Distributed Hash Tables

Simulation of DNS system using DHT

Nishanth Muruganandam 110276247

Task:

The class of algorithm this task comes under is Distributed Hash Tables(DHT). The task is to build an application that uses DHT. For this to take a shape, I rely on the implementation of any DHT algorithm. The idea is to replace the Hierarchical structure of DNS with the flat structure of DHT in an attempt to make the system more available, fault tolerant, resilient to DoS attacks, etc. Preferable programming language is Java.

Motivation:

The idea is primarily derived from [1]. The traditional DNS system uses hierarchical based structure. The one with DHT will be more flat. The latter proves to be more scalable as discussed in [1] & [2].

Sub-Tasks:

The sub-tasks (which is expected to grow) are as follows:

1. Read the resources collected so far (I.e) [1], [2] & [3].
2. Come up with a minimal UI for the application.
3. Work on the back-end with the implementation from team members.
4. If language conflict between implementation and application, find a suitable API.
5. Test the flow of the application.

Interface:

Input:

- Human readable URL

Output:

- Fetch the corresponding physical address for the URL.

Timeline:

1st week: Finalize the input and output for the user and interaction between the application and the underlying application. Find a suitable open source implementation on DHT (as a backup option) and modify it to the application needs.

2nd week: Implementation of the application in a suitable platform and a suitable language.

3rd week: Test the application developed for various cases. Some of the work in 2nd week might overflow to this one.

References:

[1] Vasileios Pappas, et.al. A Comparitive Study of the DNS design with DHT-Based Alternatives. http://web.cs.ucla.edu/~lixia/papers/06INFOCOM.pdf. INFOCOM- 2006

[2] https://courses.cs.washington.edu/courses/csep551/04wi/krishna.dht-pmp.ppt

[3] https://wiki.hacdc.org/index.php/Byzantium_Distributed_DNS