

How Dynamic is the ISPs Address Space?

Towards Internet-Wide DHCP Churn Estimation

Giovane C. M. Moura★, Carlos Gañán, Qasim Lone, Payam Poursaied, Hadi Asghari, and Michel van Eeten

G.C.MoreiraMoura@tudelft.nl

Delft University of Technology

★SIDN Labs

IRTF & ISOC Workshop on
Research and Applications of Internet Measurements (RAIM)
Saturday, October 31, 2015
Yokohama, Japan

Paper in a nutshell

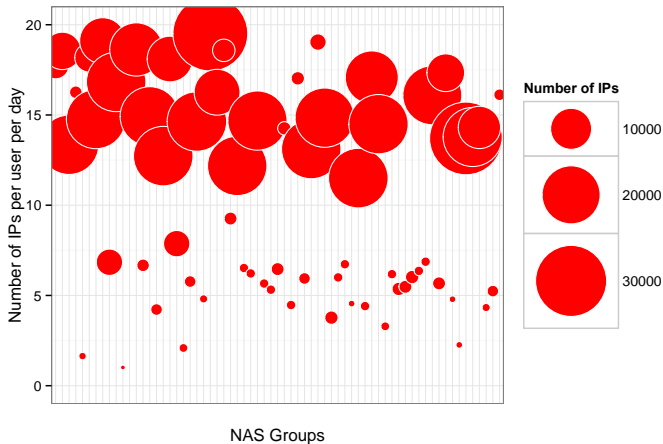
- ▶ **Problem:** bot counts based on IPs counts are flawed
 - ▶ Why? DHCP churn
 - ▶ Torpig paper showed that DE bots 4x more IPs than US
- ▶ **Fix:** need to compensate for DHCP churn
- ▶ **OK, so how to measure churn?**
 - ▶ It's been done (passively), small scale (not ISP wide)
 - ▶ Need to scale-up ; ISP-independent

Internet-wide DHCP churn measurement

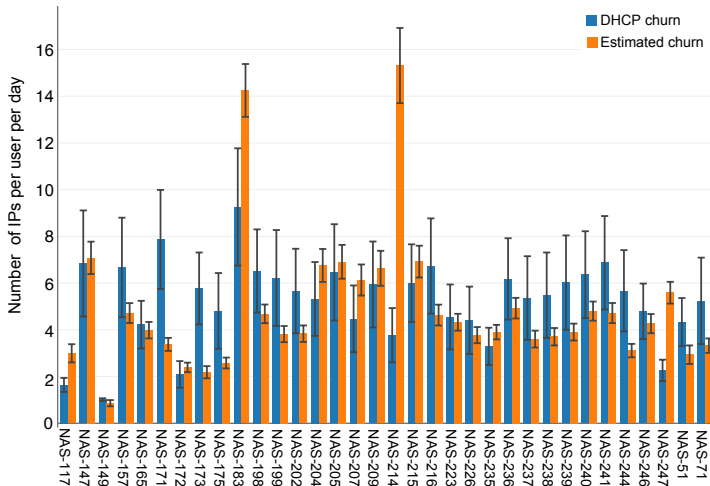
Our Method

1. **Probe:** continuous ICMP probes on entire ASes, every 10min
 - ▶ Based on Internet Census paper
2. **DHCP session estimation:** Interpolate consecutively ack'ed packets
 - ▶ Missing ack: session expired
 - ▶ More complex: see paper
3. **Validation:** mid-size ISP (1 M IP addresses)
 - ▶ Radius Logs vs measured DHCP sessions
 - ▶ 2 weeks period

Ground truth: what we try to measure

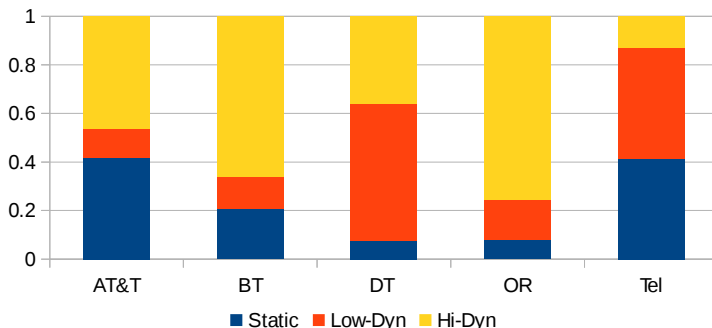


Validation



- ▶ 72.3% average precision in our model
- ▶ Simple method that works on a highly dynamic network

Now, measure other ASes



- ▶ Employed k-means to 5 ASes of large ISPs
 - ▶ Fastrack Elsevier ComCom Paper (under review)
- ▶ 2nd validation: RIPE Atlas (works better)
- ▶ Next: normalize bot counts