



Viewpoint

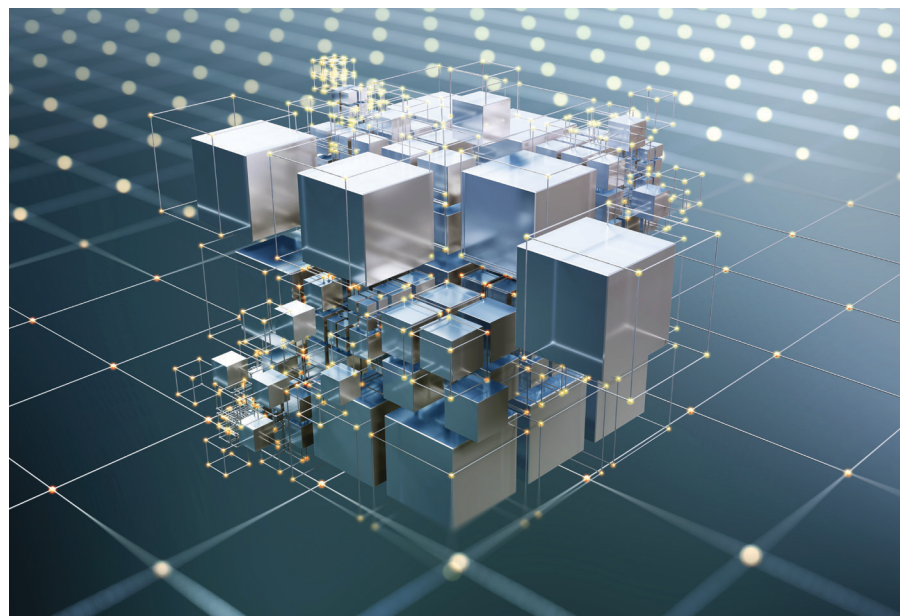
Decentraland: The Alleged Decentralization of Blockchain Applications

Breaking down the blockchain.

INSPIRED BY A post by Moxie Marlinspike on the subject of Web3,⁵ I wish to elaborate on the promise of decentralization of blockchain applications. I will focus on two major use cases of blockchain technology, namely finance and art, which beg the questions: What does decentralization mean? Are blockchain finance and art truly decentralized? And if not, what are the forces that drive us toward centralization?

I am aware of the issue of centralization of existing blockchains. However, this topic is abundantly covered in the previous literature (a comprehensive entry point is Sai⁶). What is missing, or at least less approached, is a discussion on the level of effective decentralization of blockchain applications, in particular of finance and art. Therefore, I focus this Viewpoint on these applications.

A Web3 marketplace is fundamentally different from a centralized Web2 application.



What Is Decentralization?

In information science, a centralized organization is typically represented by the tree data structure and commonly associated with the following principles:⁴

- *Centralism.* The tree structure has a unique root node from which all other nodes descend. This expresses a concentration of power and authority in a central actor of the system.

- *Finalism.* It describes the unidirectional, linear courses of trees: any point in a tree is reachable from the root by a unique, linear, top-down path of intermediate nodes. Trees therefore

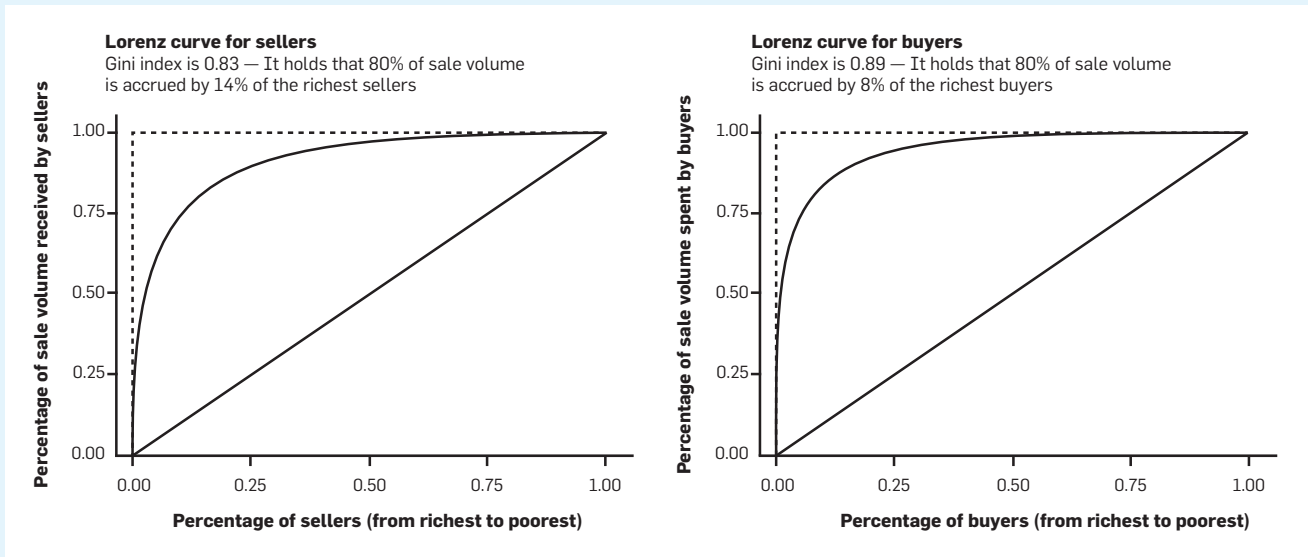
embody an organization devoid of multilinearity or feedback loops.

On the other hand, a decentralized organization is generally associated with the *network* data structure. Networks are rhizomatic structures defined by the following principles:⁴

- *Decentralization.* Networks are webs without a spider: there exists no central authority or root that regulates their growth, but they evolve in a self-organized way.

- *Multilinearity.* Networks allow feedback loops. This means that actors of the system can be reached through multiple paths. Rhizomatic (network)

Comparison of buyers and sellers.



structures offer a new model for knowledge and society that acknowledge decentralization, autonomy, flexibility, creativity, diversity, collaboration, altruism and, ultimately, democracy.

Networks match and sustain the proliferation of information typical of the postmodern condition—the co-existence of a multiplicity of heterogeneous discourses—instead of a simple, central discourse that unifies all forms of knowledge.¹

An important example of the modern perspectival shift from tree (centralization) to network (decentralization) is knowledge. Denis Diderot and Jean le Rond d’Alembert, in their *Encyclopédie* published between 1751 and 1772, depicted the genealogical structure of knowledge as a tree with three prominent branches—memory and history; reason and philosophy; and imagination and poetry—whereby only a small circle of scholars could participate as contributors. By contrast, the contemporary encyclopedia is incarnated by the knitted network of Wikipedia in which everyone can potentially contribute an article. As another example of this shift, corporations are evolving more fluid and dynamic models of decentralized autonomous organization (DAO) out of the typical monolithic hierarchies that have characterized business in the past.

My intention here is to investigate if and how the decentralization

promised by the cypherpunk origins of blockchain is still present in blockchain applications of finance and art—arguably the two major applications of digital ledger technology today.

Decentralization in Blockchain Finance

The financial crisis of 2008 led to the collapse of a number of major banks, such as Lehman Brothers, and forced many states to bail out others with public money. This crisis triggered an economic recession that has not yet been fully absorbed. On a psychological level, 2008 undermined the trust on which the relationship between citizens and their banks, and citizens and their states were based.

On Halloween of that fateful year, something else happened. A mysterious figure hiding behind the pseudonym Satoshi Nakamoto circulated an article, *Bitcoin: A Peer-to-Peer Electronic Cash System*, preceded by a statement

The two pillars of blockchain finance are stablecoins and exchanges.

that left no doubt as to their motives: “I’ve been working on a new electronic cash system that’s fully peer-to-peer, with no trusted third party.”

However, despite the original motivations of fully peer-to-peer operations with no trusted third party, a large share of blockchain finance today is in fact *Centralized Finance* (CeFi), and not *Decentralized Finance* (DeFi). A CeFi platform uses blockchain technology but it is owned by a private company. Users must trust a third party to monitor transactions and ensure the security of assets. Such services also require one to submit one’s personal information for verification in order to operate (this is known as the Know Your Customer or KYC process).

The two pillars of blockchain finance are *stablecoins* and *exchanges*. The most popular stablecoins, like USDT and USDC, are centralized and collateralized by the U.S. dollar, which, like all fiat currencies, is centralized. USDT is owned by Tether, while USDC is owned by Centre, which was in turn founded by Circle and Coinbase. In contrast, DAI is the first decentralized stablecoin, maintained and regulated by MakerDAO, a decentralized autonomous organization that governs its parameters in order to ensure the stability of the stablecoin (which is pegged to the dollar). DAI is collateralized by Ether and other cryptocurrencies (including some centralized stablecoins), and not by fiat money.

Hic et Nunc is fully functional under the new name Teia.

Centralization Is Delegation, Decentralization Is Responsibility

Moxie Marlinspike, the founder and CEO of messaging app Signal, recently addressed the effective decentralization of Web3.⁵ In his view, the Web3 architecture follows the client-server model but virtually all clients who wish to access it do so by trusting the outputs of servers run by a small number of companies including Etherscan, Infura, and OpenSea. However, this inevitably leads to some form of centralization because:

- ▶ people, even “nerds,” do not want to run their own servers and never will;
- ▶ the burden of building software is high. At this point, software projects require an enormous amount of human effort;
- ▶ a protocol such as the blockchain moves much more slowly than a platform such as OpenSea. If something is truly decentralized, it becomes very difficult to alter, and often remains stalled in time.

As Marlinspike hinted in his post, not all individuals have the will, skill, and time to adapt to a truly interdisciplinary field such as blockchain. A dose of delegation and centralization is therefore inevitable. This is not a bad thing, so long as we deeply understand that centralization entails delegation, while decentralization demands responsibility. ■

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Moreover, the most important cryptocurrency exchanges by trade volume, such as Binance, Coinbase, and Kraken, are centralized under private business identities. This effectively means that, when a customer moves funds on these exchanges, the funds are deposited in the exchange’s wallet, and the customer does not own them anymore in their wallet. The customer is forced to trust the third party, as one would when depositing money with a traditional bank. All transactions cost a fee that goes directly to the exchange.

On the other hand, on a decentralized exchange such as Uniswap, customers rely on smart contracts in order to operate (to swap coins or deposit liquidity). Smart contracts are public, audited by third parties, and deposited on the blockchain. Hence, they always do what they are supposed to do (including executing bugs), and cannot be altered unless a new contract is deployed according to the will of a community of token holders. Market takers (those who swap coins) pay a fee that remunerates the market makers (the providers of liquidity). Notably, when a user swaps coins, the exchanged funds are deposited directly into their wallet. In this case, users are forced to trust not a third party but the exchange developers and the smart contracts they wrote, although the code is open source and hence can be audited by anyone.

Decentralization in Blockchain Art

Crypto art is a recent artistic trend leveraging on the novel idea to make a digital file scarce by associating it with a non-fungible token or NFT on the blockchain.³

Despite crypto art’s original commitment to decentralization and equal distribution of resources, the crypto art market is now highly concentrated around a small number of artists and collectors. On SuperRare (one of the major crypto art marketplaces), I computed that 80% of the sale volume (between April 2018 and January 2022) was made by 14% of the top artists (Gini index equal to 0.83) and collected by 8% of the top collectors (Gini index of 0.89). By comparison, in the U.S., the Gini index of household incomes was 0.48 from 2014 to 2018. On other

marketplaces, such as Foundation, the situation is similar or even worse.⁷ In other words, if crypto art were a country and sales reflected a population’s income, then wealth would be as concentrated as it is in the wider economy.

Another point of concentration concerns marketplaces. In principle, an artist can write and deploy on the blockchain their own smart contract and use it in a pure peer-to-peer fashion to interact with collectors and sell their art. In practice, few artists have these technical skills and prefer to use smart contracts developed by marketplaces. In all cases, only the NFT is deposited on the blockchain (hence fully decentralized), while the artwork’s metadata and media containing the actual digital art are typically stored on either a centralized server such as Amazon Web Services (AWS), or on some nodes of a peer-to-peer network such as IPFS and Arweave. The transaction minting the NFT on the blockchain records (but does not verify) the link between the token and the metadata and artwork files.

That said, a Web3 marketplace is fundamentally different from a centralized Web2 application. The recent case of Hic et Nunc (a popular crypto art gallery on the Tezos blockchain) exemplifies this. When its creator, Rafael Lima, decided to shut down what was a highly successful NFT marketplace—not to mention a progressive ecosystem based on the Tezos blockchain—many users felt scammed and some even claimed it was a rug pull. Yet only the front end of the website disappeared, while all the smart contracts and NFTs were still immortalized on the blockchain and visible via other NFT aggregators, like Objkt.com. Now