

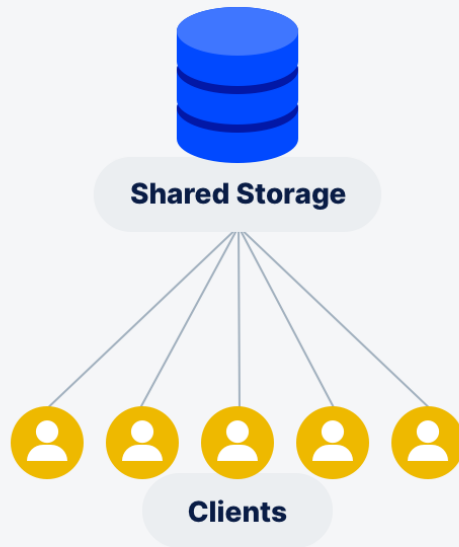


DECENTRALIZED STORAGE

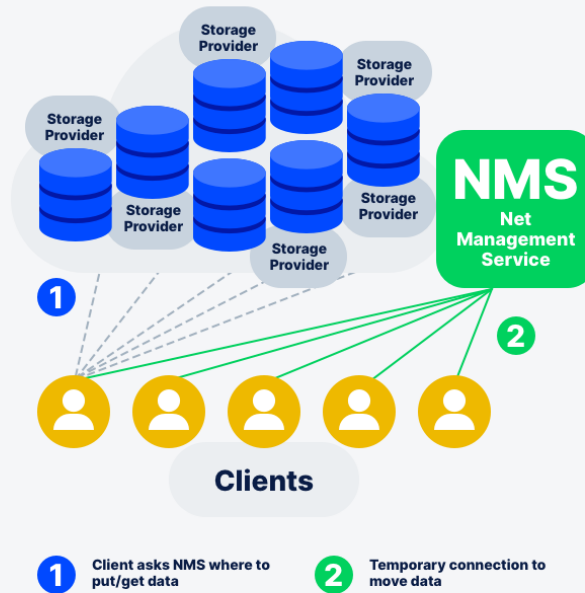
Daniel Maliro



Traditional Shared Storage



Decentralized Storage



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

The background features a dark gray field with a network diagram. It includes several computer icons (monitors and towers) and a series of black lines representing network connections. Some lines are straight, while others are diagonal, creating a mesh-like structure. Four large, white L-shaped corner brackets are positioned at the corners of the central text area, framing the content.

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

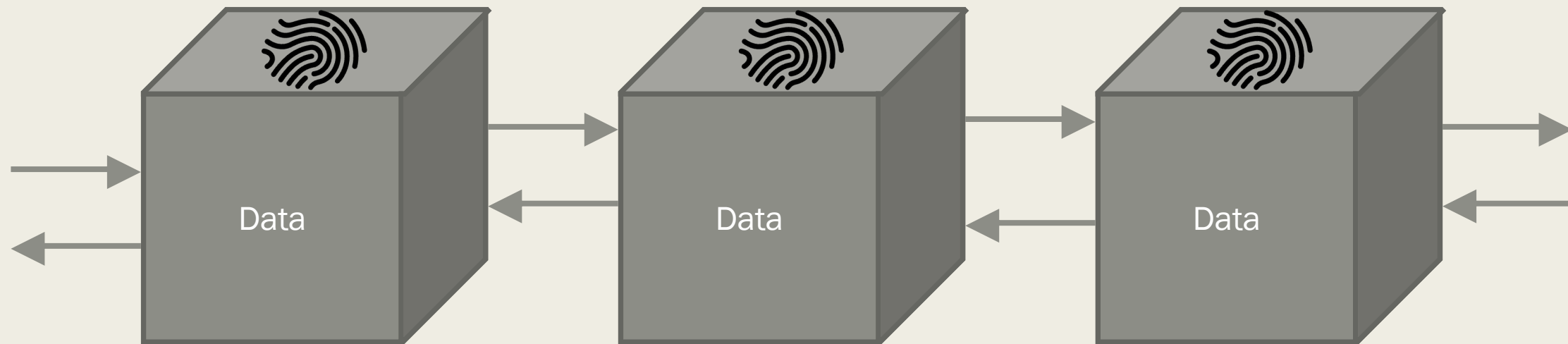
Blockchain

- 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



The background features a dark, textured surface with a grid of small, light-colored dots. The dots are arranged in a pattern that appears to recede into the distance, creating a sense of depth. A white L-shaped frame is positioned around the central text, with the top-left corner being a solid white rectangle and the bottom-right corner being a white L-shaped bracket.

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

```
6  #define BLOCK_SIZE 1024 // block size in bytes
7
8  typedef struct Block {
9      int id;
10     char data[BLOCK_SIZE];
11     struct Block* parent;
12     struct Block* next;
13 } Block;
```

CODE

Connecting to another
Computer

```
danielmaliro — leafbro@raspberrypi: ~/Desktop/output_directory — ssh leafbro@192.168.1.100
→ ~ ssh leafbro@192.168.1.100
leafbro@raspberrypi:~$ password:
Linux raspberrypi 5.15.84-v7+ #1613 SMP Thu Jan 5 11:59:48 GMT 2023 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed Apr 19 13:10:09 2023 from 192.168.1.100
leafbro@raspberrypi:~$ cd Desktop/
leafbro@raspberrypi:~/Desktop$ ls
block_chain  block_chain.c  FindDuplicate.class  FindDuplicate.java  output_directory
leafbro@raspberrypi:~/Desktop$ cd output_directory/
leafbro@raspberrypi:~/Desktop/output_directory$ ls
block_0.dat
leafbro@raspberrypi:~/Desktop/output_directory$
```

Future Work



Better Hashing
Algorithm

Implement transfers
with the Network

Encrypt Files and
have the files
contain the data
needed to be
identified