# Feb 6/7 2007 DNS Attack Recap*

*public archival version

DNS-Operations Meeting
July 27, 2007

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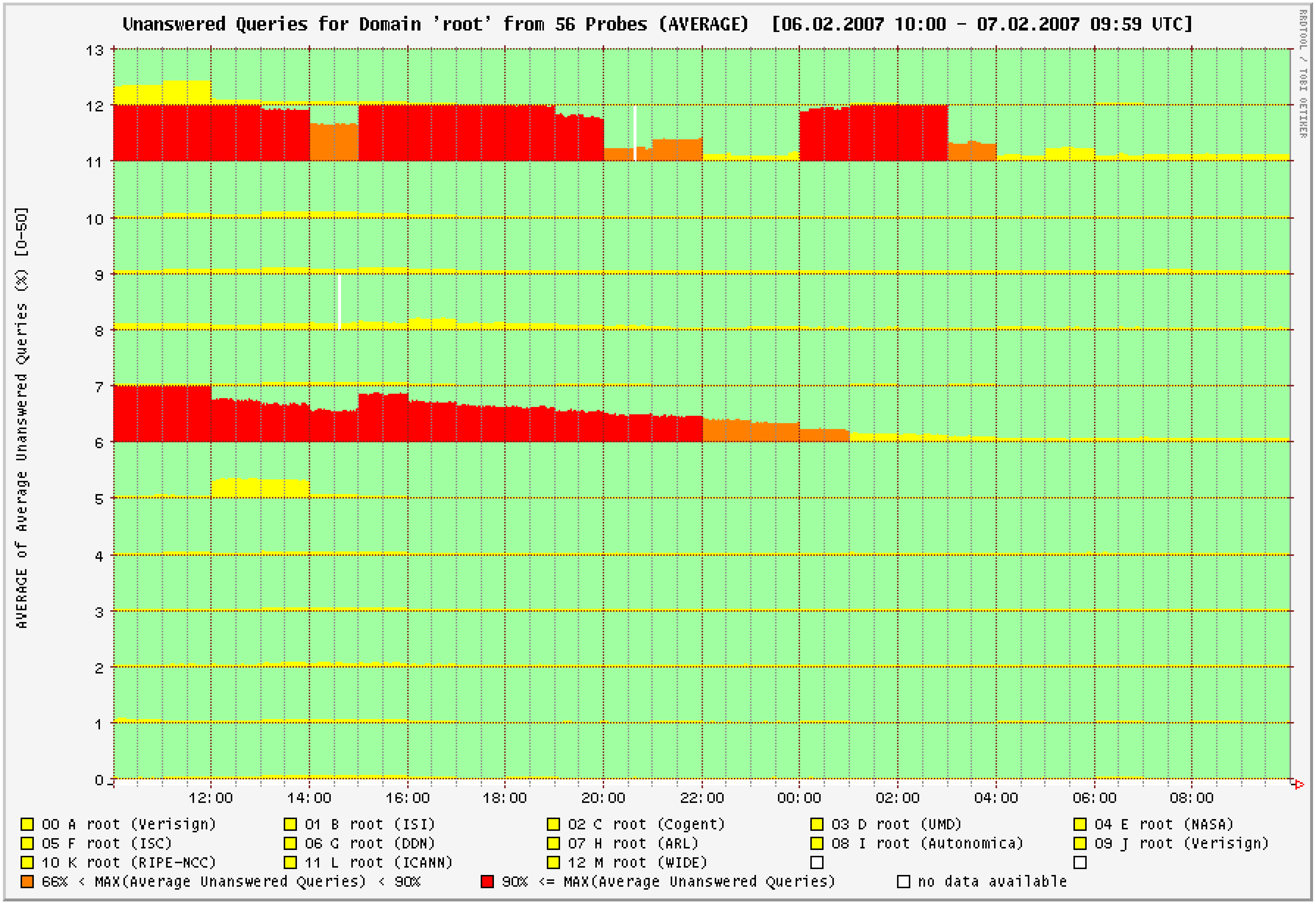
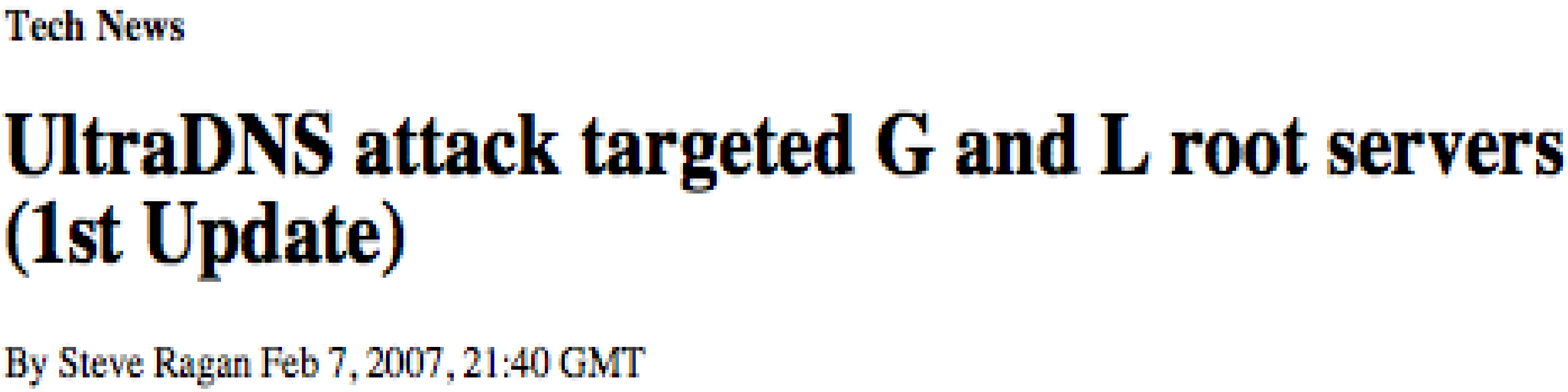
# While many of us were here...


Unanswered Queries for Domain 'root' from 56 Probes (AVERAGE)   [06.02.2007 10:00 - 07.02.2007 09:59 UTC]
AVERAGE of Average Unanswered Queries (%) [0-50]
0
1
2
3
4
5
6
7
8
9
10
11
12
13
12:00
14:00
16:00
18:00
20:00
22:00
00:00
02:00
04:00
06:00
08:00
00 A root (Verisign)
01 B root (ISI)
02 C root (Cogent)
03 D root (UMD)
04 E root (NASA)
05 F root (ISC)
06 G root (DDN)
07 H root (ARL)
08 I root (Autonomica)
09 J root (Verisign)
10 K root (RIPE-NCC)
11 L root (ICANN)
12 M root (WIDE)
66% < MAX(Average Unanswered Queries) < 90%
90% <= MAX(Average Unanswered Queries)
no data available
RRDTOOL / TOBI OETIKER

# Events interpreted as...

- “According to information from experts, all 13 root servers were attacked [...]”
- “Three of the world's 13 root servers [...] were victims of [...]”
- “The attackers targeted five of the Internet's DNS root name servers [...]”
- “They did this by flooding two of the top level DNS servers with requests.”
- “At least six root servers were attacked [...]”

# And my personal favorite



Tech News

## UltraDNS attack targeted G and L root servers (1st Update)

By Steve Ragan Feb 7, 2007, 21:40 GMT

# But they were all wrong

- Four root servers (F, G, L and M)
- Three .info servers
- And a set no one's probably heard of
  - Fast flux DNS spammy something-or-other

# Early, imperfect advice

```
From: John Kristoff <jtk@ultradns.net>
Date: Tue, 6 Feb 2007 12:05:50 +0000 (GMT)

[...]

Protocol UDP, destination port 53.  High
rate senders are sending bogus DNS
payloads.  If you can, one thing that can
help is to filter packets of size > 300
bytes.  Since these should all be queries,
you should not being seeing large packets
destined to those addresses.

[...]
```

# Gotta love the media

# InformationWeek

## Secrets of the DoS Root Server Attack Revealed
## February 7, 2007

- “Security experts say possibly millions of zombie computers were used [...]”
  - Uhm, not quite.

# Web Host Industry Review

## RIPE Protects Against DDoS Attack
## February 8, 2007

- “[...] it was able to prevent overnight attempts to disrupt global computer traffic thanks to its managed K-root server.”
  - Hehe, K-Root wasn't even attacked

# Network World

## Defending Against Global Information War
## February 7, 2007

- “More than likely the Chinese government, engaged in a form of Class III Information Warfare [...]”
  - Pffffttt... *plonk*

# Korea Times

## Korea Becomes Haven for Hackers
## February 19, 2007

- “We learned a host server in Coburg, Germany ordered a flurry of Korean computers to stage DOS assaults on the root servers,” said Lee Doo-won, a director at the ministry.
  - Germany: Sprechen sie WTF?!?!

# Accurate story hard to find

- Even the ICANN “fact sheet” was imprecise on:
  - Who exactly got hit
  - The attack duration and start/stop times
  - The packet-level details
- http://www.icann.org/announcements/announcement-08mar07.htm

# Here is what we now know

# The Botnet

- About 4500-5000 bots on Microsoft Windows boxes
- About 65% from South Korea
- About 19% from the United States
- About 3.5% from Canada
- About 2.5% from China
- The rest from various places
- Note: these are bot  numbers, bps distribution differs

# The Controller

- HTTP-based, located in the USA
- Bots located it via DNS (there was a backup name)
- Was still doing DDoS attacks up until late May

# The Attack Profile

- Bot performed one DNS query per victim
- Set up three “threads” per victim
- Unique, but stable source port per thread
- Each thread had it's own 1023-byte payload “seed”
- UDP packets blasted to each victim on port 53
- Source addresses not spoofed
- Each UDP packet of random 0-1023 seed payload
- Each thread set to last for 24 hours

# Filtering and mitigation

- Packet filter by source, but a bit unwieldy
- Packet size filter > 300-512 bytes helped some
- Better regex possible if gear can handle it
- TCP switch-over gear

# Motivation

- I really don't know, I can only speculate
- Probably a test of strength or a demonstration?
- Other targets this botnet later hit may provide clues
  - Almost all `.ru` hosts

# And finally...

- People pay more attention when it's the root servers
- Anycast helps a great deal
- The so-called experts rarely are, they're not involved
- Kudos to F-Root for making data available to OARC