CSC2231 – Internet Systems and Services

Paper Review – CoDoNS
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Date: Nov. 9th, 05

CoDoNS addresses many of the same concerns as the first paper. Additionally, the authors recognize that the log(N) number of hops required to route a request results in latencies that are higher than those seen in traditional hierarchical DNS. The main contribution of CoDoNS is an additional caching layer on top of the overlay network. Based on an analytic formula, CoDoNS determines the optimal number of replicas required to guarantee that queries are answered within *X* hops. The formula assumes that DNS queries are Zipf-like in nature.

The advantage of CoDoNS is that it addresses the issue of increased latency in P2P DNS schemes through caching. The adaptive algorithm used in replication also allows CoDoNS to behave well in the face of flash-crowds (or so the authors claim) and achieve prompt updates to DNS entries.

Since CoDoNS is still built on top of a structured overlay network, it is prone to the same problems I mentioned in my previous reviews on Chord and Pastry. These issues have not been resolved here. In regards to their analytic replication algorithm, it is commonly accepted that overlay networks are highly heterogeneous. As such, minimizing the number hops does not necessarily result in minimizing latencies. The overhead to maintaining popularity and ranking statistics (not to mention periodic aggregation) on every CoDoNS node also seems a bit excessive. This is analogous to permanently running an Internet measurement study on every DNS node.

It is interesting to note that CoDoNS periodically reacts to flash crowds with latencies that are *higher* than traditional DNS – resulting in a large latency "spike". For a period of approximately 2 hours, traditional DNS outperforms CoDoNS (which displays poor worst case characteristics). Finally, the graph of median latencies shows tremendous variability in CoDoNS' performance. Even though the initially high latencies can be mitigated by seeding the nodes, there are strange fluctuations throughout the graph. There does not seem to be sufficient data for a good evaluation of CoDoNS in its steady state. Because of this variability, it is difficult to make any conclusions on the performance of CoDoNS. Perhaps the nature of CoDoNS is such that there is no steady state – such a result would be unacceptable.