Internet Measurement Conference

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Outline

Preamble

Paper: Home Gateway Characteristics

Conference Papers

Summary

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- 10th Internet Measurement Conference (IMC)
    - Melbourne, Australia
- 211 submissions
- 47 accepted; 22.3% accept rate:
    - 24 long papers (12 pages)
    - 23 short papers (6 pages + references)
- 11 accepted prior to TPC

# Outline

An Experimental Study of Home Gateway Characteristics

- Seppo Hätönen, University of Helsinki
- Aki Nyrhinen, University of Helsinki
- Lars Eggert, Nokia Research Center
- Stephen Strowes, University of Glasgow
- Pasi Sarolahti, HIIT
- Markku Kojo, University of Helsinki

# An Experimental Study of Home Gateway Characteristics

- ▶ Common home gateway function is network address translation (NAT)
- ▶ Best current practices: RFC 4787, RFC 5382
- ▶ Lots of anecdotal evidence suggests behaviour is varied
- ▶ This affects protocol design, application design, user experience

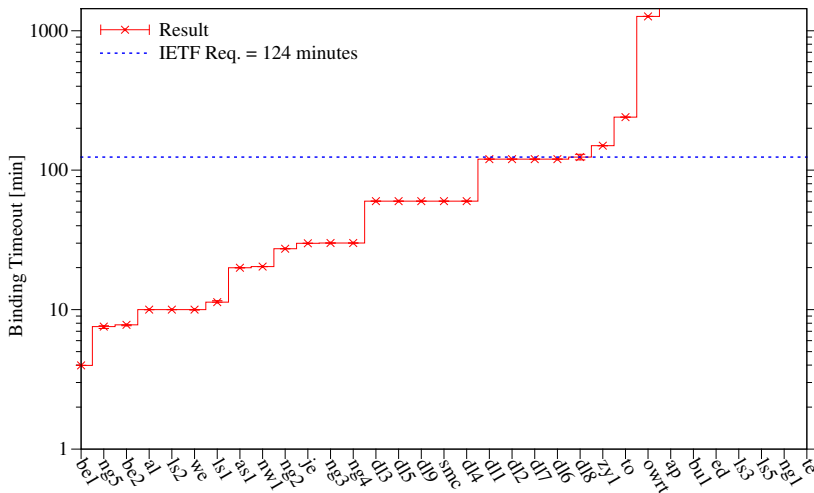# An Experimental Study of Home Gateway Characteristics

- ▶ 34 NATs
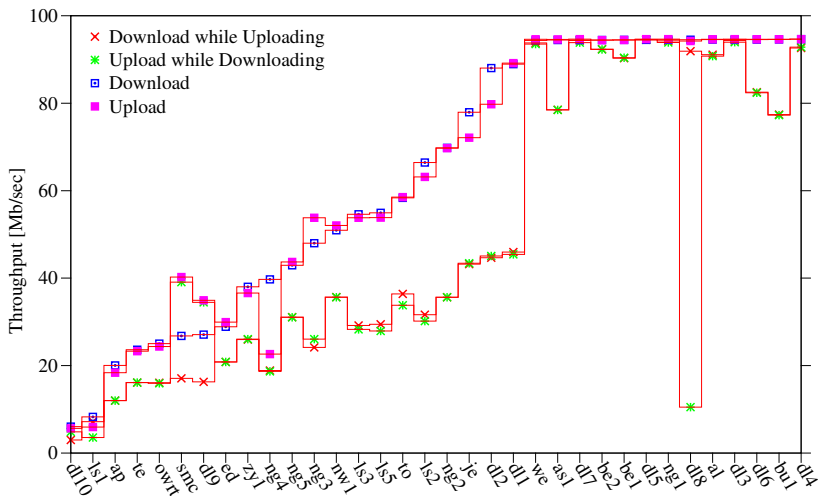- ▶ Two servers
- ▶ Run some tests...
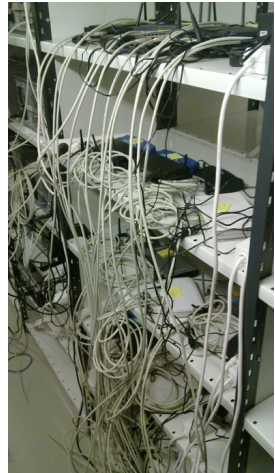
Results: UDP Binding Timeouts
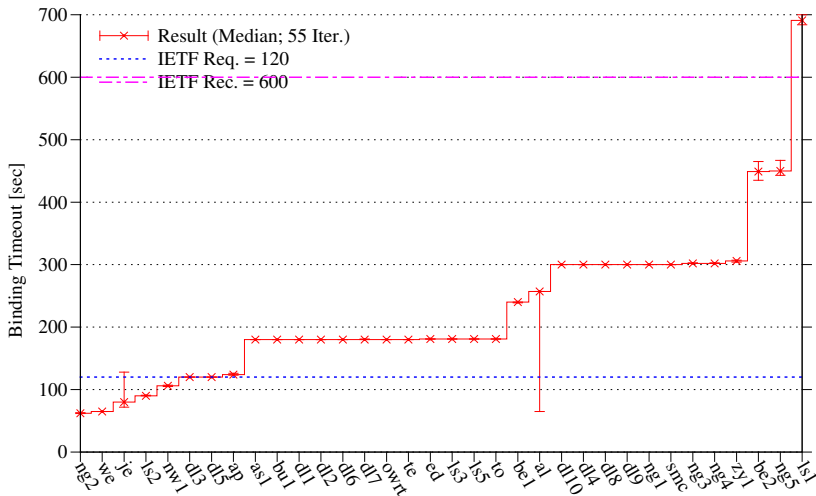
Results: TCP Binding Timeouts

Results: TCP Throughputs

Results

- There is high variability in performance
- Some behaviour seems at odds with a working Internet connection at all...
- Many timeouts are remarkably short
- Throughput tests: 2/3 of devices cannot sustain 100Mbps
- ICMP handling: Many devices only support some message types; all but one translate at least "port unreachable" and "TTL exceeded"
- DCCP: Fails in all cases
- SCTP: Passes on 18 of 34 NATs

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Eyeball ASes: From Geography to Connectivity

- ► Amir H. Rasti, University of Oregon
- ► Nazanin Magharei, University of Oregon
- ► Reza Rejaie, University of Orego
- ► Walter Willinger, AT&T Labs

Eyeball ASes: From Geography to Connectivity

- Aim: To determine geographical footprint of AS based on locations of its users
- Determine geo-footprint of ASes using the geo-location of its end users
  - Collect IP addresses from users
  - Map IP addresses to geolocation
  - Group end users by AS
- 48 million users in 1,233 ASes
- Kernel density estimation to estimate probability density of customer population
- Detects ISP points of presence
- Evaluated against "ground truth" of some known PoPs

Towards an AS-to-Organisation Map

- Xue Cai, USC/ISI
- John Heidemann, USC/ISI
- Balachander Krishnamurthy, AT&T Labs
- Walter Willinger, AT&T Labs

Internet Background Radiation Revisited

- Eric Wustrow, Merit Network Inc.
- Manish Karir, Merit Network Inc.
- Michael Bailey, University of Michigan
- Farnam Jahanian, University of Michigan
- Geoff Huston, Asia Pacific Network (APNIC)

Internet Background Radiation Revisited

- Characterise background noise on four unused /8's
  - Malicious traffic, misconfiguration
- Using:
  - 1/8, 50/8, 107/8 over the period of 1 week
  - 35/8 over the period of 5 years
- Advertise, and passively monitor
- Each prefix attracts tens of billions of packets during the weeks monitored

Internet Background Radiation Revisited

- ▶ Results include:
  - ▶ 1.*.168.0/24 attracts some traffic
    - ▶ Last octet is often 192. That is, 192.168.x.1 in host-byte order for little-endian hosts.
    - ▶ Likewise, 1.*.0.10
  - ▶ 50.153.199.194 is another hotspot
    - ▶ Misinterpretation of config: "062", octal, == 50, decimal
    - ▶ Offending network has offered to firewall this address
  - ▶ Within 1/8, 1.1.1.0/24 attracts 44% of packets, 58.7% of bytes
    - ▶ Majority is to 1.1.1.1:15206
    - ▶ Payload type 0x8000
    - ▶ Malicious SIP INVITE attack; server responds with RTP stream

Internet Background Radiation Revisited

"*The number you have dialled is not in service. Please check the number and try again.*"

Internet Background Radiation Revisited

- There is scope for testing any blocks prior to allocation
- Cleanup space if possible
- Identify addresses which *should not be allocated* to ISPs

Netalyzer: Illuminating the Edge Network

- ▶ Christian Kreibich, ICSI
- ▶ Nicholas Weaver, ICSI
- ▶ Boris Nechaev, HIIT & Aalto Univerisity
- ▶ Vern Paxson, ICSI & UC Berkeley

> *"Like a breathalyser. Is your ISP sober enough to drive your traffic?"*

Netalyzer: Illuminating the Edge Network

- http://netalyzr.icsi.berkeley.edu/

Netalyzer: Illuminating the Edge Network

Netalyzer: Illuminating the Edge Network

- Accumulated 130,000 traces over the last few years
- 12% of whom use OpenDNS ("geek bias" in data)

Netalyzer: Illuminating the Edge Network

- ▶ They have a lot of data on blocked ports, upstream and downstream throughput, in-network buffering, DNS behaviour (e.g., wildcarding)
- ▶ Interesting oddities, like: 42% of HTTP proxies do not cache data if they could; 35% of caches will store stronly uncacheable content
- ▶ Overbuffering, probably in home gateways; buffers often 128KB or 256KB
- ▶ ... And lots more in the paper
- ▶ Unfortunately they haven't released code, far as I can tell

Outline

Summary

- There was lots of interesting work here. Examples:
    - A couple of papers on packet capture on commodity hardware ("up to a gigabit stream")
    - Network tomography
    - Identifying router aliases using IP timestamping
    - Event detection from mining logs from many routers

Summary

- The quality of the work here was pretty good.
- Culture of data sharing: only papers with associated public data are eligible for "best paper"
- This seems a worthwhile venue!
- IMC is in Berlin next year
    - November 2-4
    - http://conferences.sigcomm.org/imc/2011/
    - Submission deadline ~May 2011, based on 2010's schedule

Questions?