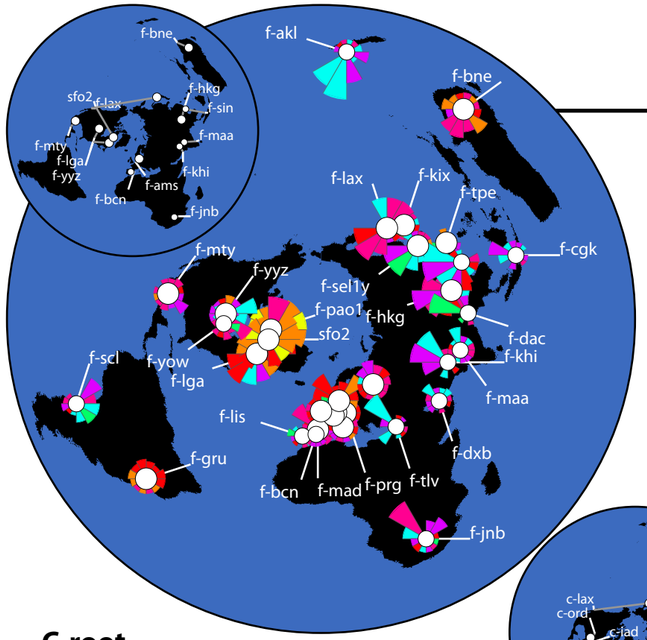
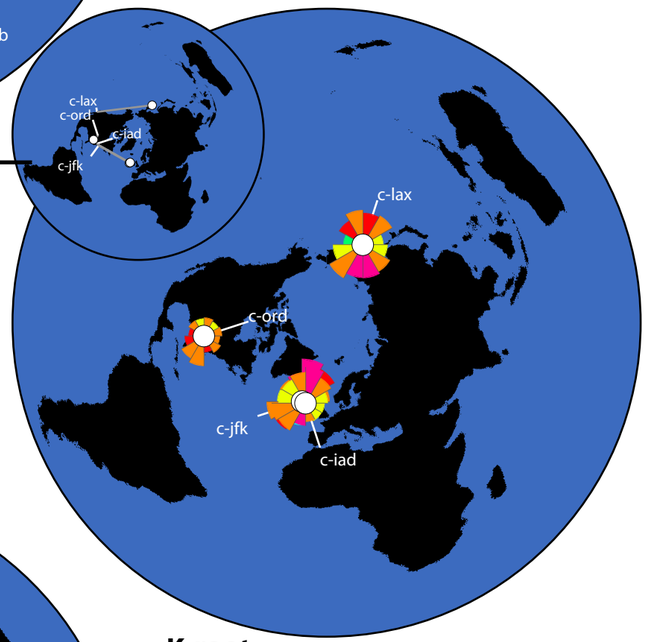
Influence Map of DNS Root Anycast Servers



F-root

2 global instances, 59 (of 61) local instances

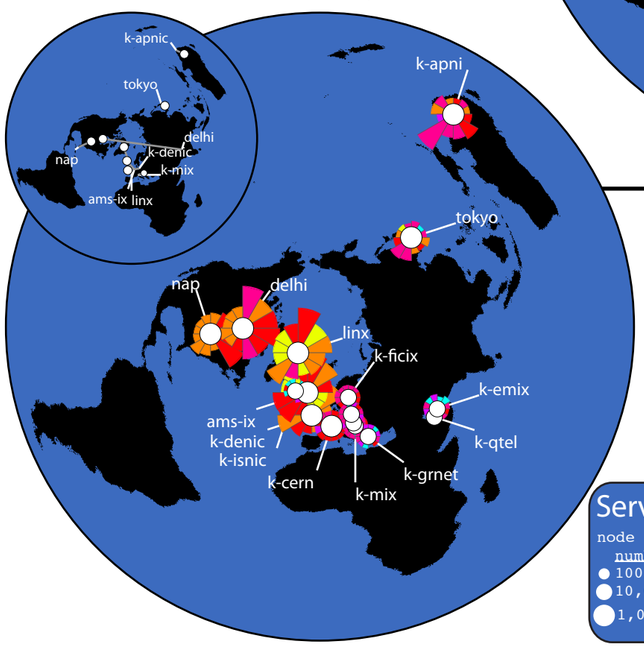
F-root includes two global instances maintained by ISC in San Jose/San Francisco, CA; 59 local instances maintained by local hosting sites. Nodes on the Location Map that are not drawn on the Displacement Map serve mostly their own geographic region (they are not displaced).



C-root

4 (of 7) global instances

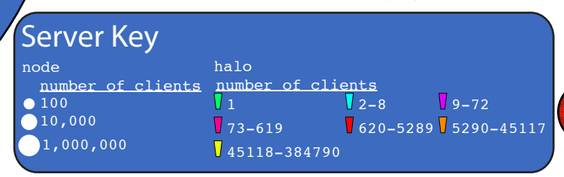
C-root deploys seven global instances, although we only have data from the 4 instances in the US. Of these four, only the Chicago (ORD) node has its geographic centroid in the US. The New York (JFK) and DC (IAD) instances primarly served a European client base. The client population for the Los Angeles (LAX) instance was primarly Asian.



K-root

5 global instances, 19 (of 26) local instances

A large set of local instances provides good European coverage with more limited deployment in other geographic regions. Despite that the anycast instance in Delhi is local, it sees the largest observed displacement, due to its largely European client population. Tokyo's global instance has a client population largely in Japan.

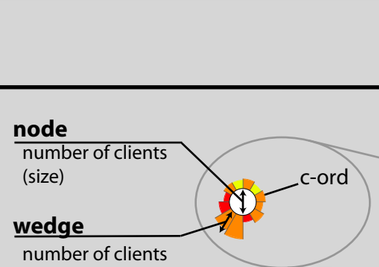


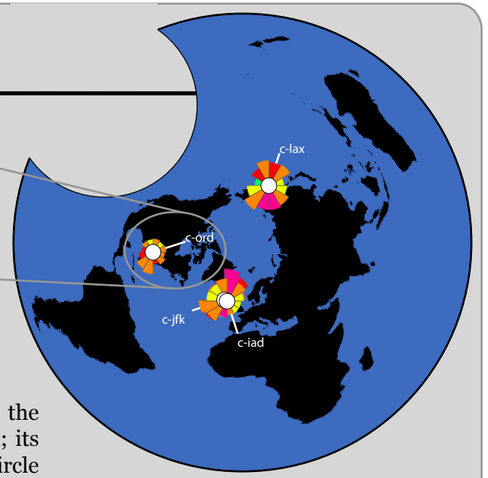
This visualization shows the geographic distribution of DNS clients for anycast instances of the C, F, and K root servers based on 48-hour packet traces from each anycast instance beginning midnight UTC 10 January 2006. We provide two world maps for each root server, with each individual anycast instance for that root placed on the map at the geographic centroid of its observed clients. Wedges fanning out from each instance indicate the direction, distance, and number of clients observed in the direction indicated by the angle of the wedge.

The number of instances, their geographic displacement (the distance between the geographic location of the instance and the geographic centroid of its clients), and the number of clients served by each instance illustrate differences in root server deployment policies.

Location Map

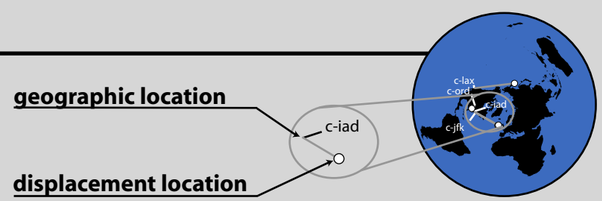
To show the relationship between each instance and its clients, the location map (the larger ones, with the displacement maps inset) plots each server as a circle surrounded by a group of wedges. Each wedge represents the number and average distance of clients from the instance's centroid in the direction the wedge points. The color of the wedge represents the number of clients coming from the corresponding geographic region; its length represents the average distance to those clients. The size of the circle reflects the server's total number of clients.





Displacement Map

For anycast instances whose actual location and centroid (i.e., geographic center of the client population) differ significantly, the smaller *geographic displacement* maps show this displacement of the clients relative to the queried instance. The displacement is depicted using a gray "drift" line beginning at the server's actual geographic location, marked by a text label, and ending at the geographic centroid location, marked by a white circle. A short drift line means the instance serves a mostly geographically local population of clients.



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