

ICANN Research Projects



Paul Hoffman

ICANN DNS Symposium, กรุงเทพมหานคร
10 May 2019

Overview

- ⦿ Like many organizations, many ICANN departments do different types of research
- ⦿ Some is one-off, some is ongoing
- ⦿ This is a non-systematic sampling of some of the research being done, particularly around security, stability, and resilience
- ⦿ Doesn't cover DAAR, which you will hear more about tomorrow

IPv6 global deployment

- ⦿ Goal: looking at global trends in IPv6 deployment worldwide
- ⦿ Per-country and per-ASN analysis, looking back to 2012
- ⦿ Provide elements to answer the question “are we there yet?”
- ⦿ Dealing with noisy data

Conversations with root servers

- ⦿ Analyze multiple days of root server traffic, picking some representative query addresses
- ⦿ What TTLs are used for positive and negative answers?
- ⦿ How sticky are resolvers to a particular root server?
- ⦿ Are there interesting patterns of jumping between instances?
- ⦿ Mostly based on IMRS (L-root) traffic, but will also look at DITL data

Root server placement

- ⦿ IMRS (L-root) has about 150 instances in its Anycast cloud
- ⦿ What is the latency of reaching the one closest to a particular location?
- ⦿ Can this information help determine where to focus efforts for future placements?

How browsers interact with the DNS

- ⦿ Discussions of DNS-over-HTTPS (DoH) alerted many DNS developers that browser developers are doing things with the DNS that they didn't expect
- ⦿ Browser vendors don't feel a need to always use API calls to get DNS data
- ⦿ Kind of of checking and correcting is done in the location bar, such as for IDNs
- ⦿ Domain names in TLS certificates
- ⦿ Make a catalog, keep it up to date and probably expanding

DNS Magnitude

- ⦿ Better answers to the question “how popular is this domain”
- ⦿ Deal sensibly with TTLs, number of sources of queries, subdomains, and so on
- ⦿ Come up with a metric similar to “earthquake magnitude” that people can understand

IMRS (L-root) quick analyses

- ⦿ ICANN leadership and the Board ask a lot of ad hoc questions
- ⦿ Get quick preliminary answers to indicate whether more study is needed and can be done with the current data
- ⦿ Use historical data where accessible

- ⦿ A set of metrics collected by ICANN
 - Metrics are published: **<https://ithi.research.icann.org>**
 - Measurements rely on a network of partners
 - Data collected does not contain any PII
- ⦿ Types of data published: inaccuracy of Whois data, domain name abuse, root traffic analysis, recursive server analysis, resolver behavior, IANA registries for DNS parameters, DNSSEC deployment, TLD traffic analysis
- ⦿ Seeking partnerships with many more recursive resolver operators

Data collecting that is not directly research

- ⊙ gTLD Marketplace Health Index
 - Number and placement of registries and registrars
- ⊙ ICANN History Project
 - Not the kind of research one normally thinks of here
- ⊙ Operational data collected by GDD
 - Example: whether the gTLD servers are meeting their SLAs
- ⊙ Operational data collected by DNS Engineering
 - Example: how the IMRS (L-root) instances are performing
- ⊙ Open Data Initiative (forthcoming)
 - Way that ICANN will publish internally-generated measurements and metrics

Engage with ICANN



Thank You and Questions

Visit us at icann.org

Email: email



[@icann](https://twitter.com/icann)



facebook.com/icannorg



youtube.com/icannnews



flickr.com/icann



linkedin/company/icann



slideshare/icannpresentations



soundcloud/icann