



DECENTRALIZED SOCIAL MEDIA APP ON ETHEREUM BLOCKCHAIN

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Abstract: An internet dominated by corporations that offer services in exchange for your personal information. Web3, refers to decentralized apps that run on the blockchain. These square measure apps that enable anyone to participate while not monetizing their personal information. During this project we are going to be making a web3 primarily based social media application for users wherever the applying will run on blockchain, decentralized networks of the many peer-to-peer nodes. We will use the tools like Metamask, vercel, pinata and Ethereum Blockchain for deploying the contracts. The web3 not only allows individuals to own their data, but they will be compensated for their time spent on the web.

Keywords: Web2.0, Web 3.0, Blockchain, web3 social network

I. INTRODUCTION

The phrase "Web3" refers to a collection of decentralization ideals and futuristic visions in which community-driven, ad-free, and self-monetized content rule supreme. In light of a reinvented social media paradigm, the creator economy is positioned as a significant beneficiary of this ongoing revolution, despite the fact that Web3 will threaten a substantial number of existing Web2-based business models [1]. Work providers, for example, are frequently at the mercy of the platforms on which they distribute their content in the present iteration of the internet. This can lead to a variety of concerns, such as unjustifiable content suppression, content demonetization, and even deplatforming. Several Web2 platforms also retain total control over the material, placing significant restrictions on content providers. Consider how Facebook owns the photographs you post on the site. Despite the fact that you took the photos, Facebook now owns them! Simultaneously, while being the driving force behind these platforms and the primary reason content providers exist, users (consumers)

are charged for their data. Web3 overcomes these problems by giving content providers unlimited control. Web3 allows artists to profit from a variety of revenue sources while rewarding customers for their continued involvement and support by leveraging the power of blockchain and cryptocurrencies[2]. The main objective of our project is to build and deploy a decentralized social media platform designed for creators where the creators can earn in cryptocurrency. Our project is divided into various objectives to build smart contracts using solidity, to deploy the smart contracts on Ethereum and host the app using vercel, to integrate metamask wallet to manage users and their transactions on blockchain, to build a front end of the platform using NextJS, to store the tweets and users in sanity.io, to interact with our contracts from our Front-end using web3.js library, to style our app using Tailwind CSS, to mint own NFT profile and store it in Pinata.

A. Working of web3 social network

Consider the idea of compensating consumers for using the internet for a moment. We spend a lot of time on one or more Web2 platforms, whether it's reading blogs, watching videos, or simply browsing the web. Our platforms produce billions of revenue, yet consumers never receive anything in return for their devotion. Web3 substantially alters this by compensating users for their engagement [3].

Web3 social networks include built-in payment layers, eliminating the need for superfluous middlemen and fees [4]. They're also completely interoperable, allowing users to purchase, sell, and exchange native assets across several platforms with ease. Content makers, for example, may use NFTs to monetize their work and sell it on several platforms [5]. They may also use the underlying platform's native token to create unique subscription models and add-on services for their communities, opening up new revenue streams.

Simultaneously, Web3 platforms allow content creators to connect into the metaverse by letting them to create a variety

of play-to-earn, learn-to-earn, and other similar incentive

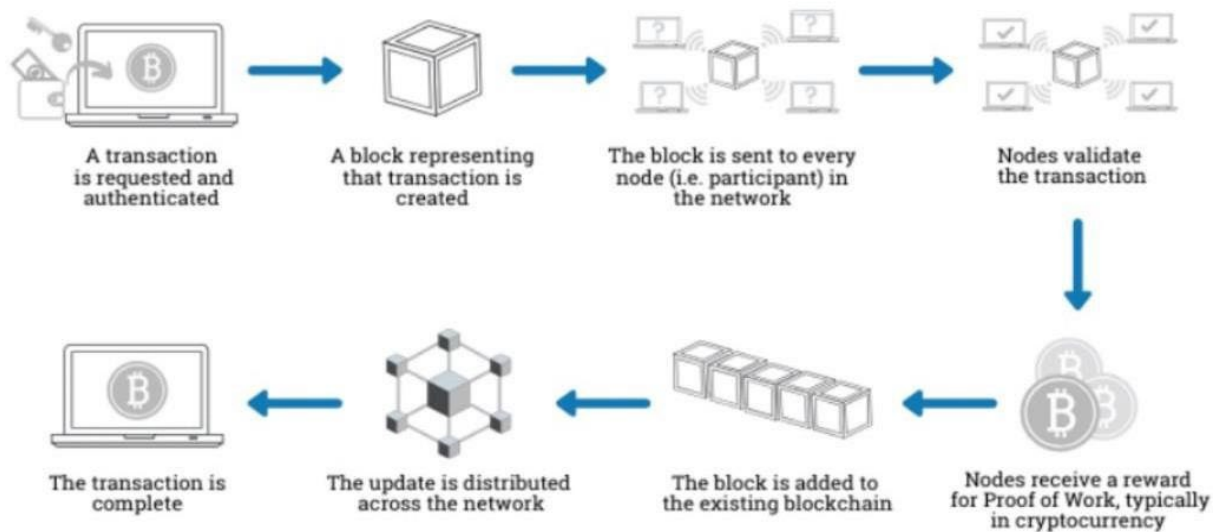


Figure 1: Transaction in a Blockchain

Web2 paradigm, Web3 envisions a social (and interoperable)

Programs for their communities. Community members may earn platform-native tokens by participating in these activities, which they can use to buy more features on the platform, reward creators, or swap for other tokens. They may also use the underlying platform's native token to create unique subscription models and add-on services for their communities, opening up new revenue streams.

Simultaneously, Web3 platforms allow content creators to connect into the metaverse by letting them to create a variety of play-to-earn, learn-to-earn, and other similar incentive programs for their communities. Community members may earn platform-native tokens by participating in these activities, which they can use to buy more features on the platform, reward creators, or swap for other tokens.

In the context of social networks, a native token can also provide holders with the ability to influence the network's destiny. Unlike Web2, where users have little to no input in the platform's development, Web3 delegated this authority to stakeholders.

Token holders may vote on ideas that are most beneficial to their communities and help define the platform's future. These

Ideas might encompass a wide range of subjects, such as introducing new platform features, deciding on future upgrades, reorganizing existing development and marketing teams, and much more.

Web3 encourages consumers to participate in a creator-driven economy while also paying them for doing so, ushering in a new era of social networks. Unlike the Big

Tech-controlled network environment in which all users may eventually own a piece of the financial pie.

Web3 social networks, driven by decentralization, will return authority to the community by providing content producers complete control of their work. These social networks, in conjunction with other Web3 services, will enable censorship-resistant, ad-free, and creative-centric ecosystems, providing equitable possibilities for all.

II. LITERATURE REVIEW

Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto [6]. Through a peer-to-peer network with public recording of all transactions that cannot be distorted or reversed, the paper offered a transaction system that does not rely on third parties and eliminates double-spending. Nakamoto emphasizes that a voting mechanism between nodes may change the entire network. Each node votes using their CPU power, and the system stays incorruptible as long as the majority of the network is made up of honest nodes.

A next-generation smart contract and decentralized application platform by Vitalik Buterin [7]. Ethereum promises to provide a new architecture that offers even greater development simplicity and stronger light client qualities, while also allowing apps to share a common economic environment and blockchain security.

Smart Contracts by Nick Szabo [8]. The scene is fast changing as blockchain is used to industries other than crypto currencies, with Smart Contracts (SCs) playing a key role. SCs, which Szabo described in 1994 as "a computerized transaction protocol that implements the provisions of a contract," allow us to convert contractual clauses into



embeddable code, reducing external participation and risk.

III. TECHNOLOGIES USED

1. Next.js

Next.js is an open-source web development framework implemented on top of Node.js that enables server-side rendering and the generation of static webpages in React-based online apps [9]. Next.js is mentioned in the React documentation as one of the "Recommended Tool chains," recommending it to developers for "Building a server-rendered webpage using Node.js." Whereas standard React apps can only render information in the client-side browser, Next.js expands this capabilities to encompass server-side applications.

2. Tailwind

Tailwind CSS is a utility-first CSS framework for swiftly constructing bespoke user interfaces that may be used to make websites in the quickest and easiest way possible [10]. It's a highly configurable, low-level CSS framework that offers you all the building blocks you need to create personalized designs without having to struggle to override irritating opinionated styles [11].

3. JavaScript

JavaScript (JS) is a first-class compiled programming language that is interpreted, lightweight, or just-in-time compiled [12]. While it is best known as a scripting language for Web pages, it is also used in a variety of non-browser settings, including Node.js, Apache CouchDB, and Adobe Acrobat. JavaScript is a single-threaded, prototype-based, dynamic language that supports object-oriented, imperative, and declarative (e.g., functional programming) programming styles. More information about JavaScript may be found here [13].

4. Typescript

Typescript is a JavaScript programming language for use in applications. Typescript extends JavaScript with optional types that provide tools for large-scale JavaScript applications in any browser, on any host, and on any operating system. Typescript compiles to legible JavaScript that adheres to industry standards.

5. Solidity

Solidity is a high-level object-oriented language for creating smart contracts. Smart contracts are programmes that control how accounts behave in the Ethereum state. Solidity is a curly-bracket programming language aimed towards the Ethereum Virtual Machine (EVM). C++, Python, and JavaScript all have an impact on it. In the linguistic impacts section, you may learn more about the languages that have influenced Solidity. Solidity is statically typed and, among other things, enables

inheritance, libraries, and sophisticated user-defined types. Solidity allows you to design contracts for voting, crowd funding, blind auctions, and multi-signature wallets, among other things.

6. Sanity.io

The Sanity Studio is a React.js-based open-source CMS. It allows for quick configuration as well as free-form customization. Create a workflow that is optimized for how you wish to work with material using our toolkits and plugins.

The Sanity Studio is a single-page application that is open-source. Install npm plugins or create your own. Integrate Sanity into your software.

7. Ethereum Test Network

Rinkeby is an Ethereum test network that allows developers to test their blockchains before deploying them to Mainnet, Ethereum's primary network [14]

In April of 2017, the Proof-of-Authority test network was built. It is maintained by the Geth development team and employs the Clique PoA consensus technique. Geth, Nethermind, and Hyperledger Besu all support the network.

8. Metamask

MetaMask is a cryptocurrency wallet that interacts with the Ethereum network through software [15]. Through a suitable web browser or the mobile app's built-in browser, MetaMask lets users to save and manage account keys, broadcast transactions, transfer and receive Ethereum-based coins and tokens, and securely connect to decentralized apps.

9. Pinata

Pinata is a platform for transporting and safeguarding data over blockchains. It's billed as an easy way to post files to the IPFS, or Interplanetary File System. The process of storing data on an IPFS node is known as "pinning." It's also why Pinata's name is Pinata! When you "pin" data to an IPFS node, you're telling it that it's essential and should be kept.

IV. IMPLEMENTATION

A. Smart Contracts

Simply said, a "smart contract" is a software that runs on the Ethereum blockchain. It's a set of code (its functions) and data (its state) stored on the Ethereum blockchain at a single address. They're usually used to automate the execution of a contract so that both parties may be confident of the conclusion right away, without the need for an intermediary or any time wasted. We'll use Solidity to create our smart contract. Solidity is a high-level contract-oriented language for smart contract implementation. It was inspired by C++, Python, and JavaScript and was created with the Ethereum



Virtual Machine in mind (EVM). Vercel will be used to deploy our smart contracts. Vercel is a top-of-the-line development environment, testing framework, and asset pipeline for Ethereum-based blockchains (EVM). Vercel is largely regarded as the most popular tool for developing blockchain applications. Vercel is a one-stop shop for developing decentralized applications, including contract compilation, deployment, injection into a web app, front-end development, and testing.

B. Frontend

For the front-end of our platform, we'll utilize React, a popular JavaScript package. React is a JavaScript library for creating user interfaces that is declarative, fast, and customizable. It allows you to build complicated user interfaces out of "components," which are tiny, independent bits of code. For quicker and smoother styling of our web app, we use the Tailwind CSS framework. MetaMask will be used for blockchain transactions and user authentication on our dApps. Through a suitable web browser or the mobile app's built-in browser, MetaMask lets users to save and manage account keys, broadcast transactions, transfer and receive Ethereum-based coins and tokens, and securely connect to decentralized apps. In order to interface with the Ethereum Blockchain and, in particular, our smart contracts, we will utilize the web3.js framework for our front-end application. Web3.js is a set of libraries that enable you to transmit Ether from one account to the other, write and read data from smart contracts, and construct smart contracts.

C. Minting NFTs

The term "non-fungible token" refers to a sort of digital certificate produced on a blockchain, primarily Ethereum that ensures ownership of a single digital asset. Artists may monetize their work by minting digital assets (anything from art to music to writings) as NFTs.

The Interplanetary File System (IPFS) is a distributed file system protocol and peer-to-peer network for storing and distributing data. In a global namespace linking all computing devices, IPFS employs content-addressing to uniquely identify each file.

Pinata is the most convenient way to submit your stuff to IPFS. Pinata not only allows you to effortlessly upload a file to your own IPFS account, but it also includes other useful features, so you don't have to become an IPFS expert.

You should upload the file to the interplanetary File System before minting an NFT (IPFS). In general, blockchains are not good at storing vast amounts of data. Instead of keeping your picture or video's content on the blockchain, you should store it on IPFS and offer the hash to your content in the NFT token's information.

When you upload a file to IPFS, it's divided into smaller bits, cryptographically encrypted, and given a unique fingerprint known as the Content Identifier (CID). This unique fingerprint is looked up when someone tries to access

your file using IPFS. The lookup procedure will check if their peer IPFS nodes have access to the CID. The file will be downloaded for usage after IPFS locates the CID.

The picture or video is not really stored on the blockchain by the NFT. Instead, the wallet that generates the NFT will communicate with the smart contract in order to obtain the NFT's uri. The wallet will then search IPFS for the file at the specified URI. The file at the IPFS uri will be rendered by the wallet.

D. Rinkeby Test Net

Because Ethereum is a protocol, it may have numerous independent "networks" that follow it but do not communicate with one another.

Networks are several Ethereum settings that you may use for development, testing, or production. Your Ethereum account will operate on all networks, but your account balance and transaction history will be lost if you leave the main Ethereum network. It's useful to know which networks are accessible and how to obtain testnet ETH so you can play around with it for testing reasons. Anyone with an internet connection can access public networks from anywhere in the globe. On a public blockchain, anybody may view or make transactions, as well as validate the ones that are being carried out. A consensus of peers decides on transaction agreements and the status of the network.

The principal public Ethereum production blockchain, where actual-value transactions take place on the distributed ledger, is known as Mainnet.

There are public testnets in addition to Mainnet. Protocol developers and smart contract developers utilize these networks to test protocol changes and prospective smart contracts in a production-like environment before deploying them to Mainnet. Consider the difference between production and staging servers.

Any contract code you develop should be tested on a testnet before being deployed to the Mainnet. Most projects have replicas of their smart contracts deployed on testnets that you may interact with if you're creating a dapp that interfaces with them.

A proof-of-authority consensus technique is used by the majority of testnets. This implies that only a few nodes are chosen to validate transactions and produce new blocks, so securing their identity. On a proof-of-work testnet, it's difficult to encourage mining, which makes it susceptible.

Because ETH on testnets has no actual value, there are no testnet ETH marketplaces. Most users receive testnet ETH through faucets because they require ETH to engage with Ethereum. The majority of faucets are webapps that allow you to enter an address to which you want ETH to be transferred.

The Rinkeby Ethereum Testnet is one of several public testnets. For our project, we used the Rinkeby testnet.



V. CONCLUSION AND FUTURE SCOPE

The blockchain is helping to restore internet privacy. Unlike traditional databases, which store data in a single location, blockchain develops a distributed ledger that maintains data accuracy and security by storing it in multiple hashes that link to verify the data. There is a need for a system that can provide data transparency to its consumers in order to build confidence. Users are currently concerned about where their data is going and how it is being used; while such users are few in number, they are becoming more conscious of data security and its importance to their privacy. Smart Contracts does have the potential to create data transparency and privacy for the users but currently the Ethereum Mainnet is very slow and expensive as well, so privacy comes at a price right now. But with the rapid technology advancements seen in the field of blockchain, the days are very close when Mainnet will become faster and much cheaper.

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