THE DISTRIBUTED WEB

```
{"Charly_Yan_Miller", "Ebrahim_Badawi", ("Dylan_Hancock")};
```

Intro

Why does it matter that the web stay/become distributed?
Talk about the origins of the web as intentionally distributed. And how new paradigms emerged which centralized and non-distributed the web.

Forces Opposed to centralization:

501C3 US non-profits, ceos not incentive to "cash out"
Internet archive
Mozilla
EFF
WIkipedia

Distributed art

Distributed art/ art that involves over time → memes

Modern Web

Money → centralization
Centralization does not equal non distributed necessarily
First centralization is bulletin boards, then forums
Internet through isp's
Larger and larger platforms, search engines
→ terms of service user agreements
Few server companies own majority of web
(famja)
All means that flow of internet is heavily regulated by companies and is not direct between individuals, centralization of business means this is not distributed

Centralization and Platformization

Domain speculation
Beginning of centralization (platformization
Monetization became data itself → leading to "surveillance economy"
network effects
Lack of data portability
It's important to remember that today's mega-platforms are built on top of the Web's already distributed and open protocols. The real issue to address is this natural tendency towards market consolidation.
Underlying these concerns is the predominant business model for platforms on the Web – user-targeted advertising. Advertising based business models encourage the consolidation and the hoarding of user views and data, driving platforms to become ever larger.

Resisting market consolidation

Platforms benefit from economies of scale in multiple ways – it's cheaper to acquire resources like storage and servers in bulk and as platforms become larger they become more useful as a social network and usually, more profitable. Even in decentralized systems like Bitcoin, there has been a natural market consolidation in the form of large mining pools. This type of consolidation into a few super-participants might be inevitable due to economies of scale. We are increasingly persuaded that this isn't necessarily a bad thing, and that a more realistic goal might be the development of a robust, competitive marketplace that offers a range of ground rules for online speech, rather than a return to a purely peer-to-peer architecture for communication online.

Solutions for centralization

Content based addressing, or other p2p protocols
IPFS
What it is,
Why,
Benefits (distributed, faster, no bandwidth bottlenecks)
Challenges (lots of bandwidth hard for poorer countries, privacy)

What are Platforms, why might they be problematic?

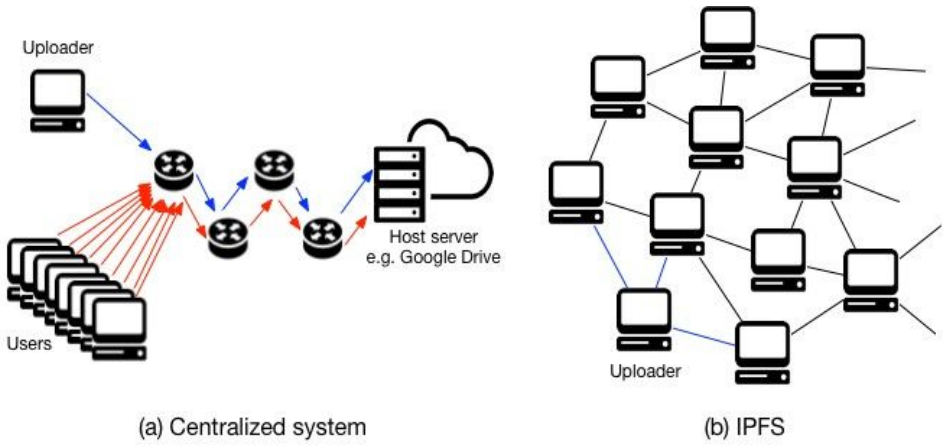
Both less centralized (no regulation, broader), but less distributed in that everything is under a single umbrella
No responsibility
Data Portability (anti apple ecosystem)

Pros to centralization and platformization

Trolls and online harassment groups can be shut down (gamer gate)
Anything connects to anything, anything links to anything

IPFS

IPFS standing for InterPlanetary File System is a modern network system which quote “aims to surpass https to build a better web for all of us”. Now where this all started lies in the IPFS’s initial dislike for the current centralized web system. DEparting from the current centralized network system. IPFS proposes distributed storage of data which is immune to altering and forgery through a distributed network.



(a) Centralized system (b) IPFS

In this system the client becomes server meaning you possess and store your own data. To navigate and access the data IPFS uses cryptographic hashing. “You query the IPFS’ Distributed Hash Table (DHT) network to discover who else claims to have the file you want, connect to them and request the file. Upon arrival your IPFS client can recalculate the cryptographic hash of the file and thus confirm they sent the right file. This ensures the integrity of the files you access and prevents man-in-the-middle (MITM) attackers from modifying the pages you want to access. “. This differentiates from a centralized network where it is common for one central corporation or unit to possess and handling all the distributions of data, which puts your own information in a vulnerable state. This also means that in a natural disaster the information one company stores wouldn't be lost. This also brings the internet back to a more open and organic place.

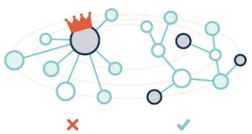
IPFS PRINCIPLES

Today's web is inefficient and expensive

HTTP downloads files from one computer at a time instead of getting pieces from multiple computers simultaneously. Peer-to-peer IPFS saves big on bandwidth — up to 60% for video — making it possible to efficiently distribute high volumes of data without duplication.

Today's web can't preserve humanity's history

The average lifespan of a web page is 100 days before it's gone forever. It's not good enough for the primary medium of our era to be this fragile. IPFS keeps every version of your files and makes it simple to set up resilient networks for mirroring data.



Today's web is centralized, limiting opportunity

The Internet has turbocharged innovation by being one of the great equalizers in human history — but increasing consolidation of control threatens that progress. IPFS stays true to the original vision of an open, flat web by delivering technology to make that vision a reality.

Today's web is addicted to the backbone

IPFS powers the creation of diversely resilient networks that enable persistent availability — with or without Internet backbone connectivity. This means better connectivity for the developing world, during natural disasters, or just when you're on flaky coffee shop wi-fi.

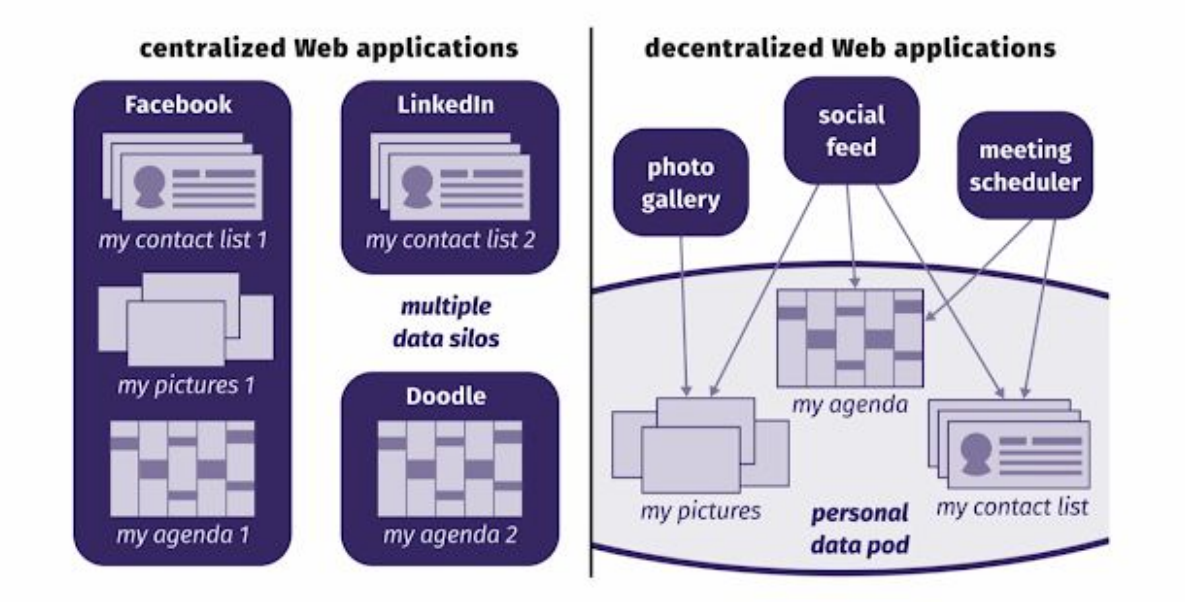
Solid : Empowering people through choice

Everyone could make a website without asking permission from anyone else.

The Solid ecosystem enables you to use the apps you need, while storing your data wherever you want.
You own your data, and share it with the apps and people you choose.
=> there is just ONE copy of your data.

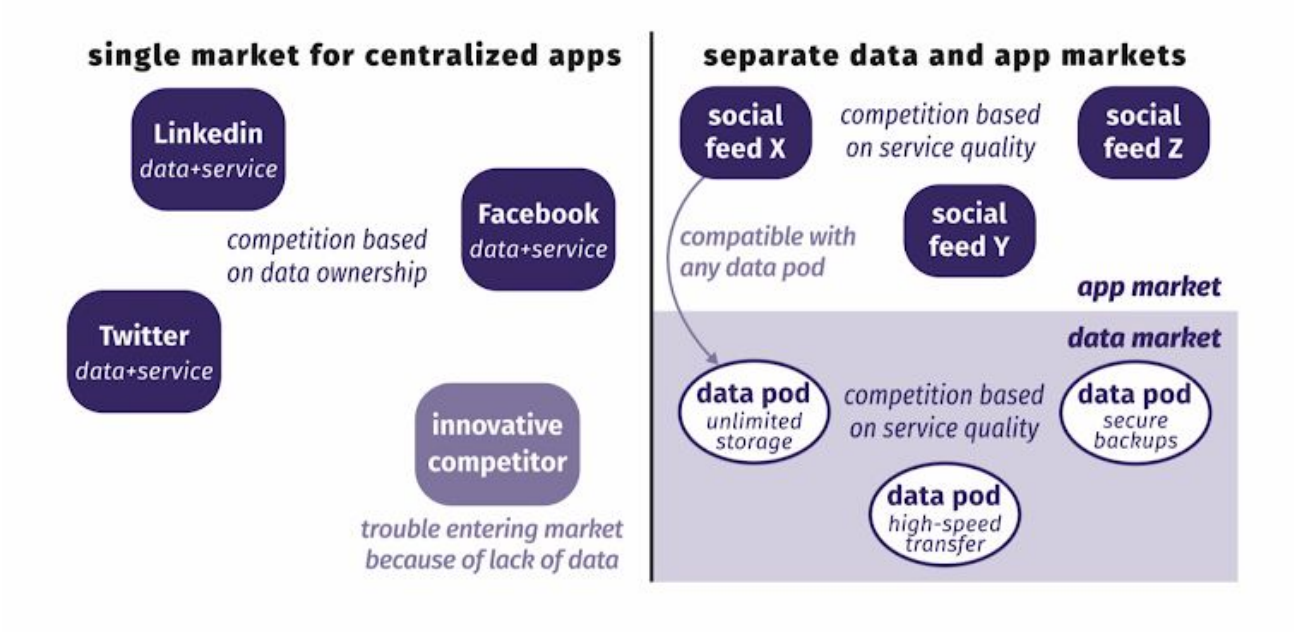
Different platforms tackle decentralization at very different scales:

- One data **POD** (Personal online data) for millions of users -> Facebook, Google, Tweeter
- One data POD for thousands of users -> **Mastodon** (Mastodon is a free and open-source self-hosted social networking service. It allows anyone to host their own server node in the network, and its various separately operated user bases are federated across many different servers. These servers are connected as a federated social network, allowing users from different servers to interact with each other seamlessly. Mastodon is a part of the wider Fediverse, allowing its users to also interact with users on different open platforms that support the same protocol,[2] such as PeerTube and Friendica.)
- One data POD per user -> Solid
- Multiple data PODs per user -> Solid



You can choose where you store every single piece of data you produce.
(Ex. Profile pictures are stores in author's data PODs, whereas comments or likes will store in each individual's data POD.) => every piece of data can link to any other piece of data

In centralized web, Application = Application + Data, whereas on decentralized web, apps will come to your data pod to get data and you can cut that access whenever you want
=> it separates app & storage (data) competition and allows permissionless innovation.



Solid is an ecosystem of data and apps that can work seamlessly together. This ecosystem consists of:

- **Data PODs**
  Servers where you can put your data
- **Applications**
  That can use those data to do something
- **Standards**
  Ensuring those two (data PODs and Apps) can communicate seamlessly

Available resources:

- **Solid Servers:** solid.community, inrupt.net
- **Apps:** Solid's GitHub
- **Libraries, Documentation, etc.:** Inrupt.com, solid.MIT.edu

Scott Draves’ ELECTRIC SHEEPS

the inventor of Fractal Flames and the leader of the distributed computing project Electric Sheep. He also invented patch-based texture synthesis and published the first implementation of this class of algorithms.

First created in 1999 by Scott Draves, the Electric Sheep is a form of artificial life, which is to say it is software that recreates the biological phenomena of evolution and reproduction through mathematics. The system is made up of man and machine, a cyborg mind with 450,000 participant computers and people all over the Internet.

This is a distributed system, with all participating computers working together to form a supercomputer that renders animations, called "sheep", that everyone sees. The human participants guide the survival of the fittest by voting for their favorite animations in the flock. You can join this project by downloading the Electric Sheep Screensaver.

Each participating computer follows mathematical instructions, Draves' Flame algorithm, to render its own piece of the larger work, as seen in the table at left. The images are sent back to a central server which compresses them into animations which are sent back out to the viewers. The electricsheep.org website shows the family tree for each sheep, including its parents and offspring, and viewers can track family resemblance. The artist's Clade series shows a selection of family members in high resolution.

Like Draves' other software art, the Electric Sheep code is open source, which has allowed it to benefit from code contributions from many enthusiastic programmers. Now Draves serves as head Shepherd on a project with many participants.

Artist’s Website

Video **Another Video (Explanation)**

QUESTIONS

Is IPFS the magical solution we have all been waiting for to reclaim internet privacy and space?

What are the pros and cons of platformization?

As a computation artist, what would you create with Solid ?

REFERENCES

- TALK: Solid: empowering people through choice
- Solid | Home
- Decentralized Web Summit
- Scott Draves | Software Artist
- IPFS powers the Distributed Web
- Learn to securely share files on the blockchain with IPFS!
- A Beginner’s Guide to IPFS
- The Decentralized Web
- Where Uber and Amazon rule: welcome to the world of the platform
- Conceptualising media platforms: from a culture of connectivity to a platform society