WebDHT

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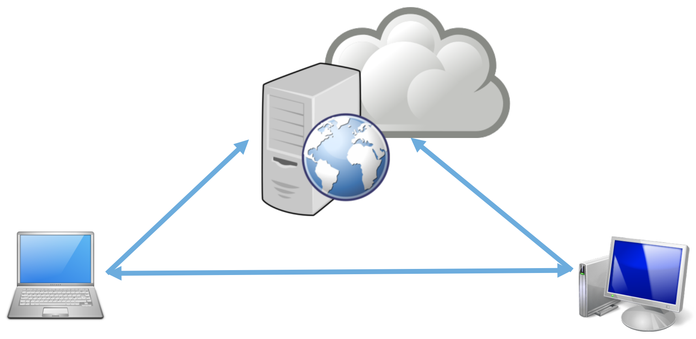
Modern **Web browsers** support:

- **P2P communication** (WebRTC)
- **Persistent data storage**

WebRTC

Our **goal** is to build a **Distributed Hash Table** comprised of **Web browsers** for **decentralized social applications.**



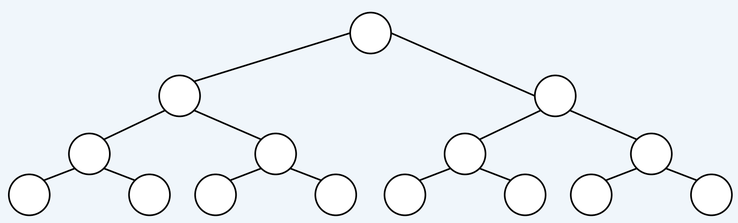
Challenges:

- Limited memory
- Limited number of connections
- Signal server overhead

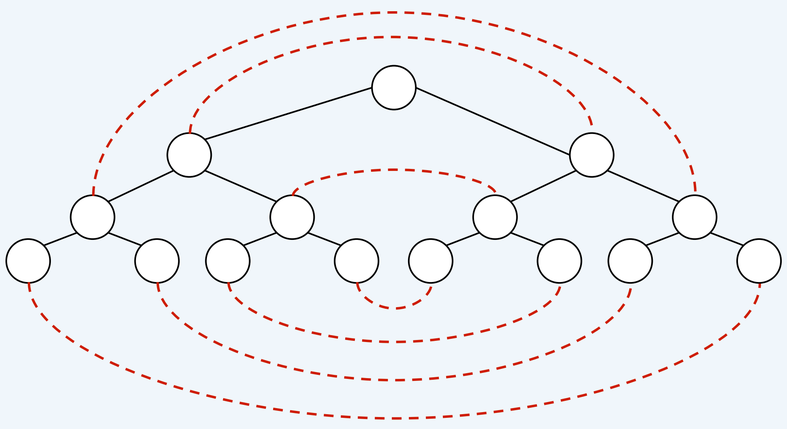
A DHT for the Web

We propose a light-weight DHT structure that:

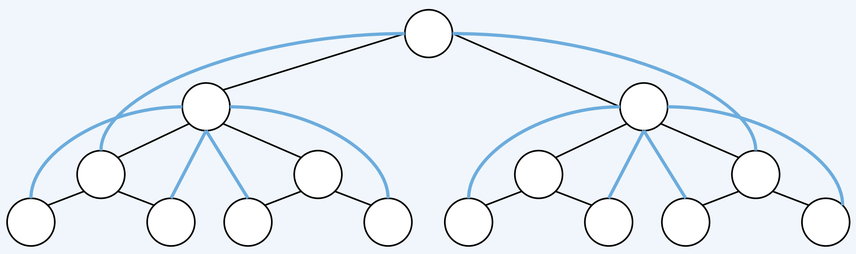
- **Resembles a Binary Tree**



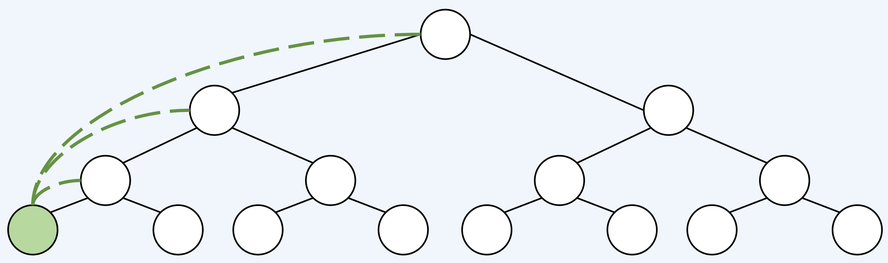
- **Nodes are connected across the branches symmetrically**



- **Nodes are connected to their grandparents**



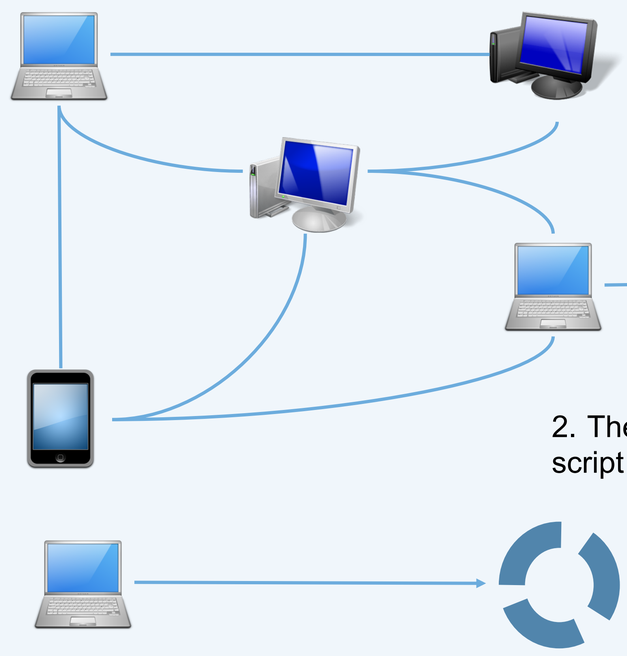
- **Nodes that join the network are assigned as backups for higher hierarchy nodes to restore balance under churn.**



Algorithm Analysis:

Connections	$O(1) - 8$
Lookup complexity	$O(\log(N))$
Signal Server	**JOIN**

Backend for Social Applications



1. The Web browser requests the script from the server.

2. The Web browser executes the script and connects to a peer.

WebDHT

3. Store and retrieve data using **GET(key)** and **PUT(key, value)** operations.

Ember Angular

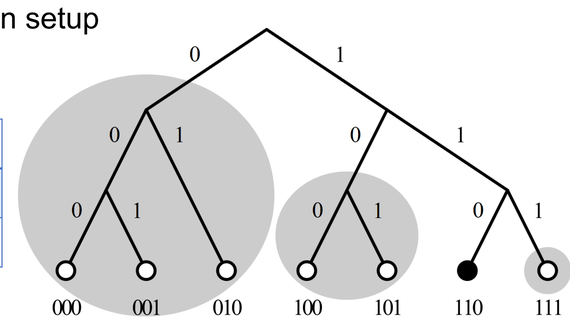
4. Applications run on the **client-side** rendering HTML elements. Frameworks such as **Ember.js** and **Angular.js** provide this functionality.

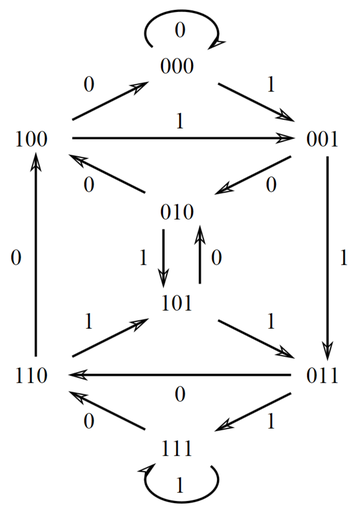
Related DHT Algorithms

Connections – Connections to other peers
Lookup complexity – Avg. peers forwarding a message
Signal server – Messaging for connection setup

Kademlia

Connections	$O(\log(N))$ - 160
Lookup complexity	$O(\log(N))$
Signal Server	**JOIN, CONNECT**





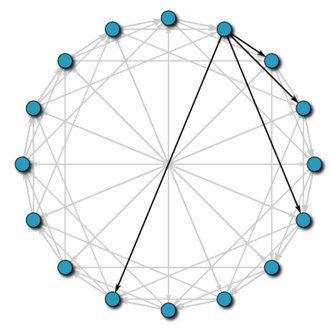
De Bruijn Graphs

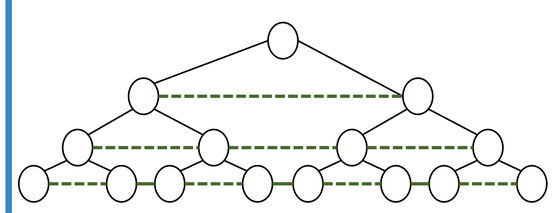
Connections	$O(1) - 4$
Lookup complexity	$O(\log(N))$
Signal Server	**JOIN**

** No mechanism to avoid fragmentation of the sequence when nodes leave the network.*

Chord

Connections	$O(\log(N)) - 160$
Lookup complexity	$O(\log(N))$
Signal Server	**JOIN, CONNECT**





Baton P2P

Connections	$O(\log(N)) - 160$
Lookup complexity	$O(\log(N))$
Signal Server	**JOIN, CONNECT**

References

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