Pollution in 1.0.0.0/8

Or why having 1.2.3.4 might not be that cool after all....

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RIPE NCC

Background

- Many networks filter unallocated address space (bogons)
  - Some time passes
- Unallocated addresses become allocated
  - Filters are not always well maintained
  - Freshly allocated space is not fully reachable
- ISPs and users complain
  - RIRs get some of the blame

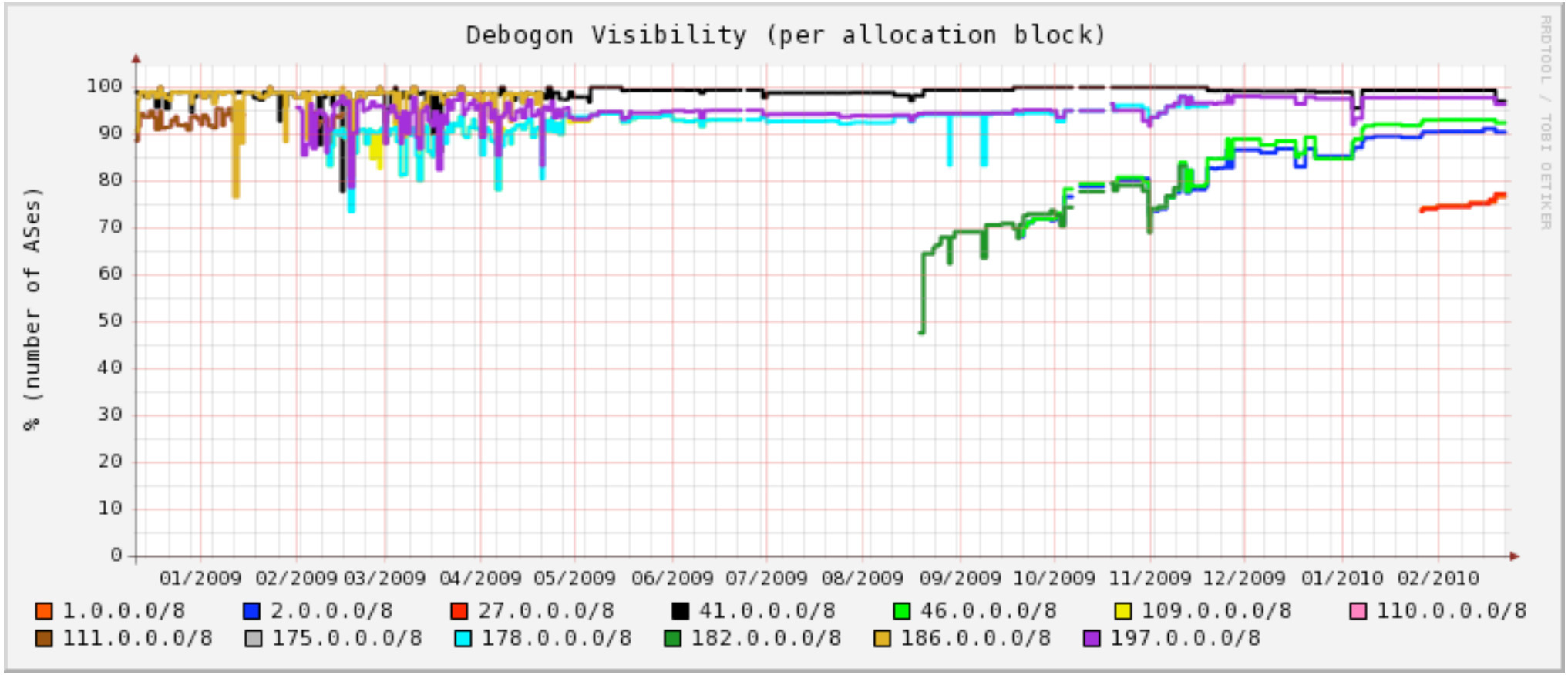
Debogon Project

- Mitigate issues surrounding new address space
  - Increase communications
  - Provide tools to measure and monitor reachability

- Using existing RIS infrastructure since 2005
  - Announce a few prefixes from new /8s
  - Provide target IPs for ping/traceroute
  - Measure reachability and produce graphs

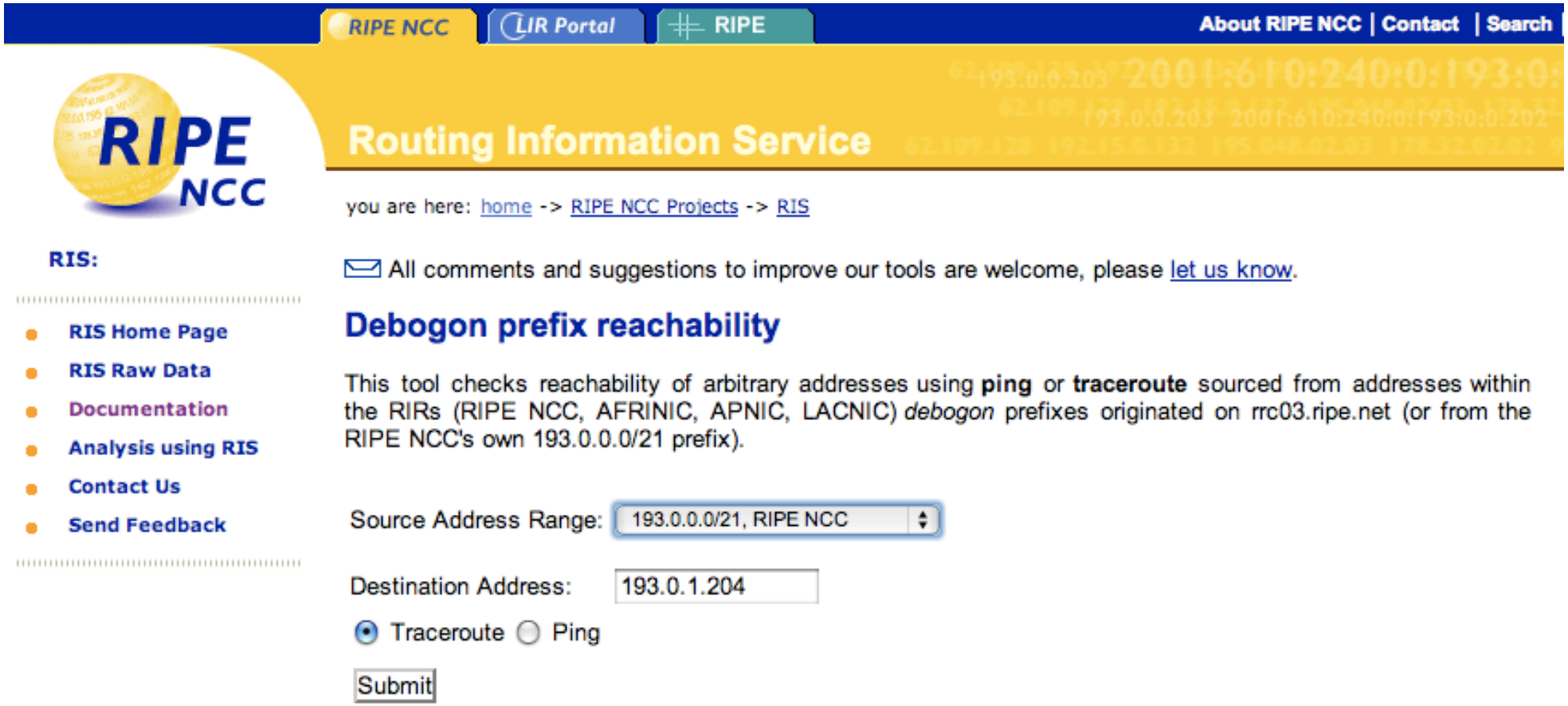
http://www.ris.ripe.net/debogon/

Debogon Reports



- Combined yearly report for all /8s

Debogon Tools



http://www.ris.ripe.net/cgi-bin/debogon.cgi

The 1.0.0.0/8 story

- “Reserved” since 1981
- Changed to “unallocated” by IANA in 2008
- Allocated to APNIC in January 2010 ‘randomly’

  - Added to the debogon report as usual
    - 1.255.0.0/16
    - 1.50.0.0/22

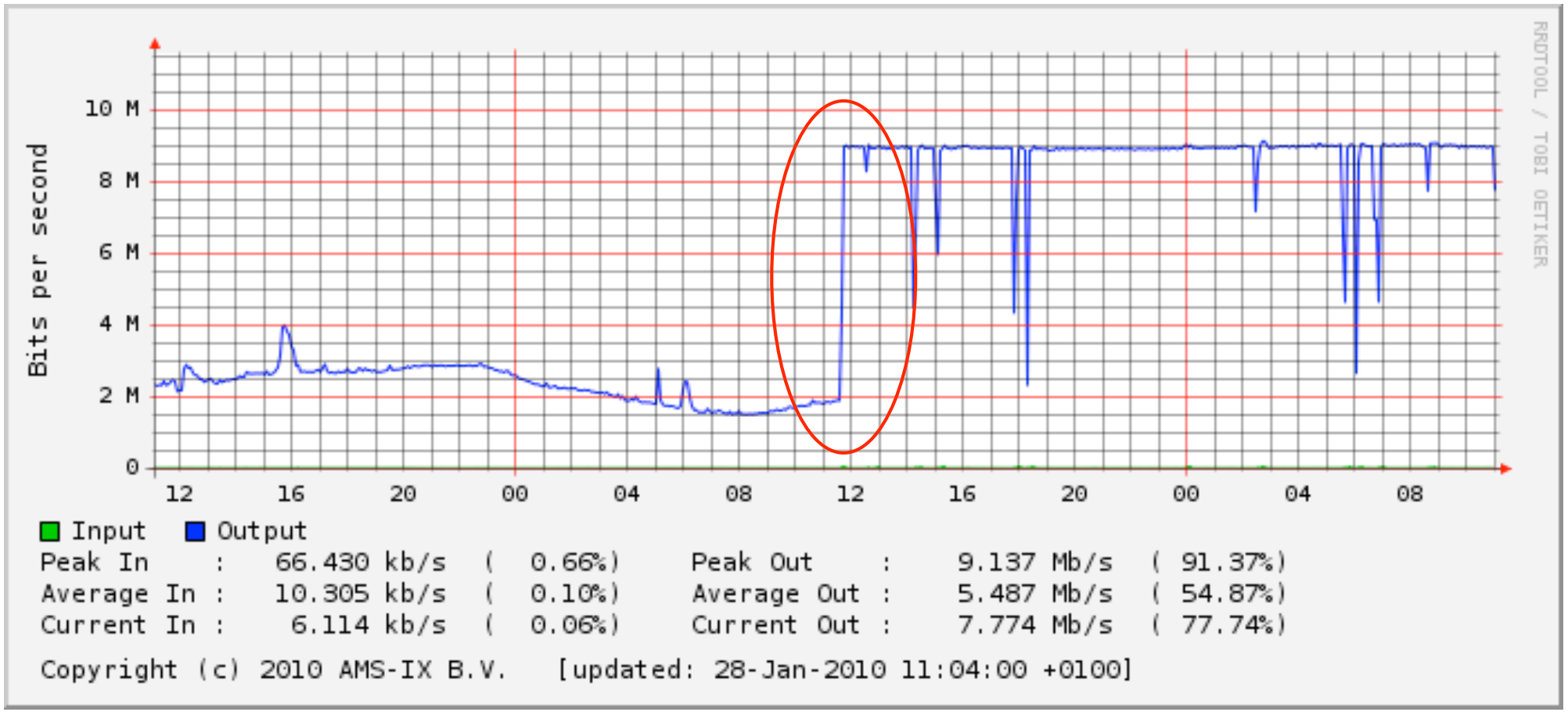
  - As a special experiment, we also announced:
    - 1.1.1.0/24
    - 1.2.3.0/24

Measurement Setup

- RIS Remote Route Collector (rrc03.ripe.net)
  - Connected to 3 Dutch IXPs
    - AMS-IX
    - NL-IX
    - GN-IX
  - AMS-IX port is ~~10~~ 100 MBit/s
  - Outbound traffic via RIPE NCC network
  - About 100 active peers

27th January 2010

- Announcements began just before midday
  - Instantly maxed out our AMS-IX port



RIS View

This prefix had multiple originating ASes:

Origin AS	AS Name	First Seen	Last Seen
AS12654	RIPE-NCC-RIS-AS RIPE NCC RIS project	2010-01-27 10:38:23 UTC	2010-02-02 05:36:29 UTC
AS8218	NEO-ASN AS Confederation of Neotelecoms, euNetworks AG and Upstreamnet gmbh	2009-05-18 16:40:27 UTC	2010-01-15 12:56:13 UTC
AS45899	VNPT-AS-VN VNPT Corp	2009-12-25 14:24:44 UTC	2009-12-25 15:37:43 UTC

This prefix comes from the **1.0.0.0/8** block allocated to **APNIC** by the IANA.

Related (overlapping) prefixes seen by RIS in the last 30 days

Prefix	Origin AS	AS name	First seen	Last seen
1.0.0.0/8	21345	MESSAGELABS-EU MessageLabs | Symantec Hosted Services	2010-01-11 21:01:06 UTC	2010-01-12 20:06:35 UTC
1.0.0.0/8	1733	CENTAF-SWA - 754th Electronic Systems Group	2010-02-01 10:20:44 UTC	2010-02-01 11:46:57 UTC
1.0.0.0/8	65333	-Private Use AS-	2010-01-11 21:01:06 UTC	2010-01-11 21:01:49 UTC
1.1.1.0/24	12654	RIPE-NCC-RIS-AS RIPE NCC RIS project	2010-01-27 10:38:23 UTC	2010-02-02 05:36:29 UTC
1.1.1.0/30	38091	HELLONET-AS-KR CJ-CABLENET	2010-01-07 07:49:40 UTC	2010-01-07 08:08:41 UTC

Note: Prefixes marked orange are currently not announced. The entries refer to announcements in the past.

RIS View

- 14 distinct ASes
- 26 prefixes
  - /30 to /13

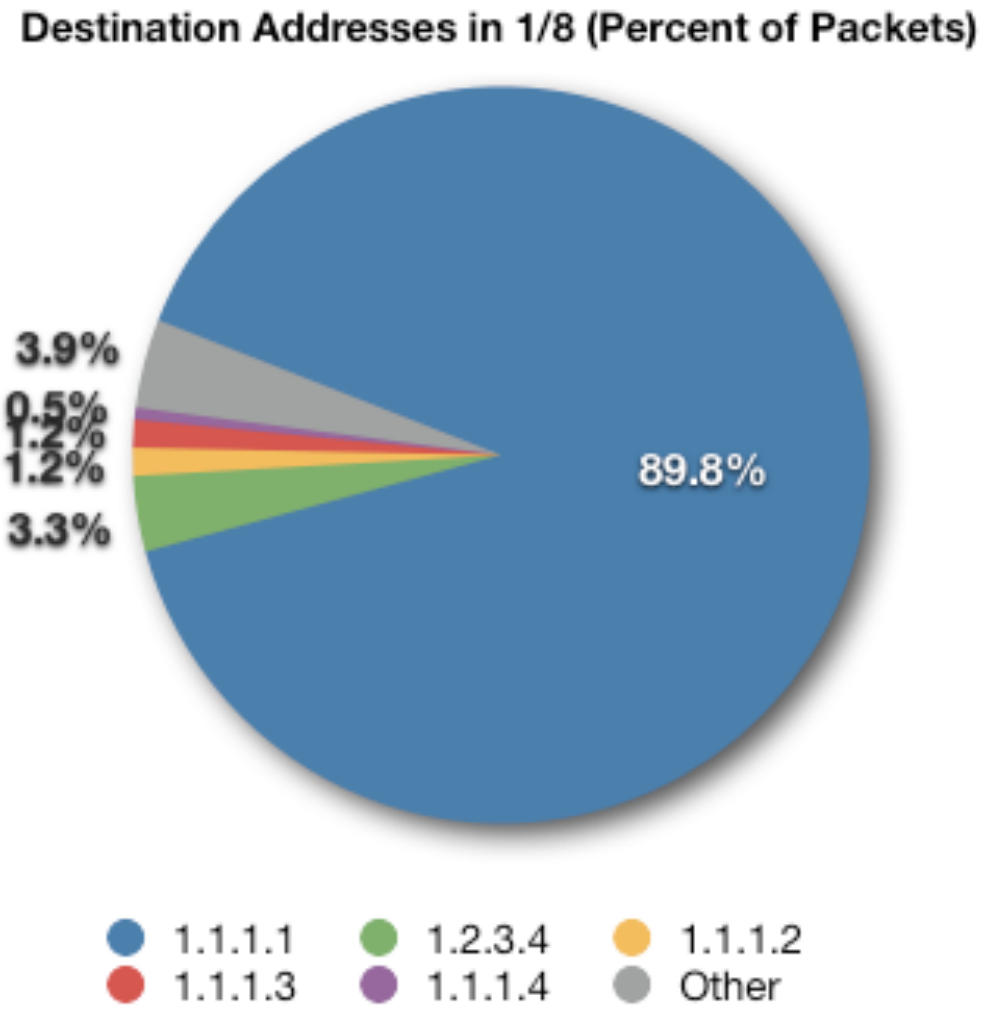
Prefix	Origin AS	First seen	Last seen
1.1.1.0/30	262710	2010-02-12 17:28:04 UTC	2010-02-12 17:46:30 UTC
1.1.1.0/24	8218	2009-05-18 16:40:27 UTC	2010-01-15 12:56:13 UTC
1.2.3.0/24	12637	2010-02-06 23:45:04 UTC	2010-02-07 02:47:35 UTC
1.1.1.0/24	12637	2010-02-06 23:45:04 UTC	2010-02-07 02:47:35 UTC
1.1.0.0/24	3549	2010-01-08 23:56:18 UTC	2010-01-12 12:16:16 UTC
1.120.0.0/13	23148	2009-12-21 21:39:58 UTC	2010-01-04 16:32:48 UTC
1.2.3.0/24	36561	2010-03-02 00:53:16 UTC	2010-03-02 07:59:00 UTC
1.1.1.0/24	36561	2010-03-02 00:50:26 UTC	2010-03-02 07:59:00 UTC
1.10.25.0/24	28006	2010-02-27 15:53:12 UTC	2010-02-27 18:07:04 UTC
1.1.88.0/24	39386	2009-12-15 09:53:02 UTC	2009-12-15 09:54:50 UTC
1.1.1.0/24	45899	2009-12-25 14:24:44 UTC	2009-12-25 15:37:43 UTC
1.1.1.0/30	3313	2009-12-30 09:04:24 UTC	2009-12-30 09:04:36 UTC
1.80.0.0/13	23148	2009-12-21 21:39:58 UTC	2010-01-04 16:32:48 UTC
1.1.1.0/24	3549	2010-02-24 11:55:42 UTC	2010-02-24 12:09:46 UTC
1.50.0.0/22	0	2010-02-16 15:59:56 UTC	2010-02-18 07:59:00 UTC
1.1.88.0/24	4645	2009-12-01 11:00:09 UTC	2009-12-20 23:59:00 UTC
1.1.2.0/30	3313	2009-12-30 09:05:06 UTC	2009-12-30 09:05:15 UTC
1.255.0.0/16	12654	2010-01-27 10:38:23 UTC	2010-03-02 07:59:00 UTC
1.2.3.0/24	12654	2010-01-27 10:38:23 UTC	2010-02-24 07:59:00 UTC
1.2.3.0/24	7575	2010-03-01 06:36:19 UTC	2010-03-01 11:23:28 UTC
1.1.1.0/30	38091	2010-01-07 07:49:40 UTC	2010-01-07 08:08:41 UTC
1.40.0.0/13	23148	2009-12-21 21:39:58 UTC	2010-01-04 16:32:48 UTC
1.1.1.0/24	7575	2010-03-01 06:36:19 UTC	2010-03-01 11:23:28 UTC
1.255.0.0/16	0	2010-02-16 15:59:56 UTC	2010-02-18 07:59:00 UTC
1.50.0.0/22	12654	2010-01-27 10:38:23 UTC	2010-03-02 07:59:00 UTC
1.1.1.0/24	12654	2010-01-27 10:38:23 UTC	2010-02-24 07:59:00 UTC

Some analysis

- 900k packet sample taken on 28th January

- Looked at:
  - Sources
  - Destinations
  - Protocols

Packet destinations

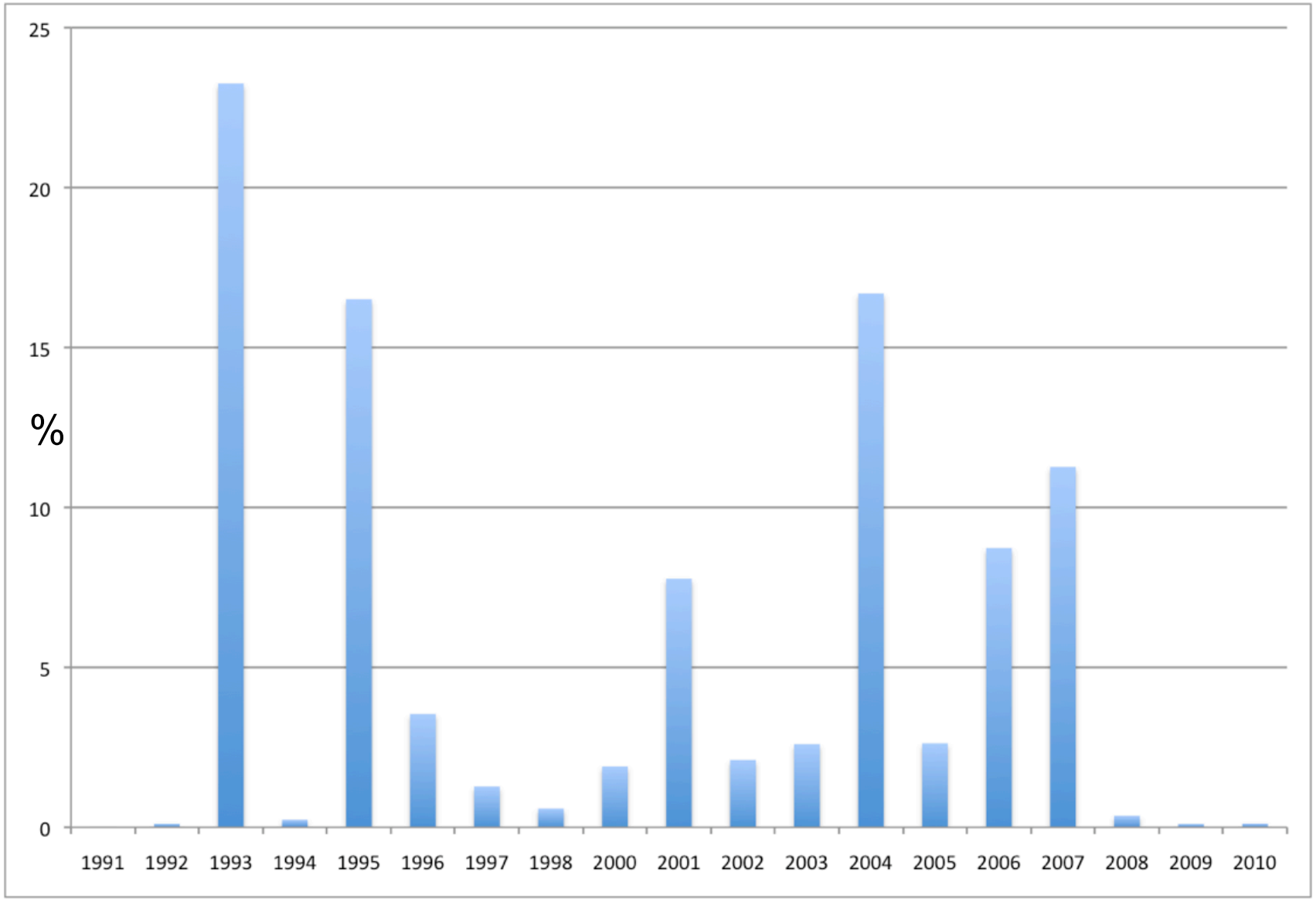


- Two busiest destinations:
  - 90% of packets to 1.1.1.1
  - 3.3% of packets to 1.2.3.4

Packet Sources

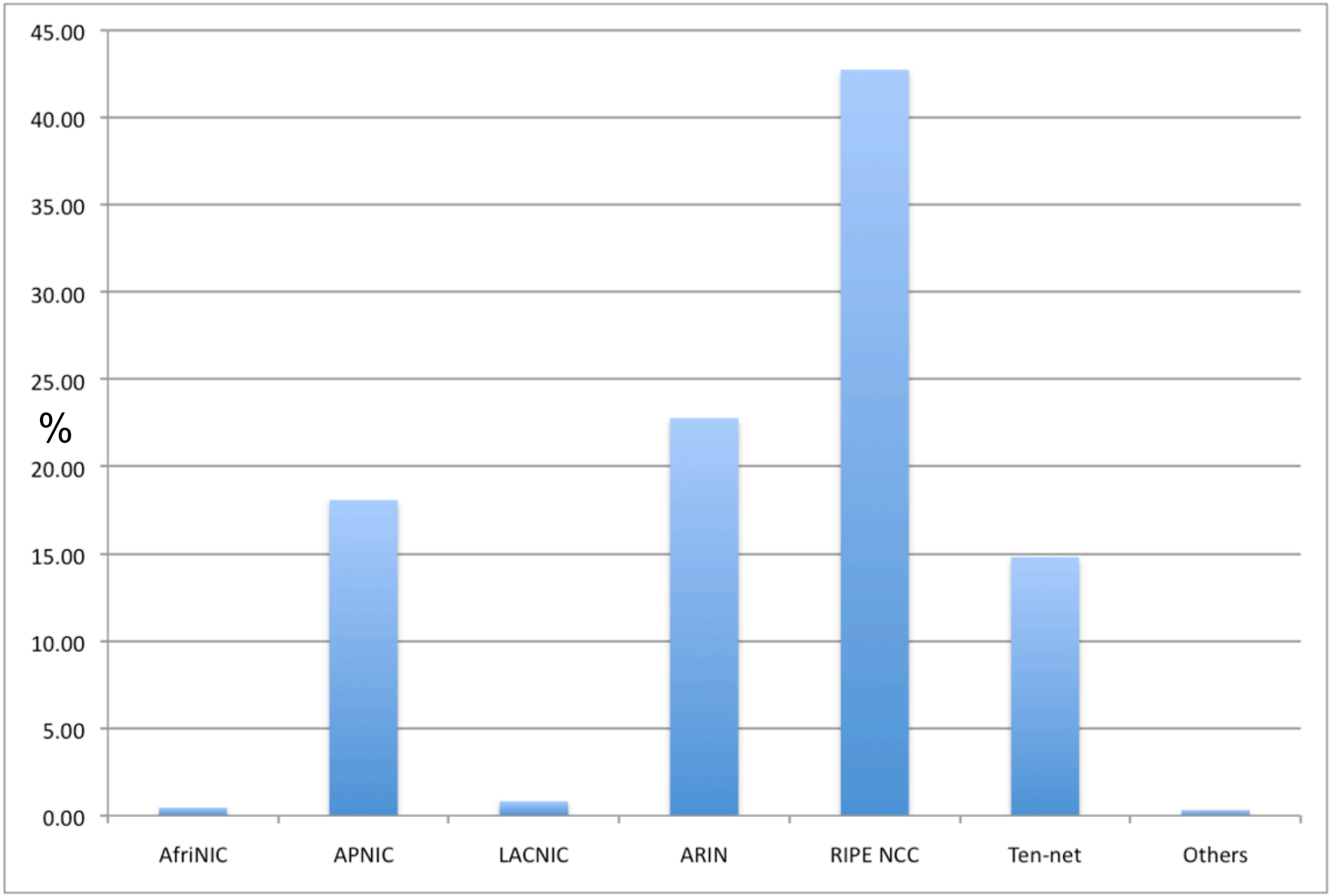
- 96,160 unique IP addresses
  - 95% sent ≤ 10 packets
  - 33% sent 1 packet
- 30% of packets from 23 IP addresses
  - 4.4% from 1 IP address
- 90% from 43 /8s
  - 15% claims to originate from 10/8

Packet Sources



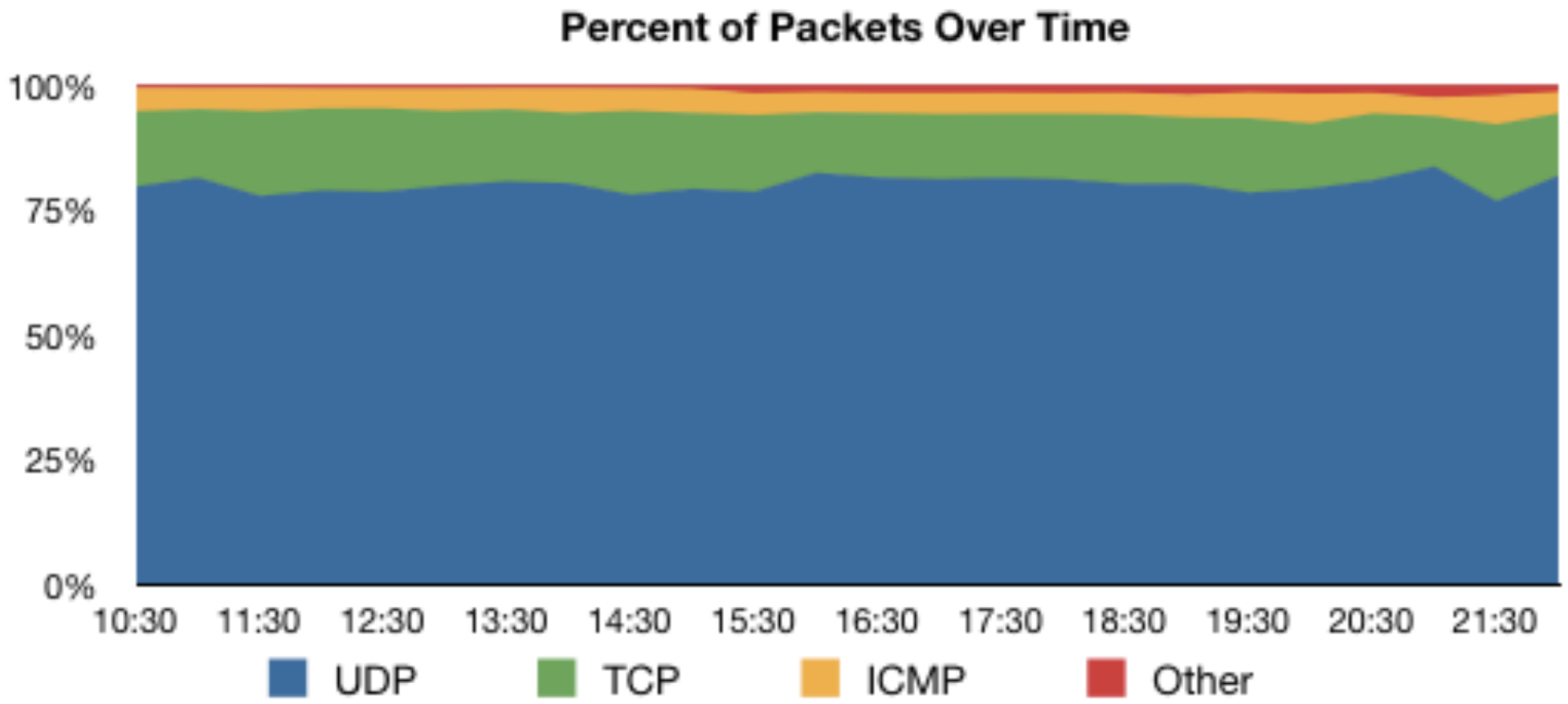
Year in which parent /8 was allocated

Packet Sources



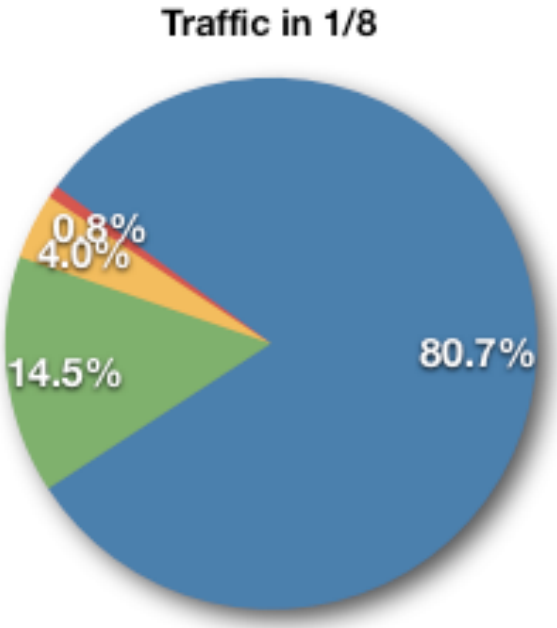
Responsible RIR for parent /8

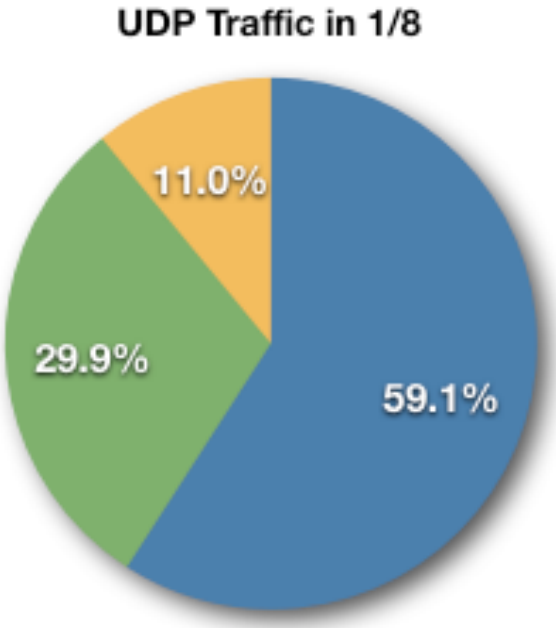
What was the traffic?

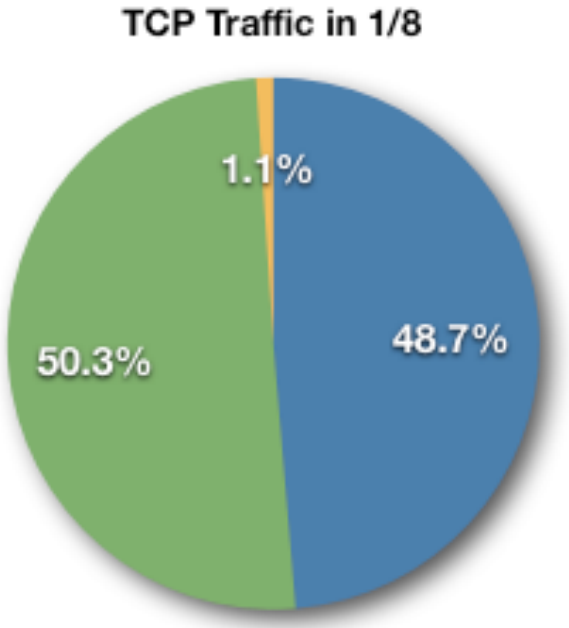


What was the traffic?

- 80% UDP traffic
  - 60% SIP INVITE (VoIP) scans *
  - 30% Media Gateway Protocol
- 20 %TCP traffic
  - 50% HTTP
  - 5.4% SMTP







* Thanks to Sandro Gauci and others for pointing this out!

Feedback

- Give it to me!
- Don’t give it to me!
- Don’t give it to anyone!
- How representative is this?
  - Is it just ‘normal’ background noise?
  - Isolated data point?

Further Research

- Comparison with other prefixes
- Announce for longer
  - From a “real” network with high capacity
- Collect more data
  - Don’t just analyse small samples

References

- RIPE Labs
  - http://labs.ripe.net/content/pollution-18
  - http://labs.ripe.net/node/195
- Debogon Report
  - http://www.ris.ripe.net/debogon
- APOPS list
  - http://archive.apnic.net/mailing-lists/apops/archive/2010/02/
- Reddit.com
  - http://www.reddit.com/r/programming/comments/axltd/pollution_in_10008/

Questions?