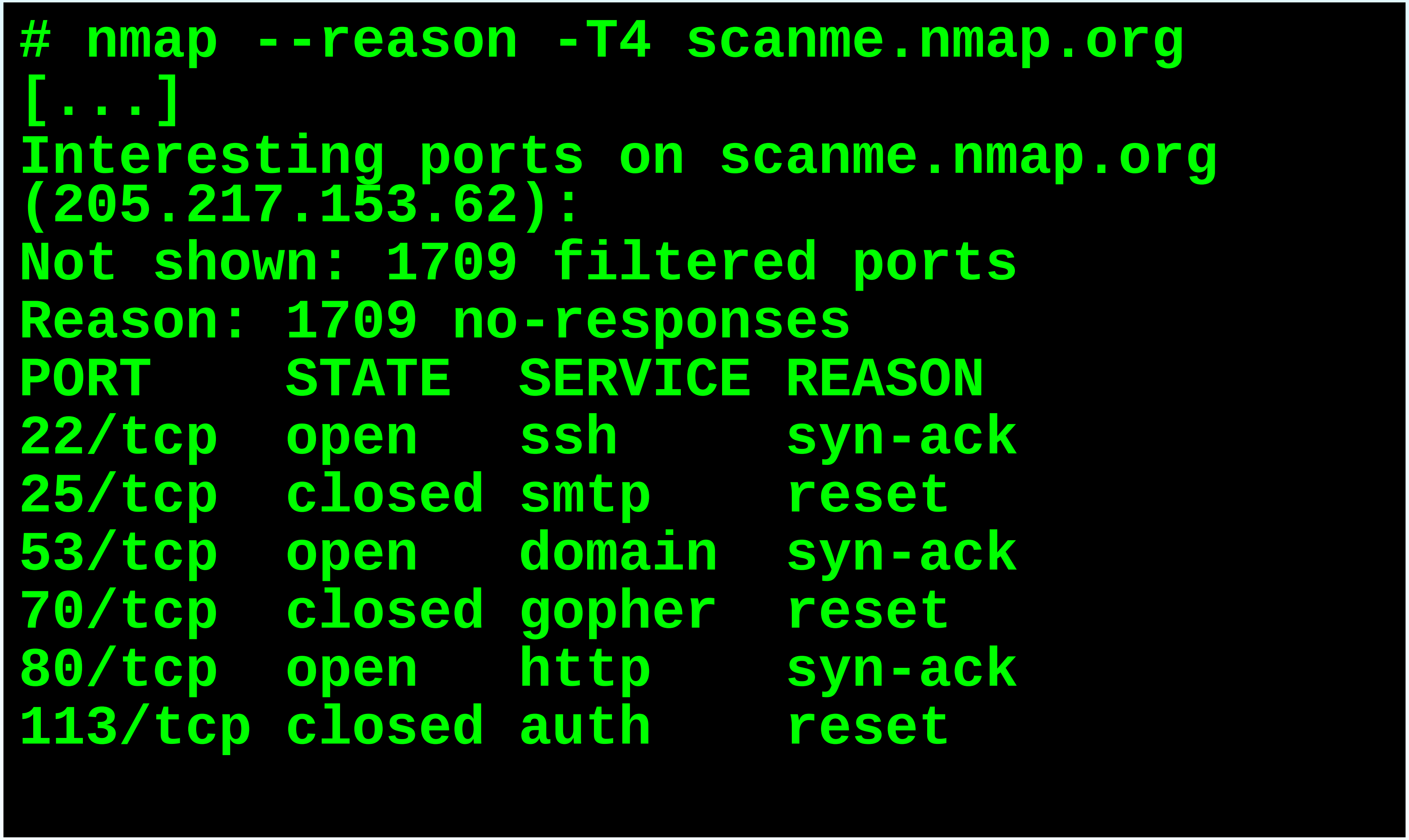
```

--reason



```
# nmap --reason -T4 scanme.nmap.org
[...]
Interesting ports on scanme.nmap.org
(205.217.153.62):
Not shown: 1709 filtered ports
Reason: 1709 no-responses
PORT    STATE  SERVICE REASON
22/tcp  open   ssh     syn-ack
25/tcp  closed smtp    reset
53/tcp  open   domain  syn-ack
70/tcp  closed gopher  reset
80/tcp  open   http    syn-ack
113/tcp closed auth    reset
```

Advanced Traceroute

```
# nmap –traceroute scanme.nmap.org
[...]
TRACEROUTE (using port 22/tcp)
HOP RTT   ADDRESS
1   0.60  wap.nmap-int.org (192.168.0.6)
[...]
6   9.74  151.164.251.42
7   10.89 so-1-0-0.mpr1.sjc2.us.above.net
(64.125.30.174)
8   10.52 so-4-2-0.mpr3.pao1.us.above.net
(64.125.28.142)
9   14.25 metro0.sv.svcolo.com
(208.185.168.173)
10  12.80 scanme.nmap.org (64.13.134.52)
```

Performance and Accuracy

```
# 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
[...]
Nmap run completed -- 4096 IP
addresses (4096 hosts up) scanned
in 46.052 seconds
```

TCP and IP Header Options

```
# nmap  -vv -n -sS -P0 -p 445 --
ip-options "L 10.4.2.1" 10.5.2.1
```

Learn More

- Download Nmap from http://nmap.org
- Download these slides from: http://insecure.org/presentations/BHDC08/