

A Distributed Multicast DNS System

Daniel Johnson

October 28, 2009

Purpose and Scope

To allow a group of workstations as present on a medium-size subnet to survive complete loss of a DNS server through collaboration. The syslab workstations provide an example of an appropriate size.

Background Research

Several efforts have been made to solve similar problems:

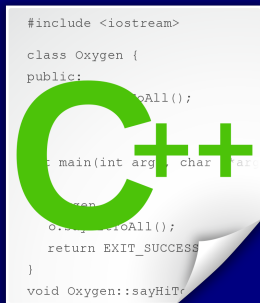
- The Apache project provides name lookups for machines on the local subnet via a .local pseudo-TLD
- DistributedDNS attempts to surpass the traditional ICANN-based name service, which is too ambitious to succeed.

My solution will work with the local link only, which will keep speed as fast as or faster than traditional nameservers, provide lookups for all hosts, not just nearby ones, and honor the authority of the root nameservers.

Another important algorithm may be DHT: Distributed Hash Tables. Since DNS records are key-value pairs, this may be perfect.

Computer Language/Software

Python is being used for prototyping and network simulation.
Eventual client/server will be written in C++.



Procedure

- Python
 - Proof-of-concept
 - Protocol development
- C++
 - Client/server development
 - Name Service Switch (NSS) module

Testing/Analysis

- Simulation tests
 - Network chatter
 - Protocol development
 - Degradation of network

Expected Results

The benefits of offloading routine and emergency duties from the nameserver has several practical benefits. First, in the event of a nameserver outage, not all systems need to fail. While non-cached entries may not be available, those that have seen high use (google.com, for example) will still be available. This helps to eliminate one instance of a single point of failure. With a sufficient number of hosts, processing queries on the main nameserver can lead to performance issues. By dividing responsibility for name lookups among hosts, the speed and scalability of lookups can be improved.