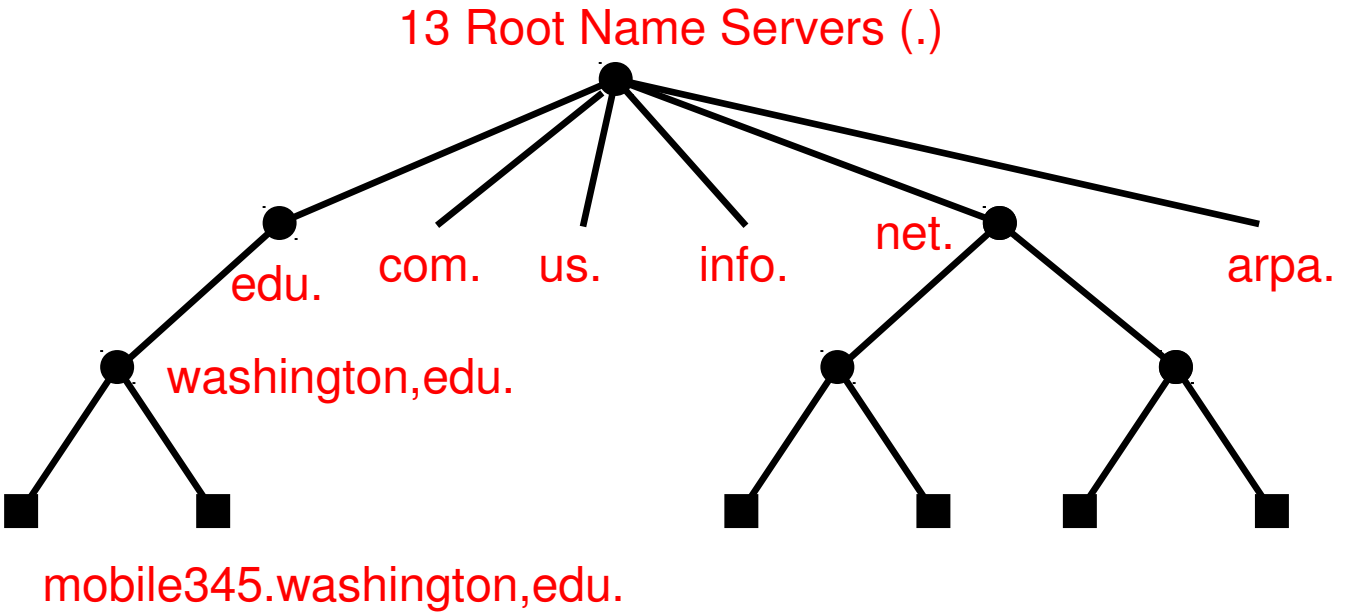
Flattening DNS using DHT

Nishanth Muruganandam
110276247

Domain Name System today



Taken from Krishna Gummadi – University of Washington [3]

Problems in current DNS

- Skewed Distribution:
  - Root-servers have very few children(.com,.net,etc)
  - Verizon’s .com server has hundreds of 1000’s of children,
  - .washington.edu has few hundred department name servers
  - cs.washington.edu. has 0 children

Taken from Krishna Gummadi – University of Washington [3]

Administration Requirement

- In 2000, Jung et al. [1] found that approximately 35% of DNS queries never receive an answer or receive a negative answer, and attributed many of these failures to improperly configured name servers or incorrect name server (NS)
- Serving DNS data over Chord eliminates the need to have every system administrator be an expert in running name servers. It provides better load balance, since the concept of root server is eliminated completely.
-

- Finally, it provides robustness against denial-of-service attacks since disabling even a sizable number of hosts in the Chord network will not prevent data from being served.

Method/Tools used

- OpenChord – an implementation of CHORD in java is used.
- Only Administrator has the right to setup the network.
- One user from each country logs into the network and inserts the data DNS/IP map in the network.

Method/Tools used

- Any user can query the IP value for any DNS from the network using the API provided by application.
- The DNS to IP map data is taken from: http://public-dns.tk/
  - Missing data is removed and only valid data is inserted in the Network
  - 98076 DNS to IP mappings

Results

- Elapsed Time for setting up the network (in ms): 434032 ~ 7mins
  - Chosen User Country: JM Retrieve time : 1
  - Chosen User Country: PA Retrieve time : 1
  - Chosen User Country: KW Retrieve time : 5
  - Chosen User Country: SN Retrieve time : 1
  - Chosen User Country: BN Retrieve time : 0
  - Chosen User Country: KE Retrieve time : 0
  - Chosen User Country: TT Retrieve time : 0
  - Chosen User Country: CA Retrieve time : 0
  - Chosen User Country: KE Retrieve time : 0
  - Chosen User Country: AM Retrieve time : 1

References

[1] Jaeyeon Jung, Emil Sit, Hari Balakrishnan, and Robert Morris. *Dns performance and the effectiveness of caching.* In Proceedings of the ACM SIGCOMM Internet Measurement Workshop ’01, San Francisco, California, November 2001

[2]Russ Cox, Athicha Muthitacharoen, Robert T. Morris. *Serving DNS using a Peer-to-Peer Lookup Service. MIT Laboratory for Computer Science*

[3] Krishna Gummadi, *DHTs and their Application to the Design of Peer-to-Peer Systems,* Presentation in University of Washington

[4] http://open-chord.sourceforge.net/