

## INTRO/ABSTRACT

BChain is a new decentralized peer to peer protocol and app implementation which allows for sharing files anonymously, securely and privately. It is verified through a blockchain containing file metadata and members are automatically managed to distribute hosting and distribution of all available files through novel pseudo-random algorithms, circumventing censorship and spying in addition to networking to Tor.

## METHODS

This project investigated ways to make a fully peer to peer network protocol without any reliance on pre-established trust or centralized services. We mainly focused on management of peers in the network using hashed algorithms to pseudo-randomly distribute actions across peers for connections and distribution of files. This allows circumventing methods of bulk censorship or spying by ISPs, governments, or other listeners. Next, we looked at using a blockchain as a method of immutable peer to peer verification to verify the integrity of files, while also providing a persistent and tamperproof ledger of available files.

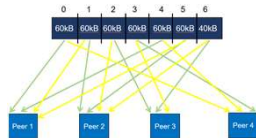


Fig.1 A depiction of a typical peer and file distribution layout, simplified.

## RESULTS

We have developed an algorithm and protocol which allows peers to self-organize through a Kademlia inspired binary tree ID system, and join the network through intelligent geographically biased reverse random probing, wherein peers on the network coordinate the querying of new peers wishing to join. The network protocol is overlaid on top of Tor hidden services to reference peers by a unique connection ID unrelated to their actual IP, routed through the anonymous and encrypted network. File sharing is done through HTTP/3, and recorded within a blockchain which provides an immutable ledger of files, some metadata and verification information for downloaders. Files are distributed redundantly in chunks to peers, on a binary tree by level according to file characteristics, randomly distributed by hash parity.

### Resources:

- <https://grothoff.org/christian/bootstrap.pdf>
- <https://networking.iitp.org/2009/Website/proceedings/networking/1569173039.pdf>
- [http://ryandoyle.net/assets/papers/Distributed\\_Bootstrapping\\_of\\_P2P\\_Networks-RDoyle.pdf](http://ryandoyle.net/assets/papers/Distributed_Bootstrapping_of_P2P_Networks-RDoyle.pdf)
- <https://bitcoin.org/bitcoin.pdf>

# Secure, private and anonymous fully peer to peer file sharing powered by blockchain and Tor.

