

Decentralized Internet: The Trustworthy, Democratic – Digital “Garden of Eden”

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Abstract

[The] days of usenet, irc, the web...even email (w PGP) ...were amazing,"

~ Jack Dorsey

[Owner, Former CEO Twitter]

The main purpose of this paper is to investigate the evolution of the internet over the decades. It aims to analyze the need to shift the current centralized network back to the decentralized network. The decentralized internet offers more benefits than the centralized ones but also require careful trade-offs. The original goal of the internet was not meant to be centralized. The US Department of Defense (US DoD) wanted to establish a secure communication that could withstand the catastrophic wars and unanticipated situations. The paper also throws light on the success of the current internet today mainly due to developments in protocols like TCP/IP, WWW & HTML, Browsers, Search Engines, and ISP's.

Keywords: Centralization, Decentralization, Modern Internet, Privacy, Search, Discovery, Abuse, Monetization, Peer to peer etc.

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Bullet: Today's Web – A puppet of “THE BIG FIVE”

If we time travel back in 1983, we would see that the internet was completely decentralized. Every single person had freedom to publish their contents on it without relying on any external service providers. The internet was not owned by anyone. Even today, no one owns the internet and its infrastructure. But the power distribution and its dominance are left in the hands of few.

Earlier when the web came into existence, we used to connect directly with our friends in our network through IRC, Emails that is through desktop computers that communicated with each other. We CONTROLLED OUR DATA. However, after 2000s as the commercialization of

internet begin its reign, we started using the “new” web, communicated with our friends and shared information to them through centralized services provided by third parties like Google, Microsoft, Amazon, Apple, and Facebook. A computer today without these services is just a screen. The “biggies” have monopolized the market.

A Secret Weapon, ARPANET: The pendulum is now swinging drastically the other way

It was the evening of October 29, 1969, when a metal box of the size of refrigerator arrived at the doorsteps of Leonard Kleinrock, a professor at the UCLA. It was IMP (Interface Message Processor).

The original goal of Advanced Research Projects Agency Network (ARPANET) was to establish secure and impenetrable communication network across geographical locations for the US military. Later in 1980’s it benefited the research institutes too as the universities like UCLA, Stanford adopted it via an initiative by the National Science Foundation (NSF). The real game started when the ARPANET, NSFNET and DARPA (The Defense Advanced Research Agency) eventually got decommissioned and it paved the way for the big tech giants as they grabbed the opportunity of commercializing the web seeing that the people heavily depended on the internet. This is how the internet shifted from decentralized to centralized.

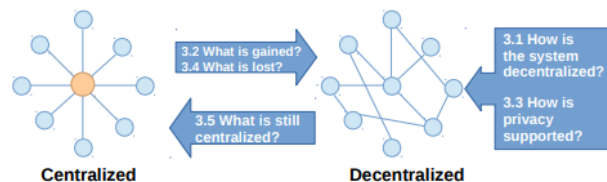
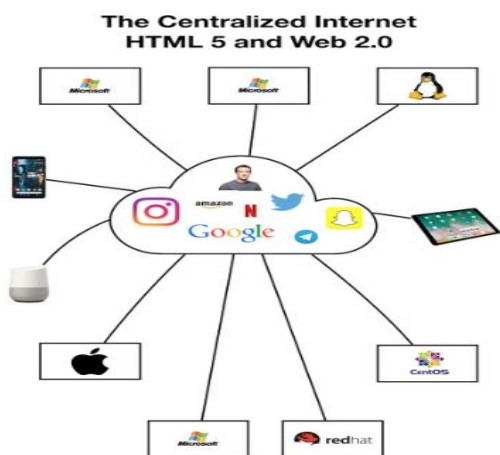


Fig. 1. From centralized to decentralized systems

The Pros & Cons: Four Decade Long Journey of the Internet!

Nowadays, in midst of the hustle, trembled by the current economic downturn, and the turmoil of recession in which the US has been trapped, events happening in market like mass layoffs of the employees at giants like Facebook and Twitter, users are becoming more aware and gradually noticing the challenges of the centralized internet. These powerful giants have now become the gatekeepers of the information. We have to rely on them, trust them. The centralized internet does not guarantee privacy neither is safe from a breach. Any fake or misleading information could be circulated among the public, basically the modern internet has the power to manipulate its users' decisions. Recommender systems are like hidden spies. Wherever you browse, you are being tracked and this information is used illegally to gain profit by understanding the user behavior and playing with their minds.

A centralized internet is prone to attack, vulnerable to failures if the main hub goes down or gets corrupted. However, if your network contains various nodes, it becomes difficult to paralyze the operations and hit their operating systems. Decentralized systems offer freedom, control, and better privacy/security.

The Web Before the Web: The demise of Gopher, the supplemental web Gemini, and the advent of HTTP

There was a time when the HTTP was not a standard. Back in those days people turn their heads to gopher. Gopher was the old school HTTP. Super Dimension Fortress (SDF) was the major host of gopher services. However, it failed to support huge scripting. The interface of gopher was "boring". Then came a fix for gopher, a decentralized protocol called "GEMINI" that was intended to supplement the web. The goal of this protocol was to promote Simplicity,

privacy, generality, and accessibility. Gemini was a fit in simpleness of gopher and completeness of http. Fast forward to 1990's, the HTTP became a web standard. This heavy weight protocol was generic, stateless, and agnostic. The birth of http was responsible for the advent of centralized system whose effects, our generation is facing today.

Analysis of Decentralized Internet Systems: The future of humanity is not AI, it is

Decentralization!!

Experts say that the next milestone in evolution of advanced networking is the metaverse and the Decentralized web (DWeb). Blockchain is an encrypted, secure technology. Bitcoin and ether are a virtual currency, a cryptocurrency that operates free, without the intervention of governments, central control or banks and runs on Blockchain. It provides a decentralized ledger of transactions to the public. How about using these systems instead of intermediaries?

We came across many protocols in the past like the TCP/IP, Email, IRC, Telnet, Usenet, IMAP, The DNS, HTTP, there's one such protocol that supports file sharing and is based on peer-to-peer design system, and which is fully decentralized. This is a BitTorrent protocol. Its network is so robust that it can transfer huge files from one server to every customer. It follows the mirroring concept. User is the master here. Since the protocol is fully decentralized, there are no chances of any bottlenecks, and the user can experience fast downloads. The host on the other hand, does not incur bandwidth charges. Don't you think BitTorrent gained popularity? Of course, it continuous to gain fame because the downloads don't get affected if power crash or system failure happens. You get every piece of data untouched!

IPFS is a Point-To-Point(P2P) decentralized file storage system. It is like torrent that we use to download files using the BitTorrent protocol. It makes use of Distributed Hash Table

(DHT) to store data in various nodes across the network. Objects are not allowed to be altered, instead versioning can be used to alter .txt, .html file for a website.

Secure Scuttle Butt (SSB) is a distributed social network that could work offline without the intervention of the Internet Service Providers. Users can perform all the activities staying offline supported by their Git repo. Users can find each other on the local network. SSB hold the power to replace Facebook.

Privacy, Monetization, No Abuse: Let's grab the power

Attracting flies with honey: The internet today abuses users by playing with their trust. No matter what, our feed or any website that we open gets cluttered with unnecessary advertisements. Today, you browse any website, it pops the dialog box to "Accept All Cookies". Unwillingly the user has to bear with such interventions. Cyber criminals illegally steal our information and sell our data. Your location gets traced too. Hackers trace you and monetize their malware.

Best Practices in bad business: Identity fraud is now a multi-faceted business. The online payment that you do after ordering stuff from sites, you voluntarily provide your credit/debit card details along with CVV, this user information is sold in bulks to the brokers making it almost impossible for the law enforcement to trace.

In the last couple of decades such crimes have increased tremendously, and the advent of centralized internet is to be blamed. But is it still possible to prevent such abuse by staying on centralized network? What preventive measures should one take? The answer lies in decentralization which is clearly explained by Jack Dorsey, the owner, and former CEO of Twitter. Below are the excerpts from his twitter page.

<https://twitter.com/jack/status/1204766078468911106>

Conclusion

“Decentralization is a continuum, not a binary choice.”

In this paper, we saw the benefits and ease one gets by using decentralized internet. It has the potential to solve many problems that the current internet is facing. It shows the resiliency against cyberattacks by eliminating single points of failure. We can achieve the prevention of Data breaches by declining to store information in data stores. Users will get control and ownership of their data. In short, the user will become the King and chooses or change the services at his/her will.

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