DECENTRALIZED STORAGE

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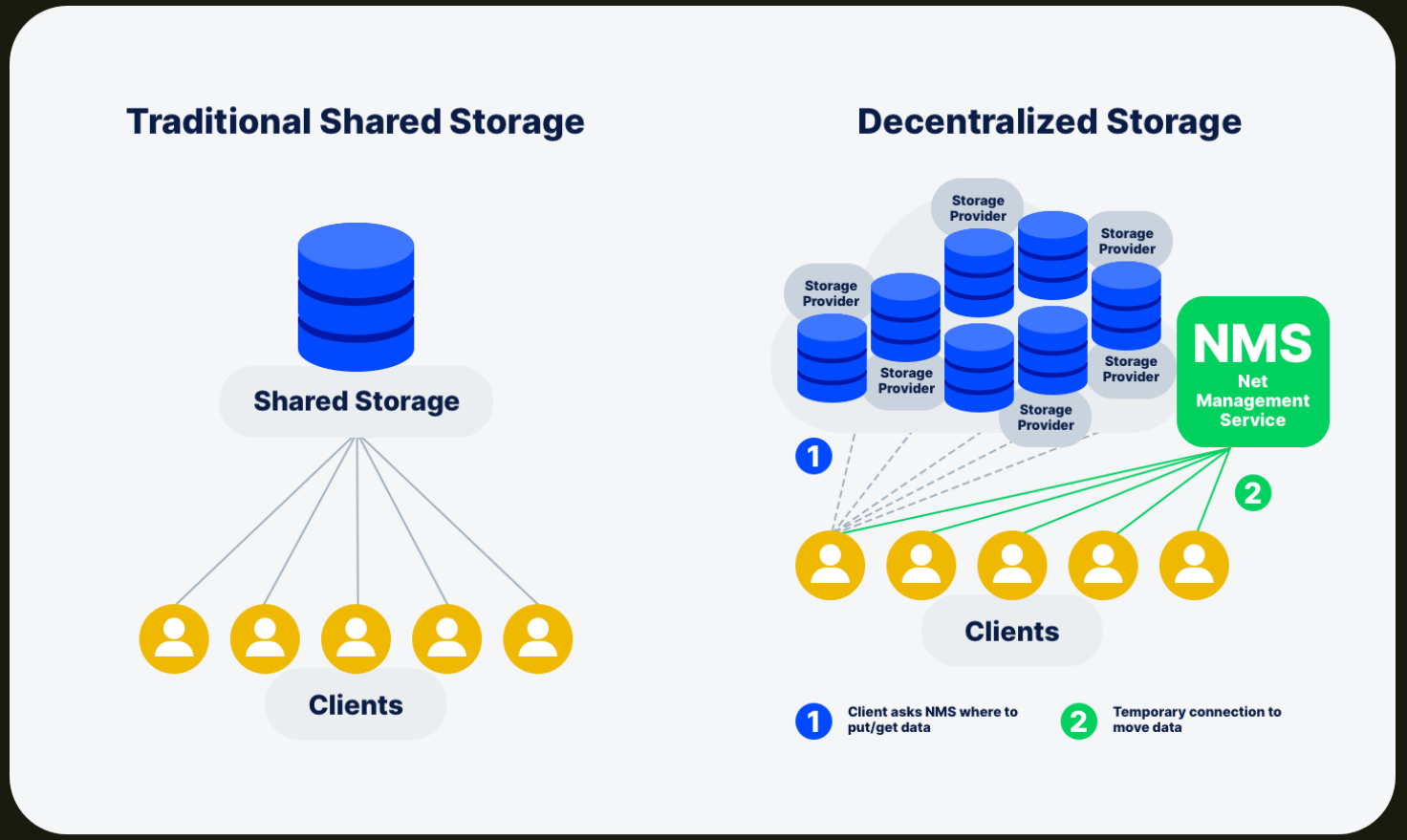


Source: GigaOm 2021

Introduction

Most information online:

- Stored on big servers
- Controlled by a single company
- Risk of Censorship
- Easy to block access

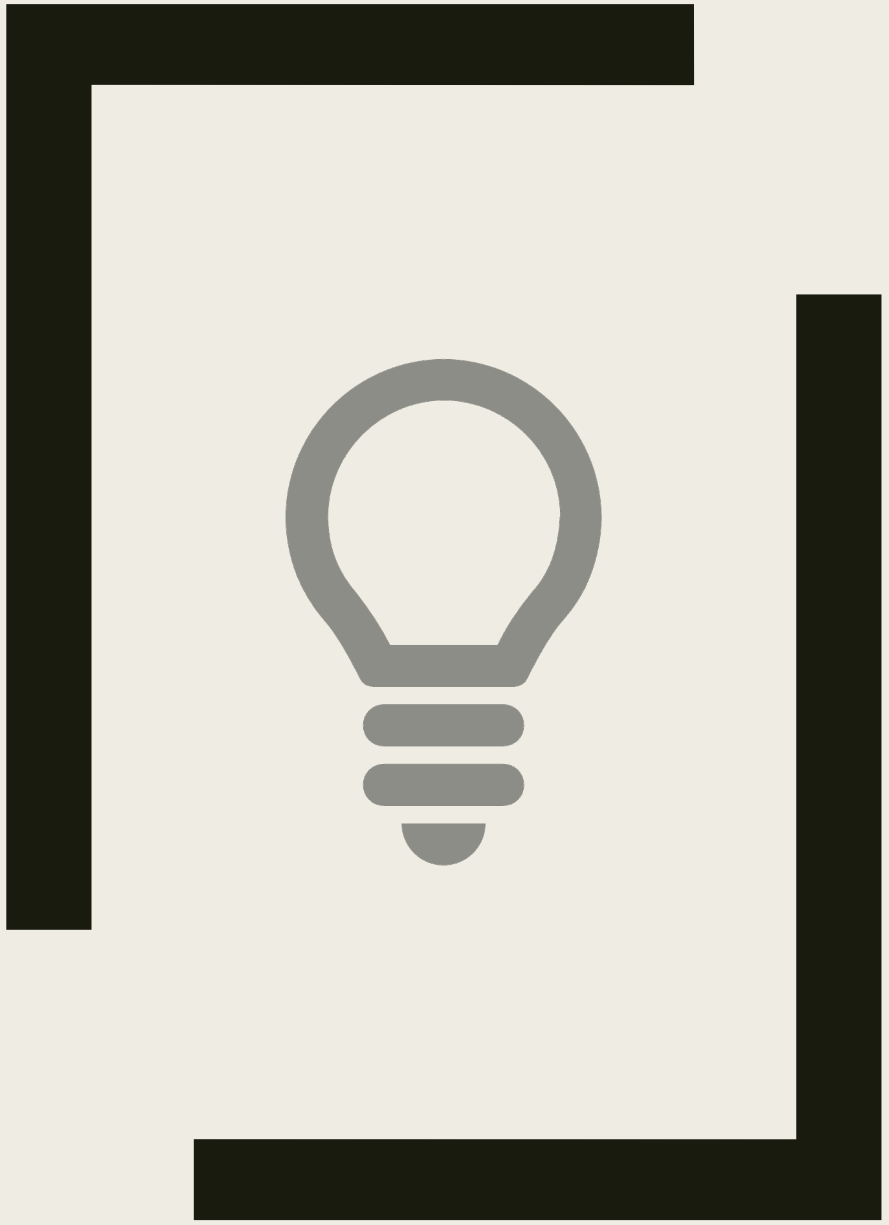
Advantages & Disadvantages of Centralized Storage

Advantages:

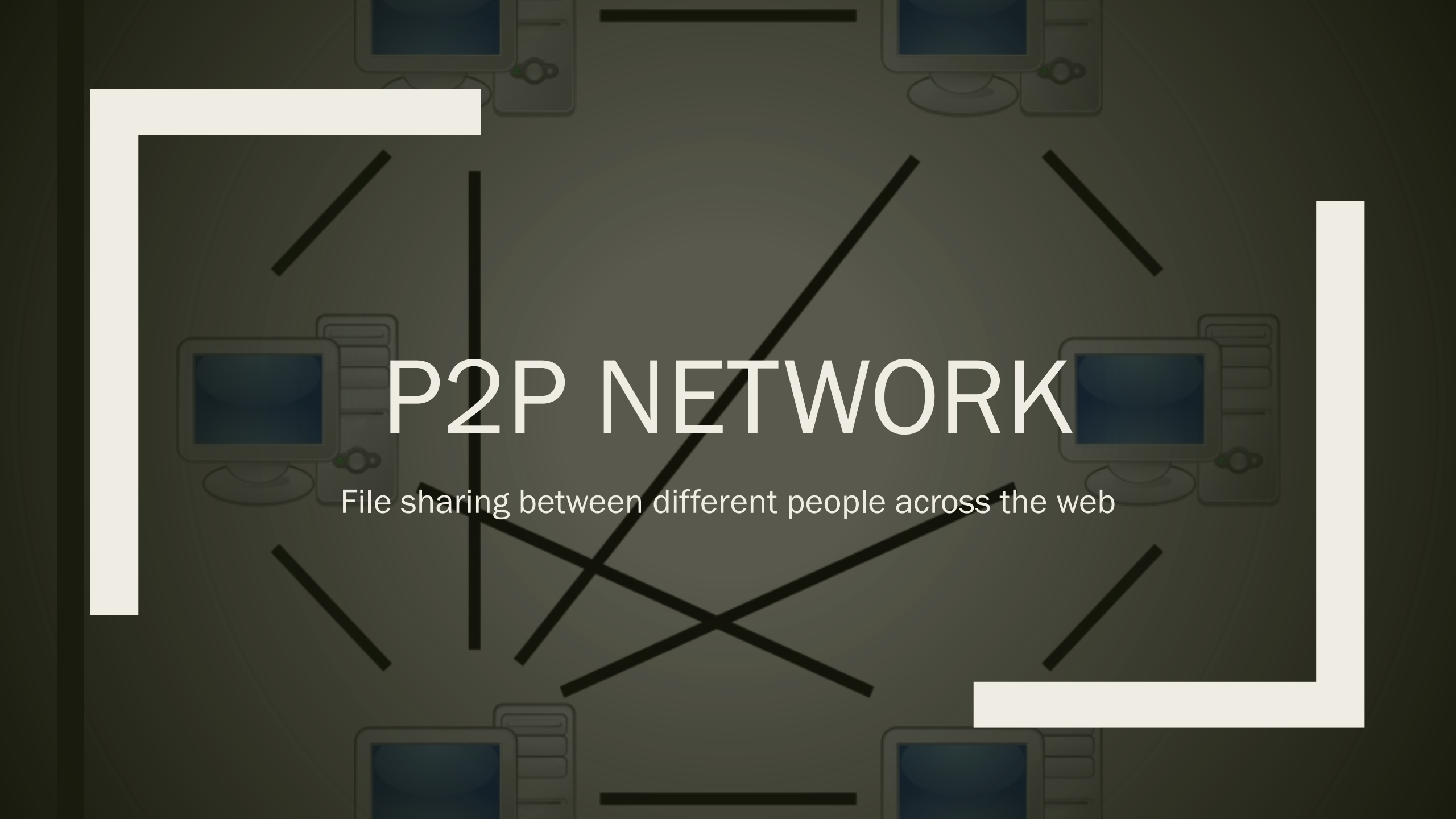
- Centralized Servers are fast
- Low latency

Disadvantages:

- Location based addressing
- If server is down you won’t get that file
- Hackers always target big companies



SOLUTION



P2P NETWORK

File sharing between different people across the web

P2P Networks

- The intended system from the start of networks
- There are no third-party your data has to go to, to get to its intended destination
- Each device in a P2P acts like its own server
- You are in control on where your data is sent and how its used

P2P Usage

Instead of using one big server we can use storage from peers to hold blocks of our data

Peers can partition or rent out storage just for having it be used like a server

Limitations

Keeping files available

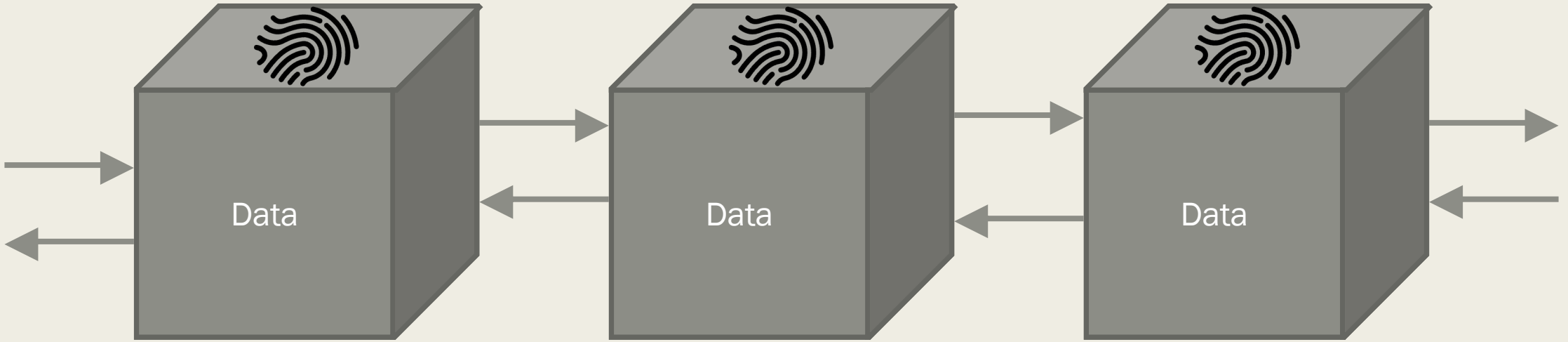
If nodes go offline, it is unavailable

Blockchain

- A chain of blocks that contain information
- BitCoin
- Distributed Ledger
  - Open to everyone
- It is very difficult to change data once it is in a blockchain
- Block
  - Data
  - Hash
    - Always unique
    - Changing something would change the hash
  - Hash of previous
    - Creates a chain of blocks
    - Tracks progress

Content-Based Addressing

- Moves from location-based to Content-Based Addressing
  - Instead of Where you want to find something, you ask what you want to find


Data
Data
Data

USES

Uses

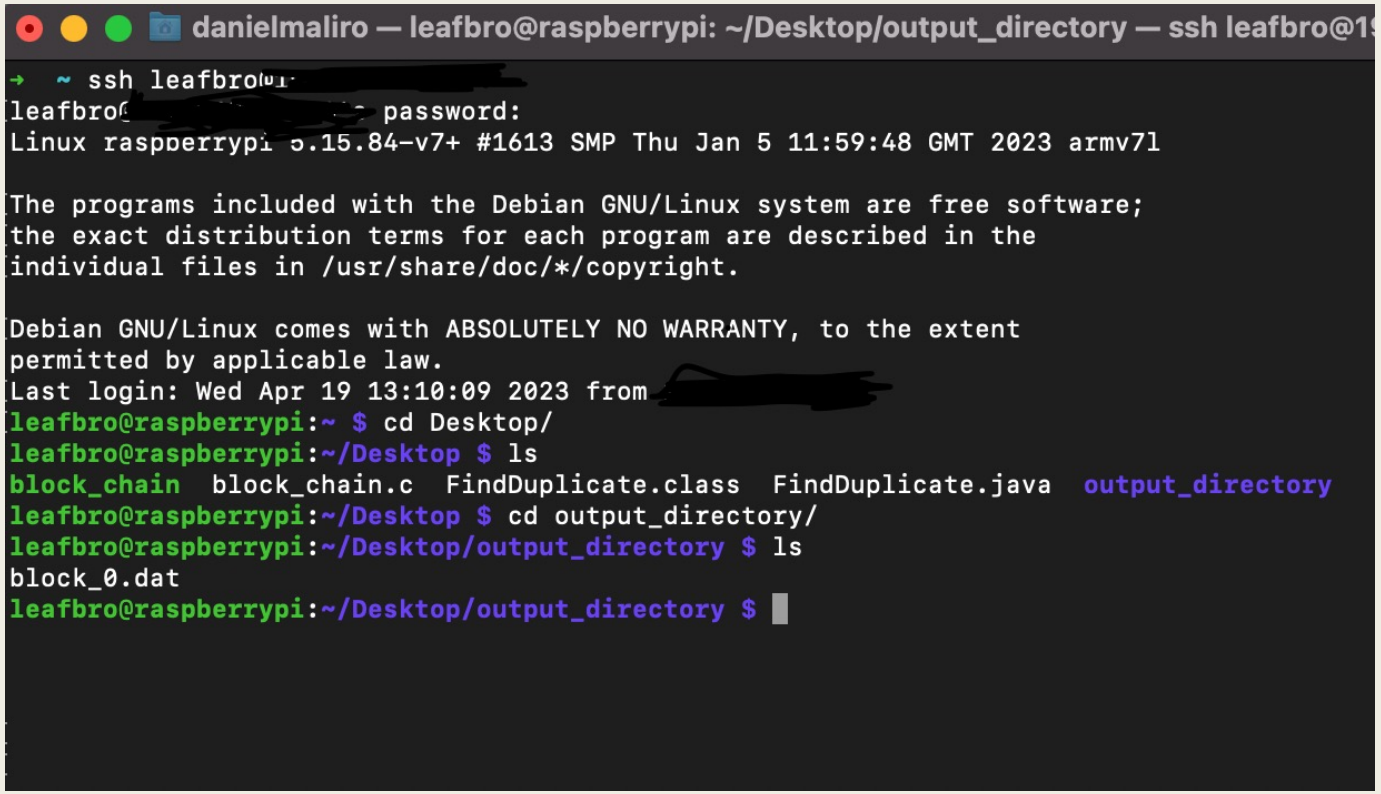
- BitCoin
- IPFS
- Block-Chain for IPFS (Filecoin)
  - Rent out storage and store nodes
  - Has to keep files online otherwise you won’t be reimbursed
  - Incentivize storing nodes
  - Proactively distribute files
  - Multiple copies of the same nodes will be on multiple places just in case the one person has their files offline

```c
#define BLOCK_SIZE 1024 // block size in bytes

typedef struct Block {
    int id;
    char data[BLOCK_SIZE];
    struct Block* parent;
    struct Block* next;
} Block;
```

CODE

Connecting to another Computer



Future Work

- Better Hashing Algorithm
- Implement transfers with the Network
- Encrypt Files and have the files contain the data needed to be identified