Cache Pollution
(and other trends)

Paul Vixie, ISC

DNS-OARC Prague

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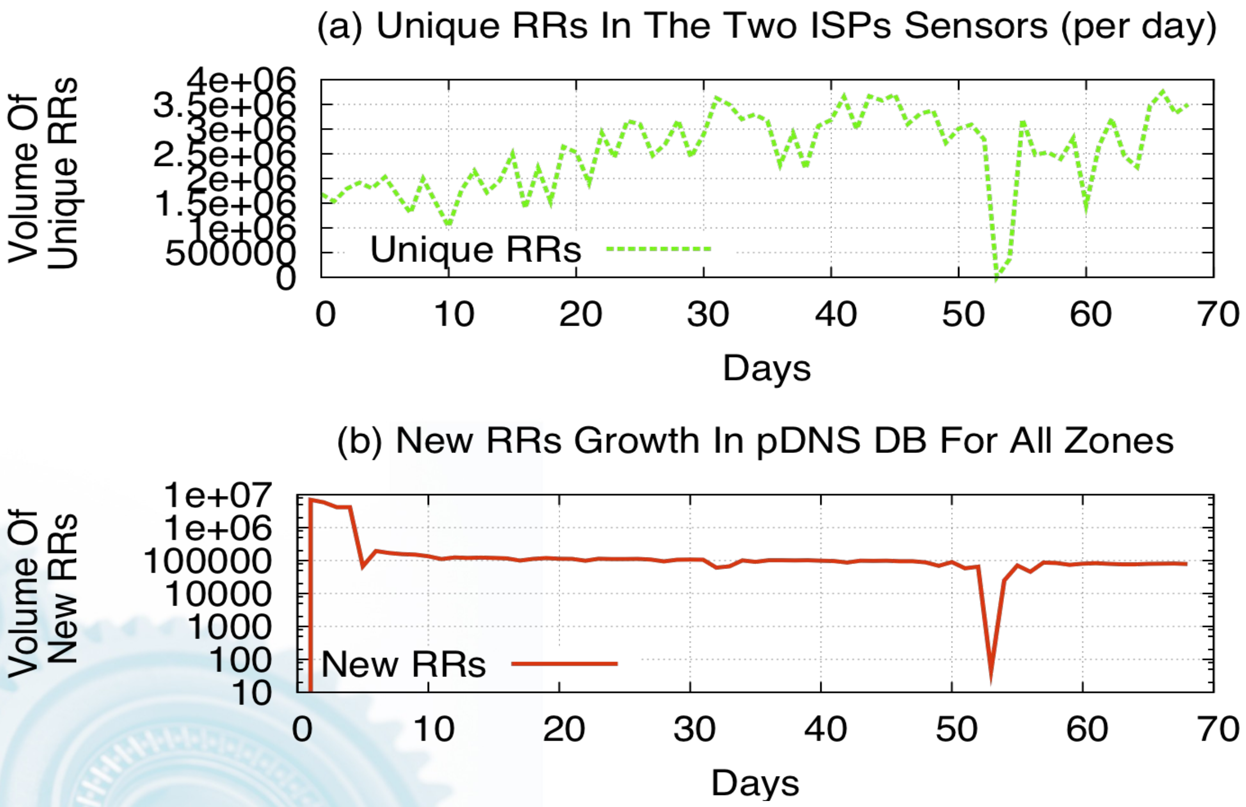
Today's talk

- Cache Pollution
  - SIE noticed that some were taking up more RR space in passive DNS databases than others
  - GaTech was able to quantify and graph it

    Contributions by Manos Antonakakis, GaTech, et.al. (D.Dagon, W.Lee, R.Perdisci, N.Feamster)
- A case for real-time analysis

Number of unique RRs is increasing

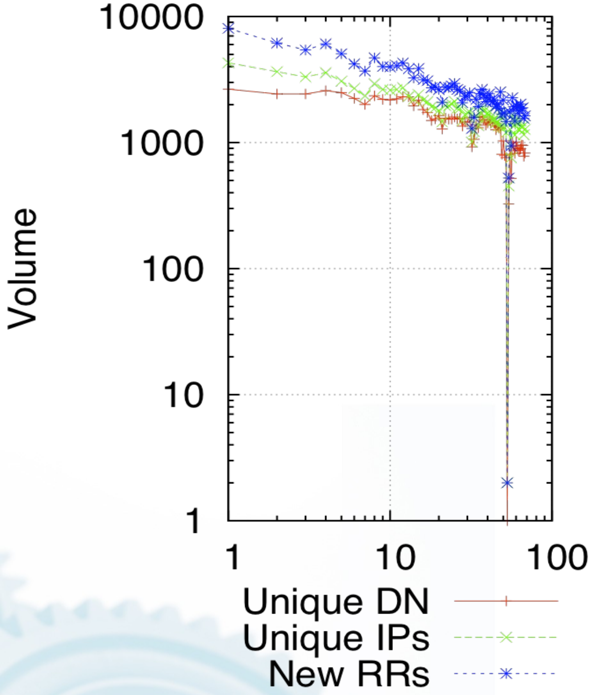


(a) Unique RRs In The Two ISPs Sensors (per day)

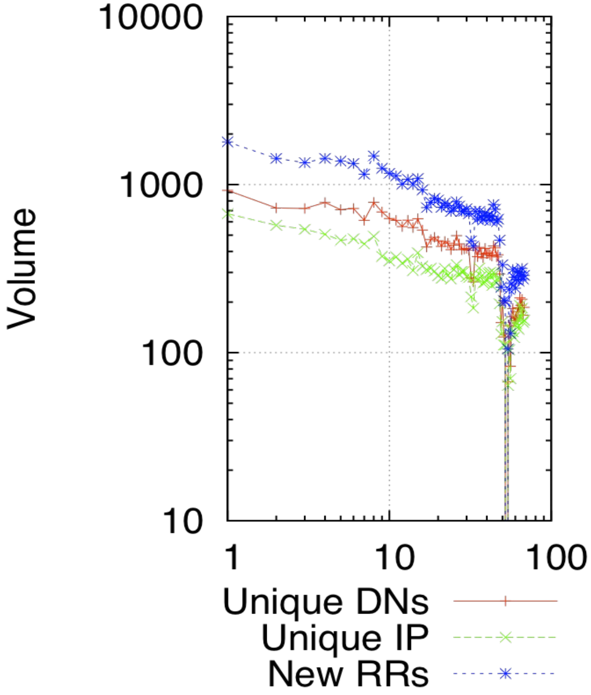
(b) New RRs Growth In pDNS DB For All Zones

More CDN names and IPs

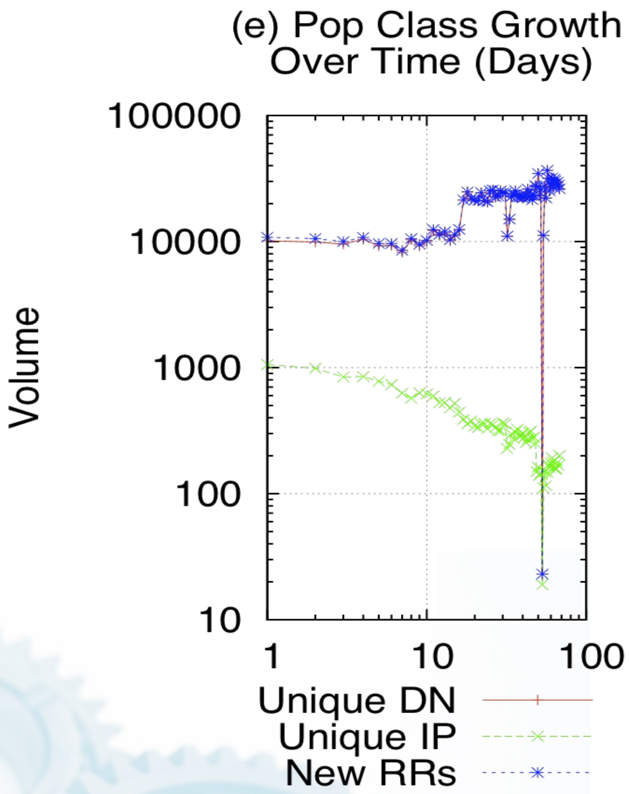
(c) Akamai Class Growth Over Time (Days)



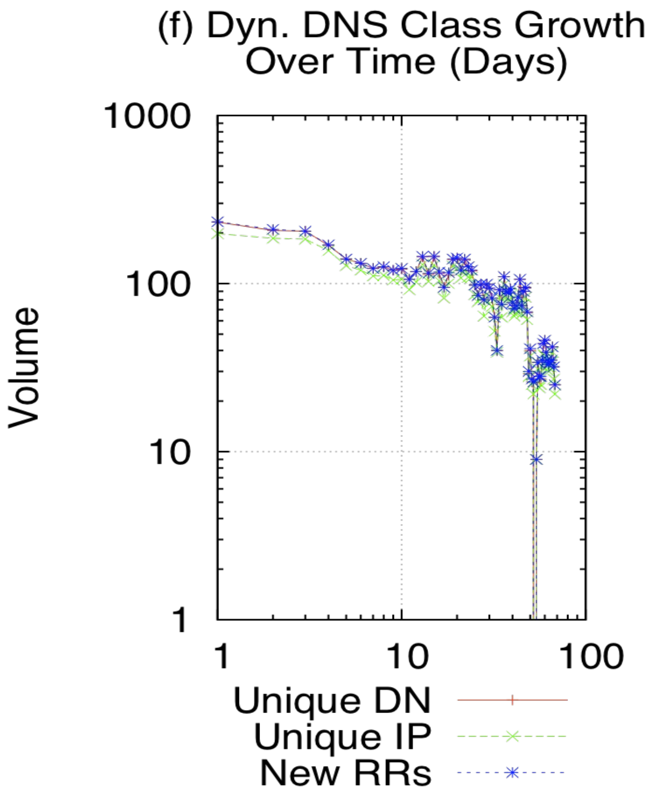
(d) CDN Class Growth Over Time (Days)



RRs served by large providers and dynamic DNS



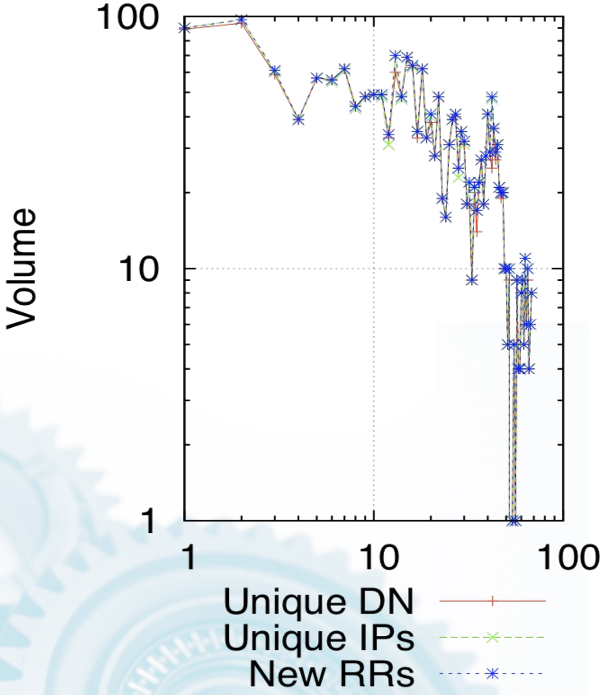
facebook, amazon, google
(note divergence between RRs/IPs)



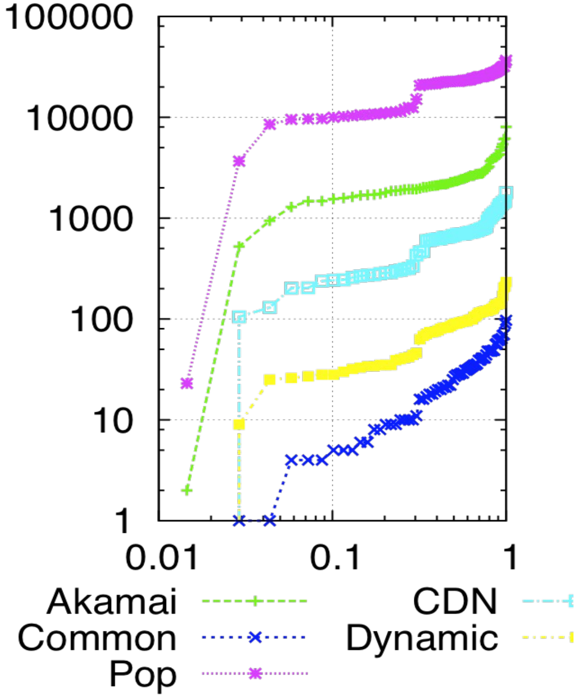
no-ip, dyndns

Less growth in “normal” sites, while large growth in CDNs and popular sites like Facebook

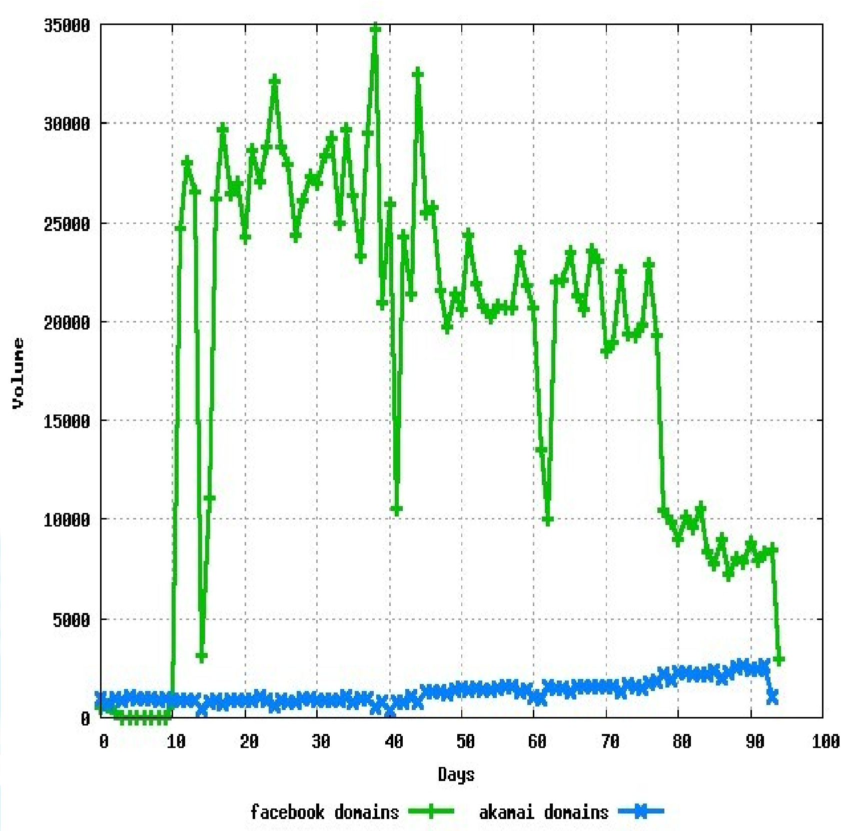
(g) Common Class Growth Over Time (Days)



(h) CDF Of RR Growth For All Classes

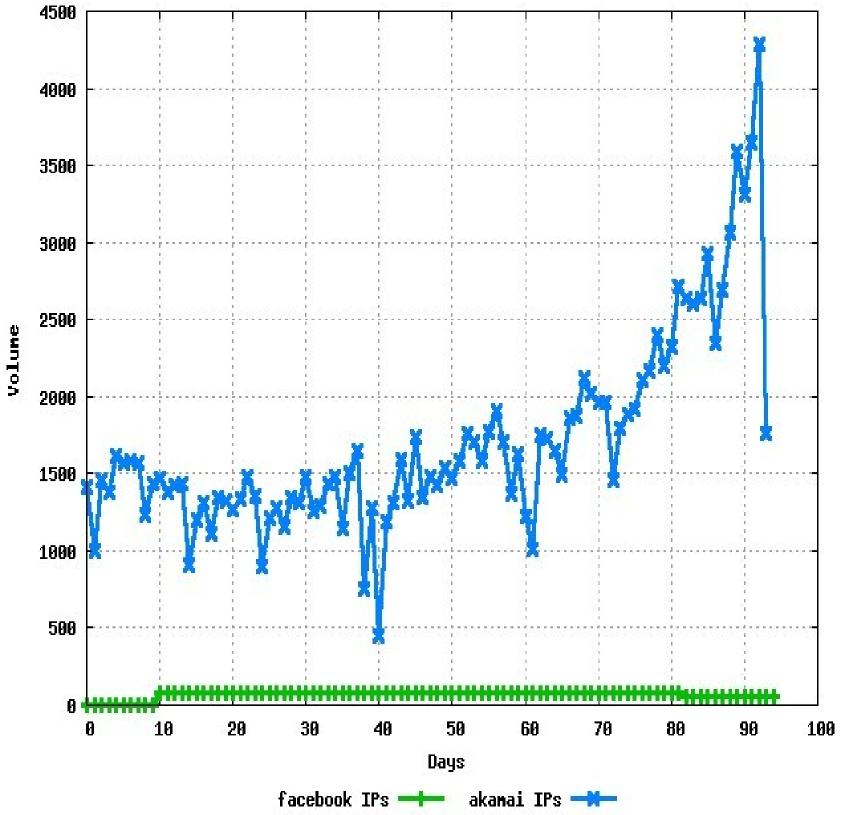


Akamai vs Facebook: RR growth



- Facebook generates large number of domains per day
- Akamai generates a lot but nowhere close to Facebook.

Akamai vs Facebook: IP growth



- Akamai maps new RRs to new IPs each day
- Facebook uses a relatively static IP address space into which all new RRs are pointed

facebook

```
# nmsgtool -C ch202 -o - -c 5000 | egrep “channel.*facebook” | fgrep -v \;
053822xxxx.channel53.facebook.com. 3600 IN A 69.63.178.123
0199595xxxx.channel66.facebook.com. 3600 IN A 69.63.178.136
0253010xxxx.channel11.facebook.com. 3600 IN A 69.63.176.171
06670xxxx.87.channel.facebook.com. 3600 IN A 69.63.180.44
0289776xxxx.channel07.facebook.com. 3600 IN A 69.63.176.167
0285474xxxx.channel05.facebook.com. 3600 IN A 69.63.176.165
47771xxxx.92.channel.facebook.com. 3600 IN A 69.63.180.45
0381825xxxx.channel35.facebook.com. 3600 IN A 69.63.176.195
173621xxxx.channel08.facebook.com. 3600 IN A 69.63.176.168
0257487xxxx.channel12.facebook.com. 3600 IN A 69.63.176.172
0241726xxxx.106.channel.facebook.com. 3600 IN A 69.63.180.47
040887xxxx.channel11.facebook.com. 3600 IN A 69.63.176.171
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Akamai

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a1394.g.akamai.net. 20 IN A 70.167.151.137
a1394.g.akamai.net. 20 IN A 70.183.191.114
a1492.g.akamai.net. 20 IN A 70.167.151.190
a1492.g.akamai.net. 20 IN A 70.183.191.113
a1339.b.akamai.net. 20 IN A 98.174.28.121
a1339.b.akamai.net. 20 IN A 98.174.28.123
a1108.da1.akamai.net. 20 IN A 70.167.151.182
a1108.da1.akamai.net. 20 IN A 70.167.151.195
a1493.g.akamai.net. 20 IN A 70.183.191.114
a1493.g.akamai.net. 20 IN A 70.167.151.134
a1593.g.akamai.net. 20 IN A 70.167.151.196
a1593.g.akamai.net. 20 IN A 70.167.151.171
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low ttl at least

Take-aways

- Need to research impact of CDNs and Facebook on caching resolver behavior
- How many similar services can large-population resolvers take?
- When inserting lots of RRs, perhaps lowering TTL can help mitigate effect?
- We need continued real-time monitoring
  - Every day is a DITL
  - SIE is here to help