A Distributed Greedy Heuristic for Computing Voronoi Tessellations With Applications Towards Peer-to-Peer Networks

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May 12, 2015

Outline

Distributed Hash Tables

- ▶ Abstractly, a DHT is a mechanism for maintaining a large state in a decentralized network.
- ▶ In practice, the state is a large number of key,value records.
- ▶ A Distributed hash table assigns those records to servers and routes request for those records to those servers.
- ▶ Current incarnations of Distributed hash tables assign servers and records locations in an arbitrary metric space.
- ▶ DHTs currently use a variety metric spaces.

Applications

- ▶ *P2P file sharing* is by far the most prominent use of DHTs. The most well-known application is BitTorrent [**?**].
- ▶ *Distributed Domain Name Systems* (DNS) have been built upon DHTs [**?**] [**?**]. Distributed DNSs are much more robust that DNS to orchestrated attacks, but otherwise require more overhead.
- ▶ Distributed *machine learning* [**?**].
- ▶ Many *botnets* are now P2P based and built using well established DHTs [**?**]. This is because the decentralized nature of P2P systems means there's no single vulnerable location in the botnet.

Extant Varieties of DHT

- ▶ Ring Based DHTs
  - ▶ Chord
  - ▶ Pastry
  - ▶ Tapestry
- ▶ Tree Based DHTs
  - ▶ CAN
  - ▶ Kademlia

The different topologies DHTs utilize present optimization tradeoffs (lookup latency, number of lookup hops, network robustness, availability, processing overhead)

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