Combined Text Files

51 Percent Attack

What is a 51% attack?

Examples of 51% attacks on crypto networks

The risks and consequences of 51% attacks

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A 51% attack is when a group of miners take control of more than half of a blockchain network's computing power (also known as hashrate) and use it to manipulate the network. This is possible becauseblockchain networkssuch as Bitcoin are decentralized and rely on a network of computers, called nodes, to confirm new transactions and keep the network running smoothly. 51% attacks are also referred to as a majority attack or a double-spend attack.

A double-spend attack is when the attackers use their extra mining power to create fake transactions and spend their digital currency more than once without anyone noticing. Another type of attack is called "block withholding," where the attackers interfere with the confirmation of new transactions and prevent them from being added to the blockchain, halting the entire network. On the Bitcoin network, this attack would make the mining pool lose all block rewards contained within the block.

Theproof-of-work consensus mechanism, used by the Bitcoin blockchain (BTC), makes it very hard for hackers to take over the network: more computational power leads to more security. They would need to do a lot of computational work, called "hashing," to validate new transactions. Since the amount of work required is related to the total computing power on the network (network hashrate), no group of miners with less than 51 percent of the power can take over.

In the Bitcoin whitepaper, Satoshi Nakamoto assumed that acquiring 51% of Bitcoin's hashrate would be impossible, and therefore didn't consider the economic incentives behind a 51% attack. TheBitcoin blockchain, number one network and cryptocurrency by market cap, has never been subject to a 51% attack before.

There were unfortunately some successful attacks in the history of blockchain. Although the Proof-of-work mechanism is secure, smaller blockchains that operate on this algorithm such as altcoins (BTG or Litecoin, for example), are more vulnerable to such attacks, since there is way less computational power for the attackers to compete with.

In May 2018, the Bitcoin Gold (BTG) blockchain suffered a 51% attack, and it was estimated that $18 million worth of BTG was double-spent. One of the most high-profile examples of a 51% attack occurred in May 2021, when the Bitcoin Gold network was targeted again. The attackers were able to use their overwhelming hashing power to reverse transactions and double-spend their crypto, effectively resulting in the theft of nearly $70 million worth of BTG.

Ethereum Classic (ETC) has also been the victim of a 51% attack, as has Bitcoin SV (BSV). The chain reorganization led by the attackers allowed them to reverse transactions and potentially steal digital assets such as NFTs.

The decentralization of cryptocurrency networks is one of their key selling points, as it allows for increased security and fairness. However, the reliance on proof-of-work (PoW) consensus algorithms, which require miners to compete with each other to solve complex mathematical problems in order to validate new blocks, can make them vulnerable to 51% attacks. This is because the cost of acquiring the necessary mining equipment and electricity to achieve 51% of the network's hashrate can be prohibitively expensive for most individual miners, but may be within reach for well-funded organizations or even governments.

Some measures can be taken to mitigate the risk of 51% attacks. The XMR blockchain implemented a protocol update that blocked ASIC mining from being used to mine on its network. ASIC mining is a technology developed by various early Bitcoin mining companies to enhance mining hardware, making it a lot more powerful, but increasing the risk that certain individuals or groups of miners could gain too much power.

TheProof-of-stake(PoS) consensus algorithm, which ETH moved to in 2022 with theEthereum

Merge, is an example. PoS requires block validators to have a certain amount of digital currency staked, in order to have the ability to validate new blocks. This helps to discourage malicious actors, as they stand to lose their stake if they attempt to interfere with the network.

Since NFTs reflect ownership and have manyuse casesin the real-world and the metaverse, it is especially valuable to secure them through Bitcoin. Bitcoin has proven to be the most secure blockchain with the least attacks. This is what theStacks blockchainallows: powering Bitcoin secured NFTs.

NFT Standards

NFTs: the basics

What is a non-fungible token standard?

Stacks blockchain standards

Ethereum standards

Tezos blockchain standard

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An NFT, or non-fungible token, is a unique digital asset on the blockchain. It has unique metadata and can't be copied or substituted. Unlike traditional cryptocurrencies such as Bitcoin or Ethereum, NFTs are not like-to-like with one another (fungible).

Someuse casesfor NFTs include digital art and digital collectibles, game items and blockchain games, tickets to events, as well as long term uses in the metaverse and in the real world.

The ecosystem is growing fast and NFTs, at first popular on the Ethereum blockchain, have spread to other blockchains including Solana, Tezos andStacks, a blockchain layer which enablessmart contractfunctionality for Bitcoin.

In this article, we will look into token standards and how they work.

NFT standards (or token standards) describe how to build NFTs on a particular blockchain protocol.

There are many different standards on different blockchains.

Stacks is a blockchain technology that is anchored to the Bitcoin blockchain. It enables the use and creation of smart contracts through the Clarity programming language, essentially making the Stacks blockchain a 'GitHub for smart contracts', and making NFTs, NFT marketplaces, and DeFi applications built on Bitcoin possible.

Gamma.io, the leadingNFT marketplaceon Stacks, allows users to buy, sell and mint incredible NFTs secured by Bitcoin.

The standard used by the Stacks blockchain to create NFTs isSIP-009. It outlines standard features that NFTs must have to be compatible with Stacks wallets. SIP stands for Stacks Improvement Proposal.

TheSIP-010standard is an interface definition that allows Stacks applications and wallets to interact with fungible tokens in a standard way.

On the Ethereum network, token standards start with the abbreviation 'ERC' (Ethereum Request for Comments). The "ERC" abbreviation denotes a set of rules that help developers improve the process of creating a standard ETH-based token, and the number that follows is the unique identification number for the proposal. ERCs are essentially EIPs (Ethereum Internal Proposals) mainly dedicated to dApps (decentralized applications).

The ERC-721 token standard was the first NFT standard, and started it all. It is the most popular and widely used NFT standard. It describes how to build NFTs on Ethereum. Every ERC-721 token is unique and can be priced independently of other tokens. For this reason, many digital artists choose to use ERC-721 tokens for their creations. ERC-721 tokens cannot be destroyed or duplicated, and are unique because the token ID (identifier) and the contract address pair must be unique. ERC-721 was first used in the CryptoKitties game and is the most popular token standard on OpenSea, the leading NFT marketplace on ETH.

Due to its popularity, ERC-721 equivalents were written on other chains. As an example you'll find

BEP-721 on BSC (Binance Smart Chain) and standards similar to ERC-721 on the Flow blockchain, with the advantage of a lower gas fee (transaction fees). Since Flow powers NFT marketplaces like NBA Top Shot, it is gradually gaining popularity in the NFT space. TRC-721 is the equivalent of ERC-721 on the Tron blockchain.

ERC-20 tokens areEthereum smart contractsthat provide great flexibility and functionality. They can act as certificates, financial assets, utility assets, cryptocurrencies or stocks. The main difference between ERC-20 and other crypto standards is that it is tied to ETH and can only be used within this network, therefore, commissions are written off during transactions and gas fees directly depend on the network's load.

Just like ERC-721 standard, ERC-998 tokens are non-fungible, but they are also composable. Think of it as a portfolio of digital assets: they can be organized into complex digital assets and hold various NFTs (like the ERC-721) as well as fungible tokens (like the ERC-20).

With the ERC-1155, users can register NFTs and FTs (fungible tokens) in the same smart contract. Fungible tokens, such as in-game currency, are often used to purchase NFTs, such as in-game items and other digital collectibles. This standard was created by blockchain gaming developers Enjin, Horizon Games and The Sandbox in 2017, and is essentially a combination of theERC-20(fungible token) andERC-721(non-fungible token) standards.Semi-fungible tokensemerged from Ethereum's ERC-1155 standard and are mainly used in the gaming industry.

Other Ethereum standards include ERC-827, which allows the approval of fungible token transfers so the tokens can be spent by an on-chain third party; ERC-777, an improvement on ERC-20 allowing users to send tokens on behalf of different addresses; ERC-1137, designed for recurring payments, and more.

Tezos, a decentralized blockchain, has its own native cryptocurrency called Tez and a single NFT standard called FA2, that can support a variety of token types (including fungible tokens, NFTs and other interactive, transmutable gaming items). FA2 also supports a standard API for external wallets,

games, and apps.

What is sBTC?

Understanding sBTC

sBTC features and potential

What is Stacks?

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In the fast-evolving world of web3, new innovations are continually emerging. One such innovation is sBTC --- short for Stacks Bitcoin --- a Bitcoin derivative that enables decentralized movement of BTC in and out of Bitcoin layers.

sBTC (not to be mistaken with SBTC, Super Bitcoin) is a novel synthetic asset designed to enable a trustless two-way Bitcoin peg system. This system serves as a crucial tool in realizing the completeStacksvision, as it allows for trustless writing to the Bitcoin network. Stacks 2.0 introducedClarityand 'read' access; sBTC represents the final component needed to achieve a fully expressive Bitcoin layer with the capability to tap into vast amounts of Bitcoin capital, amounting to hundreds of billions.

Bitcoin layers hold the potential to facilitate DeFi and various BTC-based applications, but there is a significant drawback: there is currently no trustless method for users to employ their BTC within applications andsmart contracts. Stacks has persistently strived to make Bitcoin fully programmable, but Bitcoin's inherent design limits it with a constrained scripting language. As a result, conducting activities such as writing to Bitcoin or working with Bitcoin assets in a manner akin tosmart contracts on ETHor fully operational applications has been either impossible or exceedingly challenging.

sBTC seizes the opportunity to enable trustless writing toBitcoinvia a two-way peg mechanism. So far, previous attempts have typically relied on federated or centralized approaches. The sBTC price peg system has the potential to elevate the security and functionality of Bitcoin layers, akin to the

developments witnessed inEthereumwith technologies like Arbitrum and Optimism. This means that users not only gain access to comprehensive smart contracts at Layer 2 but can also effortlessly transfer their assets in and out of the layer in a decentralized fashion and in real-time, with their transactions benefiting from the rock-solid security of the Bitcoin base layer. In Ethereum, multiple layers primarily enhance scalability but with Bitcoin, the Bitcoin layers take on heightened importance, given the inherent limitations on the main chain.

Thewhitepaperfor Stacks Bitcoin and the Nakamoto release covers the benefits and more technical aspects of sBTC, so here are a few key takeaways. The Stacks layer and sBTC state automatically forks with Bitcoin L1. All transactions settle to the Bitcoin L1 with total Bitcoin finality, giving strong security guarantees. The network is open and decentralized, operated by a dynamic set of economically incentivized open-membership signers. Because all sBTC operations happen on the main chain, external actors in the layer can't censor those operations, making sBTC censorship resistant. sBTC could also help scaleBitcoin Ordinals: as they continue to grow, moving certain functions to the L2 can enable faster, richer and and cheaper experiences for users.

sBTC has a number of use cases, including BitcoinDeFi, which will enable decentralized ways to earn yield on BTC. Applications powered by sBTC can enhance the safety of using BTC as collateral for borrowing. With Bitcoin's constrained circulating supply and rapid transferability, it serves as an ideal asset for borrowing purposes (as a reminder, Bitcoin's total supply is limited to 21M coins). Users can securely lock up their Bitcoin within smart contracts and borrow funds from a diverse network of lenders, including both institutions and individuals. sBTC also facilitates asset swaps, enabling users to exchange their BTC for other assets in a decentralized manner, eliminating the need to rely oncentralized exchangessuch as Binance. Given the volatility of Bitcoin price, sBTC offers users a means to effectively manage their BTC exposure by swapping it forstablecoins(which are pegged to fiat currencies such as USD and EUR) during periods of heightened volatility.

While sBTC is not the only Bitcoin derivative in the market, its unique functionality sets it apart.

Unlike Wrapped Bitcoin (WBTC) which relies on custodians to lock up actual BTC, sBTC operates on-chain, offering a higher level ofdecentralization. This distinction is essential for users who value security and trustlessness. Keep it on your watchlist!

We've been discussing how sBTC helps realize the Stacks vision, but what is Stacks?

The Stacks blockchain leverages the security of Bitcoin while introducing the capability to create smart contracts. These smart contracts utilize a user-friendly and easily readable language known as Clarity. Despite Bitcoin (BTC) being the most widely recognized blockchain and the largest cryptocurrency with the biggest market cap in US dollars, its potential for smart contract applications has been constrained due to scalability, speed, and syntax limitations. The Stacks network aims to change this and unlock Bitcoin's full potential.

Stacks operates on theProof of Transfer (PoX)consensus mechanism, where miners use BTC to mint new STX crypto tokens. It relies on the Bitcoin blockchain, functioning somewhat like a Layer 2 solution, yet it is distinct from Bitcoin, has its own set of rules and is maintained by Stacks nodes, exclusively for the Stacks ecosystem. This separation is intentional, as Stacks developers aim to enable programmability for Bitcoin without altering the core Bitcoin protocol. Stacks blocks are securely recorded on the Bitcoin base-layer blockchain.

Thanks to its smart contract functionality, Stacks allows developers to builddApps, DeFi apps,DAOs, andNFTs. Because of the unique properties of Stacks, builders can create applications with sBTC that leverage the built-in bitcoin yield of the protocol to reward users, bootstrap liquidity, & more.

How to Buy an NFT

Understanding NFTs

The basics

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The first step to buying NFTs is to understand the difference between a non-fungible token and a cryptocurrency, as well as the different types of NFTs.

Non-fungible tokens, (unique digital assets on the blockchain), are unlike cryptocurrencies in the sense that if you trade one token for another, for example bitcoin, you'll have exactly the same thing because bitcoin is "fungible".

There are manytypes of NFTs: art, music, photography, video game items, tickets to events, avatars and profile pictures, domain names, trading cards and tons of other digital items. Thanks to blockchain technology, NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate.

NFTs and associated memes are trending. But why?

Interest in the blockchain network and its decentralized nature has soared in the past years. Social media, the quality artwork produced by creators and digital artists for their digital collectibles and the sense of community within the ecosystem play a huge part in the popularity of NFTs, and the NFT market's growth.

Some noteworthy events also participated in the NFT boom: in 2021, NFT sales volume surged to over $2.5 billion; Beeple sold adigital collagefor a record-breaking $69 million; Jack Dorsey, former CEO of Twitter, sold an NFT of his first Tweet for $2.9 million; A four-bedroom house in Tampa, Florida, was sold as an NFT in early 2022, the buyer paid 210 ethers to acquire the rights to the house, which were stored in an NFT on the ethereum network. The list goes on.

To buy NFTs, you'll need to go to anNFT marketplace, an online marketplace where you can find, explore, buy, trade and sell NFTs. You'll be able to purchase digital art, discover NFT projects such

as Cryptopunks, Bored Ape Yacht Club,Megapont, the Guests and more.

The marketplace you choose depends on the type of NFT you are looking to buy as well as the blockchain ecosystem you're looking to join. If you're looking for NBA collectibles, head over to NBA Top Shot. If you're looking for a game-oriented NFT marketplace, head over to Axie Infinity, where the assets of the online gaming platform can be minted, sold and bought.

If you're looking for digital artwork and profile picture collections, consider other popular NFT marketplaces such as OpenSea, Rarible, Nifty Gateway or Superrare on the Ethereum blockchain (ETH), Magic Eden and Solanart on the Solana blockchain, Aavegotchi on Polygon, andGammaonStacks, a blockchain layer built on Bitcoin, the must trusted blockchain.

First, you'll need adigital walletand cryptocurrencies. Some NFT marketplaces accept debit and credit cards payments, but the majority will require a cryptocurrency wallet.

A crypto wallet is where you store your cryptocurrencies and digital assets. Popular wallets include Metamask, Coinbase, Gemini, Electrum and many others. At Gamma, we accept Leather Wallet and Xverse, both compatible with Stacks. Note that different wallets enable access to different NFT marketplaces andsmart contracts, therefore different NFT collections. As an example, a Metamask wallet or a Coinbase wallet allows you to access ETH dApps, a Temple wallet allows you to access Tezos dApps and a Leather wallet allows you to engage with Bitcoin dApps built with Stacks.

If you don't have any cryptocurrencies, you will need to exchange your fiat (currencies such as dollars, euro etc) for cryptocurrencies (such as bitcoin, ether, stacks). You can head over to acrypto exchangeplatform such as Binance or Coinbase.

When you have cryptocurrencies and a crypto wallet compatible with the NFT marketplace you'd like to use, you can get started!

Bitcoin is the most trusted blockchain. Stacks is a settlement layer built on Bitcoin, enabling smart contracts secured by Bitcoin.

Gamma is the largest NFT marketplaces on Stacks. Our user-first marketplace makes buying and

selling NFTs as easy as shopping on Amazon or eBay.

Once you've completed the cryptocurrency exchanges process and created your digital wallet, head over to the Gamma marketplace. Connect a supported digital wallet browser extension to Gamma and allow usage of your wallet's cryptocurrency for the purchase of an NFT.

While we have no explicit affiliation with Leather, we recommend using the Leather wallet extension for the best experience. You can download the Leather wallet atLeather.io/install-extension. You can find more information on how to purchase STX (Stacks) in thisblog post.

Once your crypto wallet is connected, you can start exploring the NFT art and collections available onGamma. You can buy an NFT at a fixed price on thesecondary marketplace, make an offer on a collection or individual NFT, place a bid on anauction,mint new NFTsand more !

We've put this together this helpfulguidein learning some of the ways you can protect yourself as a user, screen for high quality projects and avoid scams, but you should always perform your own research before purchasing any NFT for any amount of money.

As a buyer, the price listed includes all marketplace commission fees, so the final cost will only include the list price plus the actual transaction fee charged by the network to secure and confirm your transaction.

When you list an item for sale on Gamma, we'll prompt your wallet extension with a transaction that includes the details of the sale plus our commission fee. Your digital wallet will then submit the transaction on your behalf. When you sell an NFT, you'll pay atransaction feeassociated with the blockchain (also called gas fees), as well as our commission fee. We make money when your NFT sells, not when it is listed; if your NFT never sells, you will not be charged a fee.

Are you ready to get started on your own NFT adventure?

Bitcoin Name System (BNS)

What is BNS?

What are ENS domains?

Unstoppable domains

How can I buy a .BTC domain name?

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Web3 domain name services such as BNS and the Ethereum Name Service ("ENS") have become extremely popular in recent months.

Blockchain Name System (BNS), considered use-cases of blockchain technology, are blockchain domains that are secure and open, with decentralization at their core. The domain assets only belong to the owner and are censorship-resistant, making integrity one of their top qualities.

They can be used as the user'sdigital identityand social media handles, to store usernames, fungible and non-fungible tokens, avatars, and other profile data to be used across dApps in the crypto andWeb3ecosystem.

DNS (Domain Name System) make the internet easier to use, allowing users to simply remember a human-readable name rather than an IP address. With BNS, users have more functionality than with DNS, as well as full control over their private keys. Data is securely stored and cannot be tampered with, or deleted.

A good example of BNS domains is the.btc domains. This is theStacks blockchain's decentralized web identity and human-readable wallet address system. .BTC domains are registered through asmart contracton Stacks, secured by Bitcoin. This smart contract implements a decentralized name registry. Given Stacks' unique connection to Bitcoin, registering .btc names automatically generates a pair of corresponding Bitcoin and Stacks addresses and ownership of every .btc name is represented in a hash of the Bitcoin blockchain. Stacks is uniquely positioned to unleash Bitcoin's potential, enable BitcoinDeFiand help grow the web3 ecosystem.

On Gamma, you can use your blockchain domain to transfer NFTs to someone by typing in their .btc name instead of the longer alphanumeric wallet address, or you can use it to view your own --- or

someone else's --- profile and NFTs on Gamma. Your BNS name is automatically reserved as your unique profile address, likegamma.io/example.btc.

ENS domains enable users to register domains issued on the Ethereum blockchain.

These domains are programmable and interact with other Ethereum-based dApps. Since they use the ERC-721 tokenstandard,ENS domainscan also be traded as NFTs, with the vast majority of their trading activity taking place on leading marketplaces OpenSea and LooksRare.

ENS is composed of two Ethereum smart contracts: the ENS registry, which records domain names, and the Resolver, which translates domain names to machine-readable addresses and vice-versa.

To date, over 2.6 million total ENS names have been created. Investors and speculators have been purchasing popular domain names, in the hope of flipping them for a profit when the time comes where brands and corporations want to acquire their associated domain name, to establish a presence within Web3. For example, theEthereum addressowning "nike.eth" has accumulated over 130 ENS domain names including the domains "sony.eth" and "strawberry.eth".

ENS also allow users to launch censorship-resistant decentralised websites and to upload their website to IPFS and access it with their ENS name. To register an ENS domain, go toens.domainsand search the name you'd like to purchase. You will need an ETH-compatible wallet such as Metamask or Coinbase Wallet.

Another popular Web3 domain name service provider isUnstoppable Domains. Unstoppable Domains works similarly to ENS but offers support for additional top level domain server names. Whereas ENS domains only follow the naming convention of "name.eth", Unstoppable Domains allows users to purchase domain names that can include top level domain servers such as "name.crypto", "name.wallet", "name.nft", "name.dao", "name.bitcoin", amongst others.

The Unstoppable Domains community has registered over 2.5 million total domains in 3 years, transacted $80 million in primary sales, and the project supports over 275 tokens and 370 applications.

Toclaim your Bitcoin domain, head over tohttps://btc.us/. Connect yourcrypto walletand make sure to select an address that does not already have a .btc domain tied to it, as you can only have one per address.

If the name you'd like to purchase is available, you will be able to pay with cryptocurrencies (STX and Bitcoin) or USD. That's it, your name registration is complete and your domain name is yours for five years! You'll then need to pay some renewal fees if you'd like to keep it.

Thebtc.usweb bridge also allows users to use their names as web pages. The web bridge turnsbtc.usinto the top level domain and allows users to generate subdomains for their personal use. This means that with your Bitcoin domain registration, you can link to your website's address via your domain name. Let's take example.btc, once linked to your website with a top level domain (TLD) such as .com, typing example.btc in the browser URL bar will lead users toexample.com.

For more information on selling, buying and transferring .btc domains, head over tothis article.

Stablecoins

What is a stablecoin?

Types of stablecoins

Popular stablecoins

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Stablecoins aredigital currenciesthat are designed to maintain a stable value relative to an external reference, such as a fiat currency like the U.S. Dollar, or another cryptocurrency, and to maintain reserve assets as collateral. This reserve or collateral used for the issuance of the stablecoin is what backs the value of the asset.

They are built onblockchain technologyand don't rely on a central bank like the Federal Reserve, just like cryptocurrencies, but they offer a level of stability that other crypto assets lack. Indeed, despite the attention that cryptocurrencies such as Bitcoin (BTC), Ethereum (ETH) and Solana

(SOL) have gained over the years, their volatility isn't attractive to financial stability seekers.

From concepts likeNFTsto DeFi anddecentralized identity, the crypto market is ever evolving, innovation is happening rapidly, and more and more stablecoins are surfacing and bringing change to the traditional financial system. Stablecoins have a number of advantages over traditional fiat currency, like faster transaction speeds, lower transaction fees and increased transparency. Let's take a look at how they work and the most popular ones.

There are several types of stablecoins, including fiat-backed, crypto-backed, commodity-backed and algorithmic stablecoins.

Crypto-backed stablecoins, such as Dai and TerraUSD (UST), are backed by other digital assets like Ethereum (ETH). These stablecoins use smart contracts to maintain price stability, making them ideal for use indecentralized finance (DeFi)ecosystems. However, in the event of a crisis, thinks can shift dramatically. As an example, UST was pegged to Luna, which slumped over 80% overnight in May 2022, leading TerraUSD to also plunge by over 60%.

Algorithmic stablecoins use complex algorithms to maintain their stability. These stablecoins are designed to automatically adjust their supply based on market demand, ensuring that their value remains stable.

Collateralized stablecoins maintain a reserve of a fiat currency or physical assets as collateral, assuring the token's value. Forms of collateralized stablecoins include fiat-backed stablecoins such as Tether (USDT), USD Coin (USDC), and Binance USD (BUSD), which are pegged to a fiat currency. These stablecoins are backed by actual U.S. dollars held in reserve by stablecoin issuers, providing a level of transparency and regulatory compliance that is attractive to regulators and financial institutions. Commodity backed stablecoins are backed by physical assets such as precious metals, oil and real estate.

Non-collateralized stablecoins (also called seigniorage-style stablecoins) work similarly to algorithmic stablecoins but don't have any reserves in smart contracts. They rely on complex

processes that adjust the supply of the coins depending on supply and demand, destroying and inflating supply on-chain to maintain their peg. They are essentially self-collateralized, meaning no collateral is used to mint them.

Stablecoins can be purchased oncrypto exchangessuch as Coinbase, Binance and others. Like other cryptocurrencies, they are kept in digital wallets.

The market capitalization of stablecoins has grown tremendously in recent years. Tether (USDT), one of the most popular stablecoins, is leading with a market cap of over $80 billion at the time of writing. Its primary use is moving money between exchanges quickly, to take advantage of arbitrage opportunities. When the price between cryptocurrencies differs on two exchanges, traders can make money on these discrepancies.

Another very popular stablecoin is the USD Coin, which pegged to the US dollar. USDC is an open-source protocol, meaning anyone can use it to develop their own products, and suggest improvements or changes.

Other stablecoins like Dai and TrueUSD (TUSD) have also gained significant market share. Dai is is a stablecoin on theEthereum blockchain, pegged to the U.S. dollar and backed by ether, the token behind Ethereum.

Scrutiny over stablecoins by regulators and politicians continues to increase, with tighter regulations developing. The Gemini Dollar (GUSD) and the Paxos Standard (PAX) are two examples of coins that got the regulatory approval of the New York State Department of Financial Services.

Blockchain Forks

What is blockchain technology?

What is a Blockchain Fork?

Hard Forks

Soft Forks

Impact of blockchain forks

Examples of blockchain forks

Bitcoin Cash

Ethereum Classic

Ethereum Merge: Casper

SegWit and Taproot

The Bottom Line

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A blockchain is a type of distributed ledger technology (DLT) that consists of growing lists of records, calledblocks, that are securely linked together using cryptography. The distributed database is managed by multiple participants and transactions are recorded only once. Virtually anything can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved. All network participants can access the digital ledger and its immutable record of transactions.

The concept ofblockchain technologyfirst emerged in 1991, with apaperexplaining the use of a continuous chain of timestamps to record information securely, and now forms the bedrock of cryptocurrencies and open-source, decentralized networks such as Bitcoin and Ethereum.

There are many important developments in the world of blockchain and digital currencies, including upgrades such as Segwit and Taproot,smart contractsanddApps, as well as blockchain forks. In this article, we'll explore the different types of blockchain forks, how they function, and their impact on the crypto ecosystem.

A blockchain fork occurs when the software of ablockchain protocolis upgraded or changed, resulting in a new version of the software that is not backward-compatible with the previous version. This can lead to a divergence in the blockchain network, creating a new blockchain that is separate from the old chain.

It should be noted that forks can be either accidental or intentional. An accidental fork happens

when multiple miners mine a new block at nearly the same time. The entire network may not agree on the new block, leading to a different chain of blocks from that point onward. These temporary forks resolve themselves when one of the chains is orphaned because a majority of the fullnodeschose the other chain to add new blocks to.

An intentional fork involves intentionally modifying the software code to change the rules of the blockchain. This can result in two different types of forks, which depend on whether the updated blockchain protocol is backward-compatible and the timing of when a new block is mined.

Blockchain forks can be hard forks or soft forks. Let's take a closer look at each of these.

A hard fork occurs when there is a permanent divergence in the blockchain network, resulting in the creation of a new blockchain that is incompatible with the old version.

This can happen when the software upgrade introduces new rules that are not compatible with the previous version of the blockchain. This type of fork requires all nodes in the blockchain network to upgrade to the new version of the software, or risk being left behind on the old chain.

A soft fork, on the other hand, is a divergence in the blockchain network that is backward-compatible with the older version.

This type of fork occurs when the software update introduces new rules that ensure compatibility with the old version, allowing nodes that have not upgraded to continue functioning on the old version of the software.

Blockchain forks can have a significant impact on the ecosystem of digital currencies. A hard fork can result in the creation of a new blockchain with new features, functionality, and a new cryptocurrency. This can create competition for the old chain and result in a split in the blockchain network.

For users, the impact of a hard fork can be significant. If they hold the original cryptocurrency, they may receive a corresponding amount of the new cryptocurrency. However, they may also have to upgrade their software, transfer their assets to the new chain, or risk losing their funds.

One of the most notable Bitcoin Forks is the chain split in theBitcoin blockchain(BTC) in 2017, resulting in the creation of Bitcoin Cash (BCH). This hard fork was created due to a disagreement about the block size and led to the creation of a new cryptocurrency with a larger block size and different validation rules. Shortly after, other hard forks such as Bitcoin Gold (BTG) and Bitcoin Diamond (BTCD) also occurred.

Another example of a hard fork is the Ethereum blockchain split in 2016, which resulted in the creation of Ethereum Classic (ETC). This split occurred after a hack on The DAO, which was built on theEthereum blockchain. The hard fork was created to restore the funds lost in the hack, while the old version of the blockchain continued to function, creating a new cryptocurrency with old rules.

Casper is a hard fork of Ethereum that aims to tackle some of the main obstacles standing between the blockchain protocol and mass adoption. Casper is the switch of Ethereum from aProof of Workconsensus algorithm to a Proof of Stake consensus, also called theEthereum Mergeor Ethereum 2.0. UnderProof of Stake(PoS), miners are replaced with validators, who must take turns proposing and voting on new blocks. The weight of each validator's vote depends on the size of the validator's stake (ETH tokens).

An example of a soft fork is the implementation of SegWit on the Bitcoin blockchain. SegWit introduced a new way of storing transaction data, without requiring all nodes to upgrade to the new version of the software.

The Taproot upgrade is also a soft fork upgrade to the Bitcoin network that aims to improve the network's privacy, security, and functionality.

Blockchain forks are a natural part of the evolution of blockchain technology. While they can cause temporary divergence in the blockchain network, they also allow for innovation, software upgrades, and the introduction of new features and functionality.

As an example,Bitcoin Ordinalswere made possible by the BitcoinTaproot upgrade. On January 21st 2023, software engineer Casey Rodarmor launched theordinals protocol. By finding a way

toinscribe4MB of data on a Bitcoin block, Casey Rodarmor has unlocked a plethora of possibilities for the Bitcoin network. In short, Ordinals Bitcoin NFTs you can mint directly on the Bitcoin blockchain, without the need for a sidechain or separate token. All of the data lives on-chain, making them truedigital artifacts. The future lies ahead!

Fine Art Bitcoin Ordinals

Bitcoin Ordinal Inscriptions

Fine art on the Bitcoin Blockchain

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The Future of Fine Art and Blockchain

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Ethereum has long been the most popular blockchain technology for digital artists, but this past year, new developments in the crypto ecosystem have led to a shift, with renowned artists inscribing their digital assets directly on-chain on the Bitcoin blockchain. Let's dive in!

Bitcoin ordinalshave emerged as a new way to store data within Bitcoin transactions. These inscriptions, spearheaded by the Ordinals Protocol launched in 2023 by Casey Rodarmor, use a creative coding approach to embed data on-chain, on satoshis, the smallest unit of BTC.

With the introduction of ordinal inscriptions, the crypto ecosystem has witnessed a surge in engagement and activity beyond traditional financial uses, propelling Bitcoin to the forefront of crypto news. Uniquedigital artifactsand non-fungible tokens (NFTs) are now possible within the Bitcoin ecosystem, opening up exciting possibilities for digital artists andweb3enthusiasts.

In February 2024, over 200,000 ordinals have been minted since the launch of the protocol. One of the first stand-alone ordinal collections is called BitcoinShrooms by artist Shroomtoshi. In December 2023, Sotheby's conducted an auction featuring three pieces from the collection, surpassing expectations by achieving a total of US$450,850 with fees---over five times the high estimate of

US$90,000. Having closely observed the growing ecosystem around ordinals, Michael Bouhanna believed that the end of the year marked the right time for a sale. Building on the success of this auction, Sotheby's initiated its inaugural curated sale of bitcoin ordinals in the current year, named "Natively Digital: An Ordinals Curated Sale." The sale comprised 19 lots and concluded on January 22, 2024, generating an impressive total of US$1,097,534 with fees---more than double its conservative estimate of US$412,000. Michael Bouhanna, vice-president and head of digital art at Sotheby's, mentioned in an interview that if Ordinals "continue to have the importance they're getting today, this will probably be one of the most significant works ever inscribed".

In the meantime, FAR's Genesis Cat for Taproot Wizards achieved an impressive sale of US$254,000, surpassing the estimated range of US$15,000 to US$20,000. In February 2024, FAR launchedFLARES, an on-chain art project that engages with the concepts of world-building, immersion, and blockchain as part of the PARALLAX body of work. The collection holds 512 unique generative art pieces, minted onGamma.io, one of the leadingOrdinal marketplacesand launchpads.

Also minted on Gamma.io was Nullish's "Uncommon patterns" collection, a full-feature cohesive generative Ordinal project exploring sat rarity. Fifty uniquely chaotic art pieces algorithmically generated, were inscribed on uncommon satoshis. The totaltrading volumeof the collection reached over 6BTC --- approximately US$317,000.

Various other marketplaces such asGamma, Magic Eden and Ordinals Market also allow users to trade and collectBitcoin NFTs.

With its unique offerings, Gamma.io positions itself as one of the leading marketplaces forfine arton Bitcoin andlaunchpadfor artists.

Through Gamma.io, creators are ensuredroyaltieson secondary sales, can manage their collections and auctions, airdrop digital assets to collectors, and a lot more. In the fall of 2023, Gamma launched an exclusive program for hand-selected artists, the Gamma Partner Program. Being part of the program grands artists access to curated Gamma products and experiences, opportunities to

in-person galleries and showcases, discounted and complimentary access to events, and more. Partner Artists have the ability to createPrints:recursive inscriptionscreated from an Original inscription created by the artist. With this feature, Gamma bridges the gap between the traditional and digital art world, offering creators the ability to produce and share unique and exclusive pieces of digital artwork in a cost-effective way while maintaining high quality.

To collect art on Bitcoin via Gamma, simply connect yourLeatherorXversewallet to the platform. Both wallets are also compatible with Stacks, so you can keep your Stacks NFTs and Bitcoin Ordinals in one place. Xverse makes it easy to access Ordinal marketplaces and DeFi apps and securely store assets offline with Ledger.

Looking ahead, the future of fine art in the blockchain landscape holds tremendous potential. As technologies like Bitcoin ordinals continue to evolve, artists are empowered to explore cutting-edge ways of creating and showcasing their work in the metaverse and beyond. NFT marketplaces further enhance the liquidity and accessibility of fine art, democratizing the art world and engaging a broader audience. Renownedauction houseslike Sotheby's have embraced the potential of blockchain technology to tokenize and authenticate fine art, bringing a touch of the traditional art world into the digital era and cryptocurrency ecosystem.

In this world where the traditional and the digital converge, the marriage of fine art and blockchain technologies is poised to redefine how we perceive, value, and interact with art.

Bitcoin Smart Contracts

What is a smart contract?

What is a Bitcoin Smart Contract?

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In the 90s, Nick Szabo coined the term "Smart Contracts" when describing the notion of a digital protocol designed to facilitate, verify, or enforce the terms of an agreement without the need for a

third party, where the right inputs guarantee a certain output. The full possibilities of this protocol became a reality when blockchain technology emerged.

Smart contractswork by following simple "if/when...then..." statements that are written into code on a blockchain, meaning they are blockchain programs designed to run autonomously when predefined events or actions occur. There is no central authority necessary to run the software to function seamlessly: the terms of a smart contract are specified in code, thus eliminating the need for human intervention. Similarly to a vending machine, once you drop a coin in and select your option, a predefined automated routine is executed. Because the code is stored on the blockchain and cryptography protects all documents, the terms can't be tampered with. A blockchain-based smart contract is visible to all users of said blockchain, and all Bitcoin transactions recorded on the blockchain are considered on-chain transactions.

Bitcoin, created in 2009 when Satoshi Nakamoto minted the genesis block, was rarely a part of the discussion on smart contracts until just a few years ago. It has limited scripting language and prioritizes security over programmability, making it difficult for developers to work with the syntax. It was designed to be a decentralized cryptocurrency, leaving out smart contract functionality.

Stacks, formerly known as Blockstack, made bitcoin smart contracts possible, allowing developers to build Web3 dApps (decentralized applications) beyond Ethereum (ETH) and other blockchains, while enjoying the security of Bitcoin. Stacks functions as the smart contract layer for Bitcoin, through theClarity programming language, enabling projects that can natively use BTC, unlocking immense value and helping the growth of crypto adoption.

Like other smart contract platforms, Bitcoin smart contracts ensure trustless transactions, which settle on the Bitcoin network, making the history of transactions more durable through Bitcoin's proven security. The digital agreement (smart contract) is stored and executed across all nodes in theBitcoin blockchainnetwork, where it is given security and immutability.

There are various types of Bitcoin Smart contracts. Script is useful for powering the Bitcoin network

but isn't Turing complete, which means it doesn't allow for logical loops. This keeps the Bitcoin network safe from DoS attacks. Bitcoin's most popular script type isPay-to-Public-Key-Hash (P2PKH). P2PKH scripts allow bitcoin to be sent to a Bitcoin address, such that only the owner of the corresponding private key can spend the bitcoin. Bitcoin's Taproot upgrade will introduce a new script type calledPay-to-Taproot (P2TR), which will unite the functionality of P2PKH and P2SH scripts, allowing bitcoin to be sent to both a public key and arbitrary scripts. More custom smart contracts can be built on top of Bitcoin, like multisignature accounts, payment channels, escrows, time locks, oracles, and more.

All of the above are executed on Bitcoin's blockchain as regular Bitcoin transactions. However, bitcoin can also be spent and used to power smart contracts on additional layers, such as the Lightning Network, which relies on multisignature transactions calledHashed Time-Locked Contracts (HTLCs)to enable instant and nearly free Bitcoin payments. It is only one of many protocols that allow bitcoin to be transferred off-chain. Others, such as the Liquid Network, side chains, and state chains, also rely on Bitcoin's smart contracting ability to enable even more use cases.

Stacks smart contracts offer many benefits including transaction fees that are much lower on the Bitcoin blockchain than on theEthereum blockchain; trustlessness and immutability, as well as unrivalled security. While the Ethereum blockchain uses the Solidity programming language, Stacks usesClarity, which offers transparency and scalability.

Stacks enables developers to write fully expressive smart contracts, allowing the creation of new types of apps, use cases, NFT marketplaces andDeFi appssuch as Arkadiko, which enables users to take out a self-repaying loan in USDA (a stablecoin) that is backed by their STX tokens, or InfinitySwap, where you can transfer your BTC directly to another Bitcoin address to enter a liquidity pool.

NFTs such as music, collectibles, arts and even real estate can be minted through the Bitcoin ecosystem onNFT marketplacessuch as Gamma, the largest NFT marketplace on Stacks.

Ethereum Name Service (ENS)

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An introduction to BNS

Web3 domain name services such as the Ethereum Name Service (?ENS?), the leading decentralized domain name registry service, have become extremely popular in crypto news feeds in recent months.

DNS (Domain Name System) make the internet easier to use, allowing users to simply remember a human-readable name rather than an IP address. With BNS, users have more functionality than with DNS, as well as full control over their private keys. Data is securely stored and cannot be tampered with, or deleted.

Blockchain Naming Service (BNS), considered use-cases of blockchain technology, are blockchain domains that are secure and open, with decentralization and integrity at their core. The domain assets only belong to the owner and are censorship-resistant and can be used as the user?s digital identity, storage for usernames, fungible and non-fungible tokens, avatars, and other profile data to be used across dApps in the crypto and Web3 ecosystem.

What is Ethereum Name Service?

The Ethereum Name Service is a distributed, open and extensible naming system that interacts with the Ethereum blockchain. Nick Johnson and Alex Van de Sande of the Ethereum Foundation led the initial development of the ENS DAO, where the governance token is ENS.

In November 2021, ENS launched with a very successful airdrop: ENS tokens were sent to users of the service and established a decentralized autonomous organization, or DAO, to manage it. ENS token-holders use their assets as company shareholders would: they can make decisions about pricing, protocol changes and how to manage funds within the treasury. The introduction of ENS tokens had the added benefit of transitioning the project's funding model away from grants. ENS

tokens are tradable for USD and other cryptocurrencies on crypto exchanges such as Binance.

To date, over 2.6 million total ENS names have been created. Investors and speculators have been purchasing popular domain names, in the hope of flipping them for a profit when brands and corporations want to acquire their associated domain name, for example Amazon.eth, to establish a presence within Web3. The Ethereum address owning ?nike.eth? has accumulated over 130 ENS domain names.

How do ENS domains work?

ENS domains enable users to register domains issued on the Ethereum blockchain. Similar to the role of the DNS mentioned above, the role of the ENS is to map human-readable names such as "john.eth" to a machine-readable name such as an alphanumeric wallet address, content hashes, metadata, and other cryptocurrency addresses.

These domains are programmable and interact with other Ethereum-based dApps. Since they use the ERC-721 token standard, ENS domains can also be traded as NFTs. ENS is composed of two Ethereum smart contracts: the ENS registry, which records domain names, and the Resolver, which translates domain names to machine-readable addresses and vice-versa.

ENS also allow users to launch censorship-resistant decentralised websites and to upload their website to IPFS and access it with their ENS name.

To register an ENS domain, go to ens.domains and search the name you?d like to purchase. You will need an ETH-compatible wallet such as Metamask or Coinbase Wallet.

Other assets that have a similar market cap to Ethereum Name Service include IoTeX, Gnosis, Terra, and many others.

What are other BNS domains?

ENS is not the only BNS system out there. .BTC domains are the Stacks blockchain?s decentralized web identity and human-readable wallet address system. The domains are registered through a smart contract on Stacks, secured by Bitcoin.

This smart contract implements a decentralized name registry. Given Stacks' unique connection to Bitcoin, registering .btc names automatically generates a pair of corresponding Bitcoin and Stacks addresses and ownership of every .btc name is represented in a hash of the Bitcoin blockchain. Stacks is uniquely positioned to enable Bitcoin DeFi and help grow the web3 ecosystem.

The BTC.us web bridge allows users to use their names as web pages. The web bridge turns btc.us into the top level domain and allows users to generate subdomains for their personal use, allowing users to link their websites via their domain names. Let?s take example.btc, once linked to your website with a top level domain (TLD) such as .com, typing example.btc in the browser URL bar will lead users to example.com.

On Gamma, Stacks? leading NFT marketplace, you can use your .btc name to transfer NFTs to someone by typing in their domain name instead of the longer alphanumeric wallet address, or you can use it to view your profile and NFTs on Gamma, as well as other users? profiles. Your BNS name is automatically reserved as your unique profile address, like gamma.io/example.btc.

For more information on selling, buying and transferring .BTC domains, head over to this article.

Generative Art

The rise of generative art

Iconic generative NFT collections

Autoglyphs

Fidenza

Ringers

Artificial Intelligence Art by AI Art House

Chromie Squiggle

Uncommon Patterns By Nullish

Looking forward

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Generative art, a captivating fusion of technology and creativity, has found a home in the web3 space through Non-Fungible Tokens (NFTs). Let's explore the synergy between algorithmic innovation and the decentralized possibilities offered by blockchain technology and crypto.

While generative art can be traced back to the mid-20th century, its large presence in the form of crypto art is quite recent and the NFT market has been buzzing!Blockchain technology, particularly with the Ethereum blockchain and the Bitcoin blockchain, has become the canvas for generative artists to showcase their creations as NFTs, using algorithms and randomness to create pieces of art unlike any others.

Smart contractsplay a pivotal role in the generative art NFT space. Digital artists leverage on-chain smart contracts for the minting process, enabling the creation, ownership, and transferability of these algorithmically generated artworks securely and transparently.

Platforms like Art Blocks, OpenSea and FxHash have emerged as prominent spaces for generative art NFTs. Art Blocks, for instance, facilitates the creation of curated generative artwork collections, offering a diverse range of pieces from artists like Fidenza, Chromie Squiggle, and Autoglyphs.

The randomness embedded in generative art creation processes ensures each piece is a one-of-a-kind masterpiece. This level of uniqueness adds an attractive layer to the art market, especially for collectors seeking truly distinctive digital assets. While Ethereum remains a major player in the generative art NFT scene, other blockchain networks like Tezos are making waves. The algorithmic art is also making its way to theBitcoin blockchainand fabulous pieces can be minted onGamma.io.

Many generative artists leverage social media to connect with audiences and showcase their creations. The community-driven nature of generative art NFT projects fosters engagement and interaction, creating a dynamic ecosystem within the digital art space.Traditional art spacesare starting to recognize the significance of generative art, with pieces like Snowfro gaining attention

and blurring the lines between the digital and physical art worlds.

Autoglyphs, a series developed by Larva Labs, also known for the iconic CryptoPunks, was the first generative art collection on the ETH blockchain. Autoglyphs are a collection of 512 static black-and-white patterns and stand as a series of creative coding experiments. Notably, this digital art project made headlines in the NFT space as the pioneer on-chain generative art NFT collection, with tokens entirely scripted on the Ethereum blockchain. The cumulative sales volume for the generative art NFT project is estimated to have reached an impressive $41 million.

Fidenza, create by Tyler Hobbs, is one of the most highly acclaimed generative art NFT projects within the Art Block platform. Comprising 999 distinctive NFTs, the collection showcases vibrant structured curves and blocks. A distinctive aspect of Fidenza's acquisition process was that buyers remained unaware of their chosen art piece's appearance until the hash was generated. The Fidenza smart contract seamlessly input data into the Fidenza algorithm, resulting in the creation of a unique and individualized NFT.

Dmitri Cherniak, a skilled generative artist and coder from Canada, is the mastermind behind Ringers -- a generative art NFT collection comprising 1,000 unique NFTs. This exclusive NFT collection was crafted on the Art Blocks platform, showcasing an intriguing array of strings and pegs. A standout piece within this Art Blocks NFT collection is Ringers #879, getting significant attention by selling for an impressive $5.8 million in 2021.

Developed by AI Art House, the Artificial Intelligence Art collection consists of over 1000 pieces, available on OpenSea. AI Art House completed this generative NFT project without much human intervention (apart from the initial AI programming). Every NFT sale gives the original buyer a physical free print of their piece framed in the canvas they choose.

Chromie Squiggle by Erick Calderon (also known as Snowfro) was crafted by the founder of the Art Blocks platform. Chromie Squiggle stands as a generative art NFT where each unique squiggle embodies the essence of the platform. Art Blocks has risen to prominence as one of the foremost

generative art NFT marketplace and curation platform. Since its establishment, the platform has facilitated over $700 million in generative art sales.

Nullish's "Uncommon Patterns" collection, a fully cohesive generativeOrdinalproject delving into sat rarity, comprises fifty distinctively chaotic art pieces algorithmically generated and inscribed on uncommon satoshis. The collection achieved a substantial trading volume exceeding 6 BTC, equivalent to approximately US$317,000, and minted on Gamma.io, one of the leadingmarketplaces for Bitcoin Ordinals.

Generative art on the block is a shift in the art world, ushering a new era of creativity, randomness and decentralized collaboration. As blockchain technology continues to evolve, so does the landscape of generative art, offering a captivating journey for both artists and collectors in the ever-expanding world of cryptocurrency and NFTs. At NFT Paris 2024, web3 generative artist and DJ Agoria will see his art exhibited at the Musée D'Orsay, one of Paris' most emblematic museums - an event that shows how traditional art museums and web3 artists can work together toward the future of the art industry.

Bitcoin Ordinals Inscriptions

What is an Ordinal?

What is the difference with an NFT?

What is an Ordinal inscription?

How to inscribe an Ordinal?

Notable Ordinals collections

AboutGamma.ioand Stacks

Closing thoughts

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In short, a rough definition of Ordinals is to say they are Bitcoin NFTs you can mint directly on the

Bitcoin blockchain, without the need for a sidechain or separate token.

Ordinals were made possible by Bitcoin'sTaproot upgrade. On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinals protocol, which has taken over crypto news since. By finding a way to inscribe 4MB of data on a Bitcoin block, Casey Rodarmor has unlocked new possibilities for the Bitcoin network.

TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself." Satoshis are numbered in the order in which they are mined and transferred from transaction inputs to transaction outputs first-in-first-out.

While there have been debates and controversy about Ordinals and what Satoshi Nakamoto had envisioned for the Bitcoin Blockchain, there are also manybenefits, and Ordinals could become the new standard for digital assets. With Ordinals trending and recent developments in the NFT market, there may be a cultural shift for the Bitcoin network and Bitcoin cryptocurrency.

By now, you've heard of NFTs. Although they are most popular on the ETH (theEthereum blockchain), they have spread to other blockchains such as Solana, Polygon and Stacks, with its leading marketplaceGamma.io

Non-fungible tokens, such asEthereum NFTsorStacks NFTs, generally point to off-chain data such as an image. This data can be kept on IPFS, a decentralized file storage system that can be changed using dynamic metadata, as well as other file storage systems, each with unique counterparty risk trade-offs. Metadata can be refreshed on NFT marketplaces such asGamma.ioand OpenSea, which makes NFTs "incomplete" for Rodarmor.

Ordinals NFTs, however, are "complete" because all the data is inscribed directly on-chain. They are intended to reflect what NFTs should be: true digital artifacts. NFTs also often have creator royalties attached to them, as is the case on NFT marketplaces such asGamma.io, whereas digital artifacts

don't necessarily. Gamma.io did implement opt-in creator earnings.

To purchase Ordinals, you can head over to Gamma.io's trustless Ordinals marketplace. OtherOrdinals Marketplacesalso launched soon after the Ordinals craze began.

Each Bitcoin (BTC) is broken into 100,000,000 units called satoshis (or sats). In a podcastinterview, Casey Rodarmor explains that in brief, the protocol allows users to send and receive sats --- the smallest measuring unit of Bitcoin recorded on the blockchain --- that carry optional extra data in ordinal progression. Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. With eachblockchain halving, Satoshi scarcity will increase, making Ordinals all the more valuable.

Segregated Witness, orSegWit, was launched in 2017 and fixed many bugs in Bitcoin Core, allowing more transactions per block. It laid the groundwork for Layer 2 chains such as the Bitcoin Lightning Network, and caused heated debate in the Bitcoin community, leading to a hardfork of the network. The inscription process inscribes, or writes, the data of the content stored into the witness of the Bitcoin transaction. Block space on the Bitcoin blockchain is limited, therefore so is the size of Bitcoin inscriptions.

Despite the surge in interest in ordinal inscriptions, the process of actually creating an inscription (also called inscribing) is highly technical, complex, and time consuming. In order toinscribeOrdinals, users must download Bitcoin core and run a fully synced Bitcoin node, which is costly and requires advanced technical knowledge. After the sync is completed, the next step is to create an Ordinals wallet and send some satoshis to its address. And that's just the start of it.

Gamma's no-code platformremoves these barriers and makes ordinals accessible to anyone with a Bitcoin address. Users can inscribe their jpeg, text and other formats in bulk or as single inscriptions, as well as launch Ordinal collection mints and customize transaction fees. The Satoshibles NFT collection team also created Ordinals Bot, which will inscribe an Ordinal on your behalf.

Paired with the creator launchpad on the Stacks programming and scaling layer for Bitcoin, the

Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer.

NFT walletssuch as Xverse Wallet and Leather Wallet quickly added support for Bitcoin Ordinals, making it easier to set up a Bitcoin address for your Ordinal.

Ordinal Punksis one of the most notable projects and pays homage to CryptoPunks. The collection is a set of 100 Bitcoin NFTs minted within the first 650 Inscriptions on the Bitcoin chain. The Taproot Wizards, a collection of hand-drawn NFT wizards, represents the largest block and transaction in the BTC chain's history, with a staggering 4MB. Ethereum-based collection OCM (OnChainMonkey), minted 10,000 Ordinals into a single Inscription, making it one of the first 10k collections on Bitcoin.

But NFTs aren't the onlyuse case for Ordinals. NFT marketplaceGamma.ioused itsno-code ordinal inscription serviceto broadcast theirpress releasedirectly to the Bitcoin blockchain, making it the the world's first press release inscribed to Bitcoin.

It's still very early in the Ordinals market, but the web3 ecosystem has been buzzing and many new projects have been emerging, so make sure to stay posted.

Gamma is the leading open marketplace for Bitcoin-secured NFTs, powered by Stacks.

TheStacks blockchainprovides a blockchain technology that uses Bitcoin's high security while allowing the creation ofsmart contracts, using a smart contract language called Clarity, which has an easy to read syntax. By design, it requires smart contracts to publish their source code on the blockchain giving users the ability to verify that code, and developers more tools with which to build and innovate.Clarityis open-source and essentially makes the Stacks blockchain a "Github for smart contracts".

Gamma consists of three core platforms: its user-first marketplace for exploring and collecting NFTs, its creator-first launchpad for artists to deploy fully-tested no-code, smart contracts in minutes, and its social platform, which brings together creators and collectors in an engaging and Web3-native way. Gamma supports over a thousand NFT collections, nearly 80% of which were deployed using

its no-code portal.

In the midst of all the Ordinals related crypto news, Gamma launched its no-code creator platform for making NFTs on native Bitcoin, using ordinals. Gamma's platform makes creating ordinals simple and accessible to anyone with a Bitcoin address.

Paired with the creator launchpad on the Stacks programming and scaling layer for Bitcoin, the Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer.

Ordinals are revolutionizing the blockchain art industry by offering a novel approach to storing information within Bitcoin transactions. While inscriptions have also had a huge effect on Mempool congestion, reaching some all-time highs over the past few months, the technology is not only enhancing functionality, but it has also driven the number of non-zero Bitcoin addresses to unprecedented levels. This marks a significant turning point in Bitcoin's history, where innovation is triggering network engagement beyond conventional uses like investing and money transfers. With the emergence of meme coins such as pepe, inscriptions have continued their conquest of the NFT market. At the time of writing, there have been over 3M inscriptions. For updates on Ordinals volumes, you can head over to Dune Analytics.

Stacks NFTs

Bitcoin secured Stacks NFTs

Why Bitcoin NFTs on Stacks?

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The Stacks blockchain is the first to offer a scalable approach to Bitcoin NFTs. The Stacks network allows for the creation of smart contracts using the Clarity programming language, dApps and DeFi apps, and provides an open-source API. The ecosystem is growing and NFTs are trending. Let's take a look at the reasons for the hype.

Non-fungible tokens (NFTs) are unique digital items that are issued on a blockchain such as Ethereum (ETH), Stacks (STX) or Solana (SOL). NFTs have unique traits and metadata, and have manyuse cases: they can represent artworks, grant ownership rights to a real-world asset such as a house, or provide utility in the metaverse, and more.

The Stacks ecosystem allows for the creation of Bitcoin-secured NFTs thanks toclarity, an interpreted language (which means the code is human-readable). By design, Clarity requires smart contracts to publish their source code on the blockchain giving users the ability to verify that code, and developers more tools with which to build and innovate.

Every NFT on the Stacks blockchain is secured by Bitcoin. Bitcoin (BTC) is the most well-known blockchain, and biggest cryptocurrency. However, its smart contract use cases have been limited due to its scalability, speed and syntax limitations.

The Stacks blockchain aims to change this, by providing a blockchain technology that uses Bitcoin's high security while allowing the creation of smart contracts and increased functionality.

Stacks uses a consensus mechanism calledProof of Transfer(PoX). It relies on theBitcoin blockchain, like a layer 2 would, but it is distinct from Bitcoin and is maintained by and for Stacks nodes. Stacks has its own rules and its transactions are separate from Bitcoin transactions. This is by design, as Stacks developers want to enable programmability of Bitcoin without changing Bitcoin itself. So, theStacks blockchainleverages the Bitcoin network as a secure medium for storing and broadcasting, through its Proof of Transfer consensus mechanism. Stacks blocks are recorded on the Bitcoin base-layer blockchain, making them extremely secure.

Ordinal NFTs have brought more attention to the Stacks network, which is starting to get more

recognition. This could lead to further adoption and gains in the STX token as well as the upcoming sBTC token, which will allow for a much faster chain that will still benefit from finality on the Bitcoin main layer. sBTC will be pegged to Bitcoin, like a stablecoin is pegged to a commodity.

In short,Ordinal inscriptionsare Bitcoin-native NFTs. Data can be inscribed onto individual Satoshis (the smallest unit of Bitcoin), directly on the Bitcoin blockchain. Users can transact Ordinals NFTs like Stacks NFTs, but the data (whether it is an image, a text, a memo...) is completely immutable and stored directly on the Layer 1 Bitcoin blockchain.

Because Ordinals live directly on Bitcoin blocks, their size is limited. Stacks NFTs live on the Stacks blockchain and are secured by Bitcoin, but the data lives off-chain (on decentralized services such as IPFS) and can be updated if necessary, giving more flexibility to creators with their projects.

The most popular NFT platforms on Stacks are Gamma, the leading NFT marketplace on STX, Byzantion, Superfandom and Stacksart.

Gamma,formerly known as STXNFT, is an open NFT marketplace, a home for creators and collectors, a hub for the world's Web3 social identity. We specialize in collectibles and digital art.

Join the Stacks community and discovermajor NFT projectssuch as theMegapont Apes,Bitcoin Monkeys,Crash Punksand many more.

TheGammaplatform offers three core products, offering options for minting, selling, buying and auctioning NFT tokens. Gamma helps collectors discover incredible NFT collections and helps promote curated works from unique creators who share their story.

Auser-first marketplaceto find, explore, and collect extraordinary Bitcoin NFTs, the most trusted and decentralized blockchain technology for digital assets.

A creator-firstlaunchpadfor artists to deploy their own NFT collection with fully tested, creator-owned, no-code smart contracts in minutes. Creators can sell their art at a fixed price or auction it.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

The platform also facilitates the transfer of NFTs through blockchain name service domains (BNS)

rather than long alphanumeric addresses, which can be traded on the BNS marketplace.Gamma's Discord Botsalso help creators engage and connect with their communities.

Gamma offers the highest liquidity and user base on Stacks, making it the leading NFT marketplace in the Stacks ecosystem.

Before you can start buying Stacks NFTs, you'll need a digital wallet compatible with the Stacks blockchain as well as STX (the Stacks cryptocurrency). If you are interested in minting Ordinal inscriptions, you will need some BTC. STX and BTC can be purchased oncryptocurrency exchangessuch as OkCoin, Binance and Coinbase.

The two Stacks and Ordinal-compatible wallets we recommend using areLeather Wallet(desktop and chrome extension) andXverse(mobile wallet and chrome extension).

Traditional Art and NFTs

Traditional art forms

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In a world where tradition meets innovation, the intersection of traditional art forms, crypto and NFTs has ignited a dialogue, debates and comparisons in the art industry. In this article, we will explore how traditional art and NFT art can coexist, intersect, and blend.

It is first important to clarify what art enthusiasts mean by "traditional artists, traditional artworks, traditional art world".

Traditional art encompasses artistic expressions that have been handed down through generations, typically within specific cultural communities and rich historical significance. This category includes various mediums such as painting, sculpture,printmaking, pottery, and more. Unlike digital art,

traditional art is tangible, employing manual and physical techniques and frequently utilizing natural materials (pigment, clay, wood, etc.).

The spectrum of traditional art forms is extensive, ranging from timeless oil paintings to elaborate calligraphy. Across the globe, every culture contributes its unique traditional art forms, creating a diverse and culturally rich tapestry of artistic expressions. This diversity becomes a crucial point of consideration in discussions comparingNFTsto traditional art.

The traditional art market functions through conventional channels like art galleries, art dealers, auction houses, and art fairs. Reputation and interpersonal relationships play significant roles in this space. In contrast to the transparent nature of blockchain-based NFT transactions, traditional art transactions can often be opaque, and it can prove challenging for art collectors or galleries to establish the lineage or origin of a piece of art.

NFTs, or Non-Fungible Tokens, represent unique digital assets on the blockchain. NFTs are enabled byblockchain technology, purchased withcryptocurrencies, and provide proof of authenticity and ownership of digital tokens. These digital tokens have manyuse cases: digital artwork, real estate in the metaverse, PFP NFT collections, gaming, supply chain management, and more.

NFT marketplaces, such as OpenSea and SuperRare (built on the Ethereum blockchain) orGamma.io(built on Bitcoin), have become hubs where traditional and digital artists alike can showcase their work to a global audience. These marketplaces enable artists to tokenize their creations, granting them digital ownership and ensuring the authenticity of their pieces through smart contracts orBitcoin Ordinal inscriptions.

The rise of NFTs has also brought attention to the environmental impact of blockchain technology. However, innovative solutions and eco-friendly blockchain networks are emerging, addressing concerns. Artists and collectors are increasingly mindful of their ecological footprint, contributing to the development of environmentally conscious NFT platforms.

The dialogue around "NFTs vs. traditional art" is not just about comparing two forms of art, but also

about exploring how these two intersect and impact the art industry.

While NFTs gain traction, the traditional art market continues to thrive, coexisting with the digital wave. The art market, once deeply rooted in physical forms of expression, has now embraced the digital realm. Establishedauction houseslike Christie's and Sotheby's have leveraged this new technology, incorporating NFTs into their auctions, with works of art by Beeple as an example. In early 2024, Sotheby's led a Bitcoin Ordinal inscription auction that was highly successful. This amalgamation of digital and physical art creates a dynamic ecosystem, and the democratization of art ownership.

Through NFTs, art enthusiasts can invest in unique digital assets or even partial ownership of physical masterpieces. This breaks down barriers, empowering a broader audience to participate in the art market and more artists to gain recognition in the art community, connecting with their collectors and supporters directly through social media platforms - also making them easier to discover.

A particularly interesting prospect lies in the fusion of NFTs and traditional art. A physical piece can be accompanied by an NFT certifying its authenticity, or an NFT can provide ownership of a real-world artwork. This hybrid model could seamlessly combine the tangible aspect of traditional art with the transparency and security that NFTs offer.

Platforms such as Gamma.io have witnessed fine artists auctioningBitcoin Ordinalsassociated to physical pieces, then sending said pieces to the highest bidder. Artists have also leveraged thePrintsfeature to provide their collectors with a physical version of their NFT. InArt Basel Miami 2023,Gamma.ioalso exhibited physical works by their Partner Artists, showcasing the "real-life" versions of their digital art NFTs. In-person events and showcases are just another example of how web3 and the traditional art world can not only coexist, but work together toward a new and fulfilling artistic experience.

At NFT Paris 2024, web3generative artistand DJ Agoria will hold an exhibition at the Musée d'Orsay,

one of Paris' most emblematic museums, yet another example of how traditional art galleries and museums and the web3 ecosystem can collaborate.

NFTs have come a long way since CryptoPunks, and the integration of traditional art and NFTs marks a significant chapter in the history of the art world. As the art industry embraces web3, adecentralizedinternet that fosters collaboration, transparency, and shared ownership, artists, both traditional and digital, are exploring new revenue streams and unique ways to engage with their audience.

Traditional art retains its enduring appeal. Its charm, historical significance, and tangible experience are irreplaceable. Nevertheless, it's intriguing to contemplate how technology may shape its future. The integration of digital tools in the creation process or the commonplace occurrence of virtual tours in world-renowned galleries are potential future developments.

Both traditional and NFT art hold inherent value, and it is essential to recognize and appreciate the unique characteristics that each contributes. Ultimately, viewing them as a collaboration rather than a competition can open doors to innovative and exhilarating opportunities in the future of the art world.

Cryptocurrency Exchanges

What are crypto exchanges?

Where the crypto is kept

Crypto exchange platform fees

Registration process

Choosing the best cryptocurrency exchange for you

Best crypto exchanges

Best crypto exchanges for Stacks

Popular crypto exchanges

Gemini

Crypto.com

Kraken

Coinbase

Binance

Bisq

Cash.app

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A crypto exchange is a marketplace where you can buy and sellcryptocurrenciessuch as Bitcoin (BTC), Ethereum (ETH) or Dogecoin (DOGE). Cryptocurrency exchanges work a lot like other trading platforms.

If you're interested in buying cryptocurrency, you need to open an account with a crypto exchange. You'll be able to purchase crypto with fiat currency (think USD) via your bank account with a wire transfer or ACH, credit card or debit card.

Crypto exchanges provide you with accounts where you'll keep your digital currency, allowing you to buy, sell, stake and speculate in the crypto market and NFT space as well as purchase digital assets. Users can also deposit their own crypto assets to trade for others, which is known as crypto-to-crypto spot trading.

The digital currency you purchase will then be kept in acrypto wallet. You'll need to pick one that supports the different cryptocurrencies you choose to purchase. Note that dedicated crypto and bitcoin exchanges will allow you to withdraw your crypto funds and transfer them to another wallet of your choice but others, especially those that focus on other assets like stocks and ETFs --- including Robinhood and eToro --- only let you purchase the crypto but not transfer it out of their web wallets.

Leading crypto exchanges typically hold user funds in cold storage to ensure the safety of assets. Most crypto trading platforms are known as centralized exchanges, which function as a brokerage,

but there are also decentralized options.

You pay two types of fees when you buy and sell crypto: exchange fees and network fees.

Exchange fees include trading fees (also called transaction fees or maker/taker fees), which indicate whether a crypto order provides liquidity to the market, deposit fees (usually charged via credit card or Paypal), account fees, usually charged monthly, and withdrawal fees, charged when withdrawing crypto or fiat currencies.

Network fees are paid to miners, who process and secure transactions on the blockchain. Users on decentralized exchanges generally have to pay the network fees themselves, as there is no third party between them and the miners.

Every crypto exchange has its own registration and setup process. The process generally starts by asking for personal information, and while some may let you open an account without verifying your identity, others will require you undergo an extensive KYC process to comply with government regulations.

Determining the best cryptocurrency exchanges can be intimidating and will depend on the currencies you're looking to purchase. Some features to consider are trading volumes and trading pairs, availability of educational content, mobile apps with a user-friendly interface, two-factor authentication and quality customer support, as well as liquidity aggregation, or specific altcoins and stablecoins you would like to purchase.

To mint an NFT onGamma.io, the leading NFT marketplace onStacks, you'll need to first set up awalletand fund it with $STX. $STX is currently available for purchase on exchanges such asOKCoin,KuCoin, andGate.io. For many exchanges, you'll have to go through a KYC process in order to purchase crypto. Alternatively, you can purchase Bitcoin via peer-to-peer services like Bisq, then exchange-trade your $BTC for $STX via KuCoin.

Geminiwas one of the first major exchanges and remains one of the largest by assets in the charts. It supports most major cryptocurrencies, has decent support and engagement, and if you qualify,

pays competitive interest rates on assets. It also supports recurring buys and dynamic price alerts, allows you to download account statements, and enables crypto withdrawals to only go to approved addresses.

Crypto.comhas a wide selection cryptocurrencies, with over 250. The exchange is ranked first in the Cybersecurity Ranking and CERtification Platform'stop 100 exchangesby cybersecurity rating. It employs various techniques to keep its users' cryptos secure on its trading platform, including cold storage, regulated custodian bank accounts for fiat currencies, and multi-factor authentication. It has also successfully completed several hack tests, and over the years, has proved to be resistant to hackers. Other features include non-custodialDeFiwallet, margin trading and crypto loans.

Krakenoffers a good selection of coins and tokens to invest in, and also allows margin trading and crypto staking, and has low fees. It is one of the few platforms to allow you to trade DOGE coins and other riskier tokens. Note that fewer coins will be offered to US customers than international ones, as US states have various regulations (as an example, New York residents are not eligible to stake ADA, ETH, XTM or ATOM).

Coinbaseis a user-friendly crypto exchange, that is well suited for beginners despite its complex fee structure. It has a wide selection of cryptocurrencies, provides lots of educational resources and has strong security features. Users can currently purchase over 30 cryptocurrencies including Bitcoin, Ether and Litecoin (LTC). Features include user-controlled storage, stablecoins, staking, trading tools, Coinbase Earn rewards and Coinbase Pro advanced account for advanced crypto traders. Crypto investors who store their assets in the account can also earn APY.

Binanceisn't as easy to use as other exchanges, but when it comes to cryptocurrency trading, it is one of the most robust platforms. On Binance, you can purchase cryptos such as Cardano (ADA) and Neo or Binance's own stablecoin, BNB, and over 350 other currencies. Some other features include crypto savings accounts, loans,margin tradingand liquidity swaps. Binance.com and Binance.us don't offer the same cryptocurrencies, with .com having more choice.

Bisqis the decentralized exchange that best follows the ethos of Bitcoin and facilitates peer-to-peer trading by maintaining an open-source platform that is completely decentralized without limiting currency support. The project is open-source and is funded by personal savings and donations from its community of users. No third parties or personal information are required to trade on the platform.Decentralized exchangesdon't typically support as many digital assets (including altcoins like ADA, XRP and DOGE) and fiat currencies. Both parties have complete control over their funds during the trading process, and the security of the decentralized platform is enhanced by security features such as multisignature and a security deposit system.

Cash.appis one of the easiest platforms to buy Bitcoin on. You can lock prices immediately and withdraw quickly, as well as make and receive mobile payments. The downside is that there is no insurance coverage from the FDIC unlike Coinbase and no other cryptos are available, so you can only trade Bitcoin.

Digital Artifacts

What are Bitcoin Ordinal NFTs?

Why are they called Digital Artifacts?

The benefits of Digital Artifacts

AboutGamma.ioand Ordinals inscriptions

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The world of cryptocurrency and blockchain is constantly evolving, and quickly.

NFTs withuse casesranging from digital art to the metaverse have been trending for years. While Ethereum NFTs are the most popular, these digital assets have spread to many other blockchains including Solana (SOL), Cardano (ADA) andStacks(STX), with its leading marketplaceGamma.io.

Late January 2023, the crypto ecosystem was taken over by important news: Bitcoin Core engineer Casey Rodarmor launched theordinal protocol, allowing for the creation of Ordinal NFTs, also called

digital artifacts, directly on the Bitcoin blockchain.

Simply put, Ordinals areBitcoin NFTsyou can mint directly on the Bitcoin blockchain.

Each Bitcoin is broken into 100,000,000 units called satoshis (or sats) and each sat is serially numbered, starting at 0. These numbers are "ordinal numbers", giving anorderto each sat in the total supply. As Ordinals creator Casey Rodarmor explains in a podcastinterview, with the new Ordinals protocol, people who operatenodesin the Bitcoin network can inscribe each satoshi with data, creating an Ordinal inscription. The digital asset therefore lives directly in a Bitcoin block, rather than on decentralized storage services.

This was made possible by Bitcoin's SegWit andTaproot upgradeswhich reduced resources needed to process transactions, thus increasing block size and Bitcoin's smart contract flexibility. TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-native digital artifacts that can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself." With eachblockchain halving, satoshi scarcity will increase, and so will inscriptions' value.

To illustrate what Ordinals are, Daniel Peter, cofounder and CEO of CapsuleNFT, put it this way: "Imagine the one-cent piece you have in your pocket, and put a piece of data on it". With Ordinals, the satoshi includes an inscription with the NFT's content, which can be text, a JPEG, an HTML and more.

In the Ordinal Theory Handbook, Ordinals are referred to as Digital Artifacts. This is because they are the equivalent of physical artifacts.

Imagine a coin that you've kept safe for years. You are its owner, and as long as you keep it safe, no one can take it from you. It's complete and has no missing parts, and you are the only one who can change it or dispose of it: you're the only one who can sell, trade or gift it.

For a digital asset to be a digital artifact, it must be like that coin.

A digital artifact can have owners, unlike a number (which can't be owned by anyone). A digital

artifact is "complete" in the sense that its data is kept on-chain, unlike NFTs which point to off-chain content (on IPFS, for example). Additionally, an NFT that can't be sold without paying a royalty isn't totally permissionless, thus isn't a digital artifact. A digital artifact is uncensorable and immutable, whereasNFT metadatacan be updated.

This definition, for Casey Rodarmor, is intended to reflect what non-fungible tokens should be, sometimes are, and what inscriptions always are.

The rise of Ordinals caused both excitement andcontroversywithin the Bitcoin community. While many see them as a positive, some "Bitcoin maximalists" oppose them for taking up block space on the network and making transaction fees increase due to network congestion.

It is true that in the couple weeks following the Ordinal protocol launch, the spike in creation of Ordinals contributed to the increase in transaction fees and typical block size on the Bitcoin blockchain. However, it is likely that higher transaction fees will lead to better incentivization for miners to further secure the Bitcoin network.

Improved security and incentives, as well as the fact that more developers and organizations could be attracted to the Bitcoin ecosystem, are some of the otherbenefitsof Ordinals. Over the years, we've seen large companies become crypto-curious, with some purchasing.eth domains, and others such as Spotify testingweb3 walletintegrations, and it is widely believed that Ordinal NFTs will further this adoption.

Ordinals inscriptions open up new opportunities for Bitcoin to be used in ways that go beyond its original purpose as a digital currency, and has the potential to bring new and exciting use cases to the world of cryptocurrency.

Gammaconsists of three core platforms: its user-first NFT marketplace for exploring and collecting NFT collections both on Bitcoin and on Stacks, its creator-first launchpad for artists to deploy fully-tested no-code, smart contracts in minutes, and its social platform, which brings together creators and collectors in an engaging and Web3-native way.

Gamma launched its no-code creator platform for inscribing Ordinals as well as its Ordinals marketplace. The platform makes ordinals accessible for creation, trading, selling and buying, to anyone with a Bitcoin address. NFT wallets such as Xverse Wallet and Leather Wallet support Bitcoin Ordinal functionality, making it easier to set up a Bitcoin (BTC) address for your Ordinal. BTC can be purchased on variouscryptocurrency exchangessuch as Coinbase.

The Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer. Ready to dive into the world of digital artifacts? Get your NFT wallet andBNS domain, and join the adventure!

NFT Trading

What are NFTs and why are they trending?

What are the steps to NFT trading?

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In short, NFT stands for non-fungible token. More specifically, it is a unique digital asset secured by blockchain technology and stored in a digital wallet. It has unique metadata (think: an image or a description), and it cannot be copied or substituted. NFTs are used to certify authenticity and immutable proof of ownership. NFT projects can gain or lose value independent of the currency, just like a popular trading card or piece of art. As awareness around NFT art grows, NFT projects are evolving towards projects with more and more utility: longterm uses in the metaverse and in the real world. There are many use-cases for NFTs, including video games, avatars, digital artworks and more. Importantly, given that NFTs are simply just an ownership record, it's rarely the NFT itself that holds value, but rather its work of art, the communities it unlocks, or the rewards that can be earned through owning it.

At first predominantly popular on theEthereum blockchain(ETH) with the ERC-721 token standard, and NFT marketplaces such as OpenSea, Rarible, and Grimes's choice, Nifty Gateway, these digital

assets have become ubiquitous in Web3, spreading to other blockchain networks like Solana, Tezos, Polygon, BSC, andBitcoin via Stacks, with its leading NFT marketplaceGamma.ioand lower transaction fees than the ETH blockchain.

Beeple became the first artist to inspire auction house Christie's to facilitate NFT sales. With his "Everydays --- The First 5000 Days" coming to a close for $69 million, NFTs could no longer be ignored and creators were more and more inspired to start their own NFT collections. Popular NFT collections include Cryptopunks, Cryptokitties, Megapont, Bored Ape Yacht Club, and countless others. Even popular brands and sports teams are exploring NFTs, with some examples including NBA Top Shot, Tiffany's, and Adidas.

With the ecosystem growing tremendously over the past few years and more and moredAppsandDeFi appssurfacing, blockchain technology has become well-known, and NFT trading has become hugely popular. NFTs have no fixed value, and their value is based on demand. These digital assets can be traded like a cryptocurrency, a stock or a commodity, meaning you can buy them at a low price and sell them to someone else at a higher price. NFT trading offers people a chance to make money and also allows digital artists to make money on secondary sales thanks toroyalties.

First, you'll need a digital wallet and cryptocurrencies. Some NFT marketplaces accept debit and credit cards payments, but the majority will require a cryptocurrency wallet. A crypto wallet is where you store your cryptocurrencies and digital assets. Popular wallets include Metamask and Coinbase.

Once you've acquired cryptocurrencies, you'll need to go to annFT marketplace. An NFT marketplace is an online marketplace allowing you to buy and sell NFTs. The NFT market is rapidly evolving and more and more NFT marketplaces are burgeoning on a number of blockchains. Some of the best NFT marketplaces include OpenSea and Rarible on the ETH blockchain,Gamma.ioon theStacks blockchainandmany more.

Note that different wallets enable access to different NFT marketplaces and smart contracts,

therefore different NFT collections. As an example, a Metamask wallet or a Coinbase wallet allows you to access ETH dApps, a Temple wallet allows you to access Tezos dApps and a Leather wallet allows you to engage with Bitcoin dApps built withStacks, via theGammaNFT marketplace, which specialises in digital art. Gamma is the largest NFT marketplaces on Stacks, a settlement layer built on Bitcoin that enables smart contracts secured by Bitcoin, the most trusted blockchain.

As NFTs are digital assets, there's a chance that the value of your NFT could either fall or rise, which is why doing your research is important before spending any amount of money. We also recommend considering theNFT floor priceand rankings as well as reading this helpfulguidein learning some of the ways you can protect yourself as a user, screen for high quality projects and avoid scams.

If you're interested in trading NFTs onGamma.io, join us onsocial mediaor head over to ourDiscord, we'd love to see you join the community!

Decentralized Finance (DeFi)

What is Decentralized Finance?

How Does DeFi Work?

Benefits of DeFi

DeFi Use Cases

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Decentralized finance, or DeFi, is an emerging concept in the world of finance that utilizesblockchain technologyand cryptocurrencies to offer financial services in a decentralized, peer-to-peer manner. DeFi is an open-source movement. The DeFi protocols and applications are all open for you to inspect, fork, and innovate on.

DeFi is often seen as an alternative to traditional finance. Individuals can access financial services directly without the need for a central authority or intermediaries, cutting out the middleman and

financial institutions such as banks and financial service providers.

One of the most popular blockchain platforms for DeFi is theEthereum blockchain, which has a wide range of decentralized applications (dApps) that offer various financial services such as lending, borrowing, and trading. Many DeFi applications are also built on other blockchain platforms, such as Bitcoin (BTC) or EOS.

Decentralized finance is a blockchain-based technology. In the blockchain, transactions are recorded in blocks. If the verifiers (known as miners or validators) agree on a transaction, the block is closed and encrypted. A new block is created that has information about the previous block within it, thus chaining the blocks together. A blockchain cannot be altered or tampered with.

DeFi apps usesmart contracts, which are self-executing contracts, with the terms of the agreement between buyer and seller being directly written into lines of code. Smart contracts allow DeFi applications to automate various financial processes, such as loan agreements and the exchange of assets, in a transparent and secure way.

DeFi also enables flash loans, an experimental form of lending that let you borrow without collateral. Although they aren't really accessible to non-technical people at this time, they do hint at what could be possible in the future. The loan is taken out and paid back in the same transaction. The funds that are often used are held in liquidity pools, so if they aren't being used at a given moment, someone can borrow these funds, conduct business with them, and repay them in-full at the same time they're borrowed. In DeFi, peer-to-peer can meet an individual's loan needs, and an algorithm can match peers that agree on the lender's terms, and a loan is issued. Anyone can provide crypto assets as liquidity or loans through what's called yield farming (staking), which can easily return interest rates several times those of savings accounts at banks. Fintech companies can use DeFi technology to offer savings accounts and loans, provide insurance, and enable securities trading, amongst other things.

Users interact with the DeFi market through interfaces called aggregators. Basically, they are

decentralized asset management platforms that automatically move users' crypto assets between several staking platforms to generate the highest yield. The users' digital assets are held in wallets.

Millions of people around the world don't have access to a bank account. One of the main benefits of DeFi is the ability to access financial services without the need for traditional financial intermediaries. All you need is an internet connection. DeFi also allows individuals to access financial services directly using their own digital assets, such as cryptocurrencies, rather than needing to go through a traditional financial institution.

DeFi also offers the potential for greater transparency and security in financial transactions. Traditional financial institutions can be vulnerable to fraud and corruption, as they often rely on intermediaries to facilitate financial transactions. DeFi, on the other hand, utilizes smart contracts and decentralized networks to facilitate financial transactions, which can help to reduce the risk of fraud and improve the overall security of the financial system.

DeFi also has the potential to disrupt traditional financial markets. For example, DeFi platforms such as Uniswap and Sushiswap allow individuals to trade financial products, such as derivatives and options, directly on the blockchain. This can help to reduce the need for traditional brokerage firms and improve the overall liquidity of financial markets.

One of the most popular types of DeFi applications isdecentralized exchanges (DEXs), which allow individuals to buy and sell cryptocurrencies and other digital assets without the need for a centralized exchange such as Coinbase or Gemini. DEXs are built on blockchain technology and use smart contracts to facilitate peer-to-peer financial transactions and the exchange of assets in a transparent and secure manner. Some popular DEXs include Uniswap, Binance DEX, and Kyber Network. DEXs facilitate and let users retain control over their money.

Another popular DeFi application is stablecoins, which are crypto assets that are pegged to the value of a traditional asset, such as the U.S. dollar. Stablecoins can be used to reduce volatility in the digital currency market and provide a more stable medium of exchange. Some popular

stablecoins include Tether, USDC, and DAI.

Currently, many traditional financial institutions offer loans to individuals and businesses, but the process can be slow and costly due to the need for intermediaries and the risk of default. DeFi applications such as Compound and MakerDAO allow individuals to lend and borrow cryptocurrencies and other digital assets directly, without the need for intermediaries. Some lenders even accept NFTs as collateral. This can help to reduce the cost of borrowing and improve the overall efficiency of the financial system.

It is important to note that with DeFi and cryptocurrency, you must secure the wallets used to store your cryptocurrency assets. Wallets are secured with private keys, which are long and unique codes that only the wallet owner should know. If you lose a private key, you lose access to your funds.

In the future, we may see a shift towards a decentralized financial system that is more open, accessible, and secure. The adoption of DeFi could also lead to the development of new financial products and services, as well as increased competition in the financial industry. However, like any new technology, DeFi also has its risks and challenges, including the potential for scams and hackers, as well as the need for regulatory frameworks to ensure the security and integrity of the financial system. Overall, DeFi has the potential to significantly impact the way that we access and use financial services and could lead to a more open and decentralized financial ecosystem.

What is an NFT?

What does "NFT" stand for?

How do NFTs work?

Why the NFT craze?

About Gamma.io

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In short, NFT stands for non-fungible token. An NFT is an ownership record for a digital asset.

More specifically, an NFT is a unique digital item secured by blockchains and stored in a digital wallet. It has unique metadata (think: an image or a description), and it cannot be copied or substituted. NFTs are used to certify authenticity and immutable proof of ownership. Since each NFT is unique, irreplaceable and distinct from another, they are quite different from traditional cryptocurrency tokens which are like-for-like (or,fungible) with one another. NFT projects can gain or lose value independent of the currency, just like a popular trading card or piece of art. As awareness around NFT art grows, NFT projects are evolving towards projects with utility: long term uses in the metaverse and in the real world.

Interest in the NFT market has soared recently, becoming a recurring topic in major magazines and newspapers such as Forbes and the New York Times. At first predominantly popular on the Ethereum blockchain (ETH) and NFT marketplaces such as OpenSea, Nifty Gateway, and Rarible, these digital assets have become ubiquitous in Web3, spreading to other blockchains like Solana, Tezos, andBitcoin via Stacks.

Several catalysts helped speed public interest along, including Jack Dorsey's tokenization and sale of his first Tweet, or Beeple, who became the first artist to inspire auction house Christie's to facilitate NFT sales. With his "Everydays - The First 5000 Days" coming to a close for $69 million, NFTs could no longer be ignored and creators were more and more inspired to start their own NFT collections. By now, you've probably heard of many popular NFT collections including Cryptopunks, Cryptokitties, Megapont, Bored Ape Yacht Club, and countless others. Even popular brands and sports teams are exploring NFTs, with some examples including NBA Top Shot, Tiffany's, and Adidas.

There are many practical applications anduse-cases for NFTsincluding giving the owner access to exclusive merchandise, other digital collectibles, tickets to events, video games, as well as physical assets and real estate. In the past year, the most popular use case for NFTs has been to represent digital artworks and other collectibles like songs, avatars, video clips and GIFs, game items, and

more. Importantly, given that NFTs are simply just an ownership record, it's rarely the NFT itself that holds value, but rather its work of art, the communities it unlocks, or the rewards that can be earned through owning it.

Gamma is anopen marketplacefor Bitcoin NFTs and a hub for the world's Web3 social identity. Our marketplace supportsNFTs part of the Stacksecosystem, which enables smart contract functionality for Bitcoin.

We are a home for collectors, creators and investors, where they can explore, collect, showcase, and sell NFTs. While creators are often pushed into contracts that don't serve their best interests by their galleries, producers and auction houses, blockchain technology is a unique opportunity for them. At Gamma, we empower digital artists and creators: they can deploy fully tested, creator-owned,no-code smart contractsin minutes through our creator-first launchpad, and receiveroyaltiesfor any secondary sales.

If you are a digital art enthusiast or just want to know what all the hype and memes are about, head over to Gamma.io and join us in the NFT artwork adventure!

Best NFT Launchpads

What is an NFT Launchpad?

Types of NFT Launchpads

Benefits of Using an NFT Launchpad

Best NFT Launchpads

Gamma.io

NFTLaunch

BSCPad

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A few others...

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As the world of blockchain and cryptocurrency continues to grow and evolve and more people join theWeb3ecosystem, NFT Launchpads have become increasingly popular. They are a way for creators to launch new NFT projects and sell their tokens.

NFTsare unique, digital assets that are stored on a blockchain and represent ownership of a specific item or concept. From digital artwork and collectibles to in-game items and real estate, they have a wide range of use cases in the metaverse and the real world, and have gained significant attention from investors and enthusiasts alike.

This guide will provide a comprehensive overview of NFT launchpads, from what they are to how they work and why they are important. We'll also discuss the different types of NFT launchpads available and how to get involved with one. Let's dive in!

AnNFT launchpadis a platform that facilitates the listing, sale, and distribution of non-fungible tokens (NFTs). The main purpose of NFT launchpads is to make it easy for projects to mint NFTs and raise capital by selling their NFT collections. This capital can then be used to fund development activities such as marketing, advertising, and product development.

NFT launchpads also offer additional benefits such as early access for token holders, liquidity pools for trading volume, social media influencers for promotion, and other incentives such as presale allocations, initial decentralized exchange (IDO) processes, or whitelisting. These additional benefits help attract more investors and increase the overall success of a project's token sale.

There are several different types of NFT launchpads available today. Some popular examples include GameFi (on BSC), OpenSea (on ETH), GuardianLink (on ETH & BSC), Polygon Launchpad (multi-chain) and Gamma.io (on Stacks). Crypto launchpads such as the Binance Launchpad allow blockchain projects to launch and sell their native tokens. Each platform has its own unique features

that make it desirable for certain types of projects or use cases. For example, GameFi offers early access for its token holders, Polygon Launchpad provides incubation services for new crypto projects launching on its network, and Gamma.io offers a no-code platform for artists and creators to launch new NFT projects within minutes, with no technical knowledge required.

Using an NFT launchpad can provide several benefits when launching a new project or token sale. These platforms make it easier for projects to raise capital quickly without any significant upfront costs or overhead expenses, and provide access to larger audiences than would otherwise be possible, using traditional methods, due to their global reach and user base size.

Using an NFT launchpad can increase brand visibility by leveraging the platform's existing community and user base who may be interested in investing in your project or token sale.

When selecting an NFT launchpad, it's important to consider the features and offerings of each platform, as well as the fees and restrictions that may apply. It's also a good idea to research the reputation and track record of the launchpad to ensure that it is reliable and trustworthy. Your target audience and your NFT project'suse casesare also important aspects to consider, so you can choose an NFT launchpad that aligns with your goals and objectives. Let's take a closer look.

There are more and more NFT launchpads out there, each with its own unique features and offerings. Here are some of the best NFT launchpads to consider for your NFT projects.

Gamma is an open marketplace with an NFT launchpad platform for Bitcoin NFTs, and a hub for the world's Web3 social identity. It is the largest NFT marketplace on theStacks Blockchain, a blockchain technology that enables smart contract functionality for Bitcoin.

The Gamma creator-first launchpad allows artists to deploy their own NFT collection with fully tested, creator-owned,no-code smart contractsin minutes. Creators can sell their art at a fixed price or auction it, and earnroyaltiesfor every sale on the secondary market. Three types of collections are available: Public Mint, Continuous collection and Editions collection, allowing creators to pick the most suited for their projects.

To learn more about the launchpad's roadmap and functionalities, head over tocreate.gamma.ioor find Gamma onsocial media.

This NFT launchpad platform supports multiple blockchain networks, including Ethereum, BNB and BSC, and offers a range of services for NFT projects, including presale management and liquidity provision. The platform aims to raise aware about donations for a better future and promotes a deflationary marketplace as well as the automated gift of a percentage of transactions to a charity of one's choice. NFTLaunch also started an incubator for upcoming projects, which gives the NFT projects access to NFTLaunch's legal and marketing expertise.

BSCPad is the first decentralized IDO Launchpad for the Binance Smart Chain Network. They empower crypto projects with the ability to distribute tokens and raise liquidity. BSCPad creates fair decentralized launches where users can choose between a lottery tier and guaranteed allocation tier, in contrast with the first come first serve system of most launchpads.

NFTPad is a launchpad for blockchain games, art andDeFi. Users can mint NFTs in minutes, auction them and create liquidity to exchange them on AMMs such as PancakeSwap and Uniswap. NFTPad allows investors to support multi-chain projects, and aims to become the OpenSea of the Binance Smart Chain (BSC).

NFTb aspires to provide a great user experience and gives artists access to DeFi opportunities, allows NFT projects to conduct Initial NFT Offerings (INOs), and are developing cross-chain bridges to top blockchain ecosystems. Experts vet all NFT projects on the platform, and with NFTb Labs, the platform invests and partners with unique NFT projects. NFTb's vision is to create a platform where users can trade anytime viaDEX.

Solanium is the first NFT launchpad on the Solana blockchain and attracts many participants per IDO. Unicrypt Network is one of the best ICO platforms, with many benefits for investors, incubators and token developers.

As the NFT market keeps trending, so do NFT Launchpads. They provide a valuable ecosystem for

new NFT projects to launch and sell their tokens, and can help projects gain exposure, liquidity, and traction in the market. Whether you're an NFT Gaming startup looking to launch a new NFT project or an investor looking for the next big thing in the NFT space, it may be time to get involved with the exciting world of digital assets and NFT launchpads!

What is an NFT Marketplace?

What are some popular NFT marketplaces?

What is Gamma?

Ready to join the non-fungible token and blockchain adventure?

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An NFT marketplace is an online marketplace where you can find, explore, buy, trade and sellnon-fungible tokens, i.e. unique digital assets on the blockchain. Unlike cryptocurrencies (think bitcoin --- if you trade one token for another, you'll have exactly the same thing because bitcoin is "fungible"), NFTs cannot be replaced by another token as they are unique.

As general interest in cryptocurrency and NFT art grows, the NFT market and is rapidly evolving. Having launched in 2017 (which is ancient by NFT standards), OpenSea is one of the largest NFT marketplaces active today.

Some popular NFT marketplaces on the Ethereum blockchain (ETH) include OpenSea, Rarible, Nifty Gateway, Mintable, and Superrare, but there are many others burgeoning on other blockchains such as Solana, Polygon, and Stacks, ablockchain layer built on Bitcoin. Maybe you've even heard of NBA Top Shot, an NFT platform where sports fans can buy, sell and trade NFTs of NBA highlights.

Social media, ever growing interest in the blockchain network and its decentralized nature, as well as the high quality artwork creators have proven to produce for their digital collectibles play a huge part in the popularity of NFTs andNFT marketplaces.

There are manytypes of NFTs: art, music, photography, video game items, tickets to events, avatars, trading cards and virtual worlds, and tons of other digital items---there are even NFTs just for the memes. NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate.

Gamma is the third letter of the Greek alphabet, for the third phase of the web: Web 1.0, Web 2.0, and now, Web3.

One of thetop NFT marketplaceson Stacks, Gamma is a startup created in 2021. We are an open marketplace for Bitcoin NFTs and a hub for the world's Web3 social identity. Our marketplace supports NFTs part of theStacksecosystem, which enablessmart contractfunctionality for Bitcoin.

We specialise in collectibles and digital art. We are a home for collectors, creators and investors, where they can explore, collect, showcase and trade NFTs with other users.

TheGammaplatform offers three core products, offering options for minting, selling, buying and auctioning NFT tokens. Gamma helps collectors discover incredible NFTs and helps promote curated works from unique creators who share their story.

A user-first marketplace to find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized blockchain technology for digital assets.

A creator-first launchpad for artists to deploy their own NFT collection with fully tested, creator-owned,no-code smart contractsin minutes. Creators can sell their art at a fixed price or auction it.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

Our front and backend developers are hard a work to provide you with the best NFT marketplace experience possible.

Are you eager to discover incredible digital artworks, see what'sminting, meet the community and more? Buying your first NFT is an exciting experience.

If you're new to NFTs on Stacks and Bitcoin, you may need to follow a couple of steps to first obtain

Stacks (STX) cryptocurrency, which is used to purchase NFTs on Gamma.

You can head over to acrypto exchangeplatform such as Binance or Coinbase, create yourcrypto walletand swap your fiat for cryptocurrencies. While we have no explicit affiliation with Leather, we recommend using the Leather wallet extension for the best experience. If you're familiar with Ethereum NFTs, Leather wallet is the Bitcoin equivalent of MetaMask. You can download the Leather wallet atleather.io/install-extension

Once you've set up your crypto wallet, head over to the Gamma NFTmarketplace. You need to connect a supported digital wallet browser extension to Gamma and allow usage of your wallet's cryptocurrency for the purchase of an NFT.

You're all set! You'll be able to mint NFTs, sell them and startbuying NFTs. When you list an item for sale on Gamma, we'll prompt your wallet extension with a transaction that includes the details of the sale plus our commission fee. Your digital wallet will then submit the transaction on your behalf.

We make money when your NFT sells, not when it is listed; if your NFT never sells, you will not be charged a fee. As a buyer, the price listed includes all marketplace commission fees, so the final cost will only include the list price plus the actual transaction fee charged by the network to secure and confirm your transaction.

Still feeling shy? Join our community on social media and stay posted about new NFT collections, upgrades and more. Who knows, you might find or be the next Beeple.

What is Web3?

Related articles:

Understanding the history of the web

To understand Web3, it is first important to understand how we got there.

In short, Web1 was read only, Web2 was read and write, and Web3 is read, write and own.

Web1, known as the read-only web (roughly from 1990 to 2004), was mainly made of static websites

and used by companies, with individuals creating close to no content.

In 2004, social media platforms emerged, and that was the beginning of the Web2 era, with centralization at its core. Users can also create content and interact with one another. Companies started creating platforms that allowed to share user-generated content, and some big tech companies (think Google, Apple and Amazon) began to monopolize the web as well as collect huge amounts of personal data.

In 2014, Gavin Wood, co-founder of Ethereum, coined the term ?Web 3.0?, which referred to the next iteration of the internet. It has since become a term that encompasses the idea of a better, trustless internet that embraces decentralization and a user-owned internet. Web3 uses blockchains, cryptocurrencies and NFTs to empower users and give them ownership.

The decentralized internet

The blockchain-based ecosystem is growing fast, and an incredible amount of Web3 platforms, DeFi apps, startups and DAOs (Decentralized Autonomous Organizations) have emerged over the past few years, with blockchain technology as their pillar. Web3 platforms have many use cases, ranging from the real world to the metaverse.

Although disliked by some, Web3 is believed by many to be the future of the internet. In 2021, The New York times reported that venture capital firms invested over $27 billion in crypto and related projects, more than the previous 10 years combined. Even Jack Dorsey, who argued that Web3 was a marketing buzzword, sold his first tweet as an NFT for $48M, proving that crypto adoption is increasing.

With Web2, users can generate content but they don?t own it: they must trust private companies to act in their best interests and if their account is deleted, their data is lost. With Web3, your data lives on the blockchain, so if you decide to leave a platform, you can take your reputation and digital assets with you. Web3 is permissionless, meaning no central authorities get to decide who gets access to what, nor does it require trust as there are no intermediaries for peer-to-peer transactions

to occur. It operates using incentives and economic mechanisms.

Let?s say you?re a creator posting your work on a web2 platform. Over time, you build a follower base and use the platform as a means to communicate, share and sell. If the company closes or your account is deleted or banned, you lose your follower base and all the content you had posted on the platform, leading you to have to start over.

Through blockchain technology and smart contracts, users own their data. If you?re a creator who created an NFT (non-fungible token) or a collector who owns an NFT, that information lives on the blockchain. If you leave one NFT marketplace for another or change wallets, you take your digital assets with you.

With DAOs, the company is a form of collective governance: users of the application who own governance tokens of the smart contract can vote on the company?s future, and no single authority has the power to make changes.

Web3 networks include Ethereum, Solana, Polygon and Stacks. Some of the most popular Web3 platforms are OpenSea, Coinbase, Binance and Metamask, but there are many more including Gamma.io on the Stacks blockchain.

Web3 with Gamma

Gamma is the third letter of the Greek alphabet, for the third phase of the web, a home for creators and collectors to come together in a user-owned internet.

The Gamma platform consists of three core products:

A user-first marketplace to find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized settlement layer for digital assets.

A creator-first NFT launchpad for artists to deploy fully tested, creator-owned, no-code smart contracts in minutes.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

Gamma is built to support your existing decentralized identity and let you bring it with you, not lock

you into another one within a walled garden. That?s why we?ve supported BNS names from day one, without requiring users to sign up or give up personal data to use the platform.

Not requiring users to set up accounts linked to personal data unlocks a completely new way of following and engaging with Web3 identities. Users can follow other users based on their public blockchain data and visualize their own entire history immediately when they connect their wallet. We believe this fully embodies the paradigm shift in online privacy models introduced in Satoshi Nakamoto?s Bitcoin white paper.

Gamma is built on the Stacks blockchain, a layer 1 blockchain which uses Bitcoin's high security while allowing the creation of smart contracts. The Stacks blockchain enables the creation of many projects and applications with the most notable examples being Stacks-based NFTs and DeFi. Stacks uses the Clarity programming language, which is decidable and interpreted and allows users to verify the code, essentially making the Stacks blockchain a ?GitHub for smart contracts?.

Art on Solana

What is the Solana blockchain?

Solana NFTs

Where to buy Solana NFT art

Solanart

Magic Eden

Tensor

Solsea

A few more

Closing thoughts

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Solana has emerged as one of the powerhouses of blockchain technology, and is a key player in

web3 and the digital art world. Let's learn more about the blockchain itself and its art-related offerings.

Solana is a high-performance blockchain platform designed to facilitate decentralized applications (DApps,DeFiapps andDAOs) and enable fast and secure transactions with low gas fees. Launched in 2020, Solana stands out for its high throughput, processing thousands of transactions per second, and its ability to handlesmart contractsefficiently. Unlike some other blockchain networks, Solana employs a uniqueconsensus mechanismcalled Proof of History, enhancing its scalability and reducing transaction costs. This positions Solana as a competitive player in the blockchain space, providing a robust foundation for variousnon-fungible tokens(NFTs), digital assets, and other blockchain-based projects. The blockchain has its owncryptocurrency, SOL, which can be purchased throughcrypto exchangessuch as Coinbase.

Solana's key advantages lie in its scalability, low fees, functionality and real-time throughput. UnlikeEthereum, Solana's low transaction fees offer a more efficient and cost-effective solution for users navigating the NFT market, creating an environment where artists can thrive.

From digital collectibles andgenerative artprojects to PFP NFT collections, the platform provides a playground for creative expression and innovation in the NFT ecosystem.

Over the past few years, several notable NFT collections have flourished within the vibrant Solana ecosystem, growing the platform's digital art landscape. The "Degenerate Ape Academy" collection is known for its unique and whimsical pixelated art featuring mischievous apes. The "Astronauts" series captivates audiences with its visually stunning depictions of space explorers. The "SolPunks" collection has gained attention for its Solana-specific take on the iconic CryptoPunks, showcasing a variety of characters with a playful nod to the original collection.

Navigating the ecosystem is made accessible through user-friendly Solana wallets like Phantom. These wallets empower users to manage their digital assets, trade NFTs, and participate in the vibrant Solana-based metaverse. Solana's use cases go beyond NFTs. As an example, the

"Portals" metaverse provides virtual real estate property for people to invest in, and "Audius" is a Solana music streaming platform.

You can explore Solana NFTs using OpenSea and a Solana wallet, but won't be able to purchase digital assets, list them or make offers. However, there are a number of SolanaNFT marketplacesthat offer artists and art enthusiasts exciting opportunities for collaboration and trading. Let's take a look at a few of the best Solana art marketplaces.

Solanartis another noteworthy platform, contributing to the growth of the Solana NFT space with its dynamic marketplace and support for various NFT projects. The platform provides a space for artists and collectors to mint, purchase, sell, and exchange digital art. Boasting a sleek interface, it actively supports a variety of well-known Solana-based NFT projects, with a focus on digital art.

Magic Eden, a Solana-based NFT marketplace offers a friendly user experience and diverse range of digital collectibles. The platform facilitates the discovery, trading, buying and selling of NFTs, and supports a wide range of Solana-based NFT projects. The platform also lets you tradeBitcoin Ordinals. Head over to this article for the bestOrdinals marketplaces.

Tensordistinguishes itself as the fastest NFT trading platform on Solana, transforming the process into a pleasurable experience akin to trading less weighty coins. The platform boasts advanced trading functionalities, encompassing real-time data, exhaustive historical candlestick prices, and AMM pools specifically tailored for NFTs. For power users in search of the fastest NFT trading platform on Solana, Tensor is a great fit.

Solseais a decentralized Solana marketplace, facilitating effortless trading of NFTs. Users can engage in the creation, purchase, sale, and exchange of digital collectibles, all within a streamlined and user-friendly environment.

Exchange.artandHolyGrailshave also established themselves as prominent players providing a platform for artists and collectors to engage in on-chain transactions seamlessly.

Rarible, a leading platform built on the Ethereum blockchain, focuses on the generation, sale, and

acquisition of NFTs. Users on Rarible can mint NFTs on several chains including Solana.

The Solana blockchain aligns seamlessly with the principles ofWeb3, promoting transparency, interoperability, and user-centric experiences in the digital art realm. From its NFT marketplaces to decentralized applications, the Solana blockchain is leaving its mark on the art space, offering a glimpse into a future where creativity and technology converge. As the Solana ecosystem expands, so does the potential for exciting developments in the ever-evolving world of blockchain art.

Ethereum Blockchain

What is Ethereum?

Short history of the Ethereum network

What is the difference between Ethereum and Bitcoin?

How does the Ethereum blockchain work?

Where to buy ETH?

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Ethereum is an open-source blockchain network with smart contract functionality, designed to be scalable, programmable, secure, and decentralized. Ethereum blockchain users can build apps,dApps, decentralized finance apps (DeFi apps), NFT marketplaces, hold assets, make transactions and communicate, with no central authority or intermediaries involved. Ethereum has its owncryptocurrency, Ether, which is used to pay for certain activities on the Ethereum network. Like on the Bitcoin blockchain, Ethereum transactions are public.

Ethereum was initially described in awhite paperby Vitalik Buterin in 2013. The white paper described a way to build dApps (decentralized applications) and other applications besides money. Buterin argued to the Bitcoin Core developers that Bitcoin and blockchain could benefit from these suggestions and a more robust programming language, but an agreement on how the project should proceed was not found. Vitalik Buterin then proposed the development of a new platform with a

Turing-complete programming language, which eventually became Ethereum, officially launched in 2015. Additional founders of Ethereum included Gavin Wood, who specified the Ethereum Virtual Machine (EVM) in the Ethereum Yellow Paper, and Joseph Lubin, founder of the blockchain software company ConsenSys.

The ERC-20 tokenstandardwas created in 2015, allowing for fungible tokens on the Ethereum blockchain. The standard implements an API for tokens within smart contracts, and numerous cryptocurrencies have since launched as ERC-20 tokens.

In 2016, a group of network participants gained majority control of the Ethereum blockchain, stealing more than $50 million worth of ether, which had been raised for a project called The DAO. This resulted in a hard fork, when most of the Ethereum community opted to reverse the theft by invalidating the existing Ethereum blockchain and approving a blockchain with a revised history. A fraction of the community chose to maintain the original version of the blockchain: this unaltered version permanently split to ecome the Ethereum Classic (ETC) cryptocurrency.

TheEthereum Foundation, a non-profit organization dedicated to supporting Ethereum and related technologies, was founded in 2014 and is part of a large ecosystem of organizations, individuals, and companies that support Ethereum. They allocate resources to critical projects, advocate for Ethereum to the outside world and are a valued voice within the ecosystem.

The Enterprise Ethereum Alliance was created in 2017 and now counts over 150 members, including Microsoft, Mastercard and ConsenSys.

The Ethereum network is also widely known for non-fungible tokens, enabled by the ERC-721 standard which was created in 2018. In January 2018, Ethereum was the second-largest cryptocurrency in terms ofmarket capitalizationbehind Bitcoin, and has since maintained this relative position.

The Ethereum and Bitcoin blockchain have some important distinctions. While Bitcoin's primary use case is a store of value and a digital currency (BTC), leaving out smart contract functionality and

prioritizing security over programmability, Ethereum was designed to be a programmable network, using theSolidityprogramming language, a language library with similarities to C and JavaScript. Ethereum enablessmart contractsand is more like a marketplace of financial services, games, social networks and other dApps.

Contrary to Bitcoin which has amaximum number of tokensthat can enter circulation, the amount of ETH that can be created is unlimited, and there are over 122M coins in circulation.

Transaction fees are also treated differently in the Ethereum and Bitcoin networks. These fees, called gas on Ethereum, are paid by the participants in Ethereum transactions. The fees associated with Bitcoin transactions are absorbed by the broader Bitcoin network.

Until September 2022, both Ethereum and Bitcoin used theProof-of-Work(PoW) consensus mechanism (also called consensus algorithm) which requires miners to compete for rewards. In September 2022, Ethereum moved to theProof-of-Stake(PoS) consensus mechanism. This transition was included in a series of upgrades called Ethereum 2.0 and will, according to the Ethereum Foundation, cut the network's energy usageby 99.95%.The mergecould change the narrative around the entire industry in relation topotential climate benefits.

The Ethereum network exists on thousands of computers worldwide, thanks to users participating as nodes, making the network decentralized and highly immune to attacks. Anyone can run an Ethereum node and participate in validating the network provided they have the right hardware, knowledge and time to commit to it. Ethereum runs a computer called the EVM (Ethereum Virtual Machine). Each node holds a copy of that computer. Any interaction (also called transaction) must be verified so that every node can update their copy. Each Ethereum transaction is stored within blocks. Every new transaction is recorded on a new block, which is connected to previous and future blocks in a chain.

With Proof-of-Work, miners validated these blocks before committing them to the network and committed their computer power to finding the 64-digit code that identifies each block. Miners were

rewarded in ETH. Via proof of stake, Ethereum will be secured by a global network of validators running Ethereum's software while staking a certain amount of ETH tokens, removing the need for miners.

To buy ETH, you'll need to go acryptocurrency exchangeplatform. A crypto exchange is a marketplace where you can buy and sell cryptocurrencies such as Bitcoin (BTC) and Ethereum (ETH). You'll be able to purchase crypto with fiat currency (think USD) via your bank account, credit card or debit card.

Crypto exchanges provide you with accounts where you'll keep your digital currency, allowing you to buy, sell, stake and speculate in the crypto market and NFT space as well as purchase digital assets. Some well-known cryptocurrency exchanges include Coinbase and Binance.

Decentralized Exchanges (DEX)

What is a decentralized exchange?

How do decentralized exchanges work?

Why use a decentralized exchange?

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Decentralized exchanges, also known as DEXs, have been gaining popularity in the cryptocurrency space as an alternative to centralized exchanges (CEXs). These exchanges offer a number of benefits over their centralized counterparts, including increased security, diverse trading pairs and more privacy for users.

In this article, we'll explore what decentralized exchanges are, how they work, and why they may be a good option for trading cryptocurrencies and other crypto assets.

Similar to foreign exchange markets where fiat currencies such as USD are traded continuously, cryptocurrencies need their own markets for users to buy and trade cryptocurrencies.

A decentralized exchange is a platform that allows users to buy and sell cryptocurrency and other

digital assets without the need for a central authority or third party to facilitate the transactions. Instead of relying on a central server to hold users' funds and execute trades, decentralized crypto exchanges usesmart contractson ablockchain networkto facilitate peer-to-peer crypto trading. This means that users retain control of their private keys and have full ownership of their assets, rather than trusting a third party to hold them.

The most common types of DEXs are order book DEXs and AMMs (automated market makers). DEX aggregators, which analyze multiple DEXs on-chain to find the best price and lowest transaction fees for the user's transaction are also widely used.

AMMs enable instant liquidity and in many cases, permissionless market creation for any token. An AMM is essentially a money robot which utilizes a liquidity pool that users can swap their tokens against. The price is determined by an algorithm based on the proportion of tokens in the pool. AMMs enable instant access to liquidity in markets that could otherwise have lower liquidity, and could also be used to facilitate swaps of NFTs, real-world assets, and more.

Order books allow an exchange's internal systems to match buy and sell orders in real-time. Fully on-chain order book DEXs are less common in DeFi, because they require every interaction within the order book to be posted on the blockchain. Over time, they have become more feasible thanks to the launch of layer-2s and new blockchains, and have been a compelling proof of concept for how a DEX could facilitate trading using smart contracts. Hybrid order book designs have also emerged, where management and matching processes take place off-chain, with the settlement of trades remaining on-chain.

Decentralized exchanges typically have a different structure and functionality compared to centralized cryptocurrency exchanges. DEXs often use liquidity pools to facilitate trades. These pools contain a certain amount of each asset that is available for trade, and users can add or remove liquidity from the pool in exchange for a share of the trading fees.

Unlike centralizedcrypto exchanges(CEX) such as Coinbase, DEXs don't allow for exchanges

between fiat currencies (think USD) and crypto (think Bitcoin). They only trade cryptocurrency tokens for other crypto tokens, for example some of your bitcoin for ETH.

When a user wants to trade one asset for another, the DEX uses an algorithm to determine the best price based on the available liquidity in the pool. This process is known as an automated market maker (AMM).

Decentralized exchanges often also offer otherdecentralized finance(DeFi) services, such as stablecoins, loans and staking. These services are made possible through smart contracts on the blockchain, which allow users to interact with DeFi protocols in a trustless and permissionless manner.

In addition to being decentralized, DEXsdAppsare usually open-source, meaning that anyone can see exactly how they work and developers can adapt existing code to create new projects. That is how Uniswap's code was adapted by DEXs with "swap" in their names such as Sushiswap and Pancakeswap.

Decentralized exchanges offer a number of benefits over centralized exchanges, including increased security and privacy for users. Because DEXs do not hold users' funds and do not require KYC (know your customer) information, they are less susceptible to hacks and scams. Most DEXs have no counterparty risk, meaning they don't have a risk of credit default, often have lower fees, and provide more flexibility in terms of the types of assets that can be traded.

One potential drawback of DEXs is that they may have lower liquidity and trading volume compared to centralized exchanges, which can lead to higher slippage (the difference between the expected price of a trade and the actual price) and difficulty finding the best price for a trade. However, as DEXs continue to grow in popularity, this is becoming less of an issue.

In summary, decentralized exchanges offer a secure and private alternative for trading cryptocurrencies and other digital assets. With a growing ecosystem of DeFi services and an increasing number of liquidity providers, DEXs are becoming a viable option for traders looking to

trade cryptocurrencies without the need for a central authority.

Uniswap, which runs on the Ethereum blockchain and allows users to launch any ERC-20 token and list them for free as long as they can supply tokens to the liquidity pool, is a widely popular DEX. Other well-known AMM DEXs include PancakeSwap, which runs on the Binance Smart Chain (BSC), Curve, Bancor, Balancer, PancakeSwap and SushiSwap.

It is important that users do their research before starting going on their DEX adventure. Navigating DEXs can be tricky, as interfaces aren't always easy and specialized knowledge may be needed. Caution is required, as users may make mistakes such as sending coins to the wrong wallet, and impermanent loss can result from pairing more volatile cryptocurrencies with less volatile ones in a liquidity pool.

.eth Domains

An introduction to BNS

What is Ethereum Name Service?

What are other popular BNS domains?

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These past few months, web3 domain name services such as theEthereum Name Service("ENS"), the leading decentralized domain name registry service, have become extremely popular in crypto news feeds and social media.

DNS (Domain Name System) make the internet easier to use, allowing users to simply remember a human-readable name rather than an IP address. With BNS, users have more functionality than with DNS, as well as full control over their private keys. Data is securely stored and cannot be tampered with, or deleted.

Blockchain Naming Service (BNS), considered use-cases of blockchain technology, are blockchain domains that are secure and open, with decentralization and integrity at their core. They can be

used as the user'sdecentralized identity, to store usernames, fungible and non-fungible tokens, avatars, and allow other profile data to be used across the metaverse,DAOs, and dApps in the crypto and Web3 ecosystem.

The Ethereum Name Service is a distributed, open and extensible naming system that interacts with the Ethereum blockchain. Nick Johnson and Alex Van de Sande of the Ethereum Foundation led the initial development of theENSDAO, with the very successful airdrop in November 2021.

ENS have been trending and to date, over 2.6 million total ENS names have been created, including Ethereum co-founder Vitalik Buterin's "vitalik.eth".

Investors and speculators often purchase domain names in hope of flipping them for a profit at a later time. As an example, theEthereum addressowning "nike.eth" has accumulated over 130 ENS domain names. Right before theEthereum merge, the ENS volume even surpassed Bored Ape Yacht Club (BAYC) as the most traded asset on OpenSea.

ENS tokens are tradable for USD and other cryptocurrencies oncrypto exchangessuch as Binance, providing a financial lifeline to the project's developers. All you need is an ETH-compatible cryptowallet.

ETH domain names enable users to register domains issued on theEthereum blockchain. The role of the ENS is to map human-readable names such as "john.eth" to a machine-readable name such as a wallet address like "8g978dl39ji9xl", content hashes and metadata.

These domains are programmable and interact with other Ethereum-baseddApps. ENS domains can also be traded as NFTs, with the vast majority of their trading activity taking place on leading NFT marketplaces OpenSea and LooksRare.

ENS is composed of twoEthereum smart contracts: the ENS registry, which records domain names, and the Resolver, which translates domain names to machine-readable addresses and vice-versa. ENS also allow users to launch censorship-resistant decentralised websites and to upload their website to IPFS and access it with their ENS name.

To register an ENS domain, go toens.domainsand search the name you'd like to purchase. You will need an Ethereum wallet such as Metamask or Coinbase. Once you've completed the steps and paid the gas fees, you can check the status of your transaction on Etherscan. ENS domains can also be bought and sold on secondary markets, so if the .eth domain name you're interested in buying isn't available, all hope is not lost.

There are otherBlockchain naming systems, such as.btc domains. .BTC domains are theStacks blockchain's decentralized web identity and human-readable wallet address system. The domains are registered through a smart contract on Stacks, secured by Bitcoin. This smart contract implements a decentralized name registry. Given Stacks' unique connection to Bitcoin, registering .btc names automatically generates a pair of corresponding Bitcoin and Stacks addresses and ownership of every .btc name is represented in a hash of the Bitcoin blockchain. Stacks is uniquely positioned to unleash Bitcoin's potential, enable Bitcoin DeFi and help grow the web3 ecosystem.

TheBTC.usweb bridge allows users to use their names as web pages. It turnsbtc.usinto the top level domain and allows users to generate subdomains for their personal use. This means that with your Bitcoin domain registration, you can link to your website's address via your domain name. Let's take example.btc, once linked to your website with a top level domain (TLD) such as .com, typing example.btc in the browser URL bar will lead users toexample.com.

For more information on selling, buying and transferring .btc domains, head over tothis article.

OnGamma, Stacks' leading NFT marketplace, you can use your blockchain domain (.btc name) to transfer NFTs to someone by typing in their .btc name instead of the longer alphanumeric wallet address, or you can use it to view your own (or someone else's) profile and NFTs on Gamma. Your BNS name is automatically reserved as your unique profile address, likegamma.io/example.btc.

Dynamic NFTs

What are NFTs?

What are Dynamic NFTs?

Use cases and examples

Gaming

Collectibles

Art

Other use cases

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An NFT, or non-fungible token, is an ownership record for a digital asset on the blockchain. It has unique metadata that is stored in a digital wallet. NFTs are unique and irreplaceable, unlike traditional cryptocurrency tokens (think Bitcoin), which are like-for-like (or,fungible) with one another.

Interest in crypto has soared over the past years, and these digital assets have become ubiquitous inWeb3, beyond the Ethereum blockchain (ETH) and popular NFT marketplaces such as OpenSea. The ecosystem is growing, with startups building incredible newNFT marketplaces, DeFi apps, dApps and no-code tools for NFT creators. Projects are spreading to other blockchains such as Solana, Polygon, Tezos, andStacks, which enables smart contract functionality for Bitcoin, with its leading NFT marketplaceGamma.io.

There are manyuse casesfor NFTs, the most popular being digital art and PFPs, with well known collections including Cryptopunks, Bored Ape Yacht Club, Megapont, Project Indigo and more.

NFT collections are moving towards projects with more utility and longterm uses both in the metaverse and in the real world, such as real estate, deeds, patents and more. Static NFTs are currently the most common type of NFT, used mostly for digital collectibles and digital art, providing numerous benefits for digital artists who can, for the first time in the history of the internet, sell digital art to their community by giving them verifiable ownership.

While static NFTs have become one of the most prominent applications of blockchain technology, they are limited by their permanence: the metadata attached to the NFTs is fixed once the NFTs are

minted on a blockchain.

A dynamic NFT is an NFT that can change based on external conditions.

Dynamic NFTs (dNFTs) combine the verifiable, one-of-a-kind qualities of static NFTs with dynamic data inputs, allowing them to update aspects of their metadata, using both off-chain and on-chain computations.

The change in the metadata is triggered by a smart contract which allows the dNFT to use both off-chain and on-chain data, and which provides instructions regarding when and how the NFT's metadata should change, based on external data sources. They can react dynamically to real-time sport scores, real-world events, and more, by pulling data from off-chain data sources such as web APIs, other verifiable data providers and oracles, which are a system of nodes that call upon and authenticate external data for Web3smart contracts.

On the Ethereum blockchain for example, static NFTs are defined by Ethereum's ERC-721 token standard and require smart contracts to be executed for each new token minted. The NFT's traits are place within the NFT's metadata, alongside an IPFS link to an image or video. A dynamic NFT is defined by the ERC-1155 standard, which makes it possible to alter the metadata based on external conditions.

This enables use cases such as tokenizing real-world assets, building progression-based video games, or creating blockchain-based fantasy sports leagues, which often require that data be updated. If you're interested in experimenting, many tutorials are available online to help you build your own dNFT.

Dynamic NFTs can have a huge impact on play-to-earn games, through the use ofChainlink VRF(Verifiable Randomness Function). This allows random distribution of traits and in-game items which in turn determine the rarity of the said factor. The random results are verifiable on the blockchain, and the randomness can't be swayed in anyone's favor.

This functionality can be useful for character progression in blockchain games. For example, when

first starting a game with a playable NFT character, the NFT has base metadata, which will change to reflect the character's growth metadata as the player continues levelling up.

Real-world events could impact the specific traits of NFT collectibles.

For example, LaMelo Ball, a rising star in the NBA, created pioneering dNFTs that leverage Chainlink Sports Data Feeds, giving their holders benefits based on his real-world in-game performance. Each dNFT records a different set of the player's statistics, from rebounds and assists to points scored and levels up accordingly. When he won the rookie of the year for the 2020-2021 NBA season, the NFTchanged color to gold, and the planet Saturn that he was holding transformed into the sun.

NFT art can evolve by using dynamic NFTs. As an example,Organic Growth: Crystal Reefare dynamic NFTs that evolved over time and based on transactions. Over the course of 3 months, crystals can grow their traits and change their appearance, and can be used in augmented reality.

Other possible use cases for dynamic NFTs include fundraising and passports, amongst others. Governments could issue passports in the form of dNFTs that would update as a person travels, removing the need for stamps and additional paperwork, as well as reducing the possibility of fraud thanks to blockchain technology. Builders andDAOscan leverage dNFTs to create gated communities, ultra-exclusive perks and unique gameplay opportunities.

Bitcoin NFTs

Crypto and NFTs

Bitcoin NFTs

Bitcoin NFTs on the Stacks Blockchain

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What if I don't have cryptocurrencies yet?

Bitcoin Ordinal NFTs

Inscribing Bitcoin Ordinal NFTs

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Non-fungible tokens (NFTs) are unique digital items that are issued on a blockchain such as the Ethereum blockchain (ETH), Stacks (STX) or Solana (SOL). NFTs have unique traits and metadata, and have manyuse cases: they can represent artworks, grant ownership rights to a real-world asset such as a house, or provide utility in the metaverse, and more. From CryptoPunks to Bored Apes or Bored Ape Yacht Club, millions in crypto are exchanging hands for pixel art, tokenized memes, and crypto collectibles.

With Jack Dorsey, former Twitter CEO, announcing Bitcoin Legal Defense Fund, Elon Musk actively talking up cryptocurrencies and major newspapers such as the New York Times talking about NFTs more and more, interest in the NFT market has soared over the past few years.

PopularNFT marketplacesinclude OpenSea and NBA Top Shot (ETH blockchain), Solanart (SOL), AirNfts on Polygon and Gamma on Stacks (STX).

The non-fungible trait of NFTs is critical to a problem we face today. Digital content is easy to duplicate, making it easy for ill-intended people to scam other users, and very difficult for digital assets to become valuable. NFTs solve that problem by creating and retaining value for digital content. Being unique, they enforce digital scarcity and provide buyers with proof of ownership for specific digital assets.

Bitcoin NFTs are created for the Bitcoin network instead of another blockchain such as Solana. And which blockchain an NFT is on, is important when it comes to its security.

TheBitcoin blockchainoffers exceptional durability and stability for assets created and held on the network, with no other blockchain coming close to offering that level of security. Wouldn't you want your digital assets safely protected on the most hack-resistant network?

Despite those advantages, building Bitcoin NFTs wasn't easy. TakeRare Pepesfor example, an early Bitcoin NFT. Their NFT project was innovative, but they struggled to really take root and

become successful with Bitcoin.

So why build on Bitcoin? Prior to the creation of theStacks blockchain, Ethereum provided smart contract functionality to developers when Bitcoin could not. Despite that,Bitcoin has remained the largest cryptocurrencyand has proven itself as the decentralized money layer for the internet. It's the oldest blockchain and it's never been hacked.

Couple these advantages with new scalability and programmability thanks to Stacks, and Bitcoin NFTs are poised to take over the NFT market. Could the Bitcoin blockchain be the next step for NFT hunters? Definitely.

Bitcoin (BTC) is the most secure, reliable, and fully decentralized blockchain that exists today, as well as the biggest cryptocurrency. However, itssmart contract use caseshave been limited due to its scalability, speed and syntax limitations.

But the crypto market is ever evolving. Stacks Founder Muneeb Ali aimed to change this by providing a blockchain technology that uses Bitcoin's high security while allowing the creation of smart contracts. The Stacks blockchain is the first to offer a novel and scalable approach to Bitcoin NFTs as well as the largest and fastest growing Web3 project in the Bitcoin ecosystem.

Stacks is a layer 1 blockchain that uses a consensus mechanism calledProof of Transfer(PoX). It relies on the Bitcoin blockchain, but it is distinct from Bitcoin and is maintained by and for Stacks nodes. It has its own rules and its transactions are separate from Bitcoin transactions. The Stacks blockchain leverages the Bitcoin network as a secure medium for storing and broadcasting, through its Proof of Transfer consensus mechanism. Stacks blocks are recorded on the Bitcoin base-layer blockchain.

With Stacks, you can build apps and smart contracts that make the most of Bitcoin's powers, from BitcoinDeFi, to NFTs. The Stacks ecosystem has its own smart contract language calledClarity. Compared to other smart contract languages such as Ethereum's Solidity, Clarity isoptimized for security and predictability. Its syntax is also easy to use and human-readable. By design, it requires

smart contracts to publish their source code on the blockchain giving users the ability to verify that code, and developers more tools with which to build and innovate, as they can borrow contracts from others in the NFT space, to build their own.

The Stacks blockchain uses theSIP-009 standardto create NFTs that are secured by Bitcoin. SIP-009 outlines standard features, traits and functions, including a unique identifier and other metadata, that NFTs must have to be compatible with Stacks wallets. However, NFTs are not limited to possessing only the traits and functions mentioned in the SIP.

The largest NFT platform on Stacks isGamma.io.

The Gamma platform offers three core products, offering options for minting, selling, buying and auctioning NFT tokens. Gamma helps collectors discover incredible NFT collections and helps promote curated digital art from unique creators who share their story.

A user-first marketplace to find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized blockchain technology for digital assets.

A creator-first launchpad for artists to deploy their own NFT collection with fully tested, creator-owned,no-code smart contractsin minutes. Creators can sell their art at a fixed price or auction it.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

Join the Stacks community and discovermajor NFT projectsand incredible digital artists.

Before you can start buyingStacks NFTs, you'll need a digital wallet compatible with the Stacks blockchain as well as STX (the Stacks cryptocurrency). While some marketplaces provide the ability to pay using a credit card, most will require a digital currency wallet. If you don't have any cryptos, you'll need to go to acrypto exchangeplatform such as OKCoin, KuCoin, andGate.io. You can then store your crypto in Stacks-compatible wallets such asLeather Wallet(desktop and chrome extension) andXverse(mobile wallet).

In February 2023, the ecosystem was taken over by important crypto news. On January 21st 2023,

Bitcoin Core software engineer Casey Rodarmor launched theordinal protocol, which has been the talk of the ecosystem since. Although there are some important differences between NFTs and Ordinals, a rough way of defining Ordinals could be to say they are Bitcoin NFTs you can mint directly on the Bitcoin blockchain.

Each Bitcoin is broken into 100,000,000 units called satoshis (or sats). Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshi scarcity is cut in half every four years (halving every 210,000 blocks). Ordinals were made possible by Bitcoin's recent Taproot network upgrade. TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-native digital artifacts that can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself."

NFTs, including ETH NFTs and Stacks NFTs, typically refer to off-chain information that is stored on the decentralized Interplanetary File System (IPFS). IPFS allows for dynamic metadata changes, meaning that, for instance, an image associated with a token in an NFT collection can be modified and the metadata refreshed on platforms such as OpenSea andGamma.io.

Casey Rodarmor aimed to address what he saw as a shortcoming in NFTs when he developed the Ordinal protocol. In his view, the fact that NFTs rely on off-chain metadata that can be altered makes them "incomplete," whereas Ordinals are "complete" because all the data is recorded directly on the blockchain. The goal of Ordinals is to embody the essence of true digital artifacts, which Rodarmor believes NFTs should strive to achieve.

Despite the surge in interest inordinal inscriptions, the process of actually creating an inscription is highly technical, complex, and time consuming. Gamma's no-code platform removes these barriers.

The Gamma no-code creator platform makes ordinals accessible to anyone with a Bitcoin address. Paired with the creator launchpad on theStacksprogramming and scaling layer for Bitcoin, the

Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer.

In February 2023,NFT walletssuch as Xverse Wallet also quickly announced Bitcoin Ordinal supported functionality, making it easier to set up a Bitcoin address for your Ordinal. Leather Wallet developers also confirmed support for Ordinals was on the way.

Best Bitcoin Ordinals Wallets

Bitcoin Ordinals

What are Ordinals wallets?

Best Ordinals Wallets

Xverse Wallet

Leather Wallet (Formerly Hiro Wallet)

OKX Wallet

Phantom wallet

Unisat Wallet

Sparrow Wallet

Other popular BTC wallets

Related articles:

Established bitcoin wallets rarely supported the collection ofdigital artifacts, yet the demand for Bitcoin Ordinals is surging. Record sales are making headlines every month, and mainstream investors are starting to recognize the potential value of these Bitcoin NFTs.

Many investors, eager to capitalize on the hype, immediately seek marketplaces to buy Bitcoin Ordinals. However, they often don't realize that storing an Ordinal differs significantly from holding Bitcoin or a typical NFT.

To hold an Ordinal, a specialized Ordinals wallet is required. Navigating the growing landscape of

new Bitcoin Ordinals wallets demands an understanding of what makes Ordinals unique before making a choice. This article serves as a guide to explore Ordinals wallets, but users should always do their own research before picking the wallet that will best serve their needs. When choosing a wallet, consider the following factors: interoperability with Ordinals assets, integration withdAppsand web3, security features, popularity in the cryptocurrency market, etc.

The Ordinals protocol was launched in early 2023, rocking the Bitcoin ecosystem. Since the release of the Ordinals protocol in early 2023, Ordinals have seen a dramatic rise in popularity, with 65 million Ordinals inscribed by mid-April 2024---a growth rate of over 2000% in under a year, starting from May 2023. While the rise of Ordinals lead to a lot ofcontroversyregarding the use of the Bitcoin network, the interest hasn't died down, and more and more dApps are releasing features for Ordinals NFTs.

Each satoshi (the smallest unit of Bitcoin) is assigned a sequence of ordinal numbers, defining the order in which it was mined and allowing for specific identification and tracking. These ordinal numbers can be referenced to inscribe data onto a specific satoshi, creating Ordinals Inscriptions. Some sats are considered valuable due to their ordinal numbers marking key moments in Bitcoin history (e.g., the first sat ever created or the first sat of a new halving epoch). These sats are known as rare sats, and this has led to the creation of Runes, a new BTC token standard.

Like NFTs, Ordinals derive their value from their uniqueness, scarcity, and recorded digital proof of ownership and authenticity. Unlike other chains' non-fungible tokens, Ordinal data is securely stored directly on the Bitcoin blockchain, making Bitcoin Ordinals digital artifacts.

As Ordinals have gained traction, the surrounding ecosystem, including marketplaces and wallets, has significantly improved. This emerging infrastructure provides simple and secure functionalities, ways to create, trade, collect, and store digital artifacts.

An Ordinals wallet is designed to manage Bitcoin and Ordinals assets separately. Much like a rare coin collector wouldn't store their collection in an online bank account or use a rare quarter in a

vending machine, Ordinals must be stored separately from regular Bitcoin to avoid accidental transfers during standard transactions. This requires a wallet with "coin control" capabilities.

Ordinals wallets typically offer features to manage both Bitcoin and Ordinals, including creation, viewing, trading, and storage of Ordinals. They implement strong security measures, integrate well with other decentralized applications (dApps), and allow users to interact directly with the Bitcoin blockchain. Additionally, they should be user-friendly and not require extensive funds, storage capacity, or technical expertise. All in all, a good Ordinals wallet needs to be secure, easy to use, and accessible.

The following wallets offer compatibility with various operating systems and devices, as well as marketplaces, dApps andDeFiapps, ensuring accessibility for a wide range of users. Let's take a look at some of the Best Ordinals Wallets to use with Gamma.

Xverse Walletis an open-source, non-custodial,Web3Bitcoin wallet focused on supporting Bitcoin Layer 2 protocols like Ordinals, Lightning Network, and Stacks.

The wallet prioritizes user privacy and anonymity, not collecting or storing any user data and bypassing know-your-customer (KYC) and anti-money laundering (AML) processes during wallet creation. The wallet encrypts all security keys with user-set passwords on the user's device, ensuring no sharing or storing elsewhere. Xverse's open-source code allows full transparency into its security methodology, regularly audited by security firms like Least Authority.

In July 2023, Xverse introduced for Ledger hardware wallets, which have garnered trust and acclaim from millions of users worldwide. Users can safely store their assets in Ledger devices with Xverse, extending the highest level of security to Ordinals collectors.

Xverse wallet can be used with the Gamma Bitcoin Ordinals marketplace and creator launchpad as well as theStacksmarketplace. Xverse wallet is supported on Chrome, Brave, iOS, Android. Follow thisguidefor information on how to set up your Xverse wallet.

Leather Wallet, formerly Hiro Wallet, is an open-source non-custodial Bitcoin wallet that introduced

Ordinals support on February 14, 2023. It also supports Bitcoin Layer 2 protocols like Stacks and plans to add Lightning Network support.

Leather Wallet, remains highly interconnected with popular decentralized Ordinals marketplaces and platforms such as Gamma, offering various options for creating and trading Ordinals Inscriptions. In 2024, Leather added support for Runes, a new BTC token standard.

The Leather wallet is an excellent option for collectors. It features a clean and easy-to-navigate user experience with no tabs, placing everything you need on one page. Accessing your Ordinals is straightforward, just scroll down to "Collectibles." Clicking the receive button reveals your Ordinals wallet address, as well as all of the other addresses you might need.

It is compatible with Chrome, Brave, Firefox and cold storage, allowing users to connect a Ledger device. As a non-custodial wallet, Leather gives users full control over their private keys, which are not stored on Leather's servers. Leather is specifically designed for use on the Bitcoin Network and supports swaps within the wallet. You'll find our set up guidehere.

OKX Walletis a decentralized multi-chain wallet designed to integrate users into the Web3 universe. It supports cross-chain connectivity across over 50 blockchains.

OKX Walletusers can mint and purchase BRC-20 tokens and, in 2023, adopted the BRC20-S standard, enabling users to stake BRC-20 tokens directly from the platform.

This makes OKX one of the most versatile Ordinals wallets available. Its security systems have passed an audit by the blockchain security firm SlowMist.

Check outthis step by step guideto set up your OKX wallet and start using it with Gamma.

In 2024,Phantom walletreleased support for Bitcoin Ordinals, with key new features. These include Ledger compatibility, which allows users to connect their Ledger on both the mobile app and browser extension, support for recursive inscriptions so users can view and admire them directly within Phantom, and rare sat management, enabling users to manage rare sats right from the Collectibles tab, check the total amount of sats, and see what "satributes" each UTXO contains. To

protect valuable rare sats from being accidentally spent during in-wallet transfers, the sat protection logic has also been updated.

Phantom walletcan now be used with many more apps. Users can browse, buy, list, and inscribe Ordinals on platforms like Gamma.

Phantom wallet offers one wallet for everything, integrating the best of Solana, Ethereum, and Bitcoin in one place.

It allows easy management of Bitcoin addresses, with options to toggle between Taproot and Native Segwit in settings. Transaction overviews provide important details at a glance, such as ETA and estimated balance changes, with BTC-denominated values converted to USD for better context. The inscribed and rare sat protection ensures that users never accidentally spend their Ordinals or valuable rare sats, and the immersive Ordinals gallery lets users view, search for, and pin Ordinals in the Collectibles tab. Lastly, easy onramps allow users to buy BTC instantly with a card or transfer from major exchanges.

Follow the steps in this guide toset up your Phantom walletto use with Gamma.

UnisatWallet is a Bitcoin-specific wallet that offers unique features like Unconfirmed NFTs, allowing users to view their Ordinals before they are mined into blocks. This early visibility enables users to correct any errors promptly.

Unisat ensures that private keys remain private, as they are not stored on their server; only the user has access to their private key. The wallet is open source, allowing users to review the code and see how it is built and upgraded. However, it does not have a separate Ordinals address, requiring the use of a Taproot-compatible Bitcoin address, which could lead to accidentally spending Ordinals during regular BTC transactions.

The wallet's user experience includes four tabs for viewing Ordinals, sending, receiving, and buying BTC, exploring mints, accessing dApps, and managing settings.

Unisat makes it easy to save the recovery phrase by allowing users to copy it directly to the

clipboard. It also offers a selection of Bitcoin address types, custom HdPaths, and phrases, providing more options but potentially confusing first-time users.

UniSat Wallet allows users to see their Ordinals immediately, even before they are mined into blocks. This feature, known as Unconfirmed NFTs, not only provides early visibility but also the ability to correct or override if needed. The wallet is specifically designed for Bitcoin Ordinals.

Take a look at ourguideto set up your Unisat wallet.

Sparrow Walletis designed to optimize Bitcoin transactions, making it an excellent choice for those looking to interact seamlessly with theBitcoin network. Its user-friendly interface allows users to create custom transaction types based on individual preferences, offering flexibility and control.

A standout feature of Sparrow Wallet is its advanced privacy capabilities, including CoinJoin integration. This feature allows users to combine their satoshis with others' coins in a single transaction, enhancing privacy by obscuring the source of funds and making it difficult for external parties to trace the origin of transactions.

Sparrow Wallet also supports full Bitcoin nodes, giving users direct access to the entire blockchain while maintaining complete control over their funds. This not only enhances security but also reinforces the decentralized nature of the Bitcoin network.

You'll find a guide to setting up Sparrow wallet to use with Gammahere.

MetaMask is a non-custodial multi-chain wallet and browser extension facilitating integration with Web3 dApps. Initially an Ethereum wallet, MetaMask now supports various tokens and dApps across the Ethereum network and, through a partnership with Generative XYZ, provides an interface for interacting with and storing Bitcoin and Ordinals assets. Connecting MetaMask to Generative creates a unique signature to generate a Bitcoin Taproot key and address, allowing users to leverage MetaMask's technology while exploring Ordinals.

The Ordinals Wallet launched on February 16, 2023. This community-funded project was designed to overcome the limitations of earlier wallets. Users can manage their digital assets within the

application, including viewing, buying, selling, storing, and inscribing Ordinals. The wallet supports both Bitcoin and Ordinals on a single platform, eliminating the need for multiple wallets. Its user-friendly interface and intuitive design have garnered positive feedback from both beginners and experienced users. Strong security features ensure users have direct control over their assets via user-created passwords not stored on external servers.

Magic Eden, a popular marketplace, also has its own wallet. Integrating with the Magic Eden platform enables users to view and list their Ordinals directly within the wallet. Magic Eden's multi-chain wallet collaborates with projects in the Ordinals space to provide exclusive perks for ME Wallet users, and it offers various security features to enhance user safety.

Hardware wallets, also called "cold storage", such as Ledger and Trezor, are also popular options for safekeeping of digital assets and crypto.

Bitcoin Blockchain

What is Bitcoin?

What is the Bitcoin blockchain?

How does the Bitcoin blockchain work?

Bitcoin smart contracts

How to buy Bitcoin?

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Bitcoin is both a cryptocurrency and a blockchain protocol. It is the first and largest cryptocurrency in the world, with the highest market cap. It was created to decentralize control of money and remove the need for a central authority (for example, banks).

The original 2008Bitcoin white paperthat first described the blockchain system and its set of computational rules --- that would serve as the backbone of the entire crypto market --- was written by a person or group of people known as Satoshi Nakamoto. The Bitcoin protocol was officially

released in 2009 as open-source software.

Bitcoin, capital B, refers to a global, borderless, decentralized protocol and network, while bitcoin, lowercase b, refers to the unit of account (the cryptocurrency), which has a fixed maximum supply and a known, decreasing issuance rate.

The concept of blockchain technology first emerged in 1991, with apaperexplaining the use of a continuous chain of timestamps to record information securely, and now forms the bedrock of cryptocurrencies such as Bitcoin and Ethereum. Bitcoin was largely created to facilitate the exchange of bitcoin cryptocurrency (BTC), but its potential was quickly discovered. The Bitcoin blockchain was designed to store a lot more than just data on the crypto token's movement.

The Bitcoin blockchain is a digital, distributed ledger of transactions across the blockchain's network of computer systems. It aims to decentralize financial services and allows users to be in full control of their digital currency, with no third party needed. Users no longer need to go through any financial institution to make or receive online payments, unlike with the U.S. dollar, which is controlled by the Federal Reserve, meaning the user's data and currency are technically controlled by their bank and a central authority system. Current U.S. regulations also require financial service providers to verify their customers' identities when they open an account, which can be seen as a pro or a con.

The distributed database is managed by multiple participants using distributed ledger technology. Transactions are recorded using an immutable cryptographic signature (a fixed-length string known as a hash). The transactions are then organized into blocks, and each block contains a number of transactions, every one of which are recorded on the participants' ledgers. Blocks are "stacked" on top of each other and each new block includes a hash of the previous one, effectively chaining them together, thus the term "blockchain". Every time a new block is added, the previous one becomes unmodifiable, making each block more and more secure over time.

To sum this up, the blockchain's critical parts include records (block records and transaction records), blocks, hashes and chain. Transaction records include the digital asset, price and

ownership data that are recorded, approved and settled across all nodes.

The Bitcoin blockchain is an amalgamation of Bitcoin (BTC) and blockchain. It is a distributed, public ledger that contains the history of every bitcoin transaction. In other words, Bitcoin is a trustless form of money that removes the need for a trusted third party to keep a ledger, because everyone part of the Bitcoin network has a copy of this ledger. A copy of the blockchain can be downloaded, and any user can inspect the path of bitcoins from one transaction to another with public data being accessible through an API. Bitcoin transactions are pseudonymous, meaning users are not required to provide proof of their identity.

The Bitcoin blockchain usesProof of Work(PoW), a decentralized consensus mechanism that requires members of a network to expend effort solving an arbitrary mathematical puzzle to prevent anybody from gaming the system. Proof of work requires huge amounts of energy, but guarantees a secure blockchain.

Every Bitcoin transaction happens in the Bitcoin blockchain network, a peer-to-peer network made of thousands of nodes that run the protocol. This means that all the computers that are part of the network are equal to each other and there are no "special" nodes: they are all in charge of keeping the distributed network up and running.

The Bitcoin network is the digital space where hash power generation occurs. Hashing power is the processing power used by your hardware to perform and solve hashing algorithms, which are then used to create new cryptocurrencies which can be traded with one another. This process is called bitcoin mining.

Bitcoin miners earn bitcoins by finding and publishing new blocks. When a new block is broadcast (new blocks are mined all the time, about every 10 minutes), the miner who solved the block receives a given quantity of bitcoins. This is both an incentive and a reward for keeping the network secure and ensuring that all transactions are valid. Though transaction fees are optional, miners can choose which transactions to process and prioritize those that pay higher fees.

Because transactions on the network are confirmed by miners, decentralization of the network requires that no single miner or mining pool obtains 51% of the network's mining hash rate or computing power, also known as a 51% attack.

Like other smart contract platforms, Bitcoin smart contracts ensure trustless transactions, which settle on the Bitcoin network, making the history of transactions more durable through Bitcoin's proven security. The digital agreement (smart contract) is stored and executed across all nodes in the Bitcoin blockchain network, where it is given security and immutability. As it was designed to be a decentralized cryptocurrency, leaving out smart contract functionality, Bitcoin has limited scripting language and prioritizes security over programmability, making it difficult for developers to work with the syntax.

There are various types of Bitcoin Smart contracts. Script is useful for powering the Bitcoin network but isn't Turing complete, which means it doesn't allow for logical loops. This keeps the Bitcoin network safe from DoS attacks. Bitcoin's most popular script type isPay-to-Public-Key-Hash (P2PKH). P2PKH scripts allow bitcoin to be sent to a Bitcoin address, such that only the owner of the corresponding private key can spend the bitcoin. Bitcoin's Taproot upgrade will introduce a new script type calledPay-to-Taproot (P2TR), which will unite the functionality of P2PKH and P2SH scripts, allowing bitcoin to be sent to both a public key and arbitrary scripts. More custom smart contracts can be built on top of Bitcoin, like multisignature accounts, payment channels, escrows, time locks, oracles, and more.

All of the above are executed on Bitcoin's blockchain as regular Bitcoin transactions. However, bitcoin can also be spent and used to power smart contracts on additional layers, such as the Lightning Network, which relies on multisignature transactions calledHashed Time-Locked Contracts (HTLCs)to enable instant and nearly free Bitcoin payments. It is only one of many protocols that allow bitcoin to be transferred off-chain. Others, such as the Liquid Network, side chains, and state chains, also rely on Bitcoin's smart contracting ability to enable even more use cases.

StacksmadeBitcoin smart contractspossible, allowing developers to write fully expressive smart contracts and build Web3 dApps beyond Ethereum (ETH) and other blockchains, while enjoying the security of Bitcoin.Stacks functions as the smart contract layer for Bitcoin, enabling projects that can natively use BTC and unlocking immense value while helping the growth of crypto adoption.

Stacks smart contracts offer many benefits including low transaction fees, trustlessness and immutability, a transparent and scalable programming language, as well as unrivalled security.

Stacks enables developers to write fully expressive smart contracts, allowing the creation of new types of apps, use cases,NFT marketplacesandDeFi appssuch as Arkadiko, which enables users to take out a self-repaying loan in USDA (a stablecoin) that is backed by their STX tokens, or InfinitySwap, where you can transfer your BTC directly to another Bitcoin address to enter a liquidity pool.

NFTs such as music, collectibles, arts and even real estate can be minted through the Bitcoin ecosystem on NFT marketplaces such asGamma, the largest NFT marketplace on Stacks.

Crypto exchangessuch as Binance and Coinbase allow you to purchase cryptocurrencies such as Bitcoin, Ether, Cardano and Bitcoin Cash, with fiat currencies (think USD). You'll then access your crypto through your Bitcoin wallet. Platforms such as Nasdaq offer cryptocurrency prices and market activity data for US and global markets, helping you pick the right time to invest.

When you buy bitcoin, they aren't actually stored in your digital wallet. Rather, your crypto wallet will give you access to your digital assets, which are held on the blockchain. You will own a bitcoin address which has a balance recorded on the blockchain. The bitcoin address' owner controls the associated Private Key, also known as seed phrase, that allows them to sign transactions.

Flexible traders who prefer diversifying their portfolios at a lower cost and tax benefits often invest in ETFs. ETFs (exchange-traded funds) are a collection of assets whose shares are traded on a stock market. They blend the characteristics and potential benefits of mutual funds, stocks and bonds. If bitcoin's value rises, so does the ETF's, and vice versa. ETFs are now accessible for various assets

and industries, including commodities and currencies.

Blockchain Consensus

What is a blockchain consensus mechanism?

Types of consensus mechanisms

Proof of Work

Proof of Stake

Delegated Proof of Stake

PBFT

A few more...

Conclusion

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Blockchain technology has revolutionized the way transactions are processed and recorded on a distributed ledger, but there needs to be a way of preventing malicious uses. This system is called a consensus mechanism.

Until 2008, when Satoshi Nakamoto published the Bitcoin white paper which described a digital currency based on consensus protocols that would allow secure, peer-to-peer transactions, one of the issues that prevented the development of digital currencies was the double-spending problem. You can't spend the same dollar bill twice, but with cryptocurrency, there needs to be a way to prevent users from spending the same unit twice (or more) in different places before the system can record the transactions. The consensus mechanism, also called consensus algorithm, is used to prevent this.

Blockchain technologyhas a wide range of use cases, including financial transactions, supply chain management, and smart contract execution. Every cryptocurrency blockchain uses a consensus mechanism, which allows users of the blockchain to agree on the legitimacy of transactions, with no

centralization or central authority needed. The blockchain consensus protocol that is used influences the way transactions are verified, how much energy is used, transaction fees and speed, and can have a significant impact on the security and efficiency of the network.

Although the idea of theProof of Work consensus mechanismexisted before the creation of theBitcoin blockchain, it was implemented for the very first time for blockchain technology. Amajorityof cryptocurrency networks use the Proof of Work (PoW) mechanism, including Bitcoin, Litecoin, DogeCoin, and Bitcoin Cash.

This article will explore the different types of consensus mechanisms used in distributed systems, including Proof of Work (PoW), Proof of Stake (PoS), and more.

The most well-known consensus mechanism is PoW, used by the first and most famous public blockchain, Bitcoin. PoW requires nodes, or miners, to compete against each other to solve complex mathematical problems by finding a cryptographic hash of a particular block, in order to add a new blocks to the blockchain. Thenodethat solves the problem first gets to add the next block and receives a block reward. PoW requires specialized computing systems to run through all possible solutions until the winning solution is found, an energy-intensive process, which has led to the development of other consensus mechanisms.

Proof of Stakehas gained popularity in recent years, particularly in the Ethereum blockchain, which moved from PoW to PoS in 2022 (Ethereum Merge). Other prominent platforms on PoS include Cardano (ADA), Solana (SOL), and Tezos (XTC). In the PoS consensus, validators, or users with a stake in the network, are selected to add new transaction blocks to the blockchain. The more stake a validator has, the more likely they are to be selected to add a new block. Much less computational power is required for validating transactions, making Proof of Stake more energy-efficient than PoW.

Delegated Proof of Stake (DPoS) is a variation of PoS, in which token holders vote for a limited number of validators to add new blocks to the blockchain, rather than validators being selected at random. Because of this stake-weighted voting mechanism, DPoS is one of the fastest blockchain

consensus models and is considered more democratic than PoS. Some of the real-life use cases of this blockchain consensus mechanism are Steem, EOS, and BitShares.

Hyperledger, a blockchain platform developed by the Linux Foundation, uses a consensus mechanism called Practical Byzantine Fault Tolerance (PBFT), which is based on the Byzantine Generals Problem. PBFT is a consensus mechanism that is more suitable for permissioned blockchains, where the network is comprised of known and trusted participants.

Other consensus mechanisms include Proof of activity (PoA), a hybrid of the PoW and PoS consensus mechanisms. Not to be confused with Proof of Activity, proof of authority (also 'PoA') works by selecting its validators based on reputation.

Proof of Elapsed Time (PoET) is usually used on permissioned blockchain networks (those that require participants to identify themselves), is considered one of the fairest mechanisms, as it leverages trusted computing to enforce random waiting times for block construction.

Proof of Capacity (PoC) allows sharing of memory space of the contributing nodes on the blockchain network. The rights a node has for maintaining the public ledger depends on the memory space they have available: the more memory space the node has, the more rights it is granted.

With Proof of Burn (PoB), which is a quite novel consensus mechanism, miners compete by destroying ('burning') a proof-of-work cryptocurrency as a proxy for computing resources.

Proof of Transfer(PoX) enjoys the security provided by the PoW blockchain, but also enables more day to day activities by users and more programmability. This mechanism was designed to leverage the security of Bitcoin, while allowing more complex interactions within theStacksecosystem.

Consensus mechanisms are a vital component of the blockchain system. Many types of algorithms have been developed to address the scalability and energy consumption issues of the first generation ofblockchain protocols, and as the space continues to grow and evolve, more will be developed to improve the security and efficiency of blockchain networks.

.btc Domains

What is a .BTC Domain name?

How can I buy domain names?

How can I sell, transfer or trade domain names?

A .btc domain name is theStacks blockchain'sdecentralized web identityand human-readable wallet address system. These domains are registered through a smart contract on Stacks, secured by Bitcoin. Thissmart contractimplements a decentralized name registry. With decentralized domain names, you aren't subject to whois information, so your identity remains private.

.BTC names are registered by sending a transaction to the BNS smart contract on the Stacks chain. BNS is the "Blockchain Naming System", a decentralised name registration app that can be compared to its Ethereum (ETH) counterpartENS. Given Stacks' unique connection to Bitcoin, registering .btc names automatically generates a pair of corresponding Bitcoin and Stacks addresses.

On Gamma, you can use your blockchain domain to transfer NFTs to someone by typing in their .btc name instead of the longer alphanumeric wallet address, or you can use it to view your own --- or someone else's --- profile and NFTs on Gamma. your BNS name is automatically reserved as your unique profile address, likegamma.io/example.btc.

Toclaim your Bitcoin domain, head over tohttps://btc.us/. Connect your Stacks compatiblecrypto walletand make sure to select an address that does not already have a .btc domain tied to it, as you can only have one per address.

If the name you'd like to purchase is available, you will be able to pay with cryptocurrencies (STX and Bitcoin) or US dollars. That's it, your name registration is complete and your domain name is yours for five years! You'll then need to pay some renewal fees if you'd like to keep it.

Thebtc.usweb bridge allows users to use their names as web pages. This means the web bridge turnsbtc.usinto the top level domain and allows users to generate subdomains for their personal

use. With your Bitcoin domain registration, you can link to your website via your domain name. Let's take example.btc, once linked to your website with a top level domain (TLD) such as .com, typing example.btc in the browser URL bar will lead users to example.com.

If you'd like to purchase other NFT domains such as .crypto, .wallet, .nft and more, you'll need to head over to website such asUnstoppable Domains. Available payment methods include Paypal, credit card and digital currencies. Note that NFT domains aren't part of the current DNS (domains part of ICANN), and are called alternate roots.

Gamma.io, the leading NFT marketplace on Stacks, offers functionality for selling, transferring and buying .btc domains on the secondary market.

BNS domains are a special kind of NFT that predates Stacks mainnet itself. The smart contract used to register and manage names is limited in some ways that makes buying or selling them a bit different from most other NFTs on Gamma.

Most notably, only one of these NFTs can belong to a given address at one time, and the NFT must be held in a smart contract while listed for sale. If you already own a BNS domain at your primary address, you'll see an option to purchase a domain for another account.

You can sell BNS domains by visiting your profile while logged in with a given account. Find the BNS name in your profile, and click List. Define a list price and proceed to deploy the smart contract that will hold your NFT.

If you would like to buy a domain on Gamma, visit theBNS Namescollection. You can explore the domains listed for sale on the marketplace by sorting and filtering through the provided categories and other attributes. When you've found one you like, click Buy to prompt the purchase menu. If you don't have a BNS name at the address you've used to explore the marketplace, you can purchase it with the address that is connected. If you already have a BNS name at this address, or if you'd otherwise like to send the name to another address, you can enter an address that will receive the domain when the purchase is completed.

If you would like to learn more about NFTs and the Stacks blockchain, head over to ourLearnpage.

Blockchain Protocols

What is blockchain?

What is a blockchain protocol?

What are some well-known blockchain protocols?

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Ablockchainis a type of distributed ledger technology that consists of growing lists of records, calledblocks, that are securely linked together using cryptography. Blockchain facilitates the process of recording transactions in blocks of several cryptographic databases and tracking assets in a peer-to-peer network. The distributed database is managed by multiple participants, callednodes. All network participants can access the digital ledger and its immutable record of transactions. With this shared and public ledger, transactions are recorded only once and constantly checked and secured by the computing power of the entire network.

A blockchain protocol is a set of rules that allows data to be shared across the network of nodes. Protocols serve as guidelines that help exchange information in a simple and secure way.

Blockchain protocols play a crucial role in the blockchain ecosystem by providing the underlying infrastructure for blockchain-based applications and digital assets. They are the backbone of blockchain technology and cryptocurrencies. Along with the previously mentioned set of rules, they also provide theconsensus mechanisms, also called consensus protocols, such asProof-of-Work(PoW) on the Bitcoin blockchain andProof-of-Stake(PoS) on the Ethereum blockchain. Consensus algorithms govern how transactions are validated and added to the ledger, and help avoid malicious uses of the blockchain such as double-spending.

The set of rules which is a protocol, defines the interface of the network, interaction between computers, incentives, type of data, etc. Scalability and validation are two key challenges that

blockchain protocols aim to address. Scalability refers to the ability of a blockchain network to handle a large number of transactions, while validation refers to the process of ensuring that transactions are legitimate.

Another important aspect of blockchain protocols isdecentralization, which refers to the distribution of power among the nodes in a blockchain network. Public blockchains, also called permissionless blockchains, such asBitcoinandEthereum, are fully decentralized and open-source, while private blockchains (permissioned) have a more centralized structure and are often used by businesses and organizations.

There are many different types of blockchain protocols, each with their own unique features and use cases.

There are hundreds of blockchain protocols, but here are a few of the most common protocols used in Blockchain development services, and widely regarded as the most advanced blockchain platforms available.

Hyperledger, developed by the Linux Foundation, is an open-source and permissioned framework that helps enterprises provide blockchain solutions. It supports Python and aims to provide universal guidelines for blockchain projects.

Multichain Technology allows users to create private blockchains that can be used for financial transactions by businesses. It provides both a simple API and a command-line interface, which aids in the preservation and establishment of the chain.

Corda offers an enterprise-focused protocol, making it Multichain's rival. The majority of Corda-based apps have been related to finance and banking, but the technology can be used in many blockchain solutions. Corda employs consensus methods as well assmart contracts, enables interoperability and is open-source and permissioned.

The Ethereum protocol has its own native token (Ether, also called ETH) and many features including smart contracts,dAppdevelopment,NFTsand more, but is a public blockchain and needed

to be permissioned in order to be useful to organizations. That's where Enterprise Ethereum comes in. Ethereum for business allows organizations to establish permissioned networks (private) that can scale. While its scalability and privacy are big advantages of this protocol, it is volatile and has high transaction fees. Permissioning is the main distinction between Ethereum and Enterprise Ethereum.

Quorum is another enterprise blockchain that also assists financial institutions, and has managed to remain open-source, for anyone to use. As the project began by altering Ethereum code, it is closely linked to it.

In addition to the protocols mentioned above, there are also a number of other blockchain protocols and projects worth mentioning, such as Polkadot and Solana, a high-throughput protocol that is optimized for decentralized applications andDeFi.

Semi-fungible Tokens

What are semi-fungible crypto tokens?

What are semi-fungible tokens use cases?

Gaming

Vouchers and coupons

Tickets to events and concerts

What are the advantages of SFTs?

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Semi-fungible tokens, or SFT, were developed in order to address the limitations of non-fungible tokens (NFTs), which, even though they're trending and have a number of use cases, have some limitations. SFTs are a combination of FTs and NFTs.

They are uniquely positioned as they are able to retain their fungibility until they transition to an NFT, and vice versa. In their lifecycle, they can start out as a fungible item that can be traded with another identical SFT, and then become non-fungible when the holder redeems the SFT, or the opposite.

When an SFT becomes an NFT, it is indivisible, verifiable, and indestructible. And when it is fungible, it is highly liquid and can be exchanged easily with anyone.

Each blockchain has a set of rules, called standards, that define the nature of tokens and how they will behave within the ecosystem. Initially built on theEthereum blockchain(ETH), SFTs emerged from Ethereum's ERC-1155 standard, which was created by blockchain gaming developers Enjin, Horizon Games and The Sandbox in 2017, and is essentially a combination of theERC-20(fungible token) andERC-721(non-fungible token) standards. Video games now represent the majority of the ERC-1155 standard's application cases. However, SFTs have many other use cases in the crypto market and token standards have been developed on other blockchains to accommodate SFTs.

Cryptocurrencies like Bitcoin and Ether, as well as fiat money such as US Dollars, are fungible tokens (FTs). A fungible item is one that can be replaced by another identical item with no practical difference, for example, every Bitcoin is interchangeable with another Bitcoin.

Non-fungible tokens (NFTs) usesmart contractsto provide proof of ownership of unique assets. There are many different types of NFTs, such as art collectibles, virtual real estate, music, videos and many more. NFTs can be created on different blockchains.

Semi-fungible tokens are widely used in the gaming industry and in metaverse games for in-game assets. Video games may have fungible items such as in-game currency (think gold bars or game dollars), as well as non-fungible assets such as collectibles and weapons.

You may see a token that begins as an NFT, for example an object, that can be harvested to obtain ten game dollars. The gamer may then trade that currency to others, or build something out of it, turning it back into an NFT. The digital asset the gamer built out of the ten game dollars may then turn into something else when they reach a certain level. These changes are dictated by the SFT's inbuilt smart contract, as created by the developer. As an example, the flexibility of ERC-1155 tokens is extremely useful for virtual items used in games inThe Sandbox's metaverse. Creators can mint any number of copies of the same digital ASSETs.

Games like Clash Royale have also popularized buying and selling tokens in fractions (which is not possible with FTs or NFTs): players collect various pieces for their decks instead of just one card with full value on it.

SFTs are also used for vouchers and coupons. For example, an SFT that represents a $10 Amazon voucher would have the same value as an identical voucher with the same expiration date and amount. They would therefore be interchangeable. However, because these types of tokens are semi-fungible, they lose their face value when they're redeemed, making the expired tokens non-fungible and insuring that those vouchers won't be used more than intended.

Another example representing the possible use of SFTs is concert tickets. Tickets to popular events tend to get sold out fast, and almost40%of ticketing traffic now comes from ticket bots. The sold out tickets are resold at higher prices on secondary markets, robbing organizers and artists, and leading to fraudulent activities, with more and more buyers getting scammed with fake tickets. The use of semi-fungible tokens can help with with this problem. The public nature of the blockchain technology allows for the use of smart contracts, traceability, and transparency.

Let's say you'd like to go and see Arctic Monkeys next month. Your ticket would have a face value, and could be exchanged for another identical one provided it's for the same concert (same band, same date, same city). Once the concert has passed, the token becomes a collectible and has a new value. It can no longer be exchanged for a valid concert ticket of the same face value to see a different bad.

Greater efficiency for app developers: the concept of semi-fungible token development allows for the use of a single smart contract for a token that is both fungible and non-fungible, as well as faster transaction times and lower gas fees.

Reduction of transaction costs and time spent, by enabling batch transfers and multi-transfers referring to more than one address in one smart contract.

Atomic swap, which means swapping any number of tokens in two-step.

A more stable in-game economy would have been possible with SFTs in the case of, for example, the free "mutant serum" that was given to some paid holders of the Bored Ape NFT created additional costs for the developer, pushed up the price of the "free" serum onNFT marketplacesand inflated prices all around.

A smoother gaming experience for gamers

More flexibility and tradability than FTs and NFTs.

Ethereum Smart Contracts

What are smart contracts?

Why Ethereum smart contracts?

How do Ethereum smart contracts work?

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In the 90s, Nick Szabo coined the term "Smart Contracts" when describing the notion of a digital protocol designed to facilitate, verify, or enforce the terms of an agreement without the need for a third party. The full possibilities of this protocol became a reality when blockchain technology emerged. Similarly to a vending machine, smart contracts work by following simple "if/when...then..." statements that are written into code on a blockchain, meaning with the right inputs, a certain output is guaranteed. The terms of a smart contract are specified in code, thus eliminating the need for human intervention, intermediaries or a central authority. Smart contracts are immutable: their definition (bytecode) cannot be changed or updated once they are deployed on the blockchain.

They are often associated with theEthereum blockchain, the world's second-largest crypto by market cap, that was designed to accommodate smart contracts, but the idea isn't restricted to any particular platform or blockchain network. Every blockchain uses different templates, algorithms and encoding techniques.

While Bitcoin (BTC) was the first cryptocurrency to support basic smart contracts, Ethereum smart

contracts are more popular, replacing Bitcoin's more restrictive language with language that allows developers to use the blockchain to process more than cryptocurrency transactions.

On theBitcoin blockchain, only the owner of a Bitcoin private key can produce a digital signature proving that they own the cryptocurrency they claim to own. In contrast, ETH has developer-friendly languages for writing smart contracts such as Solidity. The Ethereum network is "Turing-complete," meaning it supports a broader set of computational instructions. Without limits, programmers can write just about any smart contract they can think of.

Smart contracts are the fundamental building blocks of Ethereum applications. Ethereum smart contracts have led to the network's array of decentralized applications (DApps),DAOs, new technologies and other use cases such as NFT marketplaces that enable buying and minting digital assets like collectibles, art, music and even access to real-world items.

Any user or application is free to join the network and submit transactions, which are later broadcast to other nodes for validation and execution, but you must have some of Ethereum's digital currency (ether) in your Ethereumwallet(for example Metamask) to deploy Ethereum smart contract on the network. A wide selection of tutorials, tools and development frameworks is availablehere.

Unlike most blockchain networks which are described as a distributed ledger, Ethereum is what's considered a distributed state machine, containing what's known asthe Ethereum Virtual Machine (EVM). This machine state, which all Ethereum nodes agree to keep a copy of, stores smart contract code and the rules by which these contracts must abide. Since every node has the rules baked in via code, all Ethereum smart contracts have the same limitations.

Smart contracts are public on Ethereum and can be thought of as open APIs. The creators of Ethereum added an important feature to the blockchain: the storage, which could be easily described as a single GitHub repository.

Solidity is an object-oriented and static programming language influenced by C++ or javascript. Because Solidity is subject to continuous improvements, Pragma solidity is usually the first line of

code within a Solidity file: it is a directive that specifies the compiler version to be used for current Solidity file.

No-code NFT Platform

What is an NFT?

What is a no-code platform?

Create Ordinal NFTs on Gamma

Create Stacks NFT collections on Gamma

Join the ecosystem

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An NFT, or non-fungible token is an ownership record for a digital asset on the blockchain. It has unique metadata (it cannot be copied or substituted), that is stored in a digital wallet.NFTsare unique and irreplaceable, unlike traditional cryptocurrency tokens (think Bitcoin), which are like-for-like (or,fungible) with one another.

At first predominantly popular on the Ethereum blockchain (ETH) and NFT marketplaces such as OpenSea, these digital assets have become very popular in Web3, spreading to other blockchains such as Solana, Polygon, Tezos, andBitcoin via Stacks, with its leading NFT marketplaceGamma.io. More recently, NFTs have spread to the Bitcoin blockchain, with the rise of Bitcoin Ordinals.

With interest in crypto and NFT art growing, NFT projects are moving towards projects with more utility and longterm uses in the metaverse and in the real world. The ecosystem is growing, with more and more entrepreneurs, artists, non-profits, brands and influencers joining the NFT community. Start-ups are building incredible newNFT marketplaces,DeFiapps,dAppsand no-code tools for NFT creators.

Not all creators can code, andsmart contractsand IPFS can be intimidating. No-code platforms solve this issue for creators seeking to join the world of NFTs.

With no-code platforms, which usually have a wide range of templates and no-code tools, NFT creators can design and launch their own collections and mint pages in minutes, with no coding skills needed. Some examples of no-code creator launchpads areGamma.ioon the Stacks and Bitcoin blockchain and ZeroCodeNFT which is multi-chain, supporting the ETH blockchain, Arbitrum, Avalanche, and many more. Other platforms such as Nifty and NFTGenerator offer art generator services that allow users to generate their collections by only providing traits and metadata. The creator will need to choose an NFT platform, set up a crypto wallet, and have their art ready. That's it.

Note that the crypto wallet you choose depends on the blockchain you want to launch your NFT collection on. Meta Mask and Trust Wallet are some of the most popular wallets, supported by the majority of blockchains, but if you would like to launch your NFT collection on theStacks blockchain, you will need to set up aLeather or Xverse wallet. These wallets are also compatible with Bitcoin Ordinals, which are NFTs that live directly on the Bitcoin blockchain.

NFT creation has evolved in many ways over the past few years and in 2023,Ordinal inscriptionsmade their way to the Bitcoin blockchain, allowing for the creation of NFTs directly on the L1. Gamma quickly launched its platform for inscribing Ordinals, making it possible for anyone toinscribe their own Ordinalwith no coding knowledge. Through Gamma, users can create single inscriptions, bulk inscriptions, airdrops, Dutch auctions, collection mints, and nowPrints, Gamma's fresh take on Editions.

Ordinal NFTs and recursive inscriptions offer manybenefits, and we're excited to help artists join the world ofdigital artifactson the Bitcoin blockchain. The smooth user experience allows creators to inscribe their work in a few easy steps, completely removing the need to run a Bitcoin node or have access to a miner. Our team has set up a number oftutorials and step-by-step guidesto launching and managing an Ordinals collection on Gamma, so be sure to take a look!

TheGammaplatform specialises in collectibles and digital art, and helps promote curated works from

unique creators. The platform offers three core products, with options for minting, selling, airdrops, buying, and auctioning NFT tokens, amongst other features.

The creator-firstlaunchpadhelps artists deploy their own NFT collection with fully tested, creator-owned, no-code smart contracts in minutes. Creators can sell their art at a fixed price or auction it. The user-first marketplace serves as a digital storefront for NFTs and allows users to find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized blockchain technology for digital assets. The social platform brings together creators and collectors in an engaging andWeb3-native way.

Are you ready to create your first NFT collection? Go tocreate.gamma.ioand followa few easy steps. Select one of theavailable collection typesdepending on your project: Continuous, Editions, or Public Mint. Enter your collection details and upload your assets in one of theaccepted formats(such as png, jpg, gifs etc). Optionally, you can also upload yourmetadata. Review your submission, confirm the transaction in your connected wallet (you can increase or lower gas fees via your wallet), and deploy your contract to the mainnet!

When your transaction is confirmed on the blockchain, your NFT collection is live, and you can find it under the "Created" tab on your profile.

When you deploy a collection using Gamma's white label Creator Portal, Gamma automatically collects 10% of mint revenues via a function within the smart contract. TheSmart Contract Managerlets you set yourroyaltiesfor sales on the secondary market, manage your collection mint button (enable or pause minting), freeze metadata and more.

To join the world of NFTs, you'll need to consider which blockchains are of most interest to you, and purchase some cryptocurrencies. Some marketplaces such as Gamma offer a crypto on-ramp, allowing you to purchase crypto directly through the platform, with just a few clicks and a credit card.

If you would like to learn more about Gamma's Creator no-code tools and NFT minting, visit ourHelp Center, join our community onDiscord, or follow us onTwitterfor updates and

announcements!

Art on Stacks

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Looking ahead

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In the dynamic world ofweb3, the Stacks ecosystem has emerged as a pioneering force. Stacks, often denoted as STX, stands as a unique player in the landscape, bridging the world of Bitcoin and smart contracts. This article delves into the intersection of Stacks, Bitcoin and non-fungible tokens, exploring the curated, high-quality digital art scene thriving within the Stacks ecosystem.

At the core of the Stacks ecosystem lies theStacks blockchain, operating in synergy with the Bitcoin network. This collaboration allows for the creation and trading of NFTs on the Bitcoin blockchain, an unconventional approach that expands the functionality of the Bitcoin network beyond its traditional boundaries.

The concept ofBitcoin NFTswas first realized through Stacks, before the rise of Bitcoin Ordinals, leveraging the security of the Bitcoin blockchain while introducing smart contract functionality. This unique approach ensures a high level of security and transparency.

Stacks uses the Proof-of-Transfer (PoX) consensus mechanism, enhancing the security of the Stacks network by anchoring it to the Bitcoin blockchain (which uses the Proof-of-Work consensus). Additionally, the use of Clarity, a language specifically designed forsmart contracts on Stacks,

ensures transparency and reliability in the execution of decentralized apps (DApps) and NFT-related transactions.

The Stacks blockchain has its own cryptocurrency, theSTX token, which can be purchased through crypto exchanges such as Binance and Coinbase. Users can also purchase a.btc domain(BNS) for their decentralized identity on Stacks.

Leatherwallet andXversewallet support Stacks as well asBitcoin Ordinals, letting you keep all your Bitcoin NFTs in one place.

Non-fungible tokens (NFTs) are unique digital assets that are issued on a blockchain such as Ethereum (ETH), Stacks (STX) or Solana (SOL).

The Stacks art movement within the Stacks ecosystem has garnered attention for its commitment to high-quality, curated digital assets. Using Stacks to mint their NFTs ensures that both artists and buyers enjoy the assurance that the artwork is safeguarded by Bitcoin. This approach minimizes the additional energy demands associated with NFT minting, as Stacks repurposes electricity previously utilized to secure Bitcoin.

Notable projects on Stacks include Megapont, Project Indigo, The Explorer Guild, and many more. Let's take a look at a few of the key art projects on Stacks.

MegapontApe Club is a collection of 2500 pixel art NFTs, and a fictional universe in which advanced scientific mutations accelerated the evolutions of every species on Earth.

Project Indigo, also pixel art, is a collection of 3000 wasteland NFT avatars built on Stacks,. The avatars are involved in an epic interactive post-apocalyptic story. Enjoy alive creator sessionwith the artist behind Project Indigo onGamma's Youtube Channel.

TheCrashPunkscollection was created by Grace Ng, an entrepreneur and artist who uses emerging technologies to create art that inspires human potential. The collection comprises 9216 NFTs inspired by sci-fi, anime, and crypto culture.

The Explorer Guildby Sigle.io is a collection of 3000 NFTs. These digital collectibles unlock premium

features onsigle.io, a Web3 platform made for Web3 writers. The project was the first to use NFTs to fundraise on Stacks.

Blocks, embeds binary messages in unique colorful grids. Each NFT is a completely different set of squares with individual messages further defining rarity. In this generative art collection, each grid, color, and pattern is random.

Gamma.iois a home for creators and collectors. The platform specialises in Bitcoin Ordinals and Stacks NFTs, collectibles and digital art. Gamma offers three core products - a launchpad, a user-first marketplace, and a social hub for web3 communities-, offering options for minting, selling, buying and auctioning NFT tokens. The platform helps collectors discover incredible NFT collections and helps promote curated works from unique creators who share their story.

Gamma offers the highest liquidity and user base on Stacks, making it the leading NFT marketplace in the Stacks ecosystem.

Stacks marketplace and art galleryThis Is Number Oneempowers artists to leverage Bitcoin as a creative tool for crafting curated artistic experiences spanning digital art, music, and multimedia. The platform launched on the Stacks network in early 2021, featuring an array of globally acclaimed superstars such as Fatboy Slim, Dave Stewart (Eurythmics), and Orbital. In a significant milestone, This Is Number One achieved the sale of the inaugural commercial Stacks Bitcoin NFT in July 2021, marking a collaborative effort between the artist Chemical X and model Cara Delevingne.

Tradeport, formerly known as Byzantion, is the 2nd largest NFT trading platform on the Stacks blockchain. The platform has a multi-chain offering, with Stacks, NEAR and Sui.

As the Stacks network continues to evolve, its potential indecentralized finance (DeFi)applications, scalability enhancements, and ability to coexist with other blockchain networks likeEthereumandSolanabecomes increasingly evident.

The Stacks blockchain's unique integration with Bitcoin, coupled with its dedication to high-quality, curated content, positions it as a key player in the NFT art world.

The advent ofsBTCwill also be a game-changer for Stacks. sBTC, distinct from SBTC (Super Bitcoin), represents an innovative synthetic asset crafted to facilitate a trustless two-way Bitcoin peg system. This mechanism plays a pivotal role in actualizing the comprehensive vision of Stacks, providing a means for trustless interactions with theBitcoin network. Stay tuned for developments!

Ordinals Use Cases

What are Bitcoin Ordinals?

Bitcoin Ordinals Use Cases

Ready to inscribe your Ordinal?

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On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinals protocol, allowing users to inscribe 4MB of data on a Bitcoin block, which has been the talk of the web3 ecosystem since.

As Casey Rodarmor explains in a podcastinterview, with the new Ordinals protocol, people who operate Bitcoinnodesin the Bitcoin network can inscribe each sat (the smallest unit of Bitcoin) with data, creating an Ordinal NFT.

Inscribing Ordinals brings many benefits to the Bitcoin ecosystem, including more utility, bigger block size, more transactions, more miner incentives and overall growth. While many in the Bitcoin community see them as a positive, some "Bitcoin maxis" oppose them for taking up block space on the network and making transaction fees increase due to network congestion.

But what are ordinal inscriptions, and what are their use cases?

Essentially, Ordinals are Bitcoin-native NFTs, with their data living directly on the Bitcoin blockchain, without the need for a sidechain or entirely different blockchain.

The Ordinal Theory was made possible by Bitcoin's SegWit andTaproot upgrades. Individual satoshis can be inscribed with content, creating unique Bitcoin-nativedigital artifactsthat can be held

in compatible wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself. Each Bitcoin is broken into 100,000,000 units called satoshis (or sats). Each sat has a serial number, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshi scarcity is cut in half every four years (halvingevery 210,000 blocks).

When Casey Rodarmor created the Ordinal protocol, he was trying to improve what he considers to be a deficiency: NFTs (non-fungible tokens) such as ETH NFTs orStacks NFTs, are enabled by smart contracts and generally point to off-chain data which is kept on IPFS (Interplanetary File System), where the data can be changed. As an example, a token image in a given NFT collection can be updated, and metadata can be refreshed onNFT marketplacessuch as OpenSea andGamma.io. With Ordinals, however, all the data is inscribed directly on-chain. They are intended to reflect what NFTs should be, sometimes are: true digital artifacts.

AlthoughEthereum NFTsare the most popular, over the years, digital assets have spread to various blockchains including Stacks, Solana and more. TraditionalNFTs use casesinclude digital collectibles, digital art, video games, virtual real estate, concert tickets, and even tweets.

NFTs can be semi-fungible or dynamic, which requires metadata changes.Semi-fungible tokensanddynamic NFTsare used in games, vouchers and coupons, tickets to events, etc. Ordinals simply aren't meant to evolve once inscribed: they are completely immutable, which makes them quite different from NFTs on the Ethereum blockchain.

Because Ordinals are a very new development in blockchain technology, can't be updated, and their size is limited by block space, they currently don't have as many use cases as NFTs. In early 2023, JPEG, HTML, SVG, JS, CSS, images, audio, and video could be inscribed. Compression and formats such as HTML and SVG allow meaningful inscriptions with sizes on par with normal bitcoin transactions, and the more the ordinals protocol is explored, the more new use cases and functionality will emerge.

With notable NFT collections such as Ordinal Punks and Cryptopunks joining the trend, it was only a matter of a few days before startups such asGamma.iolaunched support for Ordinals.

Gamma, the largestBitcoin NFTplatform, provides an easy, low-cost way to inscribe Bitcoin Ordinal NFTs, as well as an Ordinalmarketplace.

You will first need a BitcoinOrdinal walletwith a taproot wallet address (BTC address). That wallet will need "coin control" capabilities, in order to avoid spending your Ordinal NFT satoshis on network fees. Ordinal wallets you can use with Gamma include Sparrow, Xverse and Leather wallet. You'll needcryptocurrencyto fund your transaction, which you can buy oncryptocurrency exchangessuch as Coinbase or Binance.

Once your taproot address is set up, the Gamma no-code tool allows you to inscribe your Ordinal NFTs in minutes as well as launch collection mints, and gives you the option to choose or customize transaction fees based on network congestion.

Art on Ethereum

Smart contracts on the Ethereum blockchain

Digital Art Marketplaces on Ethereum

Notable NFT Collections

Looking ahead

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In the ever-evolving landscape of the art world, the Ethereum blockchain has emerged as a revolutionary force, providing a decentralized platform for artists and collectors alike. This article explores the convergence of how crypto art leverages the blockchain platform, NFTs, cryptocurrency, and digital art in web3.

Non-fungible tokens(NFTs) have become the cornerstone of theEthereum blockchain's foray into the art world. These unique digital assets, built on theERC-721 standard, allow artists to tokenize their

work, providing proof of ownership and authenticity. Through blockchain technology, ownership history, transaction details, and metadata associated with each NFT are publicly accessible and cannot be altered.

The Ethereum blockchain's functionality has paved the way for seamless transactions and the creation of digital art marketplaces.Smart contractsenable artists to automate the minting process of NFTs and not only allocate ownership but also govern the transferability of NFTs. This functionality streamlines the creation and distribution of digital artwork, ensuring that artists maintain control over the scarcity and ownership of their creations. Anyone with adigital walletcan collect art and support their favorite web3 artists through NFT marketplaces.

Ethereum is also used by L2s (sidechains) for creating NFTs andcryptocurrencies. Polygon, for example, is one of the more popular sidechains for NFT art.

NFT marketplaces leverage blockchain technology to facilitate transparent and secure transactions, creating a vibrant ecosystem for buyers and sellers alike. Marketplaces like OpenSea, Rarible, and Nifty Gateway have become bustling hubs within the Ethereum ecosystem, offering a diverse array of digital art created by talented artists, ranging from fine art to PFP collections, GIFs and pixel art. Platforms specialised in fine art include Foundation and SuperRare.

Ethereum's native cryptocurrency,ETH, and other cryptocurrencies like Bitcoin (BTC) play a pivotal role in the buying and selling of digital assets. As the art world embraces the digital realm, cryptocurrency transactions provide a decentralized and efficient means of supporting artists and acquiring unique pieces. Collectors can easily buy or exchange crypto oncryptocurrency exchangessuch as Coinbase, connect their digital wallet to an NFT marketplace, and explore NFT collections they want to add to their personal galleries.

Prominent NFT collections like CryptoPunks, CryptoKitties and Beeple's "Everydays: The First 5000 Days" have made waves in the art world, showcasing the potential of blockchain technology to redefine the value and ownership of digital art. Christie's New Yorkauction househas also ventured

into the realm of NFTs, further validating their significance in the traditional art market. Other successful projects include Bored Ape Yacht Club (BAYC) by Yuga Labs, Axie Infinity, Sorare, The Sandbox, Meebits and more.

Ethereum-based projects like Art Blocks exploregenerative art, where algorithms play a central role in creating unique and dynamic digital pieces. This intersection of technology and creativity opens new possibilities for digital artists.

The Ethereum ecosystem extends beyond art marketplaces, encompassing decentralized applications (DApps), social media platforms, apps and DeFi apps that leverage blockchain technology, and NFTs that have been used to represent ownership of virtual land, buildings, and properties in virtual worlds or metaverses.

Art on the Ethereum blockchain represents a journey where NFTs, cryptocurrency, and blockchain technology converge to redefine the art world. From digital marketplaces to generative art projects, the Ethereum ecosystem continues to shape the future of digital art, providing artists and collectors with unprecedented opportunities in this dynamic and decentralized landscape.

As we navigate this exciting era, the fusion of art and blockchain technology propels the industry toward new heights. Many Ethereum collectors have also made their way to the Bitcoin blockchain, with the rise ofBitcoin Ordinalsattracting renowned artists. Ordinals, inscribed directly on Bitcoin's smallest unit, cannot be burned or lost --- the data lives directly on-chain, allowing artists to preserve their legacy on the mother chain, and to inscribe and sell their work on platforms such asGamma.io.

Art on Bitcoin

The early stages of the NFT art movement

Bitcoin NFTs

Bitcoin Ordinal Inscriptions

Shaping the future

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Non-Fungible Tokens (NFTs) and blockchain technology have left their mark on the art world. For a long time, Ethereum was the go-to blockchain for NFTs due to its smart contract functionality and large number of available art collections. In this article we will discuss art on the mother chain, the Bitcoin blockchain.

NFTs, unique digital assets on the blockchain, allow artists to tokenize their work and provide proof of authenticity and ownership. Unlike traditionalcryptocurrencieslike Bitcoin and ETH, an NFT is non-fungible: one is not the same as the other, where 1 BTC is equal to 1 BTC.

Crypto art has gained momentum over the past few years, with 2017 seeing the rise of collections such as CryptoPunks and CryptoKitties, and the Bored Ape Yacht Club collection launching in 2021. As artists explore new art forms and possibilities, traditionalauction houseslike Christie's and Sotheby's have embraced the digital shift, conducting auctions for high-profile NFT collections. Notable works, such as Beeple's "Everydays: The First 5000 Days" (sold on auction with Christie's New York for an impressive $69M USD) have fetched millions in the crypto art market. World-wide events such as Art Basel have also included NFT artwork to theirexhibits, bridging traditional and digital.

Art marketplaces like OpenSea, Nifty Gateway, SuperRare and Rarible facilitate the buying and selling of digital assets and NFT collections on theEthereum blockchain. However, while Ethereum remains a force in the NFT space, Bitcoin took the stage in 2023 withOrdinals Inscriptionsand hasn't left it since.

The firstBitcoin NFTcollection ever released on Bitcoin was Rare Pepes. Crafted in September 2016, Rare Pepes predates the term "NFT" and the surge in digital collectible frenzy. These tokenized assets were generated using Counterparty, an open-source protocol situated on the Bitcoin blockchain. During that period, Counterparty stood as one of the limited platforms available for NFT creation. However, its scripting language constraints imparted less flexibility and

functionality to Rare Pepes compared to contemporary non-fungible tokens. Bitcoin, in its inherent structure, is meant to be a peer-to-peer payment system andcryptocurrency, and lacks the native capacity to autonomously generate non-fungible tokens. The fundamental protocol of Bitcoin is notably straightforward, fostering a high level of decentralization, security, and stability. However, this simplicity comes at the expense of overall programmability. Notably, the Bitcoin blockchain lacks intricatesmart contracts, thereby lacking the inherent capability to produce non-fungible tokens.

In 2023, a major shift took place on the Bitcoin blockchain with the inception ofBitcoin Ordinal Inscriptions. These allow users to inscribe data --- JPEGs, GIFs, text and other formats --- directly onto satoshis, the smallest unit of Bitcoin. With inscriptions, creators can inscribe their digital artwork directly on-chain, removing the need for services such as IPFS.

Ordinals have become a pivotal player in the art market, with crypto artists joining the mother chain. Artists leverage social media platforms to showcase their work, fostering a direct connection with their audience and potential buyers in the digital art ecosystem.

Gamma.iohas positioned itself as one of the leading Bitcoinfine art NFT marketplacesand has developed tools for creators allowing them to inscribe and sell their work directly on the Bitcoin blockchain. Through the Gamma Partner Program and features such asPrints--- which lets artists create digital prints of an original inscription, in the form of open or limited editions --- Gamma expands the boundaries of the traditional art world. Gamma is the de-facto home to Bitcoin artists, showcasing art ranging from fine art photography togenerative art, and helping crypto artists flourish in this new digital landscape, navigating uncharted territories and shaping the future of the art world.

Inscribing their work directly on Bitcoin allows digital artists to preserve their legacy forever and elevate each art piece to a level of exclusivity --- all they need is a compatible wallet and to pay gas fees to inscribe their work, and that's it.

The digital ecosystem is ever-evolving, with concepts like the metaverse gaining traction, more and moreDeFiplatforms being built, and NFT collections soaring. Ordinals are reshaping the landscape

of the blockchain art industry and while inscriptions have contributed to significant Mempool congestion, reaching historic peaks in recent months, theimpactextends beyond improved functionality. This technological advancement has not only surged the number of non-zero Bitcoin addresses to unprecedented levels but also represents a pivotal moment in Bitcoin's history. This innovation is propelling network engagement beyond traditional purposes such as investing and money transfers.

What is ETH (Ether)?

Ethereum blockchain

Understanding Ethereum transactions

The difference between ETH and BTC

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Ethereum, a decentralized public blockchain platform, is commonly known for its native cryptocurrency Ether, also called ETH. While Bitcoin was designed strictly as a payment method, Ethereum was designed with ambitions to leverageblockchain technologyfor the creation of diverse applications ranging from DeFi and smart contracts to NFTs and decentralized applications (dApps). If you're new to the concept of cryptocurrency and digital assets, head over tothis beginner-friendly articleabout how Ethereum works.

Ethereum and its apps are transparent and open source. Its smart contracts are written in high-level programming languages such as Solidity (which shares similarities with C and JavaScript), Serpent, Yul, Vyper, and a few others. They are then compiled down to EVM (the Ethereum virtual machine) and deployed to the blockchain. As the network is open source, source code is usually published along with the contract, so that users can see and verify it and re-use functionality others have built.

Ethereum used theproof-of-work consensus mechanismlike Bitcoin until September 2022, when Ethereum 2.0 or Eth2 was released, event known as theEthereum Merge. At that point, Ethereum

switched over to theproof-of-stake (POS)algorithm. This switch was part of the Ethereum foundation's ongoing upgrades to improve scalability, security, and sustainability of the chain, and is expected to result in a shift in the distribution of Ether, as stakers will receive a portion of the issuance as rewards for participating in the validation process.

In 2016, a collective of network participants managed to acquire significant control in the Ethereum blockchain, absconding with over $50 million worth of ether that had been collected for a project known as The DAO. This incident led to a pivotal moment in the ecosystem where a majority of the Ethereum community made the decision to rectify the theft by nullifying the prevailingEthereum blockchainand endorsing a new blockchain version with an amended transaction history, otherwise known as a hard fork. Simultaneously, a minority faction within the community opted to uphold the original blockchain, which subsequently diverged permanently to form the Ethereum Classic (ETC)cryptocurrency.

A transaction on the Ethereum blockchain is a signed data message sent from one wallet to another. The transaction contains the sender's information as well as the recipient's, the amount being transferred, thesmart contractbytecode, and the transaction fee (gas fee) the sender is paying to the network validators.

Transactions are paid using Ether (ETH), the native cryptocurrency of the Ethereum blockchain. This prevents bad actors from congesting the network with unnecessary transactions, and acts as an incentive for users to contribute resources and validate transactions. Each ETH transaction is constituted of a series of operations that occur on the network, and each operation has a cost measured in "gas", paid in gwei (a smaller denomination of Ether, like cents to a dollar or satoshis to a bitcoin).

To purchase ETH, users can go tocryptocurrency exchangessuch as Coinbase, Binance, and many more. Crypto exchanges allow you to buy crypto with other cryptocurrencies (for example, you could buy ETH with a stablecoin and vice versa), as well as fiat currencies (think USD) via credit card or

paypal. If you'd like to cash out some of your crypto, you can link a bank account to the exchange and send ETH from your Ethereum wallet to the exchange to then have fiat transferred to your account. If it's your first time buying crypto, don't worry! There are tons of tutorials out there that will guide you through the process.

Since the launch of Ethereum in 2015 by Vitalik Buterin and Joe Luben, ether as a cryptocurrency has risen to become the second-largest cryptocurrency by market value. It is outranked only by Bitcoin. In the future, Ethereum wants to take over the world of web3 and automate many processes that still require intermediaries.

ETH and BTC share similarities as they are both digital currencies that can be traded on centralized anddecentralized exchangesand stored in crypto wallets. However, Bitcoin was designed as a currency and a store of value, while Ethereum wasn't looking to use blockchain technology for the sole purpose of maintaining a decentralized peer-to-peer electronic cash system, but also for storing computer code that can be used to power tamper and censorship-proof decentralized financial services and applications. Ethereum has quite a few use cases thanks to smart contracts, which allow users to transact with each other without a trusted central authority. Through its functionality, Ethereum allows users to exchange funds, sell or buynon-fungible tokens, use decentralized financial services, and more.

Transaction fees and how they are treated is also an important difference between the two cryptocurrencies. Gas fees (paid in gwei) on the Ethereum network are paid by the participants in Ethereum transactions, while fees associated with Bitcoin transactions are absorbed by the broader network.

One of the most significant differences between the two currencies is how many coins can circulate. The maximum number of bitcoins that can ever be minted and enter circulation is 21 million. ETH, however, is not capped: the time it takes to process an ETH block limits how many coins can be minted each year, but its creation is unlimited. There are over 122 million ETH coins in circulation.

Altcoins

What is an altcoin?

Popular altcoins

Stacks

Ethereum

Binance Coin

Ripple (XRP)

Cardano (ADA)

Polygon (MATIC)

Solana (SOL)

Litecoin (LTC)

Other altcoins

Use cases

Where to purchase altcoins

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In short, altcoins are alternativecryptocurrenciesto Bitcoin. The world of crypto assets is continuously growing, and there are many coins and tokens that have specific use cases beyond a medium of exchange, meaning they aren't competitors to BTC. Despite this evolution, and short of a better word, any crypto asset other than Bitcoin is still called an altcoin.

Bitcoin (BTC) is usually the first digital currency to come to mind, as it is the first and largest cryptocurrency in the world, with the highest market cap. Altcoins were created to improve upon Bitcoin's limitations, such as transaction speed, cost andsmart contractfunctionality. With altcoins offering unique solutions and use cases to the ecosystem, the crypto market is becoming more diverse.

Examples of popular altcoins include Ethereum, XRP, Litecoin, Tezos, Tether, Dogecoin, Binance Coin, Solana, Stacks and many more.

TheStacks blockchainleverages the Bitcoin blockchain, like a layer 2 would, but is distinct from Bitcoin. It is maintained by and for Stacks nodes and has its own cryptocurrency (STX), rules and consensus mechanism. Stacks blocks are recorded on the Bitcoin base-layer blockchain and STX token holders can stack (notstake) their tokens to earn Bitcoin as a reward.

TheEthereum blockchainhas its own cryptocurrency, Ether (ETH). It is the second-largest cryptocurrency by market cap after Bitcoin, and it has emerged as a leading player in the crypto market. Mid March 2023, Ethereum's market cap was around $200 billion USD.

Ethereum's blockchain technology enables the creation of decentralized applications (dApps), DeFi apps, smart contracts and NFTs, making it one of the most versatile digital currencies.

Binance coin (BNB) is a utility token. It can be used to get discounted trades and pay trading fees on the Binance crypto exchange. BNB can also be used outside the exchange for payment processing. Some think that BNB isn't as decentralized as other altcoins, and there are concerns about whether Binance should have registered BNB as a security with the SEC during the ICO.

XRP is a digital currency used for cross-border payments. This altcoin has very low transaction fees. While Ripple says XRP is a currency, at the time of writing, the SEC alleges that it is a security and should have been registered as such.

Cardano uses theProof of Stake consensus mechanism, which allows for faster transaction time by replacing miners with validators. The ADA blockchain promises low fees with high levels of security.

Polygon is an Ethereum-based scaling platform. It allows people to process transactions on top of the ETH network, increasing efficiency and reducing transaction fees, and builddApps.

Solana is designed to be a faster and more efficient alternative to Ethereum, with a focus on scalability. It is built on a hybrid of Proof of Stake and Proof of History consensus mechanisms to process transactions securely, and help developDeFiand dApps, digital assets, as well as smart

contracts. Compared to Ethereum, Solana has very few validating nodes, so it is subject to criticism for being too centralized, despite the fact it is one of the fastest blockchains.

Litecoin is one of the original altcoins. It was designed to be a "lite" version of Bitcoin and improve some of its limitations such as slow transaction speeds and mining monopolies. Bitcoin has evolved into more of a "store of value" cryptocurrency, whereas LTC is was built to be used in everyday transactions. Bitcoin is capped at a maximum supply of 21 million coins, and Litecoin is capped at 84 million.

Other popular altcoins include Dogecoin (Doge), which started as a meme but has gained significant attention due to its volatility and social media hype. Shiba Inu (SHIB) is also a meme coin, dubbed the "Dogecoin killer". It is based on the Ethereum blockchain and there are some SHIB-based NFTs, but it is a volatile crypto asset and doesn't have the most use cases. Monero (XMR), EOS, Zcash, Polkadot (DOT) and others as well as derivatives have been trending, and aim to improve upon the shortcomings of earlier cryptocurrencies.

Types of altcoins include utility tokens and stablecoins. Utility tokens are cryptocurrencies that are designed to be used for specific purposes within a particular ecosystem. Many cryptocurrencies have various use cases, including decentralized finance (DeFi), gaming,NFTsand social media. Defi refers to a financial ecosystem built on top ofblockchain technology, allowing for peer-to-peer transactions without intermediaries. NFTs, on the other hand, are unique digital assets that represent ownership of a particular item, such as art or music amongst many other use cases.

Stablecoins are designed to address cryptocurrency volatility and maintain a stable value against a specific asset or currency, such as the U.S. dollar. This makes them less volatile than other cryptocurrencies like Bitcoin, which can fluctuate in value quite rapidly. Stablecoins like Tether (USDT) and USD Coin (USDC) are pegged to the U.S. dollar, meaning their value remains stable. Stablecoins marketcaps are generally lower than other cryptocurrencies.

Crypto exchanges allow users to trade digital currencies, including Bitcoin, Ethereum, and other

altcoins.

Cryptocurrency exchangeslike Coinbase are making it easier than ever to buy and sell digital currencies, with the crypto market capitalization continuously growing. As the popularity of altcoins continues to increase, many are becoming more mainstream, with merchants and retailers accepting digital currencies as payment. Coinbase offers a user-friendly interface and supports several digital currencies, including Ethereum, Bitcoin Cash, Litecoin, and many others.

For more information on cryptocurrency marketcaps, visitcoinmarketcap.com.

NFT Use Cases

What is an NFT and what is the hype about?

What are the most common NFT use cases?

Digital artwork

Gaming

Metaverse

Fashion and sports

Supply chain

Ticket sales

And more...

NFTs built on Bitcoin

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In short, NFT stands for non-fungible token. An NFT is an ownership record for a digital asset. More specifically, an NFT is a unique digital item secured by blockchains that has unique metadata (it cannot be copied or substituted), and that is stored in a digital wallet. Think of NFTs as a certificate of authenticity and immutable proof of ownership. Due to their uniqueness and irreplaceability, they are quite different from traditional cryptocurrency tokens which are like-for-like (or,fungible) with one

another. NFT projects can gain or lose value independent of the currency, just like a popular trading card or piece of art.

As interest in crypto and awareness around NFT art grows, NFT projects are evolving towards projects with more and more utility with longterm uses in the metaverse and in the real world.

Beeple, the first artist to inspire auction house Christie's to facilitate NFT sales, was one of the catalysts that helped speed public interest along. With his "Everydays - The First 5000 Days" coming to a close for $69 million, creators were more and more inspired to start their own NFT projects. By now, you've probably heard of many popular NFT collections including Cryptopunks, Cryptokitties, Megapont, Bored Ape Yacht Club, and countless others. Even popular fashion brands and sports teams are exploring NFTs, with some examples including Tiffany's, Adidas and the NBA.

At first predominantly popular on theEthereum blockchain(ETH) and NFT marketplaces such as OpenSea, Decentraland, Nifty Gateway, and Rarible, these digital assets have become ubiquitous in Web3, spreading to other blockchains like Solana, Tezos, andBitcoin via Stacks, with its leading NFT marketplaceGamma.io, and allowing start-ups to come a long way in a short time and build incredible new apps, including NFT marketplaces, DeFi apps, dApps and more.

There are many practical applications and use-cases for NFTs including giving the owner access to exclusive merchandise, digital art and other digital collectibles, tickets to events, video games, as well as physical assets and real estate. Note that the type of NFT you are looking to buy can influence your choice of marketplace. Importantly, given that NFTs are simply an ownership record, it's rarely the NFT itself that holds value, but rather its work of art, the communities it unlocks, or the rewards that can be earned through owning it. Let's take a look at some of the most popular NFT use cases.

In the past year, the most popular use case for NFTs has been to represent digital artworks and other collectibles like songs, avatars, video clips, photography, and more. While creators are often pushed into contracts that don't serve their best interests by their galleries, producers and auction

houses, blockchain technology is a unique opportunity for them. Creators can sell their digital art and get royalties for every sale on the secondary market thus creating another revenue stream, put their work up for auction, and connect with their communities.

When it comes to music, NFTs have the potential to change the industry significantly. Artists can leverage NFTs to tokenize their songs and albums, sell their merchandise, and provide royalties to creators, artists and producers.

NFTs and the gaming industry are a perfect match. NFT-based play-to-earn games have gained enormous attraction over the last year. An example is Axie Infinity, a gaming-oriented NFT marketplace where the assets of the online gaming platform can be minted, swapped, or bought and sold, but there are many other upcoming blockchain games.

In-game items such as avatars, skins, and weapons can be created on the blockchain to provide game-altering or cosmetic benefits to the players. One of the largest game developers,Ubisoft, launched its NFT project on one of their flagship games, Ghost Recon Wildlands on the Tezos blockchain which enables gamers to buy cosmetic NFTs that they could use on their account and sell them for real money.

NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate. The metaverse virtual real estate market is predicted to grow by more than31%CAGRby 2028, and expected to impact almost every industry.

In the metaverse, virtual lands are bought and sold through NFTs, which are sent to the buyer's wallet, proving ownership of the land. The largest metaverse land purchase was made in the Sandbox, one of the virtual worlds, for$4.3 million.

Fashion brands have started experimenting with NFTs that can be used as collectible pieces. As an example,Guccisold a digital-only bag on Roblox (a metaverse space) for $4,115, whileDolce & Gabbanacreatively combined the physical and virtual world when it auctioned its 9-piece NFT for $5.65 Million. As brands and creators look to reinforce loyalty, community behavior can be rewarded

with NFTs, which are more liquid and valuable than traditional discount codes. Offering NFTs as a form of reward is already becoming common in the sports world, where athletes offer NFTs to their fans as a way of engagement. NBA Top Shot, for example, specialises in NBA collectibles which can be sold, bought and traded on the platform.

As an example,Koinearthis a startup that creates enterprise NFTs that enable the tracking of physical goods and documents across the supply chain. Metadata of products can be stored on the blockchain, preventing data elimination or unauthorized manipulation, while enabling tracking of the goods from their origin to their destination.

Tickets to popular events tend to get sold out fast, and almost40%of ticketing traffic now comes from ticket bots. The sold out tickets are resold at higher prices on secondary markets, robbing organizers and artists as well as buyers who get scammed with fake tickets.

The public nature of the blockchain technology allows for the use of smart contracts, traceability, and transparency. NFTs can grant the NFT owners access to a specific concert and prove the authenticity and ownership of that concert ticket.

To learn more about the possibilities regarding ticket sales, you can also read our article aboutsemi-fungible-tokens.

The security brought by the blockchain's encryption and the endless possibilities when it comes to the use of NFTs are applicable to real-world scenarios, too.Sigle.iowas the first startup to use NFTs as a means of fundraising, with NFT holders enjoying extra utility on the site.

NFTs could provide a digital identity for people without physical documentation, proving who they are and where they live. This could also be expanded to business ownership or physical real estate, to modernize the workflow and transactions, allowing the reduction of paperwork and potentially speeding up the process of buying a home or creating a company.

Stackswas the first blockchain technology to make Bitcoin NFTs possible. It functions as the smart contract layer for Bitcoin, through the Clarity programming language, enabling projects that can

natively use BTC, unlocking immense value and helping the growth of crypto adoption.

Gamma is the largestNFT marketplacein the Stacks ecosystem. It is an open marketplace for Bitcoin NFTs and a hub for the world's Web3 social identity. The Gamma NFT marketplace is a home for collectors, creators and investors, where they can explore, collect, showcase, and sell NFTs. At Gamma, we empower digital artists and creators: they can deploy fully tested, creator-owned,no-code smart contractsin minutes through our creator-first launchpad.

If you're an NFT enthusiast, join us onsocial mediaorLinkedinto stay up to date with events and announcements.

Clarity Smart Contracts

What is a smart contract?

What is the Clarity programming language?

How does Clarity work?

It is decidable

It is interpreted

Technical aspects

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In the 90s, Nick Szabo coined the term "Smart Contract" when describing the notion of a digital protocol designed to facilitate, verify, or enforce the terms of an agreement without the need for a third party, where the right inputs guarantee a certain output. The full possibilities of this protocol became a reality when blockchain technology emerged.

Smart contractswork by following simple "if/when...then..." statements that are written into code on a blockchain, meaning they are blockchain programs designed to run autonomously when predefined events or actions occur. There is no central authority necessary to run the software to function

seamlessly: the terms of a smart contract are specified in code, thus eliminating the need for human intervention. Similarly to a vending machine, once you drop a coin in and select your option, a predefined automated routine is executed. Because the code is stored on the blockchain and cryptography protects all documents, the terms can't be tampered with. A blockchain-based smart contract can have severaluse casesand is visible to all users of said blockchain, and all Bitcoin transactions recorded on the blockchain are considered on-chain transactions.

Clarity is open-source and supported by the Stacks ecosystem, Hiro PBC, & Algorand. It is a decidable language, meaning you can know, with certainty, from the code itself, what the program will do. Clarity is interpreted (not compiled) & the source code is published on the blockchain. Clarity gives developers a safe way to build complex smart contracts for the world's most secure blockchain, bringing smart contracts to Bitcoin.

Bitcoin, created in 2009 when Satoshi Nakamoto minted the genesis block, was rarely a part of the discussion on smart contracts until just a few years ago. It was designed to be a decentralized cryptocurrency, leaving out smart contract functionality. It therefore has limited scripting language and prioritizes security over programmability, making it difficult for developers to work with the syntax.

Stacks2.0 (formerly Blockstack), madebitcoin smart contractspossible, allowing developers to build Web3 decentralized apps beyond Ethereum and other blockchains, while enjoying the security of Bitcoin. Stacks functions as the smart contract layer for Bitcoin, through the Clarity smart contract programming language. Since Clarity is human readable, it allows users to verify the code, essentially making theStacks blockchaina 'GitHub for smart contracts', and gives them confidence that the smart contract code is the same as the source code, which is harder to verify in a compiled language. The use of the Clarity programming language on the Stacks blockchain makes NFT marketplaces such asGamma.ioand other decentralized apps possible.

The Clarity smart contract language supports programmatic control over digital assets within the

Stacks blockchain (for example,BNS names, Stacks tokens,DeFi, NFTs and many other use cases). But how??

Clarity differs from most other smart contract languages in two essential ways: it is decidable (not Turing complete) and it is interpreted and broadcast on the blockchain as is (not compiled).

Clarity is a decidable language. A programming language is decidable if you can know, with certainty, from the code itself what the program will do. Clarity is intentionally Turing incomplete as it avoids "Turing complexity." This allows for complete static analysis of the entire call graph of a given smart contract. Further, its support for types and type checker can eliminate whole classes of bugs such as unintended casts, reentrancy bugs, and more. You can also analyze Clarity code for runtime cost and data usage. This empowers developers to predict what a given Clarity program will do, and how much it will cost.

When the DAO wasfamously hacked, it required a contentious hard fork of the underlying chain to remedy the situation. If a decidable language had been used instead, this might have been avoided. Solidity, the implementation language for the DAO inspired from Javascript language, is anundecidable language: it is impossible to know precisely how a contract will behave in certain situations without actually executing it in those situations. There are advantages to both types of smart contract languages, but minimizing risk is critical.

Using an interpreted language ensures that the executed code is human-readable and auditable. A decidable language like Clarity makes it possible to determine precisely which code is executed, for any function.

The contract source code itself is published and executed by blockchain nodes. Removing any intermediate, compiled representation (e.g., EVM byte code for Solidity) further reduces the risk of introducing bugs. Publishing the contract source code also optimizes understandability. Compiler bugs are doubly damaging in blockchains because while the programmed source code may not have an error, the eventual program reaching the blockchain could. Any such errors would require

contentious hard forks --- which are potentially infeasible --- to remedy.

A Clarity smart contract consists of two parts, a data space and a set of functions. Only the associated smart contract can modify its corresponding data space on the blockchain. Functions may be private and thus callable only from within the smart contract, or public and thus callable from other contracts. Users call smart contracts' public functions by broadcasting a transaction on the blockchain which invokes the public function. Contracts can also call public functions from other smart contracts.

Here are some of the rules and limitations of the Clarity language: the only primitive types are booleans, integers, buffers, and principals; recursion is illegal and there are no anonymous functions; Looping is only performed viamap,filter, orfold; there is support for lists but there is no support for list operations like append or join; variables are immutable.

If you would like to further read about the Clarity programming language, you can head over tothe Clarity siteand find tutorials and docs about Clarinet, which is the go-to tool for local smart contract development and lets developers easily test and debug their contracts.

NFT Royalties

What are NFT royalties?

How do NFT royalties work?

NFT Royalties on Gamma

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If you've taken a dive into the crypto and NFT ecosystem, you've heard of creator royalties, a form of passive income that NFT projects and content creators can get from NFT sales on the secondary market. And perhaps you've noticed they are sometimes a bit of a hot topic. Let's take a closer look!

NFTshave the ability to distribute royalties from resales to NFT creators. With non-fungible tokens, NFT royalties give the original creator a percentage of the sale price each time their creation is sold

on the secondary market.

Once minted, the NFT will earn a percentage on all future sales meaning artists can have their fair share of subsequent sales from their creations for perpetuity, which seldom happens in the real world. Every time a new owner re-sells the digital asset, the creator gets a percentage of the sale again. 5 to 10% is considered a standard royalty percentage, but with most NFT marketplaces, creators can set their royalty amount themselves during the minting process.

NFT royalties allow NFT artists and creators to earn from something they produced on a recurring basis, encouraging them to join the NFT space. As their popularity grows, the returns they get on their work also increases. As an example, when digital artist Beeple's NFT "Crossroads" was resold on the secondary market for $6.6M, Beeple received a 10% royalty from the transaction.

NFT royalty payments are perpetual and automatic payouts to the creator for secondary sales, automatically executed throughsmart contracts.

The royalty features are coded into the smart contract on the blockchain. Not all NFTs yield royalties and the royalty systems can differ from one NFT marketplace to another, but it works in the following way: each time a secondary sale happens, the smart contract ensures that the terms of the NFT are fulfilled. No intermediaries need to be trusted to pay the royalty fee.

On the ETH (Ethereum) blockchain, the EIP-2981 token standard allows contracts, such as NFTs that supportERC-721andERC-1155, to signal a royalty amount to be paid to the NFT creator every time the NFT is sold on the secondary market. Marketplaces that support this standard must pay royalties for all sales, whatever the currency and wherever the sale took place (on-chain, over the counter and off-chain).

While leading NFT marketplaces such as OpenSea and Rarible honour the royalty, this isn't the case of every marketplace. As an example, marketplaces Blur and LooksRare made the decision to implement optional royalties. In the case of optional royalties, buyers can decide to implement the smart contract for royalty payments, or not. In short, it depends on the buyer, and the creator might

not get royalties on secondary sales for their work, and might only make money when they sell new NFTs. Some platforms such as LooksRare have taken some steps like sharing some of their protocol fees with creators to alleviate the effects of this process. Many people consider low NFT trading volume and liquidity and the NFT market's instability during the bear market to be the cause for these decisions to make NFT royalties optional. Magic Eden opted to make royalties optional on Solana and Ethereum NFTs, and not to implement them at all onOrdinal NFTs.

Creators may have to do a little research when choosing thebest NFT marketplacefor them. Fungible tokens are becoming more subject to regulation, which is also likely to happen to non-fungible tokens, even though many regulations don't apply to tokens but instead to the players in the ecosystem.

NFTs have manyuse casessuch as digital art and collectibles, uses in the metaverse, real estate, music and more.Gamma, the leading marketplace on theStacks blockchainwith a 95% market share, specialises in collectibles and digital art, and helps promote curated works from unique creators. Stacks is a blockchain technology that enables smart contract functionality for Bitcoin and the development of dApps, DeFi and more.

The creator-firstlaunchpadallows artists to deploy their own NFT collection with fully tested, creator-owned,no-code smart contractsin minutes. Once the collection is launched through theGamma Creator Portal, creators can manage their Stacks collection with theSmart Contract Managerwhich also lets creators set their royalties for sales on the secondary market as well as accepted cryptocurrencies.

Creators can also launch and manage their Ordinals collections on Gamma, no-code skills needed. Gamma offers creators full control over their assets, and allows them to manage their collections as well as update their Creator royalties for secondary sales. Watch thisvideoto find out how users can manage their collection.

If you're interested in launching your own NFT collection, join Gamma onsocial mediaand learn

more about the platform!

What is cryptocurrency?

How does cryptocurrency work?

Bitcoin, the first cryptocurrency

Ethereum

Stacks

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By now, you've heard of blockchain technology, NFTs and cryptocurrencies. In recent years, the cryptocurrency market has become an important part of the global financial ecosystem, with many types of cryptocurrencies being developed. Cryptocurrencies have been trending on social media and have started making their way to the real world, with more and more companies, retailers and even bars, accepting crypto as a means of payment. But what exactly is crypto, and how does it work?

Cryptocurrency is a digital currency, also called virtual currency, that uses cryptography to secure and verify transactions and to control the creation of new units. Cryptocurrencies are decentralized and operate on a peer-to-peer network, which means they do not require a central authority or central bank to function.

Blockchain technologyis the foundation of cryptocurrencies. It is a distributed ledger that records and stores all cryptocurrency transactions. Each block in the blockchain contains a list of transactions that are validated by computing power and cryptography. Once validated, the new block is added to the existing chain of blocks, creating an unalterable record of all transactions.

Cryptocurrencies differ from fiat currencies such as the U.S. dollar, in that they are not physical and do not have legal tender status. Traditional currencies are kept in bank accounts, while cryptocurrencies are kept indigital wallets.

As mentioned above, cryptocurrency transactions are secured using cryptography, which involves the use of a private key to sign transactions. The private key is a secret code that only the owner of the digital wallet knows. This makes cryptocurrency transactions secure and virtually impossible to counterfeit.

One of the biggest benefits of cryptocurrency is that it operates independently of traditional financial institutions and credit cards, making it an attractive option for people who do not have access to a bank account.

In order to purchase crypto, users will need to head over to crypto exchanges.Cryptocurrency exchangessuch as Binance and Coinbase allow users to buy, sell, and trade cryptocurrencies using different fiat currencies, including USD, or different cryptocurrencies. As an example, one could purchase BTC using either their credit card, their PayPal account, or ETH.

Cryptocurrencies can be used as a medium of exchange for goods and services. They are known for their volatility, which refers to their tendency to fluctuate in value over time. This volatility can be attributed to various factors, including market demand, news events,blockchain halvingsand more.

Users can invest in crypto and make money in the same way they can make money on the stock market: they can purchase a digital currency at a certain price and sell it when the price rises. However,stablecoinssuch as Tether and USD Coin (USDC), are designed to have a stable value and are pegged to a fiat currency or commodity.

While cryptocurrencies offer many benefits, they also pose risks, including scams, hackers, and capital gains taxes. The IRS considers cryptocurrency to be property and taxes it accordingly. It is important for beginners to understand the risks and potential rewards of cryptocurrency investment.

The most popular cryptocurrencies includeBitcoin,Ethereum, Litecoin, Cardano, Solana, Dogecoin, andStacks.

Bitcoin (BTC) is the first and largest cryptocurrency in the world, with the highest market capitalization. In fact, any cryptocurrency that isn't bitcoin is referred to as analtcoin. Bitcoin was

designed for its most important use case: to decentralize control of money and remove the need for a central authority (for example, banks).

The original 2008Bitcoin white paperthat first described the blockchain system and its set of computational rules - that would serve as the backbone of the entire crypto market - was written by a person or group of people known as Satoshi Nakamoto. The Bitcoin protocol was officially released in 2009 as open-source software.

Bitcoin is a trustless form of money that removes the need for a trusted third party to keep a ledger, because everyone part of the Bitcoin network has a copy of this ledger. A copy of the blockchain can be downloaded, and any user can inspect the path of bitcoins from one transaction to another with public data being accessible through an API. Bitcoin transactions are pseudonymous, meaning users are not required to provide proof of their identity.

Bitcoin uses theProof of Work consensus mechanism, which requires members of the network to expend effort solving an arbitrary mathematical puzzle to prevent anybody from gaming the system, guaranteeing a secure blockchain.

Ethereum is the second largest blockchain and cryptocurrency.

It is an open-source blockchain network withsmart contractfunctionality, designed to be scalable, programmable, secure, and decentralized. Ethereum blockchain users can build apps,dApps,DeFi apps,NFT marketplaces, hold assets, make transactions and communicate, with no central authority or intermediaries involved. Ethereum has its own cryptocurrency, Ether (ETH), which is used to pay for certain activities on the Ethereum network. Like on the Bitcoin blockchain, Ethereum transactions are public.

Until September 2022, Ethereum also used the Proof-of-Work (PoW) consensus algorithm. With theEthereum Merge, the network moved to theProof-of-Stake(PoS) consensus mechanism. This transition was included in a series of upgrades called Ethereum 2.0. With PoS, Ethereum is secured by a global network of validators running Ethereum's software while staking a certain amount of ETH

tokens, removing the need for miners.

TheStacks blockchainprovides a blockchain technology that uses Bitcoin's high security while allowing the creation of smart contracts. Stacks uses a consensus mechanism calledProof of Transfer (PoX). It relies on the Bitcoin blockchain, like a layer 2 would, but it is distinct from Bitcoin and is maintained by and for Stacks nodes. It has its own cryptocurrency, STX.

Bitcoin-secured NFTs, unique digital assets on the blockchain, can be created on the Stacks blockchain.Gamma.io, Stacks' leading NFT marketplace, lets users purchase, sell and tradeStacks NFTs, view their Ethereum NFTs, and create their own NFT collections in minutes, no-code needed.

Web 3 Apps (Centralized)

What is Web3?

How did we get there?

What is it for?

What are Web3 apps?

Web3 and the future

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In 2014, Gavin Wood, co-founder of Ethereum, coined the term "Web 3.0", which referred to the next iteration of the internet. It has since become a term that encompasses the idea of a better, trustless internet that embraces decentralization and a user-owned internet. Web3 usesblockchains, cryptocurrencies and NFTs to empower users and give them ownership. This is in contrast to Web2, which relies on centralized servers and is therefore vulnerable to censorship and data breaches.

The blockchain-based ecosystem is growing fast, and an incredible amount of Web3 platforms,DeFiapps, dApps, startups andDAOs(Decentralized Autonomous Organizations) have emerged over the past few years, with blockchain technology as their pillar. Web3 platforms have many use cases, ranging from the real world to the metaverse, and present many benefits for

content creators.

In short, Web1 was read only, Web2 is read and write, andWeb3is read, write and own.

Web1, known as the read-only web (roughly from 1990 to 2004), was mainly made of static websites and used by companies, with individuals creating close to no content.

In 2004, social media platforms emerged, and that was the beginning of the Web2 era, with centralization at its core. Users can generate content but they don't own it: they must trust big tech companies such as Google, Linkedin or Amazon to act in their best interests and if their account is deleted, their user data is lost. Such companies can unilaterally decide what the people using the World Wide Web are able to access.

With Web3, your data lives on the blockchain, so if you decide to leave a platform, you can take yourdecentralized identityand digital assets with you. Data cannot be deleted or tampered with, as it is scattered across multiple nodes. Also known as the decentralized web, web3 is permissionless, meaning no central authorities get to decide who gets access to what, nor does it require trust as there are no intermediaries for peer-to-peer transactions to occur. It operates using incentives and economic mechanisms.

Web3 applications anddAppsare built on blockchain networks such as Ethereum (ETH), Polygon, Stacks, and many more. Crypto wallets are the main gateway to Web3 apps, just like Google and other social networks are in Web2.

Through blockchain technology andsmart contracts, users own their data and smart contracts to execute automatically when certain conditions are met, allowing for greater transparency and trustlessness. If you're a creator who created an NFT (non-fungible token), or a collector who owns an NFT, that information lives on the blockchain. If you leave one NFT marketplace for another or changewallets, you take your digital assets with you.

While non-fungible tokens (NFTs) are a key component of the Web3 ecosystem, as they allow for the unique identification and ownership of digital assets such as art, music, and collectibles, there

are many other possible web3 applications and use cases includingDAOs,DeFiandDEXs.

With DAOs, the company is a form of collective governance: users of the application who own governance tokens of the smart contract can participate in the decision-making process and vote on the company's future, and no single authority has the power to make changes. Users own their data, identity, algorithms and content.

Decentralized finance (DeFi) is another growing area within Web3, as it allows for the creation of trustless financial services and the access to financial products without the need for intermediaries. DeFi has the potential to democratize finance and make it more accessible to a larger portion of the population, including those who do not have access to a bank account.

DAOs, DeFi and DEXs are decentralized apps, but not all Web3 applications are decentralized. Let's explore the concept of web3 centralized apps.

A Web3 app is an app that leverages blockchain technology, while still requiring centralized tools and servers to run smoothly. Although Web3 principles are at the heart of the product - users own their data, connect their crypto wallet and can use their decentralized identity on the platform - the app itself is not technically decentralized and the platform's code is not necessarily open-source.

Although the user experience between a dApp and centralized web3 app can be similar, the backend code, structure and technology differ. Web3 apps are built on open, decentralized networks, so community members can see on-chain events in real-time through block explorers.

At the time of writing, a majority of web3 apps are not fully decentralized. This is the case of even major apps such as Binance, Coinbase, OpenSea andGamma.io, the leading NFT marketplace for Bitcoin secured NFTs via Stacks.

The Gamma.io platform consists of three core products:

A user-first marketplace to find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized settlement layer for digital assets.

A creator-firstNFT launchpadfor artists to deploy fully tested, creator-owned, no-code smart

contracts in minutes.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

Gamma is built to support your existingdecentralized identityand let you bring it with you, not lock you into another one within a walled garden. That's why we've supportedBNS namesfrom day one, without requiring users to sign up or give up personal data to use the platform.

Not requiring users to set up accounts linked to personal data unlocks a completely new way of following and engaging with Web3 identities. Users can follow other users based on their public blockchain data and visualize their own entire history immediately when they connect their wallet. We believe this fully embodies the paradigm shift in online privacy models introduced in Satoshi Nakamoto'sBitcoin white paper.

Gamma is built on theStacks blockchain, a layer 1 blockchain which uses Bitcoin's high security while allowing the creation of smart contracts. The Stacks blockchain enables the creation of many projects and applications with the most notable examples beingStacks-based NFTsand DeFi. Stacks uses theClarity programming language, which is decidable and interpreted and allows users to verify the code, essentially making the Stacks blockchain a 'GitHub for smart contracts'.

Web3 has the potential to revolutionize a wide range of industries, from social media and content creation to e-commerce and supply chain management.

However, it is important to note that the technology is still in its early stages and user experience may vary depending on the specific dApp or service, and the technical barrier to entry to using Web3 is still a bit too high for it to be adopted en masse. Users must comprehend security concerns, complex technical documentation and navigate sometimes difficult user interfaces. Wallet providers and major platforms are working to solve this and it is essential for developers to continue to build and improve upon the existing frameworks and tools available, in order to fully realize the potential of Web3. This includes creating user-friendly interfaces and APIs that make it easier for non-technical users to interact with dApps and decentralized networks.

As the technology continues to mature and gain widespread adoption, we can expect to see more and more decentralized applications and use cases emerge in the coming years.

What is a decentralized identity?

Introduction to Decentralized Identity

Benefits of Decentralized Identity

Decentralized Identity Use Cases

The future of the digital identity ecosystem

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Decentralized identity is a relatively new concept in the world of digital identity management that aims to give individuals more control over their personal identity information through the use of an identity wallet.

Decentralized Identities useblockchain technology, a distributed ledger, to create a decentralized system for managing and storing identity information. This means that instead of relying on a central authority, identity providers or organizations to manage and store identity information, decentralized identities allow individuals to store their own identity information in a secure, decentralized way.

A blockchain is a type of distributed ledger technology that consists of growing lists of records, calledblocks, that are securely linked together using cryptography. Blockchain facilitates the process of recording transactions and tracking assets in a network. Anassetcan be tangible (a house, car, cash, land) or intangible. Virtually anything of value can be tracked and traded on a blockchain network. In the case of a digital identity, rather than a central authority managing the user's identity, a blockchain-based distributed ledger acts as the source of truth. Let's explore how decentralized identity works.

One of the key benefits of decentralized identity systems is the concept of self-sovereign identity (SSI), which is gaining ground as an alternative to today's centralized and federated infrastructures.

SSI allows individuals to be in control of their own identity information and how it is used, rather than relying on a centralized organization or government to manage and control their identity. With SSI, individuals can choose which pieces of their identity information to share and with whom, and can even create multiple digital identities for different purposes.

One way that decentralized identity systems achieve this level of control is through the use of decentralized identifiers (DIDs). DIDs are unique, cryptographic identifiers that are stored on a blockchain and can be used to represent a person, organization, or other entity. DIDs are often paired with verifiable credentials, which are digital documents that contain identity information and are signed by a trusted issuer. Verifiable credentials can be used to prove things like a person's age, employment status, or educational qualifications.

The use of DIDs and verifiable credentials allows individuals to prove their identity in a secure, decentralized identity framework. Instead of relying on a central authority or organization to verify their identity, individuals can use their DID and verifiable credentials to authenticate themselves directly with service providers. This can be especially useful in cases where an individual may not have traditional forms of identification, such as a driver's license or passport.

One potential use case for decentralized identity systems is in the healthcare industry. Healthcare providers often need to verify a patient's identity in order to access their medical records or provide treatment. With decentralized identity, patients could use their DID and verifiable credentials to prove their identity to healthcare providers, rather than relying on a central authority to verify their identity. This could help to improve the overall patient experience and reduce the risk of identity fraud or errors.

Decentralized identity systems can also be used to improve interoperability between different identity management systems. Currently, many organizations and government agencies use different identity management systems, which can make it difficult for individuals to share their identity information across different platforms. By using a decentralized identity system, individuals

could create a single digital identity that could be used across multiple platforms, improving the overall user experience and reducing paperwork.

Another potential benefit of decentralized digital identity is increased security. Centralized identity systems can be vulnerable to personal data breaches and other security threats, as all of the identity information is stored in a single location. With decentralized identity, the information is stored in a distributed ledger and can only be accessed using cryptographic keys, making it much more difficult for unauthorized parties to access or tamper with user data.

There are several companies and organizations working on implementing decentralized identity solutions, including Microsoft and the Decentralized Identity Foundation (DIF). The DIF is an open-source, non-profit organization that is working to create an ecosystem of identity solutions that are based on blockchain technology and focused on improving user experience and security.

One potential use case for decentralized identity is in the financial sector, where individuals could use their DID and verifiable credentials to authenticate themselves and prove their identity when accessing financial services such as online banking or applying for a credit card. This could help to reduce the risk of identity fraud and improve the overall user experience.Dynamic NFTscould also be used as digital credentials, as they have the power to evolve while preserving a unique identifier and being kept in a digital wallet secured by a public key-private key pair, necessary for the authentication process. Governments could issue passports in the form of dNFTs that would update as a person travels, removing the need for stamps and additional paperwork, as well as reducing the possibility of fraud thanks to blockchain technology.

Decentralized identity systems could also be used to improve the security and privacy of social media platforms. Currently, many social media platforms collect and store vast amounts of personally identifiable information (PII) about their users. With decentralized identity, individuals could use their DID and verifiable credentials to authenticate themselves on social media platforms, rather than sharing their PII directly with the platform. This could help to reduce the risk of data

breaches and improve the overall privacy of social media users.

Overall, decentralized identity has the potential to revolutionize the way that we manage and use our personal identity information. By giving individuals more control over their identity information and providing a secure, decentralized way to store and share it, decentralized identity systems could help to improve security, interoperability, and the overall user experience. As more organizations and individuals begin to adopt decentralized identity solutions, we may see a shift towards a more decentralized and self-sovereign identity model.

What is a Smart Contract?

How does a smart contract work?

Ethereum smart contracts

Bitcoin Smart Contracts

Smart contract use cases

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In the 90s, computer scientist and cryptographer Nick Szabo coined the term "Smart Contracts" when describing the notion of a digital protocol designed to facilitate, verify, or enforce the terms of an agreement without the need for a third party. The full possibilities of this protocol became a reality when blockchain technology emerged.

A common example to describe how smart contracts work is that of a vending machine. Smart contracts work by following simple "if/when...then..." statements that are written into code on a blockchain, meaning they are self-executed computer programs designed to run autonomously when predefined events or actions occur: with the right inputs, a certain output is guaranteed. The terms of a smart contract are specified in code, thus eliminating the need for human intervention, intermediaries or a central authority and leveraging objectivity and automation.

Similarly to the vending machine we used as an example, once you drop a coin in and select your

option, a predefined automated routine is executed. Because the code is stored on the blockchain and cryptography protects all documents, the terms can't be tampered with. A blockchain-based smart contract code is visible to all users of said blockchain. Smart contracts are immutable: their definition (bytecode) cannot be changed or updated once they are deployed on the blockchain.

Many platforms now allow for the use of smart contracts, including Ethereum, Hyperledger, Tezos, Stacks and Cardano.

Ethereum was designed to be a programmable network, using theSolidityprogramming language, a language library with similarities to C and JavaScript. Smart contracts are the fundamental building blocks of Ethereum applications.

Ethereum was initially described in awhite paperby Vitalik Buterin in 2013 where he imagined a way to build dApps (decentralized applications) and other applications besides money. Buterin argued to the Bitcoin Core developers that Bitcoin and blockchain could benefit from these suggestions and a more robust programming language, but an agreement on how the project should proceed was not found. Vitalik Buterin then proposed the development of a new platform with a Turing-complete programming language, which eventually became Ethereum, officially launched in 2015.

Ethereum smart contractshave led to the network's array of decentralized applications (DApps),DAOs, new technologies and other use cases such as NFT marketplaces that enable buying and minting digital assets like collectibles, art, music and even access to real-world items.

The Ethereum network exists on thousands of computers worldwide, thanks to users participating as nodes, making the network decentralized and highly immune to attacks. Anyone can run an Ethereum node and participate in validating the network provided they have the right hardware, knowledge and time to commit to it. Ethereum runs a computer called the EVM (Ethereum Virtual Machine). Each node holds a copy of that computer. Any interaction (also called transaction) must be verified so that every node can update their copy. Each Ethereum transaction is stored within blocks. Every new transaction is recorded on a new block, which is connected to previous and future

blocks in a chain.

On theBitcoin blockchain, only the owner of a Bitcoin private key can produce a digital signature proving that they own the cryptocurrency they claim to own. In contrast, ETH has developer-friendly languages for writing smart contracts such as Solidity. The Ethereum network is "Turing-complete," meaning it supports a broader set of computational instructions. Without limits, programmers can write just about any smart contract they can think of.

Although smart contracts are often associated with theEthereum blockchain, the world's second-largest crypto by market cap, the idea isn't restricted to any particular platform or blockchain network. Every blockchain uses different templates, algorithms and encoding techniques.

The Bitcoin blockchain is a digital, distributed ledger of transactions across the blockchain's network of computer systems. It aims to decentralize financial services and allows users to be in full control of their digital currency, with no third party needed. It has limited scripting language and prioritizes security over programmability, making it difficult for developers to work with the syntax.

While Bitcoin (BTC) was the first cryptocurrency to support basic smart contracts, it was rarely a part of the discussion on smart contracts until just a few years ago. Like other smart contract platforms,Bitcoin smart contractsensure trustless transactions, which settle on the Bitcoin network, making the history of transactions more durable through Bitcoin's proven security.

Stacks, formerly known as Blockstack, made bitcoin smart contracts possible, allowing developers to buildWeb3dApps beyond Ethereum and other blockchains, while enjoying the security of Bitcoin. Stacks functions as the smart contract layer for Bitcoin, bringing the benefits of smart contracts, trustlessness and immutability, to the Bitcoin blockchain.

Stacks uses theClarityprogramming language, which offers transparency and scalability and enables developers to write fully expressive smart contracts, allowing the creation of new types of apps, use cases, NFT marketplaces and DeFi apps.NFTssuch as music, collectibles, arts and even real estate can be minted through the Bitcoin ecosystem on NFT marketplaces such asGamma, the largest

NFT marketplace on Stacks.

Clarity is an open-source, decidable language, meaning you can know with certainty what the program will do. It gives developers a safe way to build complex smart contracts for the world's most secure blockchain. Being human-readable, the programming language also makes it easier for developers to detect vulnerabilities and potential bugs.

NFTs such as music, collectibles, arts and even real estate can be minted through the Bitcoin ecosystem onNFT marketplacessuch as Gamma, the largest NFT marketplace on Stacks.

NFTsare one of the most popularsmart contract use cases. $17 billion worth of these digital assets were traded in 2021. If you'd like to learn more about Stacks NFTs secured by Bitcoin, head over to Stacks' largest NFT marketplace,Gamma.io.

DeFi(decentralized finance) has also grown to be more than peer-to-peer transactions, with many blockchain platforms and startups diving into it. Smart contracts and cryptocurrencies have allowed sophisticated transactions to take place and DeFi platforms to provide financial services without the need for a third party.

Supply chain management is another example of potential use of smart contracts.An item's location can be tracked in real time with the help ofIoT(Internet of Things) sensors and smart contracts, with full visibility and transparency.

Smart contracts can also be useful for platforms where money needs to be held in escrow, to ensure that the funds are sent to a wallet or bank account at the right time.

DAO governance also relies on smart contracts to define a set of rules for the DAO, and how community votes are counted. For example, you could need to own a number of crypto tokens, or hold a specific NFT, to have a say in the DAO's future. This would be specified in the smart contract.

If you're curious to learn more about the above use cases and more, head over tothis article.

Proof of Stake Consensus Mechanism

What is a consensus mechanism?

What is Proof of Stake and how does it work?

Proof of Work vs Proof of Stake

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With cryptocurrency, there needs to be a way to prevent users from spending the same unit twice (or more) in different places before the system can record the transactions. This system, or way of preventing malicious uses, is called a consensus mechanism.

Every cryptocurrency blockchain uses a consensus mechanism, also called consensus algorithm, which allows users of the blockchain to agree on the legitimacy of transactions, with no centralization or central authority needed. The consensus mechanism used by a blockchain influences the way transactions are verified, how much energy is used, transaction speed, and transaction fees.

Blockchain networks such as Ethereum 2.0, Cardano (ADA), Algorand, EOS, Solana, Polkadot and Tezos use Proof of Stake. The PoS consensus mechanism originated in 2012 with the first proof of stake cryptocurrency, Peercoin.

PoS switches out the importance of computational power for staked ETH, and replaces miners with validators and improves scalability. Validators stake their crypto (ETH) to activate the ability to create new blocks. Staking consists in agreeing to lock up an amount of crypto in exchange for the chance to validate new blocks. There are dedicated staking platforms, butcrypto exchangessuch as Binance, Coinbase and Kraken offer the feature as well.

They don't compete to create blocks, they are chosen at random by an algorithm. Their odds of being chosen as the next block producer are determined by the quantity of crypto assets they have staked. If two to three validators agree on the state of a block, it is considered final.

Because validators are selected at random instead of miners competing to solve a puzzle, Proof of Stake consumes a lot less energy than PoW. Validators also don't need any special tools and

equipment that require huge computational power, as validator nodes can be run on a normal laptop. Staking pools allow users to stake without having 32 ETH.

With Proof of Stake, validators can only validate blocks if they have a security deposit or "stake", meaning if they attack the blockchain, try to double-spend or steal coins, they can't do so without losing their investment (also known as slashing).

Ethereum, the second largest crypto by market cap, used to be on the main alternative to Proof of Stake, which isProof of Work. To maintain security and decentralization, Ethereum consumed large amounts of energy. This led to theEthereum Merge, with Ethereum switching to the Proof of Stake consensus mechanism (PoS).

Proof of Work and the Proof of Stake system don't quite work in the same way, even though they share the same end goal.

The Bitcoin blockchain was designed for crypto mining, leaving out smart contract functionality. But theEthereum blockchain, however, also has to process DeFi transactions, NFT sales and minting, and many othersmart contractsand apps across the crypto ecosystem, so a scalable mechanism is crucial.

With Proof of Work, miners need specialized and expensive hardware to solve very complicated algorithms. The mining process can be very energy intensive, which has led to critiques of the consensus and its environmental impact, with Bitcoin (BTC) mining using more electricity annually than Finland and Belgium. Proof of Stake's energy consumption is much lower, and Ethereum founder Vitalik Buterin believes the shift to PoS could solve environmental woes.

Although the idea of the Proof of Work consensus mechanism existed before the creation of theBitcoin blockchain, it was implemented for the very first time for blockchain technology. Amajorityof cryptocurrency networks use the Proof of Work (PoW) mechanism, including Bitcoin, Litecoin, DogeCoin, Bitcoin Cash and more.

Overall, Proof of Stake comes with some improvements to PoW, including better energy efficiency,

lower barriers to entry, economic penalties for misbehaviour and a reduced risk of centralization. However, it is a younger consensus mechanism and is more complex to implement, as well as being less battle-tested.

What is BTC Cryptocurrency?

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In the world of digital finance, Bitcoin (BTC) stands as a groundbreaking cryptocurrency, designed as a peer-to-peer electronic cash system by an enigmatic figure known as Satoshi Nakamoto. Let's take a look at how Bitcoin works.

At its core, Bitcoin is acryptocurrency, a form of digital currency operating on a decentralized distributed ledger technology called blockchain. Unlike traditional currencies such as the US dollar, Bitcoin operates without a central authority, making it a store of value and a medium of exchange that transcends geographical boundaries and institutions.

Since its inception in a white paper published by Satoshi Nakamoto in 2008, Bitcoin has revolutionized the financial world. Bitcoin relies on strong cryptographic algorithms to secure transactions and provide transparency through its public ledger. The open-source nature of Bitcoin has inspired the development of other cryptocurrencies, withEthereumbeing a notable example.

Unlike traditional payment systems such as credit cards, debit cards or PayPal, Bitcoin operates independently from financial institutions and central banks. It facilitates quick and low-cost

cross-border transactions, eliminating the need for intermediaries and their associated fees. Instead, bank accounts are replaced by bitcoin addresses andcrypto wallets. Users can purchase the digital money oncryptocurrency exchangessuch as Coinbase, Binance and many more. They can use other cryptocurrencies or fiat currencies to purchase their BTC, and should always do their own research to avoid scams and fake Bitcoin exchanges. To enter the world of Bitcoin, you'll need a Bitcoin wallet to store your private keys and public address securely. Various wallet types, know as hot or cold wallets, cater to different security needs.

Bitcoin transactions are the backbone of its functionality. When users send BTC, they sign the transaction with their private keys, alongside their public keys, using cryptography and ensuring security and authenticity on the Bitcoin network. Thesetransactionsare verified and recorded on the Bitcoin blockchain through a process called mining. Bitcoin uses theproof-of-work consensus mechanism, which requires members of the network to expend effort solving an arbitrary mathematical puzzle to prevent anybody from cheating the system, making it extremely secure. Bitcoin miners (also known asnodes) use their computing power to solve complex mathematical problems, adding new blocks, each containing new transactions, to the blockchain and earning new Bitcoins as a reward.

The genesis block, where the first bitcoin was mined, was mined on January 3rd, 2009. The amount of Bitcoin that can circulate is capped: it has a finite supply of 21 million coins. This scarcity has led many to view BTC as a hedge against traditional financial markets and a potential store of value. Every four years approximately, Bitcoin block rewards are cut in half: this is known as theBitcoin halving. The halving occurs every 210,000 blocks. With the halving, the rate at which new bitcoins are released into circulation is reduced, enforcing a synthetic inflation of the price of Bitcoin, until the maximum supply of 21 million BTC is reached.

Cryptocurrencies are known for their volatility: the value of Bitcoin varies and yet, BTC has remained the biggest and most trusted crypto out there. In fact, any cryptocurrency that isn't Bitcoin is called

analtcoin. As Bitcoin continues to evolve, it faces ongoing debates and challenges regarding its scalability, transaction fees, and energy consumption, as well as its use cases.

To use your BTC, you'll need a cryptocurrency wallet (that is compatible with Bitcoin). As the value of Bitcoin continues to grow and be more widely recognized, more and more merchants, retailers and stores now accept Bitcoin as a valid form of payment for goods and services. You can also find ATMs that let you withdraw cash with Bitcoin, or that let you purchase Bitcoin with cash. El Salvador was the first country to officially adopt Bitcoin as legal tender in June 2021. Transactions are facilitated using a wallet address or hardware terminals. Online businesses can also effortlessly incorporate Bitcoin as a payment option alongside traditional ones.

Bitcoin garnered the attention of investors and speculators as its popularity surged. The emergence of cryptocurrency exchanges from 2009 to 2017 streamlined the buying and selling of Bitcoin, resulting in a gradual increase in prices. This momentum persisted, prompting many individuals to acquire and hold Bitcoin with the expectation of continued price appreciation. Concurrently, traders began leveraging cryptocurrency exchanges for short-term trading, leading to a significant expansion of the market. With an all-time high of $64,863.10 on April 14, 2021, Bitcoin's popularity only increased.

However, in 2022, Bitcoin experienced a sharp decline in its price, which can be attributed in part to broader market instability stemming from factors such as inflation, rising interest rates, disruptions in supply chains due to the pandemic, and the conflict in Ukraine. Additionally, some prominent cryptocurrencies experienced substantial crashes, as did a major cryptocurrency exchange, raising concerns about the overall stability of digital currencies.

Many people buy Bitcoin primarily as an investment asset rather than relying on it as a means of conducting transactions. Nevertheless, its absence of guaranteed worth and its purely digital essence introduce various risks associated with both its acquisition and utilization, as with any other cryptocurrency. Bitcoin is often sold and bought on popular online markets which are entirely digital,

and as any other virtual system, are therefore at risk from hackers, malware, and glitches. It should also be noted that Bitcoin and cryptocurrencies are not insured through the Securities Investor Protection Corporation (SIPC) or the Federal Deposit Insurance Corporation (FDIC), and there are no uniform or universal regulations about Bitcoin. Lastly, as mentioned above, Bitcoin values can fluctuate, so while BTC holders could make a lot of money, they could also lose some.

Each Bitcoin is broken into 100,000,000 units called satoshis (or sats). Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshi scarcity is cut in half every four years (halvingevery 210,000 blocks).

In 2023, theOrdinalsprotocol was released, allowing users to inscribe data (an image, text, etc) directly onto a satoshi, essentially bringing NFTs directly to theBitcoin blockchain.

There has been a lot ofcontroversyregarding Ordinals within the Bitcoin ecosystem. Debates encompass technical and narrative dimensions, highlighting stark divisions on how the Bitcoin blockchain should be harnessed.

For some, Bitcoin represents an emblematic identity, serving as a safeguard for their savings against inflation and making a powerful political statement. To this group, Bitcoin signifies a means of demonstrating that the world can function independently of entities like government bodies and conventional banks.

Conversely, there are those who view Bitcoin as merely one among many blockchain networks and cryptocurrencies, wheredigital assetsare equally legitimate and welcome, much like on any other blockchain technology. In this context,Bitcoin ordinal inscriptionspresent a novel approach, obviating the need for a separate token or side chain, with data seamlessly etched into a Bitcoin block, while metadata resides on-chain, marking a transformative development in the realm of NFTs.

Auction Houses and NFTs

Auction Houses and NFTs

Major auction houses, NFTs and Bitcoin Ordinals

Christie's

Sotheby's

Online art auctions and NFT marketplaces

The future of digital art with Web3

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The rise of non-fungible tokens (NFTs) in recent years has not only transformed the way we perceive and trade artworks, but the art world in general. From Larva Labs' Cryptopunks as the first NFTs to the debut of Christie's first NFT auction, the art world is witnessing a series of epoch-making moments. This shift in the digital art ecosystem has led to a blend of web3 and traditional contemporary art models. Let's take a closer look!

NFTshave been trending since 2017, but the buzz reached new heights in 2021 when Christie's, one of the major auction houses, successfully auctioned Beeple's "Everydays: The First 5000 Days". The digital art piece sold for over US$69M on theEthereum blockchain, a historic art sale that marked a pivotal moment in the art market and solidified the relationship between the traditional fine art world and the blockchain ecosystem. Christie's also sold Beeple's "phygital" piece "Human One" for $29M, a "triumphant follow-up to Everydays", as they put it.

As the first major auction house to integrate NFTs into the global auction arena, Christie's sparked widespread interest among collectors and artists. Since then, Christie's has witnessed numerous record-breaking prices and noteworthy firsts in the realm of digital art. Hosting the first digital art sale in Asia, embracing cryptocurrency (allowing buyers to pay in ether), and facilitating live bidding in Ethereum (ETH) are just a few of their milestones.

In September 2022, Christie's unveiled Christie's 3.0, a fully on-chain auction platform exclusively dedicated to exceptional digital art. The institution remains dedicated to collaborating with both

emerging and established digital artists and creators, providing a platform to showcase their work to a vast global audience. From luminaries like Refik Anadol and Sam Spratt to iconic entities such as Cryptopunks and Bored Ape Yacht Club, as well as initiatives supporting charitable causes like the Multidisciplinary Association of Psychedelic Studies, Christie's presents a curated selection of top-tier NFT art at various price points. Committed to diversity, Christie's also offers a range of artworks across categories like Design, Luxury, Music, Science, and Technology.

Other major auction house Sotheby's also presents a meticulously curated selection of digital art spanning diverse categories. Offering various sale formats, including online auctions, buy-now options, generative drops, and edition sales, Sotheby's extends a broad spectrum of technical possibilities to sellers. Their international team, strategically stationed in New York, London, Paris, and Hong Kong, consistently attracts sellers and buyers worldwide, achieving some of the highest prices ever recorded in the market.

In October 2021, Sotheby's introducedSotheby's Metaverse, establishing itself as the premier destination for NFTs and digital Art. Sotheby's Metaverse takes pride in curating and unveiling meticulously crafted primary drops, collaborating with both traditional and digitally native artists.

In December 2023, Sotheby's orchestrated an auction that featured three pieces from its collection, surpassing expectations by achieving a total of US$450,850 with fees. Michael Bouhanna, Vice President and Head of Digital Art at Sotheby's, having closely monitored the burgeoning ecosystem aroundordinals, deemed the year-end as the right moment for the sale.

Sotheby's embarked on its inaugural curated sale ofbitcoin ordinal inscriptionsin the current year, titled "Natively Digital: An Ordinals Curated Sale." The sale, consisting of 19 lots, concluded on January 22, 2024, amassing an impressive total of US$1,097,534. In an interview, Michael Bouhanna, noted that ifdigital artifacts"continue to hold the significance they're garnering today, this might well be considered one of the most momentous works ever inscribed."

Blockchain technologyensures transparency, security and provenance in the art market. With each

digital work tokenized and registered on the blockchain, artists and buyers alike can trace the entire history of a piece, bringing a new level of trust and authenticity to the art world.

While Christie's, Sotheby's and Phillips ventured into the NFT market, bridging the gap between traditional and digital art,fine art NFT marketplaceswere hard at work to provide digital artists with close to real-life experiences.

OpenSea, Nifty Gateway, Superrare andGamma.iohave emerged as digital art hubs, providing platforms for artists to showcase and sell their creations, whether they be natively digital or not.

Online auctions have become the norm, attracting global bidders to participate in the fast-paced world of NFT sales. Renowned digital artists like Pak and XCOPY are now hot commodities, turning heads in the art auction scene.

Gamma.io, which positions itself as the home forBitcoin artists, provides creators with a user-friendly UI and many functionalities including alaunchpadto inscribe their work on the Bitcoin blockchain, the ability to auction their work, thePrintsfeature that enables creators to leverage recursive inscriptions and create digital prints from an Original inscription (like they would in traditional arts, similar toprintmaking), and many more.

Inscribing their creations directly onto Bitcoin enables digital artists to immortalize their legacy and elevate each artwork to an unparalleled level of exclusivity. Assisting artists throughout the entire process of developing their projects, Gamma has engaged in partnerships with renowned digital andgenerative artistsand initiatives like Yuga Labs, FAR, Jack Butcher,Nullish, and numerous others.

Theweb3ecosystem continues to evolve, with each first-time event reshaping the landscape and influencing how digital and traditional art coexist. The journey from physical to digital is marked by historic sales, innovative technologies, and a global community of artists and collectors, leveraging social media to promote their work. Whether it's the first auction of a digital piece, the integration of blockchain in the art market, or the rise ofBitcoin Ordinals as a platform for fine art, the art world is

being propelled into a new and exciting era.

Bitcoin Decentralized Apps (dApps)

What is a dApp?

Bitcoin dApps

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A decentralized application, also called dApp, is a digital application that can run autonomously through the use of smart contracts on the blockchain or other peer-to-peer networks. While often built on theEthereum network, dApps are spreading to a number of blockchains including Bitcoin viaStacks, BNB, and EOS.

Dapps follow blockchain-based Web3 core principles and aren't controlled by a single authority. A dApp is operated on a peer-to-peer or blockchain network, enabling users to make transactions without relying on a central authority or third party. The user of a dApp will pay an amount of cryptocurrency to download and use the program's source code, otherwise known as a smart contract, and pay transaction fees in cryptocurrencies to complete interactions. Those transaction fees are paid to the validators of the blockchain.

Unlike traditional apps, which use centralized servers, dApps are open-source and their data and records are public. The network is secured through cryptographic tokens and maintained by multiple users (nodes). Use cases of dApps includeDAOs,DeFi(decentralized finance),DEXs, digital asset exchanges and NFT marketplaces such as LooksRare on the Ethereum blockchain. They can be accessed with a cryptographic token and can adopt cryptocurrencies like ETH, or generate a native token using a consensus algorithm, such asProof of Work(PoW) used by the Bitcoin blockchain, orProof of Stake(PoS), now used by the Ethereum Blockchain. Dapps are often developed to prioritize functionality, maintenance and stability. It can be difficult to make changes to the backend code, and the user interface can be harder to work with.

Some examples of dApps include Peepeth, a social network alternative to Twitter;Cryptokitties, a dApp game that allows users to buy and sell virtual cats; Uniswap, a DEX that enables users to swap tokens peer-to-peer; and MakerDAO, a decentralized credit service supporting thestablecoinDai and allowing users to open a collateralized debt position (CDP).

Bitcoin, created in 2009 when Satoshi Nakamoto minted the genesis block, was rarely a part of the discussion on smart contracts until just a few years ago. It was designed to be a decentralized cryptocurrency, leaving out smart contract functionality, making it difficult for developers to work with the syntax. Therefore, dApps built on Bitcoin would have very limited possibilities and the already challenging scalability would be an issue.

Stacksmadebitcoin smart contractspossible, allowing developers to build Web3 dApps, while enjoying the security of Bitcoin. Stacks functions as the smart contract layer for Bitcoin, through the Clarity programming language, enabling projects that can natively use BTC, unlocking immense value and helping the growth of blockchain technology adoption. Stacks is a layer 1 blockchain that uses a consensus mechanism called Proof of Transfer (PoX), which has miners pay in BTC to mint new Stacks tokens.

Developers can write fully expressive smart contracts, allowing the creation of new types of apps and dApps, use cases,NFT marketplacesand DeFi apps.

Some examples are Arkadiko, which enables users to take out a self-repaying loan in USDA (a stablecoin) that is backed by their STX tokens, and InfinitySwap, where you can transfer your BTC directly to another Bitcoin address to enter a liquidity pool.

Dapp development is still in the early stages, but the ecosystem is expanding rapidly. Through the use of decentralized networks and smart contracts, dApps have the undeniable potential to bring even more innovative use cases to the market, both in the metaverse and the real world.

Learn more about Stacks and the ecosystem onsocial media, and when you're ready to jump in, head over to Leather or Xverse to set up your Stacks compatible crypto wallet. Your wallet will also

allow you to get started onGamma.io, the leading NFT marketplace on Stacks.

NFT Wallets

What is an NFT wallet?

What are the best crypto wallet providers?

Bitcoin and Stacks Wallets

Leather Wallet

Xverse Wallet

Multi-chain and Ethereum wallets

Metamask

Math Wallet

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Coinbase wallet

AlphaWallet

Enjin Wallet

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An NFT wallet, or cryptocurrency wallet, is a secure environment that supports the blockchain protocol NFTs are built on. It doesn't work like a physical wallet: you don't actually storeNFTs(non-fungible tokens) or cryptocurrencies in your wallet, your wallet providesaccessto your digital assets, which are held on the blockchain. It provides and maintains a private key, which allows you to authorize NFT transactions. Your private key is unique to your wallet address. Your seed phrase is a fingerprint of all your blockchain assets that you can use as a back-up if you lose your crypto wallet. A wallet takes care of the technical things for you: it provides you a nice user interface for buying, transferring andtrading NFTs.

There are two types of wallets: hot and cold. Mobile wallets, desktop wallets and web wallets are generally "hot wallets" and give you a user interface you can use to access, transfer, mint, buy and sell your digital collectibles. Some hot crypto wallets also offer increased security with two-factor authentication. "Cold wallets" are generally hardware wallets. These are physical devices that often look like a small USB stick, and that you will need to connect to your computer.

Choosing the best crypto wallet can be difficult, as there are many on the market and various factors should be considered: compatibility, functionality, multi chain support, quality customer support, security features, whether you can store NFTs, cross-device use, and more.

There are over 100DeFiwallets on the market, so there is no doubt you'll find one that matches your needs. If you want to cover all your bases, WalletConnect, an open-source protocol that's made for connecting multiple wallets, is known as "chain-agnostic", and claims to work with all blockchains.

In 2023, the ecosystem was rocked by the rise ofBitcoin Ordinals: digital artifacts that live directly on the Bitcoin blockchain, essentially making them Bitcoin NFTs. They've been trending ever since, so it only made sense for Stacks wallets to support Ordinals.

Stacksis a blockchain network that uses Bitcoin's high security while allowing the creation of smart contracts. Although it's built on Bitcoin, you'll need a Stacks compatible wallet in order to store your STX tokens and digital assets on the Stacks blockchain. Using the Leather wallet or Xverse wallet will allow you to connect toGamma.io, the largestNFT marketplaceon Stacks, where you can discover incredible NFT art and the largest NFT collections on Stacks.

With the Leather wallet (previously Hiro) Chrome browser extension, you'll be able to connect to Bitcoin and Stacks NFT marketplaces and buy, mint, sell and transfer NFTs. Leather wallet has user-friendly interface, and will let you increase or lower transaction fees (also called gas fees), and manage your digital assets and NFT transactions very easily. We've also set up ashort video guideon how to set up your Leather wallet.

If you'd like to access your wallet on your mobile devices, you'll need to download the Xverse wallet

app. The mobile application has a built-in browser that will let you access and update your Gamma profile, buy NFTs, mint and sell and manage your transactions. You'll find more information on how to set it uphere. Like with Leather, transactions are synchronised in real-time.

If you're looking for software wallets that are compatible with different blockchains such as BSC, Polygon or theEthereum blockchain, here are a few of the top NFT wallets.

MetaMask is the top, most widely used Ethereum wallet. It also supports custom networks such as Polygon and Binance Smart Chain. It is easy to set up, has a web browser extension that can be downloaded for multiple browsers and ETH NFT marketplaces, providing easy access toweb3sites anddApps(decentralized applications), and has a mobile app as well as a built-in exchange feature. Metamask also supports many cold storage options including Ledger, Ledger nano, and Trezor.

Since MetaMask only supports ETH, Math Wallet is a strong cross-chain alternative, supporting more than 70 blockchains. It has a web, desktop and mobile version and has integrations with several hardware wallets. The built in dApp browser enables you to view NFT marketplaces, and includes other features such as staking, swapping, etc, as well as its own utility token.

Trust wallet is a highly regarded non-custodial wallet, and is renowned for its security and seamless user experience. It is user-friendly and is viewed as one of the best NFT wallets for beginners: the set up is easy and the mobile app is available on both iOs and Android. Although there is no browser extension, it has a dApp browser so you can search for NFTs with the app. It supports millions of assets, including BTC, XRP, XLM, ETH, DOGE, MATIC and BNB and you can buy crypto with a credit card. When it comes to NFTs, it can store ETH and BSC assets.

The Coinbase wallet is a self-custody crypto and NFT wallet, supporting multiple coins and ERC-20 tokens. Although it doesn't support hardware wallets, it connects to over 7 hot wallets and is accepted on a variety of dApps. It is very user-friendly, and has lots of video tutorials, mobile app guides and educational content for beginners. It supports BTC, ETH, LTC and more. Coinbase wallet also allows you to transfer crypto assets to others by using usernames instead of public wallet

addresses.

AlphaWallet is an open-source cryptocurrency wallet. It is mobile only, and only works on the Ethereum blockchain, directly with OpenSea, CryptoKitties and other NFT marketplaces and blockchain gales. It has a built-in dApp browser to find more NFT marketplaces and direct access toDeFiapplications such as Compound.

The Enjin wallet is a mobile wallet. It's a great option for NFT traders and NFT gamers. It has its own utility token, the $ENJ. The exchange is the best NFT wallet for users to collect NFTs in-game. Your Enjin wallet supports ETH, BTC, LTC, DOGE, BNB, BEP2, ERC-20, ERC-1155 and ERC-721 assets, and can also be connected to other wallets, including hardware ones. Additional security features include auto-lock and biometrics.

Other top NFT wallets include Zengo wallet which has an MPC feature, and XDEFI wallet which ideal for first-time NFT collectors as well, since all blockchains are installed natively in the wallet. Support for Solana and Near are coming soon. In the meantime, if you're interested in Solana or Tezos NFTs, you can check out the Phantom and Temple wallets, respectively.

Ethereum NFTs

What is an NFT?

Ethereum NFTs

What are popular NFT marketplaces on the Ethereum blockchain?

OpenSea

Rarible

Makersplace

A few more names

How are Ethereum NFTs and Ordinal inscriptions different?

Join the adventure

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NFTs have been trending for a while. In short, NFT stands for non-fungible token. An NFT is an ownership record for a digital asset.

More specifically, anNFTis a unique digital item secured by blockchains and stored in a digital wallet. NFTs can't be copied or substituted, they are therefore used to certify authenticity and proof of ownership. Since each NFT is unique and irreplaceable they are quite different from traditional cryptocurrency tokens which are like-for-like (or,fungible) with one another. NFT projects can gain or lose value independent of the currency, just like a popular trading card or piece of art. As awareness around NFT art and the NFT market grows, NFT projects are evolving towards projects with more and moreuse casesand utility: longterm uses in the metaverse and in the real world. By now, you've probably heard of many popular NFT collections including Cryptopunks, Megapont, Bored Ape Yacht Club, and countless others. In addition, NFTs actively contribute to the mass adoption of blockchain technology.

At first predominantly popular on the Ethereum blockchain (ETH) and NFT marketplaces such as OpenSea, Nifty Gateway, and Rarible, these digital assets have become ubiquitous in Web3, spreading to other blockchains like Solana (SOL), Cardano, Polygon, Tezos, andBitcoin via Stacks. Indeed, Ethereum is not a prerequisite to creating NFTs.

Despite being the first and largest crypto, by prioritizing security over programmability, Bitcoin long lacked the world computer aspect of ETH, making the take off of NFTs in the Bitcoin ecosystem difficult. Stacks madebitcoin smart contractspossible, allowing developers to build Web3 dApps (decentralized applications) andNFT marketplaces(the largest beingGamma.io), beyond Ethereum (ETH) and other blockchains, while enjoying the security of Bitcoin.

The Ethereum (ETH) ecosystem is a home to many NFT creators and collectors. On the Ethereum network, like on any other blockchain, NFTs are minted through smart contracts that assign ownership and manage the transferability of the NFTs. When someone creates or mints an NFT,

they execute code stored in smart contracts that conform to different standards, such as ERC-721. Tokens that follow this standard are compatible with any Ethereum-based project.

Up until now, Ethereum was using the Proof of Work consensus mechanism, as does Bitcoin (BTC). However, soon, the current Ethereum Mainnet will merge with the Beacon Chain proof-of-stake system.

In September 2022, Ethereum announced themergewas in its final stages. This is the most significant upgrade in the history of Ethereum and sets the stage for future scaling upgrades.Proof-of-Stake, which reduces the amount of computational work needed to verify blocks and transactions that keep the blockchain, and thus a cryptocurrency, secure, will reduce Ethereum's energy consumption by ~99.95%.

NFT marketplaces are the future of NFT trading, and OpenSea is the most popular NFT marketplace on the Ethereum blockchain network (ETH). With OpenSea's support forERC-721tokens, nearly every blockchain game can be traded on the marketplace. OpenSea also integrated Solana NFTs in April.

Similar to OpenSea, Rarible allows users to buy, collect and sell art, video game assets and NFTs. It is a fullydecentralized finance(defi) platform has its own native token called RARI. The holders of RARI get to vote on company decisions like company policy changes.

MakersPlace is a leading digital art gallery where crypto and NFT enthusiasts can buy and sell rare digital art. The MakersPlace artist community is currently invite-only.

Other NFT marketplaces on the Ethereum blockchain include Axie Infinity, NBA Top Shot, Mintable, KnownOrigin, and many more such as Nifty Gateway which has facilitated the sale of some of the most popular digital artists such as Beeple and singer/musician Grimes; or SuperRare, which brings more of a gallery attitude to the NFT space, with high-end digital art.

Perhaps you've heard ofOrdinal inscriptions, also called Bitcoin NFTs. In February 2023, this new development took over the crypto space, when Bitcoin Core developer Casey Rodarmor created the

Ordinal Protocol, which allows users to inscribe data directly onto the Bitcoin blockchain.

Ordinal inscriptions are essentially Bitcoin-native NFTs.How do ordinals work?Unlike Ethereum NFTs, the data contained in an ordinal inscription lives directly on-chain, with the data being inscribed onto a satoshi (the smallest unit of Bitcoin). With Ethereum NFTs, the data is stored on decentralized services such as IPFS, and can be updated. Ordinals, however, are completely immutable: they can never be updated and can never be deleted, making them truedigital artifacts. Whileuse casesdiffer, Ordinal inscriptions are already showing manybenefitsfor the Bitcoin blockchain.

If you're feeling ready of explore, mint or create your own NFT collection, head over to an NFT marketplace or join Discord communities to learn more about NFT projects and artists as well as blockchains and their use cases.

Where to buy Ordinals

What are Bitcoin Ordinal NFTs?

Where can I buy Ordinals?

Gamma's trustless Ordinal marketplace

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Ordinals are essentially native Bitcoinnon-fungible tokensyou can mint directly on the Bitcoin blockchain.

Before the rise of Ordinals, Bitcoin NFTs were only possible through the Stacks blockchain, which aims to bring more scalability to theBitcoin blockchain, enabling smart contract functionality, dApps, DeFi and NFTs which are all Bitcoin-secured. However, Bitcoin is the largest cryptocurrency by market cap, and this new development could have manybenefitsin the crypto ecosystem, including further adoption of the chain and more incentives for miners. Some noteworthy Ordinal collections include Ordinal Punks, Taproot Wizards and TwelveFold.

Here's a quick look at how Ordinals work. Each bitcoin token (BTC) is broken into smaller units called satoshis, which are serially numbered. Each individual satoshi can be inscribed with content, creating a Bitcoin-native digital artifact. The Ordinals protocol was created by Casey Rodarmor, and was made possible by theTaproot network upgrade. Ordinal NFTs can be kept in Bitcoin wallets and transferred using Bitcoin transactions.

You may be wondering howBitcoin Ordinal inscriptionsare different from traditional NFTs such as ETH or Solana NFTs. There are a few key differences: Ethereum NFTs are enabled by smart contracts, and the metadata lives off-chain, generally on a decentralized storage service such as IPFS. With Ordinals, the metadata lives on-chain, directly inscribed on the Satoshi, and can never be updated or deleted. Because Ordinals live directly on the Bitcoin network where block size is limited, the size of the inscription is also limited, meaning creators may have to compress their work to be able to inscribe it and avoid paying very high transaction fees.

Inscribing Ordinalsrequires a specific set of technical skills, can be quite costly and requires running a Bitcoin node. However, platforms such as Gamma.io quickly rose to release tools allowing creators to inscribe their work and launch their Ordinal collections in minutes, no code needed.

To purchase these digital assets, you'll need to head over to anOrdinals marketplaceand connect yourOrdinals walletto the platform. Several important players in the space launched their Bitcoin NFT marketplaces, such as Gamma.io and Magic Eden. While leading Ethereum NFT marketplace OpenSea doesn't yet support the Bitcoin blockchain, users can trade the wrapped version of their Ordinals using Emblem Vault.

Gamma.io, the leading NFT marketplace forBitcoin NFTson theStacks blockchain, offers several Ordinals services, including ano-code Ordinals launchpadfor creators, and an Ordinal marketplace.

The Ordinals marketplace allows users, collectors and creators to explore, sell, trade and buy crypto assets directly on the Bitcoin blockchain. The Gamma marketplace is built with a Bitcoin L1 infrastructure, meaning it doesn't leverage other chains such as ETH for Ordinal trading.

Gamma puts user safety and creators first, and insures that the platform's solutions will remain trustless over time. Users can confidently participate in decentralized exchanges without compromising their assets. The platform also offers a crypto on-ramp, allowing users to purchase BTC with their fiat (such as USD), directly from the platform. BTC can also be purchased throughcryptocurrency exchangessuch as Binance and Coinbase, which allow for several payment methods such as credit card, apple pay, and more.

Supported Ordinals wallets include Leather andXverse, as well as Sparrow Wallet which allows for a little more customization.

Taproot Upgrade

Introduction

The Taproot Upgrade Explained

How the Taproot Upgrade Works

Benefits of the Taproot Upgrade

Bitcoin Ordinal NFTs

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Bitcoin, the first and most popular cryptocurrency, has been at the centre of the crypto ecosystem since its inception by Satoshi Nakamoto in 2009. Over the years, theBitcoin blockchainhas undergone several upgrades to enhance its functionality and scalability.

One of the most significant ones is the SegWit upgrade, an upgrade to the Bitcoin network that enables faster and more efficient transactions. Some of the data stored in transactions is moved outside the main blockchain, allowing more data to be processed with each block, thus increasing the overall throughput of the network. The size of each transaction is also reduced, making it more space efficient. SegWit also includes a new signature algorithm that is more secure and less susceptible to fraud, making it easier for Bitcoin users.

The Taproot upgrade is the most significant upgrade the Bitcoin protocol has experienced since 2017, with Segregated Witness' activation (SegWit upgrade). The Taproot Bitcoin Improvement Proposals were broadly supported by the Bitcoin mining and development community, which reached a consensus to implement Taproot in June 2021. Six months passed between the lock-in and the activation, to allownodeoperators and Bitcoin miners to fully upgrade to the latest Bitcoin Core version, which contains the Taproot upgrade. Let's dive in!

The Taproot upgrade is asoft forkupgrade to the Bitcoin blockchain network that aims to improve the network's privacy, security, and functionality. It is a result of years of research and development by Bitcoin core developers, including Gregory Maxwell and Pieter Wuille. The upgrade includes three Bitcoin Improvement Proposals (BIPs): BIP 340, BIP 341, and BIP 342.

One of the most significant features of the Taproot upgrade is the integration of Schnorr signatures, a digital signature scheme that replaces the cryptography Elliptic Curve Digital Signature Algorithm (ECDSA). The ECDSA algorithm creates a signature from the private key that controls a Bitcoin wallet and verifies that the rightful owner carries out the transaction.

Schnorr signatures are known for their efficiency and allow multiple signature data to be aggregated into a single signature. This feature improves the scalability of the Bitcoin network by reducing the size of transactions and lowering transaction fees. The Taproot upgrade also brings improvements to multi-signature transactions. Multi-signature transactions required all signatures to be revealed on the blockchain, making them less private. With Taproot, multi-signature transactions can be batched together into a single-signature, reducing the size and improving the privacy of such transactions.

Another important feature of the Taproot upgrade is the inclusion of Tapscript, a scripting language that enables complex transactions to be executed on the Bitcoin blockchain. Tapscript enhances the functionality of smart contracts anddecentralized finance (DeFi) apps, making them more efficient and cheaper to use.

The Taproot upgrade is a soft fork, which means that it is backward-compatible with older versions

of the Bitcoin protocol. New parallel blockchains and cryptocurrencies don't need to be created, as had been the case with Bitcoin Cash. This allows for a smooth transition to the new protocol without causing any disruptions to the Bitcoin network.

The upgrade is based on the Merkle tree (MAST) structure, which allows for the aggregation of multiple signatures into a single signature. It uses a new public key format that integrates Schnorr signatures, making the transactions more efficient and secure.

The Taproot upgrade brings numerous benefits to the Bitcoin network. First and foremost, it improves the network's scalability by reducing the size of transactions and lowering transaction fees. This makes it cheaper and faster to use Bitcoin for day-to-day transactions.

The upgrade also enhances the privacy and security of the Bitcoin network. With the integration of Schnorr signatures and Tapscript, complex transactions can be executed on the blockchain more efficiently and securely. It also makes multisig transactions more private by aggregating them into a single-signature.

The Taproot upgrade also benefited Layer 2 chains such as the Lightning Network, enabling cheaper, more flexible and more private transactions.

Finally, the Taproot upgrade brings improvements to the functionality of the Bitcoin network, making it more competitive with other cryptocurrencies such asEthereum. It opens up new possibilities for DeFi applications,NFTs, andsmart contractson the Bitcoin blockchain.

In short, a rough definition ofOrdinalsis to say they are Bitcoin NFTs you can mint directly on the Bitcoin blockchain, without the need for a sidechain or separate token.

Ordinals were made possible by the Bitcoin Taproot upgrade. On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinals protocol, which has taken over crypto news since. By finding a way to inscribe 4MB of data on a Bitcoin block, Casey Rodarmor has unlocked new possibilities for the Bitcoin network.

TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content,

creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions.Inscriptionsare as durable, immutable, secure, and decentralized as Bitcoin itself."

While there have been debates and controversy about Ordinals, there are also many benefits. Ordinals could become the new standard for digital assets, and there may be a cultural shift for the Bitcoin network and BTC cryptocurrency.

Bitcoin Ordinals Benefits

Intro to Ordinals

The difference between NFTs and Bitcoin Ordinals

Benefits

AboutGamma.io

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On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinals protocol, which seems to have taken over the NFT market and wider crypto ecosystem since, brining many new users to the Bitcoin community. By finding a way to inscribe 4MB of data on a Bitcoin block, Casey Rodarmor has unlocked a plethora of new possibilities for the Bitcoin blockchain and Bitcoin enthusiasts.

A rough way of defining Ordinals is to say they are Bitcoin NFTs you can mint directly on the Bitcoin blockchain. Ordinals were made possible by Bitcoin'sTaproot network upgrade. TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself."

Each Bitcoin (BTC) is broken into 100,000,000 units called satoshis (or sats). In a podcastinterview, Casey Rodarmor explains that in brief, the protocol allows users to send and receive sats --- the

smallest measuring unit of Bitcoin recorded on the blockchain --- that carry optional extra data in ordinal progression. Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshi scarcity is cut in half every four years (halving every 210,000 blocks).

By now, you've heard ofNFTs, unique digital assets on the blockchain. Although they are most popular on the Ethereum (ETH) blockchain, they have spread to other blockchains such as Solana, Polygon andStacks, with its leading marketplaceGamma.io.

Non-fungible tokens, such asEthereum NFTsorStacks NFTs, generally point to off-chain data which is kept on IPFS, a decentralized file storage system that can be changed using dynamicmetadata. To Rodarmor, this makes them "incomplete". Ordinals NFTs, however, are "complete" because all the data isinscribeddirectly on-chain, and are intended to reflect what NFTs should be: true digital artifacts. NFTs often have creatorroyaltiesattached to them, as is the case on NFT marketplaces such asGamma.io, whereas digital artifacts don't necessarily. It should be noted Gamma.io implemented opt-in creator earnings for Ordinals, yet again putting creators first.

According to ordinals proponent, developer and blockchain consultant Udi Wertheimer, Bitcoin NFTs will have a positive impact on the ecosystem, with improved security and incentives, amongst other things. In an interview with Cointelegraph, he explored the following benefits.

In the couple weeks following the creation of the Ordinals protocol, the spike in creation of Ordinals contributed to the increase in transaction fees and typical block size on theBitcoin blockchain. The scarcity of block space in the system boosts the demand, hopefully incentivizing miners, since revenues coming from bitcoin mining rewards are expected to go down after each halving of Bitcoin.

It is likely that higher transaction fees will lead to better incentivization for bitcoin miners to further secure the Bitcoin network, bringing new developers and bitcoin users to the network. With the rising demand for Ordinals, it is also possible more and more users who are willing to pay to keep the blockchain safeguarded will join the network.

The Bitcoin blockchain was originally designed as a cryptocurrency and peer-to-peer network meant for financial transactions. Ordinals inscriptions can add new capabilities to the chain, enhancing its functionality beyond its original purpose. Ordinal projects can be anything from JPEG images to PFP projects but more than NFTs, they are a revolution in the Bitcoin space: by making it easier and more efficient to use Bitcoin, Ordinals can help promote mass adoption of the cryptocurrency and blockchain. More users, more transactions and more overall value can be brought to the Bitcoin ecosystem through the growth of Ordinals. As we are still in the early stages of Ordinals, new use cases may be discovered, so make sure to keep an eye on the latest news.

Gamma consists of three core platforms: its user-first marketplace for exploring and collecting digital art, its creator-first launchpad for artists to deploy fully-tested no-code,smart contractsin minutes, and its social platform, which brings together creators and collectors in an engaging and Web3-native way.

Gamma is the leading open marketplace for Stacks NFTs (a smart contract layer for Bitcoin, that enables DeFi, dApps and more) and supports over a thousand Stacks NFT collections, nearly 80% of which were deployed using itsno-code launchpad. Its marketplace has facilitated millions of dollars of transactions and supports trading the largest number of NFT contracts of any platform built on Bitcoin.

In the midst of all the Ordinals related crypto news, Gamma launched itsno-code creator platformfor making NFTs on native Bitcoin, using Ordinals. Gamma's platform makes creating Ordinals simple and accessible to anyone with a Bitcoin address.Crypto walletssuch as Xverse Wallet and Leather Wallet also support Ordinals.

Soon after, Gamma released its trustless BitcoinOrdinals marketplace, making all inscriptions instantly tradable.

Paired with the creator launchpad on the Stacks programming and scaling layer for Bitcoin, the Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior

levels of security, trust, and decentralization that only Bitcoin can offer.

Bitcoin Blockchain Halving

Basics of the Bitcoin blockchain

What is Bitcoin blockchain halving?

The Bitcoin Halvings

The impact of halving events

Key takeaways

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Bitcoin is a blockchain protocol and cryptocurrency and the world's first and biggest digital currency in terms of market capitalization. Its main objective is to eliminate the necessity for a central authority, such as banks, by decentralizing monetary control.

The original 2008Bitcoin white paperthat first described the blockchain system and its set of computational rules - that would serve as the backbone of the entire crypto market - was written by a person or group of people known as Satoshi Nakamoto. The Bitcoin protocol was officially released in 2009 as open-source software.

Theblockchainis a decentralized and distributed ledger that records every transaction made on the network. The Bitcoin blockchain uses theProof of Work consensus mechanismthat requires members of a network to expend effort solving an arbitrary mathematical puzzle to prevent anybody from gaming the system. To incentivize the miners (think of them as validators) who verify and process new blocks, the network rewards them with new bitcoins. This reward is known as the block reward.

Bitcoin block rewards are cut in half after a certain number of blocks have been mined. This event is known as the Bitcoin halving or Bitcoin blockchain halving.

The halving occurs every 210,000 blocks, approximately every four years. This cuts in half the rate

at which new bitcoins are released into circulation. By decreasing the rate at which new coins are issued over time, Bitcoin enforces synthetic price inflation, until the maximum supply of 21 million BTC is reached.

In August 2022, the number of bitcoins in circulation was about 19.1 million, leaving around 1.9 million left to be released via mining rewards until the maximum amount of bitcoin is reached. Unlike fiat currencies, bitcoin can't be printed infinitely.

In the past, these halvings have correlated with massive surges in the cryptocurrency's price. As with other assets with a finite supply, such as gold, high demand can lead to a price increase.

The first Bitcoin halving occurred on November 28th 2012, where bitcoin mining rewards went from 50 BTC to 25 BTC. Bitcoin price went from $12 to $1,207 in a year.

The second halving occurred on July 9th 2016, reducing the block reward to 12.5 BTC and increasing the cryptocurrency's price from $647 to $18,972 in under six months. A year and a half after the Bitcoin having, the bitcoin's price was 575% higher than its pre-halving price, reaching some (at the time) all-time highs.

The most recent halving took place on May 11th 2020. With this third halving, the reward was reduced to 6.25 BTC. On May 11th, a bitcoin's price was $8,821. On April 14, 2021, a bitcoin's price soared to $63,233.

The next Bitcoin halving is expected to occur in 2024, and the last halving is expected around 2140, when the total supply of Bitcoin will be out there.

So what happens when the maximum supply has been reached? All 21 million bitcoins that can ever be mined will have been extracted, marking the end of the halving schedule as there will be no further new bitcoins to uncover. It is anticipated that the value of transaction fees will increase over time, therefore still providing incentive for miners. This is primarily due to the expected growth in transaction volume that will come with attached fees, as well as the projected increase in nominal market value of bitcoins.

The halving event is a crucial part of Bitcoin's code and algorithm. Let's take a look at how Bitcoin halving can impact users, investors and miners.

Not only do halving events affect the total supply of bitcoin and the speed at which the cryptocurrency is issued, every halving has historically resulted in a bull run for Bitcoin.

Halving also affects the mining rewards for bitcoin miners, as shown above. The theory is that the halving sets off a chain reaction where the pace of Bitcoin issuance means that the price of Bitcoin will increase if demand remains the same. If a halving doesn't lead to an increase in demand and price, then miners wouldn't have any incentive to mine new BTC. This reduction in rewards combined to the price not increasing enough could potentially lead to a decrease in the number of miners andnodeson the Bitcoin network, which can impact the transaction fees and speed of Bitcoin transactions. Bitcoin has a system to prevent this: if the price doesn't go up, Bitcoin changes the difficulty it takes to get mining rewards, making it easier for miners and keeping them incentivized. This process of reducing difficulty of processing a transaction has proven successful.

Halving events also have a huge impact on the inflation rate of bitcoin. Before the first halving, the inflation rate was around 50%, and dropped to 25% after the halving. The most recent halving reduced the inflation rate to around 1.8%, making Bitcoin a scarce digital asset.

The reduced supply and surging demand is good news for investors: trading activity on the Bitcoin network increases in anticipation. Price increases and their pace differ based on logistics and conditions of each Bitcoin halving.

As of February 2023 with the discovery and launch ofBitcoin Ordinals, individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions. With everyBitcoin blockchainhalving, satoshi scarcity is cut in half, and so will be that of Ordinals.

Halving events are critical to the supply and demand dynamics of the blockchain network and can significantly impact the price movements of cryptocurrencies. It should also be noted that other

cryptocurrencies such as Ethereum also have halving events. Understanding the halving and its implications is crucial for anyone interested in mining Bitcoin, trading cryptocurrencies, or investing in digital assets such as BTC,NFTs, and ETFs.

And remember to keep an eye on the countdown!

What is Stacks (STX)?

How does the Stacks blockchain work?

How does the Stacks token work?

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Stacks (STX) is a blockchain-based cryptocurrency that has been trending in the market for its unique approach to combining the functionality of Bitcoin and Ethereum. The STX token is built on the Stacks network, which is a layer-2 blockchain that leverages the security of the Bitcoin blockchain to enable smart contracts and decentralized apps (dApps), DeFi and NFTs. In this article, we will explore the Stacks ecosystem and its functionality.

The Stacks network is a Bitcoin layer for smart contracts and utilizes theProof of Transfer (PoX)consensus mechanism andClarityprogramming language. This mechanism allows miners to earn STX tokens by locking up BTC on the layer-1 blockchain (Bitcoin), which helps to increase the security of the Stacks blockchain.

TheStacks blockchainis designed to be transparent and provides real-time data on transactions, nodes, and other important metrics. It enables developers to create smart contracts,DeFianddAppsthat are secure and decentralized, and allows for the creation and trading of digital assets, including NFTs.

Muneeb Ali, founder of Stacks (initially called Blockstack), released the original whitepaper, and has been a key figure in the development of the blockchain ecosystem ever since. The Stacks 2.0 upgrade was released in 2020, bringing several new features and improvements, including faster

transaction speeds, lower transaction fees, and improved scalability. In 2023, the blockchain was upgraded to version 2.1. Stacks 2.1 provides various enhancements, such as enabling more efficient Bitcoin yield through Stacking, strengthening bridges to other networks, simplifying the methods for developers to connect and activate interactions between Stacks and Bitcoin, and establishing a foundation for Subnets to bring further speed and scalability to the network.

The STX cryptocurrency was distributed to the public via an SEC-qualified token offering in 2019. The Securities and Exchange Commission (SEC), is in charge of defining whether or not a digital asset is a security. As of May 2023, the Stacks network has a circulating supply of around 1.4 billion STX tokens, with a max supply of 2 billion tokens.

In short, miners don't mine anything on the Stacks blockchain, instead, they swap already mined coins (BTC) off theBitcoin blockchainand commit them for a chance to win STX.

Bitcoin is used by miners to mine newly minted Stacks, and Stacks holders can earn BTC by locking their STX. STX miners can engage in leader elections by sending transactions on the Bitcoin blockchain. A verifiable random function (VRF) then randomly chooses the leader of each round. The new leader then writes the new block on the Stacks chain.

STX miners receive newly minted STX in the form of transaction fees, and even the fees for Clarity contract execution are paid in STX. The BTC that miners bid for the election is sent to an address that corresponds to STX token holders participating in the consensus. As a result, the Bitcoin consumed during the mining process is used as a reward based on the Stacks holder's STX holdings.

The price of Stacks, like that of any other crypto asset, is subject to changes. The Stacks price has seen some volatility over the past few years, but even though it faces competition from other liquid ecosystems such as Ethereum (ETH) and Solana (SOL), the asset is valued by the market because of its unique connection to Bitcoin.

Cryptocurrency exchangessuch as Binance and Coinbase will provide information on the

cryptocurrency's current price in USD, current market cap, all-time-highs, 24-hour trading volumes and the history of STX price. Crypto exchanges or news sites also provide information regarding exchange rates between major fiat currencies and cryptocurrencies such as BTC, ETH, XRP and USDT.

How to Inscribe Ordinals

Introduction to Ordinals

How to Inscribe a Bitcoin Ordinal NFT

Bitcoin Ordinal Wallets

Inscribe your Ordinal onGamma.io

The difference between NFTs and Ordinals

Ordinal Collections

About Stacks

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The Bitcoin community and wider crypto ecosystem have been buzzing with big news: Ordinals.

In 2021, theTaproot upgradechanged a few things in the Bitcoin protocol, affecting block space and how much data can be stored within a transaction. In January 2023, software engineer Casey Rodarmor found a loophole and launched theordinals protocol, allowing users to inscribe 4MB of data on a Bitcoin block. Unlike traditional Bitcoin transactions, which simply involve sending and receiving value between parties, Ordinals enable the inclusion of data within a Bitcoin transaction, enableBitcoin-based NFTs.

The smallest unit of Bitcoin is called a satoshi. Each Bitcoin (BTC) is broken into 100,000,000 sats. In aninterview, Casey Rodarmor explains that in brief, the protocol allows users to send and receive sats that carry optional extra data in ordinal progression. Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the

total supply.

By inscribing a serial, or "ordinal" number to each satoshi on the Bitcoin network, the satoshi becomes a tracked and transferable Bitcoin NFT, or "digital artifact". Once the satoshi has been processed as any other BTC transaction, it is stored on the blockchain. As a result, their security, decentralization, and indestructibility are on par with those of the Bitcoin blockchain. Satoshi scarcity is cut in half every four years, making Ordinal NFTs all the more rare.

In 2016, the first Bitcoin NFT 'Rare Pepe' was mined, but because of Bitcoin's smart contract limitations, Bitcoin NFTs didn't really take off until now. Inscribing Ordinals brings many benefits to the Bitcoin ecosystem, including more utility, bigger block size, more transactions, more miner incentives and overall growth. Platforms such as Gamma.io and Ordinalsbot have provided an easy and user-friendly way of inscribing Ordinals.

Despite the surge in interest in Ordinal inscriptions, the process of actually creating an inscription (also called inscribing) is highly technical, complex, and time consuming. In order to inscribe Ordinals, users must download Bitcoin core, install Ord and run a fully synced Bitcoinnode, which is costly and requires advanced technical knowledge. After the sync is completed, the next step is to create an Ordinals wallet and send some satoshis to its address.

Gamma, the largestBitcoin NFTplatform, aims to break those barriers and has provided an easy, low-cost way to inscribe Bitcoin Ordinal NFTs. The Gammano-code Ordinals launchpadallows users to inscribe their Ordinal NFTs in minutes, and gives them the option to choose or customize their transaction fees based on network congestion.

Prominent artists and projects such as the Megapont Ape Club are launching exciting NFT collections to leverage Bitcoin L1's rarity and immutability. Let's take a look at how to inscribe your own Ordinals with Gamma.

You will first need a Bitcoin Ordinal wallet with a taproot wallet address. That wallet will need "coin control" capabilities, in order to avoid spending your Ordinal NFT satoshis on network fees.

Ordinal inscriptions are a new technology, which means options for viewing and managing them are currently limited. It's a good idea to use a new and unused address to receive your ordinal. This way, you will know for sure that the ordinal containing your inscription will be the only satoshi associated with that address. This will help to ensure your wallet is "forward-compatible" with new developments for managing ordinal inscriptions.

Bitcoin wallets such asSparrow(quick setup guidehere) can be used to create new and unused Taproot addresses. Please note that if you use these options, you should not use the wallet you create to send BTC, unless you perform manual coin-selection to avoid sending ordinals as payment or fees. You should also be sure to set up your wallet with Taproot-based addresses. Taproot addresses can still receive bitcoin from other Bitcoin addresses, like more common Segwit addresses.

You can also use the specialized command line viewer if you have the technical knowledge to do so, which you can access from theOrdinal Theory Handbook.

Xverse Wallet quickly launched support for Ordinal functionality for iOs, Android and the Chrome Browser extension. You can easily process BTC payments to inscribe Ordinals and safely store them in a wallet, without risking accidentally sending them away as a satoshi payment. Leather Wallet also added Ordinal support functionality, so you are able to choose which wallet you'd like to use.

Disclaimer: Please note that while we recommend using Xverse and/or Leather, Gamma is not explicitly affiliated with either company or their products.

Once your ordinal wallet is set up, visitGamma's no-code Ordinals launchpad. Compatible wallets include Xverse, Leather and Sparrow Wallet. Upload your preferred file from your device, keeping in mind that file sizes vary and affect the cost. Your inscription can be viewed by anyone and can never be changed or deleted.

Choose your transaction fee based on network congestion. The higher the fee, the more likely your

inscription will be created sooner, though it can still take a few hours or a few days. The transaction fee amounts are estimated, and the Bitcoin network fees are needed to create your inscription.

To receive your Bitcoin NFT, you'll need a new and unused taproot BTC receiving address compatible with Ordinals. Copy your address to the recipient address field in Gamma. If the address you insert isn't compatible with Ordinals, it can't be guaranteed that you'll be able to transfer your ordinal.

Finally, you'll need to agree to the terms of service and pay the inscription fee by sending the requested amount to the wallet address. In order to pay the transaction, you'll need some BTC. You can purchase the cryptocurrency directly from your Xverse wallet, or on othercrypto exchanges. Once the transaction is confirmed, your Ordinal is inscribed and you can view it onordinals.com.

The main difference is thatnon-fungible tokens, such asEthereum NFTsorStacks NFTs, generally point to off-chain data such as an image. This data can be kept on IPFS, a decentralized file storage system that can be changed using dynamic metadata, as well as other file storage systems, each with unique counterparty risk trade-offs.Metadatacan also be refreshed on NFT marketplaces such asGamma.ioand OpenSea.

With Ordinal NFTs, however, all the data is inscribed directly on-chain. They are intended to reflect what these digital assets should be: truedigital artifacts. NFTs also often have creator royalties attached to them, as is the case on NFT marketplaces such asGamma.io, whereas digital artifacts don't always. However, Gamma.io puts creators first, and did implement opt-in creator earnings for inscriptions.

Theweb3ecosystem has been buzzing and many new projects have been emerging. Dune Analytics recorded over twenty thousand new inscriptions on February 9th 2023 alone, and in May 2023, the total number of inscriptions reached over 3M.

To find Ordinals, you can go toordinals.com, or theOrdinals Discord Channel. As it's still very early in the Ordinals market, there is currently no marketplace for them.

Ordinal Punksis one of the most notable projects and pays homage to CryptoPunks. The collection is a set of 100 Bitcoin NFTs minted within the first 650 Inscriptions on the Bitcoin chain. Another example is Ethereum-based collection OCM (OnChainMonkey), which minted 10,000 Ordinals into a single Inscription, making it one of the first 10k collections on Bitcoin.

You can also explore theOrdinals Collectionson Gamma, where you can also see Ordinal NFT projectscreated using Gamma's no-code platform. Gamma also offers an Ordinal marketplace where users can trade, sell and buy inscriptions.

It should be noted NFTs aren't the only use case for Ordinals. NFT marketplaceGamma.ioused its no-code Ordinal inscription service to broadcast theirpress releasedirectly to the Bitcoin blockchain, making it the world's first press release inscribed to Bitcoin. The Ordinals NFT market has already tremendously evolved over the past months, and it's only the beginning.

The Ordinals buzz has put Bitcoin NFTs at the centre of crypto news, with many collections hitting higher volume and floor prices than ever on the Gamma NFT marketplace. Ordinals Bitcoin NFTs are a breakthrough for Bitcoin, offering for the first time to ability to store data directly on the Bitcoin Layer 1.

Other scalable solutions for Bitcoin NFTs which could offer longterm affordable options include Stacks, a Layer 2 blockchain that uses a uniqueconsensusmechanism,Proof of Transfer(PoX), to settle on Bitcoin. These NFTs are secured by Bitcoin via theStacks blockchain, offering the highest security without making any changes to the Bitcoin anchor block. Gamma is Stacks' leading NFT marketplace, and offers three core products including a no-code NFT launchpad.

Ethereum Merge

The Ethereum blockchain

Proof of Work

Proof of Stake

The Merge

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Ethereum is an open-sourceblockchainnetwork with smart contract functionality, designed to be scalable, programmable, secure, and decentralized.Ethereum blockchainusers can build apps,dApps, DeFi apps, NFT marketplaces, hold assets and make transactions, with no central authority or intermediaries involved. Ethereum has its owncryptocurrency, Ether (ETH), which is used to pay for certain activities on the Ethereum network. It is the second-most valuable cryptocurrency by market cap, after Bitcoin. Like on the Bitcoin blockchain, Ethereum transactions are public. The Ethereum Merge, which took place in September 2022, has been a trending topic. Let's look into why!

In aproof-of-worksystem, miners compete to solve complex mathematical puzzles in order to validate transactions and add them to the blockchain. In order to run the very complicated algorithms, miners in the PoW mechanism need highly specialized hardware which incurs large costs, making mining only accessible to special mining pools. Because of its lottery-like system, the mining process can also be very energy intensive, which has led to critiques of the consensus and its environmental impact, with Bitcoin mining using more electricity annually than Finland and Belgium.

The Bitcoin (BTC) blockchain was designed for cryptocurrency mining, leaving outsmart contractfunctionality. Therefore, it mostly just has to process incoming and outgoing bitcoin transactions. TheEthereum blockchain, however, also has to process DeFi transactions, digital assets sales and minting, and many othersmart contracts.

Proof of Stake(PoS), also employed by other blockchains such as Cardano, switches out the importance of computational power for staked ETH, and replaces miners with validators. Validators stake their ETH to activate the ability to create new blocks. They don't compete to create blocks, they are chosen at random by an algorithm. The system uses financial incentives and penalties to

accomplish the task. If two out of three validators agree on the state of a block, it is considered final. Because validators are selected at random instead of miners competing to solve a puzzle, Proof of Stake consumes a lot less energy than PoW. Validators also don't need any special tools and equipment that require huge computational power. This process is often considered to be more energy-efficient and sustainable, as it does not require the same level of computational power.

With Proof of Stake, validators can only validate blocks if they have a security deposit or "stake", meaning if they attack the blockchain, try to double-spend or steal coins, they can't do so without losing their investment. With PoW, if one group of miners gains more than 50% control, they can prevent transactions from being confirmed and can also spend coins twice. This is called a 51% attack. PoW is the most secure consensus algorithm, while Proof of Stake security remains untested in comparison.

Until September 2022, both Ethereum and Bitcoin used theProof-of-Work(PoW) consensus mechanism. To maintain security and decentralization, Ethereum on proof-of-work consumed large amounts of energy.

The Ethereum Merge, also known as Ethereum 2.0 or Eth2, was a highly anticipated upgrade to the Ethereum blockchain that aimed to address scalability, security, and sustainability issues. It involved a shift from a Proof-of-work (PoW) consensus mechanism to a Proof-of-stake (PoS) mechanism, as well as the implementation of sharding and a new beacon chain. The upgrade had been on Ethereum's roadmap since its inception. It was led by the Ethereum Foundation and a team of Ethereum developers, including co-founder Vitalik Buterin.

While the Ethereum Merge had the potential to bring about significant benefits to the Ethereum blockchain and ecosystem, potential risks and challenges could have arisen during the transition. For example, the crypto market is known for its volatility, and there is always the risk of scams and fraudulent activity. At the time of the merge, Binance and Coinbase, amongst others, temporarily paused ETH deposits and withdrawals as a precautionary measure. Nine hours following the merge,

ETH was down just 5% compared to the price at the time of the transition.

Ethereum moved to theProof of Stake(PoS) consensus mechanism and the rollout took place on the Ethereum mainnet in September 2022. This transition will, according to the Ethereum Foundation, cut the network's energy consumptionby 99.95%. The merge could change the narrative around the entire industry in relation topotential climate benefits.

Following the Merge upgrade, many have criticized Ethereum for becoming more centralized, because Lido Finance and Coinbase own over 40% of the staking power. However, it must be noted that before the Merge, three mining pools owned over 50% of the overall network hashrate in Ethereum.

The Ethereum Merge introduced sharding, which aims to improve the scalability of the Ethereum network by dividing the blockchain into smaller chunks known as "shards." This will allow the network to process more transactions in parallel, resulting in faster transaction speeds. Gas fees however, remained unchanged post-merge.

In addition to these technical improvements, the Ethereum Merge is expected to bring about significant changes to the Ethereum ecosystem as a whole. For example, the switch to a proof-of-stake mechanism is expected to result in a shift in the distribution of Ether, as stakers will receive a portion of the issuance as rewards for participating in the validation process.

Blockchain Nodes

What is a blockchain node?

What is the difference between a node and a miner?

What are types of blockchain nodes?

Full nodes

Pruned full nodes

Light nodes

Archival full nodes

Authority nodes

Lightning nodes

Masternodes

Staking nodes

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In short, a node is a communication endpoint within a decentralized network, such as a blockchain network. Blockchains are decentralized, immutable, digital distributed ledgers shared across a peer-to-peer network of nodes, that allow for the secure and transparent recording of transactions.

Nodes play a crucial part in the functioning ofblockchain technology, by participating in the validation of transactions, maintaining a copy of the blockchain, and providing advanced services to users. Decentralized networks such asEthereumandBitcoinstore their blockchain data on several thousands of nodes across the world, instead of using a single central authority.

There are several types of nodes, such as full nodes, light nodes, masternodes, archival full nodes, authority nodes and staking nodes. Each type of node has a specific purpose and contributes to the stability and security of the network. Nodes can be run by individuals or service providers such as Amazon, and the number of nodes on a blockchain network can vary widely, with some networks having thousands and others having only a few hundred. Let's take a closer look at how blockchain nodes work.

To illustrate this, we'll use the PoW (Proof-of-work) consensus mechanism on the Bitcoin blockchain as an example. Bitcoin miners earn BTC by finding and publishing new blocks. This is both an incentive and a reward for keeping the network secure and ensuring that all transactions are valid. Anyone can download the entire Bitcoin blockchain and validate blocks, and Bitcoin nodes can be run by anyone in the world with the right hardware and internet connection.

In order to select valid transactions to form a new block, a miner needs to run a full node. A miner

cannot determine the validity of proposed transactions without a full node, because the miner doesn't have access to full blockchain history (think the current blockchain's transaction history). A miner is always a full node, but the opposite is not always true, as a device can run a full node without actually creating new blocks of transactions itself, whereas a miner simultaneously tries to create a new blocks as well.

Full nodes are the most important type of blockchain nodes. They are responsible for validating new blocks of transactions and maintaining a copy of the entire blockchain. They are an essential part of blockchain infrastructure, as they maintain the integrity of the network and ensure that all transactions are valid. Full nodes also play a key role in the Proof of Work or Proof of Stakeconsensus algorithms that are used by many blockchain networks, such as Bitcoin and Ethereum, and allowsmart contractsto be run.

Pruned full nodes have a set memory limit and prioritize security over storage. When installed, the node downloads a copy of the entire blockchain and beings deleting everything except the metadata from its oldest books. Retaining the metadata allows it to maintain sequence. The node only keeps the most recent entries on the blockchain, until capacity is reached.

Light nodes, or lightweight nodes, also also known as a Simplified Payment Verification (SPV) node, are another type of node. Unlike full nodes, which store a copy of the entire blockchain, lightweight nodes only store block headers and rely on other full nodes to provide them with the necessary information. This allows them to operate with a smaller storage footprint and less computational power, making them useful for users who have limited storage space or are looking for a more lightweight way to access the blockchain.

Archival full nodes, also known as super nodes, are full nodes that store the entire transaction history of a blockchain network. These nodes are useful for providing long-term data storage for the network, as well as for providing access to historical data for researchers and developers.

Authority nodes, also known as mining nodes or miner nodes, are nodes that are responsible for

maintaining the network by creating new blocks and broadcast the transactions to the network. These nodes are typically rewarded for their work with new cryptocurrency.

Lightning nodes are specifically designed to facilitate fast and low-cost transactions on the Bitcoin blockchain network. They are built on top of the traditional full nodes and use the lightning network, a layer 2 scaling solution, to enable off-chain transactions. These off-chain transactions are settled on the blockchain only when necessary, which allows for a significant increase in the number of transactions that can be processed per second. Lightning nodes offer features such as instant payment and atomic multi-path payments (AMP). Running a lightning node requires some technical knowledge, but it can be a great way to help scale the Bitcoin network.

Masternodes are another type of node that is becoming increasingly popular. These nodes are responsible for providing advanced services to the blockchain network, such as instant transactions and privacy features. They typically require a significant amount of collateral, such as a large number of coins, in order to operate. Masternodes, in addition to validating, preserving, and broadcasting transactions, may also assist other events on the blockchain, depending on their nature, such as managing voting events, but they cannot add new blocks to the blockchain.

Staking nodes participate in the consensus algorithm of Proof of Stake blockchains such as Ethereum 2.0 (Ethereum used PoW before theEthereum Merge). A staking node can be one user or a staking pool (several users who pool their crypto funds). To set up a staking node, users have to lock a certain amount cryptocurrency of that ecosystem (so, ETH for Ethereum) and are rewarded for validating new transactions.

Leather Wallet

What is Leather Wallet?

Leather Wallet and Bitcoin Ordinals

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Leather Wallet, formerly known as Hiro Wallet, was one of the firstcrypto walletsto support for Bitcoin Ordinals, making it a versatile tool for managing a wide range of digital assets in the Bitcoin ecosystem. This article will delve into the features and benefits of the Leather Wallet, particularly its support forBitcoin Ordinals, and how it fits into the broader cryptocurrency ecosystem.

Leather Wallet is a self-custodial, open-source Bitcoin wallet designed to support various digital assets. Leather was originally built to supportStacks (STX), a bitcoin layer 2 blockchain that offers scalable Bitcoin NFTs,smart contracts via Clarity,dApps,DeFiapps, and an open-source API. Stacks NFTs work likeEthereumor Solana NFTs, with the difference that they rely on the mother chain. When the Ordinals protocol was released in 2023, Leather quickly added support for BTC and Ordinals, becoming one of the leadingOrdinals wallets.

From the security and usability standpoint, Leather is very well positioned. The wallet uses advanced encryption methods to protect private keys and is compatible with hardware wallets like Ledger devices, enhancing security for long-term storage. Leather Wallet emphasizes security through non-custodial management and compatibility with hardware wallets. Users should follow best practices to ensure the safety of their digital assets. Private keys should be securely stored, users should stay up to date with best practices in the crypto space, and engage only with well-known and trusted platforms for trading and managing their Ordinals and other digital assets.

Available as a browser extension for Chrome, Firefox, Brave, and Edge, as well as a desktop application for Windows, macOS, and Linux, Leather Wallet offers an easy and friendly user experience.

WithOrdinal inscriptions, users can inscribe data directly onto individual satoshis, turning them into unique digital artifacts, often referred to as Bitcoin NFTs but most known as ordinals or inscriptions. This innovation opens up new possibilities for collectibles and other digital assets on the Bitcoin blockchain.

The integration of Bitcoin Ordinals into theLeather Walletsignificantly enhances its functionality,

providing users with a robust platform to manage these unique digital assets. With Leather, users can receive, send, swap and deploy tokens and collectibles in just a few clicks. Users can send and receive BTC via Native SegWit and Taproot addresses, view and manage Bitcoin addresses and their activity across multiple accounts, mint and trade assets, and more. It is also possible to instantly swap assets between Bitcoin and Stacks via the Lightning Network

Leather wallet supports BRC-20 tokens (fungible tokens that use ordinal inscription technology to create a standard for tokens on the Bitcoin network) and Runes (a new token standard on Bitcoin). Users can also manage Bitcoin Stamps, further expanding their digital asset portfolio.

Leather Wallet connects to variousmarketplacessuch asGammaand Magic Eden, allowing users to buy, sell, and trade Ordinals.

Leather Wallet's support for Bitcoin Ordinals marks a significant advancement in the cryptocurrency ecosystem, providing users with a versatile and secure platform to manage their digital assets. By integrating features like ordinal inscriptions and compatibility with multiple marketplaces, Leather Wallet is poised to become a key player in the Bitcoin andWeb3space, alongsideXverse Wallet,OKX, Unisat andPhantom Wallet.

To get started withLeather Wallet, take a look at this step by steptutorialGamma has put together.

Stacks Blockchain

What is Stacks (STX)?

How does the Stacks blockchain work?

History of Stacks

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The Stacks blockchain provides a blockchain technology that uses Bitcoin's high security while allowing the creation ofsmart contracts, using a smart contract language called Clarity, which has an easy to read syntax.

Despite Bitcoin (BTC) being the most well-known blockchain and biggest cryptocurrency, its smart contract use cases have been limited due to its scalability, speed and syntax limitations. The Stacks network aims to change this, and unlock Bitcoin's potential.

Stacks is a blockchain that uses a consensus mechanism called Proof of Transfer (PoX), which has miners pay in BTC to mint new Stacks tokens. It relies on theBitcoin blockchain, like a layer 2 would, but it is distinct from Bitcoin and is maintained by and for Stacks nodes. Stacks has its own rules and its transactions are separate from Bitcoin transactions. This is by design, as Stacks developers want to enable programmability of Bitcoin without changing Bitcoin itself. Stacks blocks are recorded on the Bitcoin base-layer blockchain. Additionally, STX token holders can also stack (notstake) their tokens to earn Bitcoin as a reward.

The Stacks blockchain is enabling the creation of many projects andapplications. The most notable examples areStacks-based NFTs(non-fungible tokens) and DeFis. On top of this, Stacks was the first cryptocurrency to receive SEC qualification for a sale in the United States, allowing it to launch a $28 million Reg A+ sale cash offering for its STX tokens in July 2019.

Despite its increasing use as sovereign money, Bitcoin hasn't been as productive an asset as other cryptos forDeFi(Decentralized Finance). Thanks to its natural ability to exploit Bitcoin's security and settlement assurances, Stacks is uniquely positioned to change this and enableBitcoin DeFi. Considering Bitcoin's market cap, this is a vast industry to explore.

Native BTC swaps to new assets are a foundational building block of Bitcoin DeFi. Essentially, Ethereum-like functionality is now possible directly on Bitcoin, leading to an explosion of advanced decentralized apps, trust-less BTC swaps and the ability to purchase digital assets such as NFTs anddecentralized domains.

The Stacks blockchain leverages Bitcoin as a secure medium for storing and broadcasting. It has the same block time as Bitcoin, which is almost every 10 minutes. However, Stacks usesmicroblocksto lower latency transactions, they enable the current block leader to stream

transactions and incorporate state changes.

In a sense, Stacks' consensus mechanism mimics Bitcoin'sProof-of-Workmechanism, which while extremely secure, has limitations when it comes to programmability and syntax.Proof-of-transfer(PoX) solves this. It is an extension of the proof-of-burn mechanism, but rather than burning the cryptocurrency, miners transfer the committed cryptocurrency to other participants in the network.

There are 2 parties in the Stacks blockchain: miners and Stacks native token(STX) holders.

Miners: Instead of using energy to produce new blocks, Stacks miners use bitcoin --- that they need to buy at the market rate --- to maintain the Stacks blockchain. This approach incurs costs for Stacks miners, so they are encouraged monetarily, with compensation in the form of block rewards and transaction fees from the Stacks network. The compensation is issued by the protocol in STX, Stacks' native blockchain coin. The mining rewards are halved every 4 years and they are synchronized with the Bitcoin halving.

Stackers: Eligible STX holders can temporarily lock up their STX coins and receive BTCs that were pledged by miners.

After graduating from Princeton University with an MA and PhD in computer science, Muneeb Ali co-founded Stacks in 2013 with Ryan Shea, as Blockstack. Muneeb Ali still works with the platform today as the CEO of Hiro Systems PBC, which has its headquarters in New York.

The second co-founder of the platform, Ryan Shea, disembarked from the project in 2018 to pursue other ventures --- including co-founding a new tech startup that is currently operating in stealth.

Stacks' vision is to build a full-stack solution for decentralized applications (dApps) and replace the reliance on centralized apps and service providers that require the storage of user information.

Stacks 1.0was launched in 2018 and in early 2021,Stacks 2.0main net went live.

Blockstack was rebranded to Stacks in Q4 2020 in order to "separate the ecosystem and open source project from Blockstack PBC. Blockstack PBC isnow officiallyHiro Systems PBC. The change

to Hiro PBC marked a renewed focus on developer tools for the user-owned internet on Bitcoin.

The governance is of the Stacks ecosystem is coordinated and its growth is supported by the non-profit Stacks Foundation, which also offers guidance, technical support for grantees, PR support for founders, partnership introductions, legal resources and more.

Blockchain Governance

What is blockchain governance?

On-chain vs off-chain governance

Questions around governance

The future of blockchain governance

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Blockchain governance refers to the management and decision-making processes of cryptocurrency blockchains such asBitcoinandEthereum. Think of corporate governance, which is the factual and legal regulatory framework of firms to exercise good corporate management practice, and transfer this onto blockchain: you've got blockchain governance. Whatever the governance structure, matters at stake generally involve network access, funding allocation, block size, reward systems, voting and decision making.

Blockchainis a distributed ledger that facilitates the process of recording transactions and tracking digital assets, and physical ones, in the network. The distributed database is managed by multiple participants called nodes. The peer-to-peer network cuts out the middle man and allows for a highly secure way of recording transactions. Public blockchains, also called permissionless blockchains, are generally open-source. Immutability, transparency and security are key to the blockchain.

The importance of governance is well recognized in the field of IT (information technology) and many case studies have been conducted on the topic.

There are two major forms of governance: on-chain and off-chain.

The decision-making mechanisms vary between on-chain and off-chain governance processes (Reijers et al., 2018). The major difference is that the first requires participants to have a token to vote. On-chain governance uses theProof-of-Stakeformula, while off-chain governance uses aProof-of-Workformula.

While on-chain governance refers to decision-making that takes place directly on the blockchain, off-chain governance of blockchain technologies refers to decision-making that takes place outside of the blockchain, such as through community discussions and proposals.

In on-chain governance, rules for implemented changes are encoded into the blockchain protocol. Developers propose changes through code updates, and each node or participant votes on the proposed change. Participants include cryptocurrency exchanges, wallet software providers, miners, users, etc. Thedecentralizedand permissionless nature of public blockchain systems means that stakeholders, including node operators and token holders, play a significant role in the governance and evolution of these networks. The possibility of ahard forkis reduced with on-chain governance, because each proposed change requires consensus from all nodes.Nodesare encouraged to participate in the voting process through economic incentives (for example cryptocurrency as a reward for block validation).

Typically, on-chain governance involves miners (who operate the nodes), developers (who are responsible for core algorithms), and users (who use and invest in crypto). Unfortunately, this system also means that users with greater stakes can manipulate votes, and as in the real world, low voter turnout may become a problem.

A variety of governance models have been proposed for blockchain technology, including variousconsensus mechanisms. These models aim to ensure the security, scalability, and decentralization of the network while also providing incentives for participants. But whether existing rules and decision-making processes governing blockchain platforms should be changed from the inside (on-chain) or the outside (off-chain), and whether the system should provide for a mechanism

to change the governance structure itself, are central questions to the debate between governance that includes humans and governance that can be automated through rules.

The Bitcoin and Ethereum governance systems are currently informal. They were designed with a decentralized ethos, first promulgated by Satoshi Nakamoto in the Bitcoin whitepaper. Critics, however, point to two prominent forks in the blockchain ecosystem to prove their point that this informal decentralized governance process is in fact centralized among miners and developers.

With this in mind, it is worth noting that all DAO projects are a mixture of off-chain and on-chain decision-making, echoing the idea that governance consists of more than coded procedures, both in the real world and with blockchains and digital currencies. Decentralized Autonomous Organizations (DAOs) are a key aspect of blockchain governance. These organizations operate on a blockchain-based platform and use smart contracts, consensus algorithms and other governance mechanisms to make decisions in a decentralized manner. The need for a central authority and third parties is removed. The DAO, created on the Ethereum blockchain, is a well known example of this type of governance. For De Filippi & Wright, the governance attached to these DAOs could be implemented as blockchain-based software systems throughsmart contracts.

On the Ethereum blockchain, EIP (Ethereum Improvement Proposal) Champions are expected to adapt to the circumstances of their proposal, as the community is so diverse and large that not one single metric can be used to gauge community consensus.

These questions of blockchain governance are not unprecedented, nor are they unique. Legal philosophy and theory have grappled with these issues for hundreds of years.

As the blockchain and crypto ecosystem grow and more and more startups emerge, it is safe to say the governance of blockchain technology will continue to rapidly evolve. Stakeholders must continue to closely consider the various factors that impact the decision-making processes of these systems, from the governance structures of individual blockchain networks to the use of blockchain in various industries and use cases, such as supply chain management,digital identity, smart contracts, voting,

health records, and much more.

Ordinals Marketplaces

Gamma.io

Other popular players

More about the Ordinal trend

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When Ordinals took over the ecosystem, Gamma launched itsno-code Ordinals Launchpadfor making NFTs on native Bitcoin, using Ordinals. Gamma's platform makes creating Ordinals simple and accessible to anyone with a Bitcoin address. After launching the platform and individual and bulk inscriptions, Gamma quickly released Ordinals Collection Mints for a seamless experience: just like launching aStacks NFTcollection.Gamma.iois also the leading NFT marketplace on Stacks, with over 95% marketshare.

The Ordinals marketplace allows users to explore, sell, trade and buy Ordinals, directly on the Bitcoin blockchain, with a Bitcoin L1 infrastructure. This means Gamma's Ordinal marketplace won't leverage other chains such as ETH or Stacks for Ordinal trading. TheGamma.ioOrdinals marketplace was released in March 2023, making all inscriptions tradable right away. Leather wallet and Xverse wallet, which are initially Stacks and Bitcoin wallets compatible withGamma.io, also quickly developed to becomeOrdinals wallets.

A few other notable names include Ordinals Market, based on the Ethereum infrastructure, Ordswap, built on Bitcoin, and Ordinals Wallet.

In the case of an Ethereum based Ordinals marketplace that uses vaults, users are issued an ETH representation of their ordinal, which then enables them to go to other marketplaces such as OpenSea and trade that proof of ownership token. Owners of the ETH NFT (the representation of the Ordinal) can unlock the vault with that NFT, and withdraw the original vaulted asset to an Ordinal

wallet of their choosing.

In January 2023, the crypto ecosystem was taken by storm by a new development:Bitcoin Ordinals. What are they? Ordinals are numbers assigned to a list of inputs. But in the Bitcoin world, Ordinals are essentially Bitcoin NFTs (non-fungible tokens) directly on the Bitcoin blockchain. The terms Bitcoin NFTs, Ordinals, Ordinal inscriptions, Ordinal NFTs and Bitcoin Ordinals are used interchangeably to designate these on-chain digital assets.

Casey Rodarmor, former Bitcoin Core contributor, found a loophole in the Taproot upgrade and designed the Ordinals Protocol, allowing anyone who runs a Bitcoinnodeto inscribe arbitrary data (such as text, jpegs and more) directly onto a satoshi, the smallest unit of Bitcoin.

UnlikeEthereum NFTsand many others (on other blockchains such as Solana, Stacks and Polygon), Ordinal NFTs are completely immutable. They do not depend on smart contracts and their data is stored directly on-chain within Bitcoin blocks, so once the bitcoin transaction is confirmed, they can never be edited. It is safe to say that Ordinals use cases will continue to evolve as users and developers explore their potential, from digital art to the metaverse.

Bitcoin (BTC) is the first and largest cryptocurrency by market cap, but it has limited smart contract functionality. Ethereum (ETH) and other blockchains aim to improve upon Bitcoin's limitations and help in the creation of dApps, DeFi and more. Ordinal NFTs offer many benefits so far, including high security, true immutability, the growth of the Bitcoin ecosystem and increased adoption, and lower fees. Because buying and selling onBTC blockchainis simpler than other chains, transaction fees for on-chain storage services are cheaper.

When the Ordinals trend took over the crypto market, collections such as the Ordinal Punks and The Taproot Wizards started inscribing their NFT collections onto the Bitcoin network. By the end of February, Yuga Labs, the world's largest issuer of NFTs, announced TwelveFold, a new NFT collection issued on Bitcoin. Because on-chain Bitcoin NFTs are new, the fundamental building blocks for a deep and liquid market must be built. It was only a matter of time before new startups

emerged and took over the Ordinals marketplace scene.

NFT Launchpads

What is an NFT Launchpad?

What is the difference between an NFT Launchpad and an NFT marketplace?

What are the best NFT Launchpads?

Best NFT Launchpad on Bitcoin

NFTLaunch

NFTPad

NFTb

NFTSolPad

Magic Eden

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An NFT launchpad is a platform where creators, artists, and communities can mint, sell, trade or release their NFT projects on blockchains such as Stacks, Ethereum and Polygon.

They can function similar to launchpad platforms working on initial offerings such as IDOs (Initial Dex Offering), IGOs (Initial Game Offerings) or INOs (Initial NFT Offering), where businesses offer tokens to raise funds. NFT launchpads allow creators to interact with their communities and to directly sell their NFTs without having to involve a third-party. They can also help creators find an audience and earn royalties on secondary sales, which is otherwise difficult both in the real world and in the crypto world. Some NFT launchpads require users to undergo a KYC process (know your customer) before participating in crowdfunding, to fight fraudulent activity.

With the NFT market growing at incredible rates and digital artwork trending, creators are facing a unique opportunity. While they are often pushed into contracts that don't serve their best interests by

their galleries, producers and auction houses, blockchain technology and the crypto market could be what they've been waiting for.

But not all creators can code, andsmart contractscan be intimidating. With this in mind, NFT launchpad development have soared over the past year, with more and more startups and development companies offering creators solutions for lauching their own NFT collections in minutes, with no-code involved. Some examples of no-code creator launchpads areGamma.ioon the Stacks and Bitcoin blockchain and ZeroCodeNFT on the Ethereum (ETH) blockchain, and GuardianLink.

NFT marketplacesand NFT launchpads are similar, but they do have some differences that define them. NFT marketplaces are a place for anyone to sell, trade and collect NFTs, and counterfeit NFTs could enter the blockchains if a strict vetting protocol is absent. The admin moderates the digital assets and then releases them for sales. An NFT launchpad exclusively supports creators and artists, and tends to have more stringent vetting processes. The launchpad community decides on listing an NFT project after an examination. With NFT launchpad development services, creators can build, launch and market NFT projects.

Note that an NFT marketplace can also have its own NFT launchpad. This is the case ofGamma.io, an NFT marketplace on the Stacks blockchain, that also has anNFT launchpadfor creators to launch their own NFT collections.

Numerous businesses are stepping up, aiming to revolutionize the NFT space and offer the best NFT game development services, metaverse, cryptocurrency and more.

Gamma is an open marketplace with an NFT launchpad platform for Bitcoin NFTs, and a hub for the world's Web3 social identity.

It is the largest NFT marketplace on theStacks Blockchain, a blockchain technology that enablessmart contractfunctionality for Bitcoin, and one of the first marketplaces to launch support for Ordinal NFTs.

The Gamma creator-first launchpad allows artists to deploy their own NFT collection with fully tested, creator-owned,no-code smart contractsin minutes. Creators can sell their art at a fixed price, determine all the specifics of their presale or public sales, auction their work, and earnroyaltiesfor every sale on the secondary market as well as create airdrops. Three types of collections are available on the Stacks blockchain: Public Mint, Continuous collection and Editions collection, allowing creators to pick the most suited for their projects.

Gamma offers aninscription service for Bitcoin Ordinals: creators can launch their Ordinals collections in minutes, no-code needed. The Ordinals marketplace allows users to sell, purchase and trade Bitcoin-native NFT art in a secure and trustless way.

To learn more about the launchpad's roadmap and functionalities, head over tocreate.gamma.ioor find Gamma onsocial media.

NFTLaunch focuses on marketing launchpads to make them distinctive and well-known. The site also promotes a deflationary marketplace and the automated gift of a proportion of transactions to a charity of one's choosing. The project aims to raise awareness about donations while supporting the crypto space, and hopes to influence future projects to do the same. This project has successfully dwelled into BSC Pad and has started an incubator program for promising NFT projects. By joining hands with NFTLaunch, the projects have the entire marketing, tokenomics and legal expertise of NFTLaunch at their disposal as well as.

NFTPad is an NFT Launchpad for blockchain games, art and DeFi. Users may mint NFTs in minutes, auction them, or create liquidity for them to be exchanged on AMMs like PancakeSwap and Uniswap. NFTPad allows investors to discover and invest in raw talent creators, as well as invest in multi-chain projects. Additionally, the project aims to launch on the Binance Smart Chain to be the OpenSea of BSC. NFTPad uses a system that determines the amount of allocation a participant is guaranteed for.

NFTb aspires to create a platform for users where they can trade anytime via DEX as well as access

DeFi and GameFi opportunities, while enjoying the best user experience possible. Experts vet all projects on NFTb's platform, and with NFTb Labs, the platform invests and partners with unique NFT projects which users can access by staking NFTb's native tokens. NFTb is developing cross-platform bridges to some of the top blockchain ecosystems, to enable deep liquidity access for digital assets.

NFTSolPad is a deflationary NFT Launchpad on Solana that strives to have transparent NFT drops for their community. Users will have to perform some basic tasks before getting into the whitelist of an NFT project through the launchpad. This is to ensure that everyone in the community has some primary involvement in the projects.

Magic Eden is a known player in the Solana non-fungible tokens ecosystem. Early 2023, they deployed an NFT launchpad. The platform offers community exposure, cross-chain minting technology, opportunities for partnerships and secondary trading features. Magic Eden enables Solana and Ethereum based projects to introduce new NFT project tokens to the space.

The potential of NFTs, their use cases and their future applications are only a few of the reasons they have become so top of mind. The NFT space is innovating at a tremendous speed, and an incredible amount of startups is emerging, while more established multinational companies hop on as well. Are you ready to join the NFT community or launch your own unique NFT project?

Where to Buy NFTs

Different types of NFTs you can buy

What is an NFT marketplace?

Where do I buy NFTs?

Getting Started

Popular NFT marketplaces

Where to buy Bitcoin NFTs?

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There are many types of NFTs: art, music, photography, video game items, tickets to events, avatars, domain names, trading cards and virtual worlds, and tons of other digital items---there are even NFTs just for the memes. NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate.

Before you start buying NFTs, it is important to understand the difference between a non-fungible token and a cryptocurrency, and to understand the differenttypes of NFTs.

Non-fungible tokens, i.e. unique digital assets on the blockchain, are unlike cryptocurrencies in the sense that if you trade one token for another, for example bitcoin, you'll have exactly the same thing because bitcoin is "fungible". NFTs cannot be replaced by another token as they are unique.

You can buy NFTs on NFT marketplaces. The type of NFT you are looking to buy can influence your choice of marketplace. For example, if you're looking for NBA collectibles, you can head over to NBA Top Shot; but if you're looking for digital artwork, other NFT marketplaces will be better suited. Another example is Axie Infinity, a gaming-oriented NFT marketplace where the assets of the online gaming platform can be minted or bought and sold.

AnNFT marketplaceis an online marketplace where you can find, explore, buy, trade and sell NFTs. You'll be able to purchase digital art, discover collections such as Cryptopunks, Bored Ape Yacht Club, Megapont, the Guests...

Social media, ever growing interest in the blockchain network and its decentralized nature, as well as the high quality artwork creators have proven to produce for their digital collectibles play a huge part in the popularity of NFTs and NFT marketplaces as well as the NFT market's growth, in general with the total NFT sales volume surging to over $2.5 billion in 2021 and Beeple's record-breaking $69 million sale of a digital collage.

To get startedbuying NFTs, you'll need adigital walletand cryptocurrencies. Although some NFT marketplaces accept credit card payments, the majority will require a crypto wallet.

A digital wallet is where you store your cryptocurrencies and digital assets. Several wallets are available, such as Metamask, Coinbase, Gemini, Electrum and many others. At Gamma, we accept Leather Wallet and Xverse, both compatible withStacks, a cryptocurrency built on bitcoin.

To purchase cryptocurrencies, head over to acrypto exchangeplatform such as Binance or Coinbase. You will essentially exchange your fiat (currencies such as dollars, euro etc) for cryptocurrencies (such as bitcoin, ether, stacks).

Once you have cryptocurrencies and a crypto wallet compatible with the NFT marketplace you'd like to use, you can get started!

Note that different wallets enable access to different NFT marketplaces andsmart contracts, therefore different NFT collections. For example, a Metamask wallet or a Coinbase wallet allow you to access ETH dApps, Temple wallet allows you to access Tezos dApps and a Leather wallet allows you to engage with Bitcoin dApps built with Stacks.

Buying your first NFT and choosing an NFT platform to start with can be intimidating. We've put together a short list for you to explore.

You'll find Magic Eden and Solanart on the Solana blockchain, Aavegotchi on Polygon, and Gamma on Stacks, a blockchain layer built on Bitcoin, the must trusted blockchain.

Somepopular NFT marketplaceson the Ethereum blockchain (ETH) include OpenSea, Rarible, Nifty Gateway, Mintable, and Superrare.

Gamma is thelargest NFT marketplaceon Stacks, a settlement layer built on Bitcoin.

Once you've completed the cryptocurrency exchanges process and created your digital wallet, head over to the Gamma marketplace.

On Gamma, you can usedomain namesto transfer NFTs to someone by typing in their .btc name instead of the longer alphanumeric address, or you can use it to view your own (or someone else's) profile and NFTs on Gamma. .btc domains are registered through a smart contract on Stacks, secured by Bitcoin. This smart contract implements a decentralized name registry. Given Stacks'

unique connection to Bitcoin, registering.btc namesautomatically generates a pair of corresponding Bitcoin and Stacks addresses.

Explore the NFT art and other available digital assets. When you're ready to move forward, you can buy an NFT at a fixed price, place a bid on an auction, mint new NFTs and much more! Note that you'll pay gas fees when buying NFTs, transaction fees associated with the blockchain, as well as a small commission fee. Also note that unlike sites like eBay where the buyer has to pay for the goods upfront, there is no trust problem on the Stacks blockchain! Either the transaction is confirmed in an anchor block or it isn't.

Be safe and exercise caution before making any purchase of any NFT, beware of scams and only mint or purchase NFTs from creators and NFT platforms you trust, with the expectation that there may be no future liquid market thereafter or any buyer willing to repurchase the NFT for any amount of money.

Once your transaction is confirmed, that's it, you own NFTs!

Phantom Wallet

Bitcoin Ordinals: Overview

What is Phantom Wallet?

Phantom wallet x Gamma

Closing Thoughts

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In the beautiful crypto ecosystem where digital art and meme coins happily coexist, tools and technologies are constantly emerging to streamline transactions and enhance user experiences. In this article, we'll explore howPhantom Walletintegrates Bitcoin ordinals.

Bitcoin Ordinalswere brought to the Bitcoin ecosystem in early 2023 with the launch of the Ordinals Protocol. In simple terms, Ordinals refer to ordinal inscriptions on the Bitcoin blockchain, which

allow for the creation and management of unique, non-fungible tokens (NFTs) that live directly on the Bitcoin network, with no need for storage services such as IPFS. By enabling the creation of NFTs on the Bitcoin blockchain, ordinal inscriptions have expanded Bitcoin's functionality beyond a simple store of value. Despite muchcontroversyaround Ordinals, they have manybenefitsand positive implications for digital art, collectibles, and the broader NFT market.

In order to buy, trade and keep Ordinals collectibles and digital assets, users need a Bitcoin wallet orOrdinals wallet. Let's take a look at one of the top BTC web3 wallets.

Phantom Walletis a popular multi-chain crypto wallet, originally designed for theSolana(SOL) blockchain. It has now expanded its support to include Bitcoin, Ordinals, and BRC-20 tokens, in addition toEthereum(ETH) and Polygon. This development makes Phantom Wallet a versatile tool for managing a wide range of digital assets, includingcryptocurrencies, NFTs, andDeFiapplications.

Phantom Wallet is known for its intuitive design, making it accessible to both beginners and experienced users. Its user-friendly interface and multichain functionality make it easy for users to manage assets across different blockchain networks. It offers robust security features ensuring users' funds are protected. With Phantom, users can manage their NFTs, interact with DeFi protocols, and explore various dApps within the wallet.

Managing Bitcoin addresses is straightforward, with the option to toggle between Taproot and Native Segwit settings as needed. The wallet provides detailed transaction overviews, including estimated times of arrival and balance changes, and converts BTC-denominated values to USD for better context. It also ensures the protection of your inscribed and rare sats, preventing accidental spending of Ordinals, or valuable rare sats. The immersive Ordinals gallery allows you to view, search for, and pin Ordinals in your Collectibles tab, while automatic spam detection keeps you safe from scams by filtering and hiding spam Ordinals in your Collectibles and Activity tabs. Additionally, rich Ordinals metadata, such as sat number and inscription ID, is easily accessible. Phantom simplifies the process of buying BTC, offering instant purchases with a card or transfers from major

exchanges, removing the need to go tocryptocurrency exchangessuch as Coinbase or Binance.

Phantom is supported by popular Bitcoin NFT marketplaces such asGamma.ioand Magic Eden. By connecting their wallet to Gamma, users can easily mint, buy, trade and sellBitcoin NFTs.Gamma also supports other wallets such as Unisat, Leather, Xverse, OKX, and Sparrow Wallet.

To commemorate Phantom's Bitcoin launch,Phantom walletandGammacollaborated on a free Open Edition claim with art by Degen Poet. The"Forever Bullish" collectionwas a huge success with over 225,000 editions minted in just 4 days. The drop is the largest ever on Bitcoin.

Phantom Wallet offers a secure and versatile platform for managing a wide range of digital assets across multiple blockchains, while Bitcoin Ordinals bring new functionality to the Bitcoin network, enabling the creation of unique digital assets. By understanding and leveraging the capabilities of Phantom Wallet and Bitcoin Ordinals, users can enhance their engagement with the crypto space, exploring new opportunities in DeFi, NFTs, and beyond. Whether you are a seasoned crypto enthusiast or a newcomer, these innovations offer valuable tools for navigating the dynamic world of digital assets.As always when selecting a wallet, users should proceed with caution and do their own research. It is important to explore security features, popularity and many other factors, to use strong passwords, and to keep your secret recovery phrase in a safe place.

Emblem Vault for Ordinals

A solution for NFTs from different blockchains

How does Emblem Vault work?

Emblem Vault and Ordinals

Related articles:

With many new developments in blockchain technology over the past few years, includingsmart contractsenabling DeFi and dApps, the crypto ecosystem has been thriving. Emblem Vault has contributed to this growth, providing a means to store and exchange digital assets across different

blockchains. In this article, we'll take a look at it is, how it works, and how it is used withBitcoin Ordinals.

Emblem Vaults act as multi-asset wallets that are transferable, and can contain both fungible tokens (thinkcryptocurrencies) and non-fungible tokens (NFTs). They can enable cross-chain activity, such as transferring digital assets across different blockchains without the need for bridging.

Emblem Vault was released in September 2020 and has now become the leading solution for trading historical NFTs that were minted on non-EVM chains such asBitcoin. The Emblem Vault ecosystem is open-source, ensuring that developers can contribute to the project's growth. The Vault' functionality is not limited to Ethereum and Bitcoin, as they can be used on other blockchain networks like Polygon, Namecoin, Counterparty, Dogecoin, Coval, and many more.

Emblem Vaults are created as uniqueERC-721 NFTs(the token standard for Ethereum NFTs), and each vault contains a series of blockchain addresses, generated from a single secret phrase. In practice, this means you can store digital assets in each address, and only the person with the secret phrase can send assets to other wallets. One or more digital assets, along with some cryptocurrency, can be stored in one vault. Multiple assets can be combined into a single token, making it easy to trade and manage your portfolio. For example, you could create a portfolio that contains a percentage of ETH, a percentage of Bitcoin, a percentage of Doge, and trade all of these assets as a single ERC-721 NFT. Emblem Vault also enables users to create liquidity pools, and to create a vault that multiple people hold. This could be useful for organizations or individuals looking to pool their resources.

Users can buy and sell assets that predate, or aren't compatible with the ERC-721 standard, and wrap them into ERC-721 NFTs. This means collectors can trade NFT collections such as the Rare Pepes and Bitcoin Punks, onNFT marketplaceslike OpenSea that don't support the Bitcoin blockchain.

Ever since their release,Ordinal inscriptionshave taken over the NFT market, and many well-known

NFT projects have joined the movement, including Yuga Labs, who created the Bored Ape Yacht Club (BAYC).

Ordinals are Bitcoin NFTs minted directly on the Bitcoin blockchain. They do not leverage side-chains, and are inscribed on satoshis, the smallest unit of Bitcoin. These digital assets are completely immutable and can never be updated or deleted. The Ordinals Protocol was made possible by the Taproot Upgrade and was introduced by Casey Rodarmor in January 2023.

Because Ordinals live directly on the Bitcoin blockchain, they are kept inBitcoin wallets, and they aren't supported by every NFT marketplace. Emblem Vaults allow users to wrap their Ordinals and trade them as ERC-721 tokens on non-Ordinal marketplaces.

Vaulting assets with Emblem Vault is generally the same process across various blockchains. When it comes to wrapping Ordinal NFTs, users should be very cautious and take a few extra steps to ensure they're doing things in a secure way and keeping their BTC wallets safe. The vault contains the private keys to the Bitcoin wallet holding the Ordinal inscription. The Ordinal remains on the Bitcoin network, and a new version which is compatible with theEthereum blockchain, a "representation" of sorts, is created.

Even though Emblem Vault do have some benefits, when it comes to buying and trading Ordinal inscriptions, we strongly recommend that users do their research and choose what's best for them. TrustlessOrdinals marketplacessuch as Gamma.io ensure a safe and secure means of trading Ordinals without the need to vault their assets, directly on the Bitcoin L1 blockchain. The Bitcoin NFT marketplace builds tools ensuring that it will remain trustless over time, and always puts user safety first.

Blockchain Oracles

Enabling Real-World Data in Smart Contracts

What are Blockchain Oracles?

Types of Oracles

Centralized and Decentralized Oracles

Blockchain Oracles Use Cases

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Since Bitcoin's creation in 2009, blockchain technology and the crypto space have made major advances, leading us to a now rapidly growing and diverse ecosystem of public blockchains, decentralized applications (dApps), DeFi, and cryptocurrencies. These innovations have changed the way we transact and interact with digital assets.

Smart contractsare self-executed computer programs designed to run autonomously when predefined events or actions occur: with the right inputs, a certain output is guaranteed. The terms of a smart contract are specified in code, thus eliminating the need for human intervention, third-party services or a single entity, and leveraging objectivity and automation.

Despite their numeroususe cases, there is something blockchain-based smart contracts can't do: they can't interact with the outside world. This is where blockchain oracles come in.

Blockchain oracles provide a way for smart contracts to access real-world data sources, creating a link between blockchain networks and the outside world. They are regarded as blockchain middleware.

These data sources can be information such as weather data, exchange rates, market prices, and more. In use cases such as supply chain management, prediction markets, derivatives, anddecentralized finance (DeFi)applications, this real-world data is critical.

Although Ethereum is one of the most popular blockchain networks for smart contracts, and has a thriving ecosystem of oracles, oracles aren't limited to ETH. Other blockchains can use decentralized oracle services provided by some blockchain oracle projects: Chainlink, for example, has enabled cross-chain communication, allowing smart contracts on different blockchain networks to interact with each other.

There are two types of blockchain oracles: inbound oracles and outbound oracles.

Inbound oracles bring external data into the blockchain network, while outbound oracles send on-chain data to external systems. Generally speaking, each type of oracle involves a combination of fetching, validating, computing upon, and delivering data to a destination. Any device or entity that connects a deterministic blockchain to off-chain data is referred to as a blockchain oracle. Oracles use tools such as APIs, SDKs, IoT sensors, or other sources to collect data.

There are also different types of oracles based on their functionality:

Software oracles: These are the most common type of oracle, and they rely on Application Programming Interfaces (APIs) to access external data sources.

Hardware oracles: These oracles use physical devices, such as Radio Frequency Identification (RFID) tags, to collect data from the external world.

Computation oracles: These oracles perform off-chain computations and then send the results to the blockchain network.

Human oracles: These oracles rely on human input to provide data to the blockchain network.

One of the main challenges of blockchain oracles is the Oracle Problem. This refers to the issue of trust in the data provided by the oracle.

Centralized oracles rely on a single source of data, which creates a single point of failure and counterparty risk, which isn't ideal for a trustless ecosystem like blockchain. The fundamental issue with centralized oracles is that because they have a single point of failure, they make contracts more vulnerable to attacks and weaknesses, and a bad actor's intervention could directly affect the smart contract.

Decentralized oracles aim to minimize counterparty risk, similarly to public blockchains. Decentralized oracles are also known as consensus oracles, because the smart contract consults several oracles to assess the data's validity and accuracy. A Decentralized Oracle Network combines multiple independent oracle node operators and multiple reliable data sources to establish

end-to-enddecentralization.

Chainlink is one of the most widely used oracle providers, offering secure and reliable access to off-chain data sources. It aggregates data from multiple data providers, ensuring a more accurate and reliable data feed.Decentralized exchangesthat run on a shared protocol can provide price feeds for assets such as ether (ETH) and bitcoin (BTC). However, they have no way to access the current price of ether or bitcoin in terms of fiat. This is where decentralized oracles such as Chainlink come and and provide the exchange with a price feed. Many other blockchain projects such as Band Protocol, Augur and MakerDAO have developed.

Blockchain oracles have numerous use cases in the real world. In supply chain management, they can be used to track the movement of goods and ensure the authenticity of products. Prediction markets use oracles to settle bets based on real-world events, such as election results or sports scores. DeFi applications rely on oracles to provide real-time price feeds forcryptocurrenciesand other digital assets.NFTscan also benefit from oracles, as they can verify ownership and transfer of unique digital assets.

As blockchain technology continues to evolve, the need for reliable and trustless data sources will continue to increase, and so will possible use cases. Decentralized oracle networks will continue to play a crucial role in ensuring the interoperability and security of blockchain-based systems.

Ordinals Controversy

Why the uproar?

What Ordinals bring to Bitcoin

The negative aspects of Ordinals

The future of Bitcoin NFTs

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In January 2023, Bitcoin Core software engineer Casey Rodarmor launched the Bitcoin Ordinals

Protocol, taking first place in crypto news. This was made possible by the Segwit and Taproot Upgrades, which bring added capabilities to the Bitcoin blockchain.

Digital artifactssuch as images, text, programs and more can be inscribed directly on satoshis, the smallest BTC unit, thus essentially bringing NFTs to Bitcoin. Until Bitcoin Ordinals,Bitcoin NFTswere only possible throughStacks, a blockchain layer that enables smart contracts, dApps, DeFi and NFTs secured by Bitcoin.Ordinals inscriptionsor Ordinals NFTs, live directly on the Bitcoin blockchain, and this upgrade has caused a rift in the Bitcoin community. While "Bitcoin maximalists" see Ordinals as an attack on Bitcoin, others see true opportunity in this new development.

Although the idea of inscribing data on the Bitcoin blockchain isn't new --- long ago, a few Bitcoiners floated the idea of incorporating a domain name system into Bitcoin, but the project was shut down by Satoshi Nakamoto in 2010 --- the rise of Ordinals has brought back an important question to the crypto space: should Bitcoin be used for non-financial purposes?

Since the rise of Ordinals in January 2023, the Bitcoin community has been engaging in heated debates about the impact of Bitcoin NFTs on Bitcoin itself. The ecosystem disagrees at a technical level, as well as at a narrative level, about the way theBitcoin blockchainshould be used. To some, Bitcoin is an identity, a means of protecting savings and fighting inflation, as well as political statement. To them, Bitcoin is a way of showing the federal reserve, the government and every bank out there, that the world doesn't need them. To others, Bitcoin is just another chain and cryptocurrency, where NFTs are as valid and welcome as on any other chain. Ordinals don't require a separate token or side chain, and the data is inscribed directly in a Bitcoin block, with the metadata living on-chain, making inscriptions a revolution in the world of NFTs.

According to Ordinals proponent Udi Wertheimer, Bitcoin NFTs will have a positive impact on the ecosystem, with improved security and incentives.

The spike in creation of Ordinals in the weeks following the launch of the new protocol, contributed to the increase in transaction fees and typical block size on the Bitcoin network. The scarcity of

block space in the system boosts the demand, hopefully incentivizing miners. The block subsidy decreases with everyblockchain halving, so the hope is that inscriptions will bring more fees to miners, who will be better incentivized to secure the network.

With the rising demand for Ordinals, it is also possible more and more users who are willing to pay to keep the blockchain safeguarded will join the network and runBitcoin nodes, making the network more sustainable in the future.

Ordinals inscriptions also add new capabilities to the chain and enhance its functionality beyond its original design. Ordinals can help promote mass adoption of the digital currency. Ordinals can bring more users, more bitcoin transactions and more overall value to the Bitcoin ecosystem.

While NFT projects have been running toward Ordinals, and inscriptions can be anything from JPEG digital art to PFP projects, use cases aren't limited tonon-fungible tokensand memes. It's also possible that NFT collections on the Bitcoin blockchain will become more valuable than digital assets on other chains such asEthereum(ETH) or Solana.

Originally, Bitcoin was created to be a peer-to-peer electronic cash system to make financial transactions. It wasn't meant as a decentralized data storage system. Part of the Bitcoin community is concerned that inscriptions will pose unforeseen threats to the security of the network, and threaten the core ethos of the project.

Inscribing arbitrary content onto the Bitcoin blockchain will make it bigger and harder to download. For this reason, users might reconsider running a Bitcoin node as their Initial Block Download ("IBD") process will become longer, more expensive, and less private. As new technologies make the process less cumbersome or if Bitcoin Core adds more granular tools for handling IBD and data storage, it is possible some of these concerns could be alleviated in the future. Bandwidth is also becoming more accessible as internet access and new technologies such as Starlink become common.

For some, increasing block size with non-monetary data also harms fungibility. To them, the

changes made to the network with the Segwit upgrade shouldn't be used for inscriptions. These changes were a way of incentivizing Lightning usage. Some users have blamed Bitcoin Core developers for not making it well-known that the SegWit andTaproot upgradeswould enable something like inscriptions. It is important to note that even a massive increase in inscription activity would only result in a negligible number of satoshis being inscribed.

While just because we can mint NFTs on Bitcoin doesn't mean we have to, NFTs aren't the end-all use case of Ordinals inscriptions. In the same way NFTs on Opensea (Ethereum's leading marketplace) will transform from JPEG apes to digital housing deeds or medical records, use cases for Bitcoin will also change. Largest NFT marketplace on Stacks,Gamma.io, offers a place for creators and collectors to come together, explore the world of Ordinals and lead the change.

But until newuse casesare explored and discovered, NFTs directly on the Bitcoin blockchain have already brought more users, collectors and artists to the chain, meaning wider adoption of the Bitcoin blockchain. If more people join the community, that essentially means more people exchanging amounts of currency without trust in a central authority or third party, just as Satoshi Nakamoto envisioned.

What are Bitcoin Ordinals?

What are Bitcoin Ordinals?

Differences between Ordinal NFTs and other NFTs

Notable Ordinal inscriptions

Inscribing and buying Ordinals

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Over the past decade, the world of cryptocurrency and blockchain has evolved at an unprecedented pace. From Bitcoin and Ethereum to stablecoins, staking andDeFi, the crypto space has witnessed a plethora of innovations.

Recently, the ecosystem was taken over by important crypto news. On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinal protocol, which has been the talk of the ecosystem since.

Although there are some important differences between NFTs and Ordinals, a rough way of defining Ordinals could be to say they areBitcoin NFTsyou can mint directly on the Bitcoin blockchain. Let's take a closer look.

Each Bitcoin is broken into 100,000,000 units called satoshis (or sats). Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshi scarcity is cut in half every four years (halvingevery 210,000 blocks).

As Casey Rodarmor explains in a podcastinterview, with the new Ordinals protocol, people who operatenodesin the Bitcoin network can inscribe each sat with data, creating an Ordinal. The data inscribed on the satoshi can include smart contracts, enablingNFTs.

Ordinals were made possible by Bitcoin's recentTaproot upgradecombined with the 2017 Segregated Witness (also called Segwit) update. TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself."

NFTs (non-fungible tokens) such as ETH NFTs orStacks NFTs, generally point to off-chain data which is kept on IPFS (Interplanetary File System). IPFS is a decentralized file storage system that can be changed using dynamic metadata. As an example, a token image in a given NFT collection can be updated, and metadata can be refreshed onNFT marketplacessuch as OpenSea andGamma.io.

When Casey Rodarmor created the Ordinal protocol, he was trying to improve what he considers to be a deficiency: NFTs require off-chain metadata which can be changed, making them "incomplete"

to him. Ordinals, however, are "complete" because all the data is inscribed directly on-chain, and are intended to reflect what NFTs should be: true digital artifacts.

Because block size on the Bitcoin blockchain is limited, so is the size of an inscription, resulting in some other technical differences. Unlike traditional NFTs which can be updated, Ordinals are completely immutable, so some possible uses differ, such as semi-fungible or dynamic NFTs, and any use case that implies updating the NFT.

The rise of Ordinals caused a lot of excitement and controversy within the Bitcoin community, and it was just weeks before collections emerged as ordinals.Ordinal Punksis one of the most notable projects and pays homage to CryptoPunks. Ordinal Punks is a set of 100 Bitcoin NFTs minted within the first 650 Inscriptions on the Bitcoin chain.

The Taproot Wizards, a collection of hand-drawn NFT wizards, represents the largest block and transaction in the BTC chain's history, with a staggering 4MB.

Ethereum-based collection OCM (OnChainMonkey), minted 10,000 Ordinals into a single Inscription, making it one of the first 10k collections on Bitcoin.

NFT marketplaceGamma.ioused its no-code ordinal inscription service to broadcast theirpress releasedirectly to the Bitcoin blockchain, making it the the world's first press release inscribed to Bitcoin.

It's still very early in the Ordinals market, but theweb3ecosystem has been buzzing and many new projects have been emerging. It was just a few weeks before a developer forked the Bitcoin protocol to create Litecoin and used it to mint the first-ever Litecoin ordinal NFT.

Despite the surge in interest inordinal inscriptions, the process of actually creating an inscription is highly technical, complex, and time consuming. Gamma's no-code platform removes these barriers.

Gamma launched its Ordinals Launchpad, a no-code platform for creating NFTs on the native Bitcoin ecosystem, utilizing Ordinals technology. With Gamma's platform, anyone with a Bitcoin address can easily create Ordinals. To enhance the user experience, Gamma also released

Ordinals Collection Mints, which allows for seamless NFT collection launches similar to Stacks NFT collections. Creators can also customize transaction fees. In short, the Gamma no-code creator platform makes ordinals accessible to anyone with a Bitcoin address. Paired with the creator launchpad on theStacksprogramming and scaling layer for Bitcoin, the Bitcoin NFT creator experience is finally ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer.

TheOrdinals marketplaceis built on the Bitcoin blockchain, with an L1 infrastructure, allowing users to explore, sell, trade, auction and buy these digital assets directly in a trustless way. Unlike other marketplaces, Gamma's marketplace does not rely on other chains such as Ethereum or Solana, for Ordinals trading. In March 2023,Gamma.ioreleased the Ordinals marketplace, making all inscriptions immediately tradable. Additionally, Leather wallet and Xverse wallet, which were initially STX and BTC wallets compatible withGamma.io, quickly added Ordinal functionality and have developed into Ordinals wallets. If you're ready to inscribe and purchase your own Ordinals collection, head over toGamma.io!

No-code Ordinals Launchpad

Bitcoin NFTs

The rise of Bitcoin Ordinals

Gamma.io's no-code Bitcoin Ordinals launchpad

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Over the past years, web3 has seen many new blockchains, DeFi apps, DAOs, metaverse platforms and startups develop. More and more NFT platforms are emerging on blockchains such as Ethereum with its leading marketplace OpenSea, Solana, Polygon, and the Stacks blockchain, with its leading marketplaceGamma.io.

Stacksprovides a blockchain technology that uses Bitcoin's high security while allowing the creation

of smart contracts, enabling the creation ofBitcoin secured NFTs.

The integration of NFTs directly on theBitcoin blockchainhas long been a dream for many in the crypto ecosystem. However, Bitcoin was first and foremost designed to be a decentralized cryptocurrency, leaving out smart contract functionality.

In February 2023, the crypto ecosystem was taken over by important news: truedigital artifactsdirectly on the Bitcoin blockchain, calledBitcoin Ordinals, were made possible.

With the new Ordinals protocol, people who operatenodesin the Bitcoin network can inscribe individual satoshis with data, creating anOrdinal inscription. Inscribing a satoshi creates a unique Bitcoin native digital asset, that can be held in a Bitcoin wallet and transferred using Bitcoin transactions.

This new advancement was made possible by Bitcoin'sTaproot upgradewhich reduced resources needed to process transactions, thus increasing block size and Bitcoin's smart contract flexibility.

Despite somecontroversywithin the Bitcoin community, Ordinals are a huge breakthrough. They allow for more growth of the ecosystem, more utility and more use cases. Notable artists and NFT projects immediately started creating their Ordinal collections, including Ordinal Punks and the Taproot Wizards.

However, as a user, creating an inscription is complex, costly, time-consuming and requires advanced technical knowledge.Gamma.io, Stacks' leading NFT marketplace, aims to change that.

Gamma allows users to deploy fully-tested no-code smart contracts in minutes through the creator launchpad. In February 2023, Gamma already supported over a thousand NFT collections, 80% of which were deployed using the launchpad.

When Ordinals took over the space, the open marketplace quickly launched its no-code creator platform for inscribing Ordinals, making it possible for anyone with a Bitcoin (BTC) address and a compatibleOrdinal wallet, to inscribe their own Ordinal.

The platform allows users to create single Ordinal inscriptions, bulk inscriptions, airdrop Ordinals,

request collection pages and launch Ordinals Public Mints, and more is to come. Gamma offers an easy and low-cost way ofinscribing Ordinals, where creators are given the option to choose or customize their transaction fees based on network congestion.

Gamma also offers a dual viewing method that ensures that a high quality viewing experience is accessible to anyone, without compromise, with inscriptions that live 100% on-chain, directly on the Bitcoin L1, and any trading anywhere will be for native Ordinal inscriptions.

Additionally, Gamma supports an Ordinals explorer to view all inscriptions held by a Bitcoin address or to view an inscription owner's profile.

Soon after the launch of its creator tools, Gamma also released its trustless BitcoinOrdinals marketplace, where users can sell, purchase and trade Ordinal NFTs.

NFTs aren't the only use-case for ordinals. Gamma used its own no-code launchpad to broadcast itspress releasedirectly to the Bitcoin blockchain. In the future, press releases will be broadcast to the network instead of sent to the newswire.

Gamma's just getting started. As mentioned by Co-Founder Jamil Dhanani, coupled with its Ordinal marketplace, the startup is putting creators first, as always, and getting Bitcoin-native NFTs ready for mainstream adoption, without sacrificing superior levels of security, trust, and decentralization that only Bitcoin can offer.

Interested in connecting with Gamma on social media? Join us onDiscordandTwitter!

If you're new to the space, you can purchase BTC on variouscryptocurrency exchangessuch as Coinbase or Binance with fiat currencies such as USD, or other cryptos such as ETH. Connect your Leather or Xverse wallet to get started with Stacks NFTs and Bitcoin Ordinals!

Xverse Wallet

What is Xverse Wallet?

Bitcoin Ordinals and Xverse Wallet

How to Set Up Xverse Wallet Ordinals wallet

Additional features

Closing thoughts

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Xverse Wallet, one of the leading wallets for Bitcoin assets --- whetherordinal inscriptionsor cryptocurrency --- is designed to cater to the needs of the growing Web3 ecosystem on Bitcoin. Let's take a look at the wallet's features and benefits.

Xverse Wallet is a multi-functional Bitcoin wallet that supports various digital assets including BTC, BRC-20 tokens,Bitcoin OrdinalsandStacks NFTs. It functions similarly to ETH wallets such as Metamask, but is built for the Bitcoin ecosystem.

Available on iOS, Android, and as a Chrome browser extension, it provides a user-friendly experience for managing Bitcoin and Bitcoin-native assets. The wallet also offers built-in Ledger support, ensuring high security for your digital assets. It uses advanced encryption methods and provides non-custodial management, meaning users retain full control over their private keys.

Xverse Wallet is designed to be intuitive, making it easy for users to navigate and manage their assets, from buying and selling Bitcoin Ordinals to exploringdAppsand showcasing theirRare Sats.

Bitcoin Ordinals, also known as inscriptions, allow users to attach unique digital artifacts directly onto theBitcoin blockchain. This innovation leverages the 2021 Taproot upgrade, enabling the creation of Bitcoin NFTs that are securely stored on-chain.

Xverse Wallet provides a comprehensive solution for managing Bitcoin Ordinals. Users can inscribe new Ordinals directly from the wallet and securely store them. Xverse Wallet integrates with leadingmarketplaceslike Gamma and Magic Eden, allowing users to buy and sell Ordinals seamlessly.

The wallet also offers a simple interface for viewing and transferring Bitcoin Ordinals, making the management of these digital collectibles straightforward and efficient.

It can take time for Bitcoin transactions to go through, and they sometimes get stuck in the mempool. For such scenarios, Xverse offers the possibility to speed up transactions.

Setting up Xverse Wallet is straightforward, and Gamma provides this tutorial to help users through the steps.

Users will first need to download the wallet fromxverse.app, and follow the on-screen instructions to create a new wallet. Users must ensure they securely back up their private keys and set up their authentication methods. The wallet's seed phrase can then be used to access funds through other wallets such as Unisat, also supported by Gamma.

Once the wallet is created, users will be able to see their payment BTC address, and their Ordinals address. From there, they can connect to supported Ordinal marketplaces likeGamma, to start buying and selling Bitcoin Ordinals. It should be noted that while Xverse and Leather (formerly Hiro wallet) share Stacks and Ordinal addresses, the Bitcoin payment address differs, as Xverse uses a Nested Segwit address.

Beyond Bitcoin Ordinals, Xverse Wallet supports a variety of other digital assets and functionalities.

Xverse wallet supports Stacks NFTs, which are more similar to classic ETH or Solana NFTs, except that they use Bitcoin as a base layer, making them extremely secure. In the Stacks ecosystem, users can stack Stacks (STX) in order to receive BTC rewards.

The wallet provides access toDeFiprotocols, enabling users to earn rewards and participate in decentralized finance activities. Users can also mint, etch and trade Runes.

Xverse Wallet stands out as a powerful and user-friendly solution for managing Bitcoin Ordinals and other digital assets. Its robust security features, integration with major marketplaces, and support for a wide range of digital assets make it an essentialcryptowallet for anyone looking to explore the BitcoinWeb3ecosystem. Whether you're inscribing new Ordinals, trading collectibles, looking for hardware support or diving into DeFi, Xverse Wallet has you covered.

Burned NFTs

What is burning an NFT?

How is an NFT burned and why?

Burned NFT projects examples

Burning in cryptocurrency

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In the world of non-fungible tokens (NFTs), burning refers to the process of destroying a token or removing it from circulation. There's no such thing as "deleting" in crypto, so that's where the "burn mechanism" comes into play. NFTs, being unique digital assets, can't be duplicated or replaced, which makes the burning process significant in maintaining scarcity, which in turn drives up the value of the remaining NFTs. It is important to note that burned NFTs don't disappear from the blockchain itself, since it is immutable.

The process of burning NFTs depends on thesmart contractof the NFT collection. If the smart contract includes an option to burn an NFT, a burn function can be called to do so.

However, if burning wasn't planned in the smart contract, burning NFTs is done by transferring them to a "burn address" (also known as a null address).

A burn address is a special address on the blockchain, that has a string of zeros as its public key. On theEthereum blockchain, you'll find a "0x000000000000000000000000000000000000dEaD" null address. Once the tokens are transferred there, they become impossible to access.

Even though Ethereum is the most popular blockchain for NFTs, burning is possible on other blockchains such as Solana,Stacksand many others. As the act of burning an NFT is a transaction in itself, it involves paying a transaction fee (also called gas fee).

Burning can be done to eliminate unsold or problematic inventory from an NFT drop, or to engage collectors through "upgrades". As an example, a trend has emerged recently, where certain NFT projects use burning as a marketing tool, encouraging their collectors to burn their NFTs in

exchange for an airdrop. A person may also want to burn NFTs to declutter their wallet, especially with NFT scams going on where people send unsolicited NFTs to users.

To keep track of burned NFTs, Etherscan, the Ethereum blockchain explorer, provides information on NFT burn projects, including the number of NFTs burned and the correspondingmetadata.Popular NFT marketplaces, such as OpenSea, also display information on burned NFTs, including the total supply of NFTs and thefloor price, which is crucial information for collectors and investors.

The Explorer Guild, one of the topStacks NFTprojects, is a good example of the value that can be brought by burning. The NFT collection was created by Stacks' decentralized blogging platform,Sigle, which was the first startup to use NFTs as a means of fundraising, with NFT holders enjoying extra utility on the site. The collection was originally composed of 10000 assets. However, after an on-chain vote by the community, the decision was made to burn 7000 of them in order to increase value and scarcity. Something novel emerged from burning those NFTs: the startup thought it would be a shame for them to simply disappear from circulation and fall into oblivion, and instead created theExplorer Guild Museum, an interactive experience that allows users to view and inspect the burned NFTs, while wondering through the metaverse, or Sigleverse. The exhibition is composed of 100 NFTs from the 7000 burned, decided by a verifiable random function produced by the Stacks blockchain, and is renewed every block (approximately every 10 minutes). When a new block is created, this combination of 100 Explorers disappears to make room for a new one. Through burning, increased value was brought to the remaining NFTs, as well as to the burned ones, that became a new experience entirely.

Artist Damien Hirst has also joined the burning trend at his Newport Street Gallery in London. The collection "The Currency" is made of ten thousand handmade artworks, andthe artist told his buyersto choose either the physical artwork or the NFT representing the piece. If the buyer chose to keep the NFT, the corresponding physical version of the NFT would be destroyed - burned, as it

were. The act of setting physical NFTs on fire added a whole new dimension to the world of NFTs, where the scarcity and value of digital assets are not only limited to the digital world but also extend to the physical realm.

The concept of burning a token isn't limited to NFTs, and can be applied to cryptocurrency as well. With Proof of Burn, which is a quite novel consensus mechanism, miners compete by destroying ('burning') a proof-of-work cryptocurrency as a proxy for computing resources. PoX is an extension of Proof-of-Burn, which was the mining mechanism originally proposed for theStacks blockchain(founded by Muneeb Ali and formerly known as Blockstack), however, unlike with PoB, the anchor crypto is distributed instead of burned.

How do Ordinals work?

Introduction

What is an Ordinal inscription?

How to inscribe an Ordinal?

How are Ordinals and NFTs different?

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Put simply,BitcoinOrdinalsare Bitcoin NFTs you can mint directly on the Bitcoin blockchain, without the need for a side-chain or separate token.

On January 21st 2023, Bitcoin Core developer Casey Rodarmor launched theordinals protocol, which has been at the centre of crypto news since.

Despite the debates and controversies within the Bitcoin community,Ordinals' benefitsand traction suggest that they could lead to a culture shift in the world of digital assets. Paired withGamma's creator launchpadon the Stacks programming layer for Bitcoin, the Bitcoin NFT creator experience is finally ready for mainstream adoption. Let's take a closer look at why Ordinals have been trending.

In short, Ordinals allow users to inscribe data onto satoshis (or sats), the smallest measuring unit of

the bitcoin cryptocurrency (BTC) recorded on the blockchain.

The protocol allows users to send and receive sats that carry optional extra data in ordinal progression. Each sat is serially numbered, starting at 0. These numbers are "ordinal numbers" in the mathematical sense, giving an order to each sat in the total supply. Satoshis are numbered in the order in which they're mined, and transferred from transaction inputs to transaction outputs first-in-first-out. This system is called the first-in-first-out algorithm.

TheOrdinal Theory Handbookstates that, "individual satoshis can be inscribed with arbitrary content, creating unique Bitcoin-native digital artifacts that can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself."

The SegWit upgrade in 2017 introduced a new way of storing transaction data. In 2021, theTaproot upgradeimproved the network's privacy, security, block size and functionality. Bitcoin's Taproot upgrade made this new protocol possible. Casey Rodarmor's discovery of a method to encode 4MB of data onto a Bitcoin block has opened up exciting prospects for the Bitcoin network.

The process of actually creating an ordinal inscription (also called inscribing) is highly technical, complex, and time consuming. In order toinscribe Ordinals, users must download Bitcoin core and run a fully synced Bitcoin full node, which is costly and requires advanced technical skills.

But developers in the Stacks ecosystem have been hard at work.Gamma's no-code platformremoves these barriers and makes ordinals possible for anyone with a Bitcoin address. Gamma also provides users the option to choose or customize their transaction fees based on network congestion. Bitcoin-basedNFT walletssuch as Xverse Wallet and Leather Wallet also quickly announced Bitcoin Ordinal support functionality, making it easier to set up a Bitcoin address for your Ordinal. The Satoshibles NFT collection team created Ordinals Bot, which will inscribe an Ordinal on your behalf.

Although they are most popular on the ETH (theEthereum blockchain), NFTs have spread to other

blockchains such as Solana, Polygon and Stacks, with its leading marketplaceGamma.io

There are a few important differences between Ordinals and NFTs. Non-fungible tokens such asEthereum NFTsorStacks NFTs, generally point to off-chain data (this can be an image, sound, etc). This data can is often kept on IPFS, a decentralized file storage system, and the metadata can be changed.

With Ordinals NFTs, however, the data is inscribed directly on-chain, within a satoshi, making themdigital artifacts. Ordinals can, like NFTs, haveroyaltiesattached to them, which is the case on some marketplaces such as Gamma.io.

NFT use casesalso differ from Ordinals use cases. While NFTs are enabled bysmart contractsand can be used in many ways including the gaming industry, the metaverse, digital art and more, Ordinals don't depend on smart contracts and are limited to 4Mb. They also are completely immutable, so they can't besemi-fungibleordynamic, unlike NFTs. However, Ordinals aren't limited to JPEGs and Profile Pics! NFT marketplaceGamma.ioused its no-code ordinal inscription service to broadcast theirpress releasedirectly to the Bitcoin blockchain, making it the the world's first press release inscribed to Bitcoin.

Best NFT Marketplaces

What is an NFT marketplace?

What are the best NFT marketplaces?

Largest NFT marketplaces on the Stacks Blockchain

Gamma

Byzantion

Superfandom

Top NFT marketplaces on the Ethereum Blockchain

OpenSea

Rarible

Superrare

Nifty Gateway

Makersplace

A few more names

Buying NFTs on marketplaces

Buying NFTs on Gamma

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An NFT marketplace is an online marketplace where you can find, explore, buy, trade and sell NFTs (non-fungible tokens), unique digital assets on the blockchain. NFT marketplaces offer the ability to buy, sell, trade and mint NFTs, amongst other things.

Unlike cryptocurrencies (think bitcoin --- if you trade one token for another, you'll have exactly the same thing because bitcoin is "fungible"), NFTs cannot be replaced by another token as they are unique. There are manytypes of NFTs: art, music, photography, video game items, tickets to events, avatars, trading cards and virtual worlds,domain names, and tons of other digital items---there are even NFTs just for the memes. NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate.

The NFT market is rapidly evolving, and while some of the most popular marketplaces are on the ETH blockchain, more and more NFT marketplaces are burgeoning on other blockchains such as Solana, Polygon, andStacks, a blockchain layer built on Bitcoin. Choosing the right one can be intimidating, and depends on the type of digital collectibles you are looking to buy. Let's dive in.

Gamma is an open marketplace for Bitcoin NFTs and a hub for the world's Web3 social identity. It is the largest NFT marketplace on the Stacks Blockchain, a blockchain technology that enablessmart contractfunctionality for Bitcoin.

Specialising in collectibles and digital art, Gamma is a home for collectors, creators and investors,

where they can explore, collect, showcase and trade NFTs with other users with options for minting, auctioning, selling and buying NFT tokens.

Gamma helps collectors discover incredible NFTs and helps promote curated digital collectibles from unique digital artists.

A user-first marketplace to find, explore, and collect extraordinary NFTs secured by Bitcoin.

A creator-firstlaunchpadfor artists to deploy their own NFT collection with fully tested, creator-owned, no-code smart contracts in minutes. Creators can sell their art at a fixed price or auction it, and earnroyaltiesfor every sale on the secondary market.

A social platform, bringing together creators and collectors in an engaging and Web3-native way.

Our front and backend developers are hard a work to provide you with the best NFT marketplace experience possible. To learn more about our functionalities, head over toGamma.io.

Byzantion is the 2nd largest NFT marketplace on the Stacks blockchain. Even though they are Stacks-based NFT marketplace, they are focusing on creating tools that can be used in the different blockchains and have expanded their tools to the NEAR blockchain.

Superfandom is an NFT marketplace focusing on connecting artists and creators to their fans. They aim to establish a platform for different types of creators such as actors and youtube personalities. Super fandom's NFTs currently are not tradable on secondary markets but they are planning to introduce and integrate with other secondary marketplaces.

OpenSea is the most popular NFT marketplace on theEthereum blockchainnetwork (ETH), as this marketplace is the largest in the world when it comes to trading volume and NFT sales. With OpenSea's support forERC-721tokens, nearly every blockchain game can be traded on the marketplace, including CryptoKitties, Cryptopunks, and many more.

Similar to OpenSea, Rarible allows users to buy, collect and sell art, video game assets and NFTs. It is a fully decentralized finance (defi) platform has its own native token called RARI. The holders of RARI get to vote on company decisions like company policy changes.

SuperRare brings more of a gallery attitude to the NFT space, with high-end digital art, and puts credibility and artistic intent above meme-friendly art.

Nifty Gateway has facilitated the sale of some of the most popular digital artists such as Beeple and singer/musician Grimes. It's an art curation platform powered by the crypto exchange Gemini.

MakersPlace is a leading digital art gallery where crypto and NFT enthusiasts can buy and sell rare digital art. The MakersPlace artist community is currently invite-only

Other NFT marketplaces on the Ethereum blockchain include Axie Infinity, a popular blockchain-based game that also functions as an NFT marketplace; NBA Top Shot, an NFT platform where sports fans can buy, sell andtrade NFTsof NBA highlights; Decentraland, an NFT marketplace and a virtual-world play-to-earn game as well; Mintable, which aims to be an open marketplace similar to OpenSea; and KnownOrigin, a market where you can discover and collect rare digital artwork, to only mention a few.

Also note that some NFT marketplaces are cross-chain, for example Binance NFT Marketplace which offers NFTs on the Binance Smart Chain and the Ethereum blockchain.

Although some NFT marketplaces such as Nifty Gateway accept credit cards and debit cards, you will most certainly need acrypto walletto store your cryptocurrencies and digital assets and enjoy the full NFT experience.

Popular wallets include Metamask, Coinbase, and Gemini. Different wallets enable access to different smart contracts, therefore different NFT collections. As an example, a Metamask wallet or a Coinbase wallet allows you to access ETH dApps, a Temple wallet allows you to access Tezos dApps and a Leather wallet allows you to engage withBitcoin dAppsbuilt with Stacks.

If you don't have any cryptocurrencies, you will need to exchange your fiat currencies (think dollars) for crypto (think bitcoin) on a crypto exchange platform.

Once you've completed thecryptocurrency exchangesprocess and created your crypto wallet, head over to the Gamma marketplace. Connect a supported digital wallet browser extension (we

recommend theLeather wallet) to Gamma and allow usage of your wallet's cryptocurrency for the purchase of an NFT. You can find more information on how to purchase STX (Stacks) in thisblog post.

Start exploring the NFT art and collections available onGamma. You can buy an NFT at a fixed price on thesecondary marketplace, make an offer on a collection or individual NFT, place a bid on anauction,mint new NFTsand more !

As a buyer, the price listed includes all marketplace commission fees, so the final cost will only include the list price plus the actual transaction fee charged by the network to secure and confirm your transaction. When you sell an NFT, you'll pay atransaction feeassociated with the blockchain (also called gas fees), as well as our commission fee, which is only charged if your NFT sells. Creators who launched their collection through Gamma's Creator Portal will earn royalties on every secondary sale of their NFT projects.

Proof of Work Consensus Mechanism

What is a consensus mechanism?

What is Proof of Work and how does it work?

Proof of Work vs Proof of Stake

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Until 2008, when Satoshi Nakamoto published the Bitcoin white paper which described a digital currency based on proof of work protocols that would allow secure, peer-to-peer transactions, one of the issues that prevented the development of digital currencies was the double-spend problem. You can't spend the same dollar bill twice, but with cryptocurrency, there needs to be a way to prevent users from spending the same unit twice (or more) in different places before the system can record the transactions. This system, or way of preventing malicious uses, is called a consensus mechanism.

Every cryptocurrency blockchain uses a consensus mechanism, also called consensus algorithm, which allows users of the blockchain to agree on the legitimacy of transactions, with no centralization or central authority needed. The consensus mechanism used by a blockchain influences the way transactions are verified, how much energy is used, transaction speed, and fees.

Although the idea of the Proof of Work consensus mechanism existed before the creation of theBitcoin blockchain, it was implemented for the very first time for blockchain technology. Amajorityof cryptocurrency networks use the Proof of Work (PoW) mechanism, including Bitcoin, Litecoin, DogeCoin, Bitcoin Cash and more. Let's take a closer look at the first, and still dominant, consensus algorithm.

Proof of Work is a consensus mechanism that allows anonymous entities in decentralized networks to trust one another. There is no financial institution or central authority to ensure trust, instead, miners are the guardians and facilitators that make the system run smoothly and accurately.

When users buy and sell cryptocurrencies or digital assets, the data from these new transactions is pooled into a block of transactions. With the Proof of Work system, miners are tasked with verifying new data. They compete with each other to solve a mathematical puzzle and find the nonce for a block. Showing proof that they've undertaken the computational work gives the miners the right to process the block. The winner of the next block is rewarded with cryptocurrency and adds the block to the blockchain.

Miners are required to use computing resources for the privilege, investing significant resources in computer power, equipment and energy consumption and costs. By financially incentivizing miners to verify the integrity of new crypto transactions before adding them to the blockchain network, proof of work helps prevent double spending and guarantees security.

Bitcoin, the first cryptocurrency, uses Proof of Work. Bitcoins are mined using the Hashcash proof-of-work function by individual miners and, verified by the decentralized nodes in the peer-to-peer bitcoin network. The difficulty of the math puzzle is regularly adjusted, to keep the block

times around a target time of 10 minutes. Miners receive Bitcoin rewards in the form of newly minted BTC coins and transaction fees. Although Bitcoin has a fixed maximum supply of 21 million coins, after that, miners will continue receiving transaction fees for their service.

Proof of Work and Proof of Stake share the same end goal, but there are a few differences in the way they work.

In order to run the very complicated algorithms, miners in the PoW mechanism need highly specialized hardware which incurs large costs, making mining only accessible to special mining pools and threatening the decentralization of the system. Because of its lottery-like system, the mining process can also be very energy intensive, which has led to critiques of the consensus and its environmental impact, with Bitcoin mining using more electricity annually than Finland and Belgium. The Bitcoin blockchain was designed for cryptocurrency mining, leaving outsmart contractfunctionality. Therefore, it mostly just has to process incoming and outgoing bitcoin transactions.

But theEthereum blockchain, however, also has to process DeFi transactions, NFT sales and minting, and many othersmart contracts. To maintain security and decentralization, Ethereum on proof-of-work consumed large amounts of energy. This led to Ethereum moving to theProof of Stakeconsensus mechanism in 2022. Following theMerge, many have criticized Ethereum for becoming more centralized since Lido Finance and Coinbase own over 40% of the staking power. However, it must be noted that before the Merge, three mining pools owned over 50% of the overall network hashrate in Ethereum.

Proof of Stake (PoS), also employed by other blockchains such as Cardano, switches out the importance of computational power for staked ETH, and replaces miners with validators. Validators stake their crypto (ETH) to activated the ability to create new blocks. They don't compete to create blocks, they are chosen at random by an algorithm. If two out of three validators agree on the state of a block, it is considered final.

Because validators are selected at random instead of miners competing to solve a puzzle, Proof of Stake consumes a lot less energy than PoW. Validators also don't need any special tools and equipment that require huge computational power.

With Proof of Stake, validators can only validate blocks if they have a security deposit or "stake", meaning if they attack the blockchain, try to double-spend or steal coins, they can't do so without losing their investment. With PoW, if one group of miners gains more than 50% control, they can prevent transactions from being confirmed and can also spend coins twice. This is called a 51% attack. PoW is the most secure consensus algorithm, while Proof of Stake security remains untested in comparison.

Ordinals Wallets

The rise of Bitcoin Ordinals

How to inscribe an Ordinal

Setting up a Bitcoin Ordinal Wallet

Xverse wallet

Leather Wallet

Ordinals Wallet

Phantom Wallet

OKX Wallet

The Bottom Line

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On January 21st 2023, Bitcoin Core software engineer Casey Rodarmor launched theordinal protocol, essentially enabling NFTs directly on the Bitcoin blockchain. Unlike Ethereum non-fungible tokens (ETH NFTs), Ordinals data lives directly on-chain and they don't require file storage systems such as IPFS. The data is inscribed directly on individual satoshis.

Until then, Bitcoin NFTs had only been possible through Stacks, a blockchain network that leverages Bitcoin's high security while allowing the creation of smart contracts, NFTs and dApps.Stacksis a layer 1.5 for Bitcoin with its own set of rules and cryptocurrency (STX).

This new development and the emergence of truedigital artifacts, or Bitcoin NFTs, caused a lot of excitement andcontroversywithin the crypto ecosystem. Unlike regular NFTs where the image lives off-chain, Bitcoin Ordinals have their data inscribed directly on-chain, making them highly valuable digital collectibles. The idea of bringing digital assets directly to the Bitcoin network has been trending, and it was only a matter of time before Web3 developers started to fill the demand for user-friendly interfaces for Ordinals.

The process of actually creating an ordinal inscription (also called inscribing) is highly technical, complex, and time consuming. In order toinscribeOrdinals, users must download Bitcoin core and run a fully synced Bitcoin node, which is costly and not quite beginner-friendly. After the sync is completed, the next step is to create an Ordinals wallet and send some satoshis to its address.

Stacks' leading Bitcoin NFT marketplaceGamma.ioquickly released itsno-code Ordinals launchpad, allowing anyone with a bitcoin address to inscribe Ordinals, and making it a lot easier for users. If you're interested in joining the Gamma community, find us onTwitterandDiscord!

Ordinals marketplaces and inscription tools include Gamma, Magic Eden and Ordinalsbot.

NFT walletssuch as Xverse Wallet and Leather Wallet (formerly Hiro wallet) announced Bitcoin Ordinal supported functionality, making it easier to set up a Bitcoin address for your Ordinal. Gamma supports Xverse Wallet, Leather Wallet, Unisat, Sparrow, OKX and Phantom wallet.

In order to inscribe and keep Ordinals, you will need a Bitcoin Ordinal wallet with a taproot wallet address. That wallet will need "coin control" capabilities, in order to avoid spending your Ordinal NFT satoshis on transaction fees.

It's a good idea to use a new and unused ordinals address to receive your inscription. This way, you will know for sure that the ordinal containing your inscription will be the only satoshi associated with

that address, because Ordinals are sent using bitcoin transactions. This will help to ensure your wallet is "forward-compatible" with new developments for managing ordinal inscriptions.

Bitcoin wallets such asSparrow wallet(quick setup guidehere) can be used to create new and unused Taproot addresses. Please note that if you use these options, you should not use the wallet you create to send BTC, unless you perform manual coin-selection to avoid sending ordinals as payment or fees. You should also be sure to set up your wallet with Taproot-based addresses. Taproot addresses can still receive bitcoin from other Bitcoin addresses. You can also use the specialized command line viewer if you have the technical knowledge to do so, which you can access from theOrdinal Theory Handbook. Let's take a look at some of the best Ordinals wallets.

The Bitcoin Web3Xverse Walletquickly launched support for Ordinal functionality for iOs, Android and the Chrome Browser extension. A few months later, Xverse announced the integration of Ledger hardware wallet support for Ordinals and BRC20 tokens.

You can easily process BTC payments to inscribe Ordinals and safely store them in a wallet, without risking accidentally sending them away as a satoshi payment. Users need to own some BTC to pay for transactions, which can also be purchased in-app using a fiat on-ramp service.

Once the ordinal is inscribed and sent to their taproot address, users can find their inscriptions inside their Xverse NFT collection. Xverse also lets Bitcoin users interact with Stacks, with plans to introduce instant payments via the lightning network.

Just a day before Xverse wallet, Leather Wallet (previouslyHiro Wallet), another Bitcoin focused Web3 wallet and Stacks wallet, rolled out inscriptions to its testnet.

Leather Wallet functions similarly to Xverse, withGammadoing the inscribing and the Ordinals being deposited directly into a user's account. Once the Ordinal has been sent to the user's taproot address, they can see them in the "Collectibles" section of the wallet.

Leather Wallet CEO stated that the platform will provide extensive support for bothStacks NFTsand Ordinal inscriptions.

In 2024, Leather introduced support for Bitcoin Runes --- Bitcoin's new fungible Token Standard --- shortly after the Runes protocol was launched. Now, Leather users can view their Rune token balances within the extension and connect to platforms such as OrdinalsBot and Luminex to etch, mint, and transfer Runes.

TheOrdinals walletis a digital wallet platform that provides a secure means for users to store, sell, buy, and trade Bitcoin Ordinals. The process of purchasing Bitcoin Ordinals on the platform is simple and user-friendly. Users are required to create an account and deposit funds into their wallet to get started. BTC can be purchased oncrypto exchangessuch as Binance or Coinbase, using fiat or other cryptocurrencies.

Phantom Wallet is a popular multi-chain wallet, originally designed for the Solana blockchain. It has now expanded its support to include the Bitcoin ecosystem, and BRC-20 tokens, in addition to Ethereum and Polygon. This development makes Phantom Wallet a versatile tool for managing a wide range of digital assets, including cryptocurrencies, Bitcoin Ordinals, NFTs, and DeFi applications

OKX Wallet is a multi-chain crypto wallet known for its robust security features and support for a wide range of digital assets. Originally designed to handle major cryptocurrencies like Bitcoin (BTC) and Ethereum (ETH), it now supports Bitcoin Ordinals and BRC-20 tokens, expanding its utility in the crypto ecosystem.

OKX Wallet provides staking and yield farming capabilities, allowing users to earn passive income through their token holdings.

As Ordinals have gained popularity, the number of Ordinals wallets has grown significantly, with wallets such as Metamask in collaboration with Generation XYZ adding support. Any of the wallets mentioned above surpass the expectations of even skilled users in these criteria, with most excelling particularly in a few key areas.

When choosing a wallet, users should consider a number of factors, such full interoperability with

Ordinals assets (view, transfer, buy, sell, store); easy processes for creating new Ordinal inscriptions; integration with dApps and Web3; robust security features, private key management and authentication methods; management of a diverse digital asset portfolio from one wallet: popularity in the cryptocurrency market

Ultimately, it is up to the reader to determine which option best suits their needs.

NFT Marketplace Basics

NFTs

Smart contracts

NFT Marketplaces

Stacks NFTs

AboutGamma.io

NFT marketplace development

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The world ofnon-fungible tokenshas exploded in recent years, with the market for these unique digital assets growing rapidly. As the popularity of the NFT market and ecosystem has increased, so too has NFT marketplace development.

Social media, ever growing interest in the blockchain network and its decentralized nature, as well as the high quality artwork creators have proven to produce for their digital collectibles play a huge part in the popularity of NFTs and NFT marketplaces.

Over the past few years, some individual NFTs sold for millions of dollars, with Beeple's NFT selling for $69 Million, making it the most expensive NFT to date.

NFTs are unique digital assets that are verified on a blockchain with a unique identifier, making them scarce and valuable. NFTs can represent a wide range of digital assets, including artworks, collectibles, and even tweets and GIFs.

Unlike cryptocurrencies (think bitcoin - if you trade one token for another, you'll have exactly the same thing because bitcoin is "fungible"), NFTs cannot be replaced by another token as they are unique. There are manytypes of NFTs: art, music, photography, video game items, tickets to events, digital collectibles, trading cards and virtual worlds,domain names, and tons of other digital items - there are even NFTs just for the memes. NFTs can provide utility both in the metaverse and in the real world, with access to special features or even real estate.

NFT marketplacesare online platforms that allow users to buy, sell, trade NFTs, and they often offer additional features such as the ability to mint NFTs and manage personal NFT collections. Minting is the process of creating and issuing a new NFT, often requiring the use of a crypto wallet and the payment of fees in cryptocurrencies such as ETH.

Although every NFT marketplace works differently, one of the main features of NFT marketplace platforms is their use ofsmart contracts, which are self-executing contracts with the terms of the agreement written into lines of code. Smart contracts allow for the automation of many tasks and processes, making NFT marketplaces efficient and transparent.

Smart contracts work by following simple "if/when...then..." statements that are written into code on a blockchain, meaning they are computer programs designed to run autonomously when predefined events or actions occur: with the right inputs, a certain output is guaranteed. The terms of a smart contract are specified in code, thus eliminating the need for human intervention, intermediaries or a central authority.

The Ethereum (ETH) ecosystem is a home to many NFT creators and collectors. On theEthereum blockchain, like on any other blockchain, NFTs are minted through smart contracts that assign ownership and manage the transferability of the NFTs. When someone creates or mints an NFT, they execute code stored in smart contracts that conform to different standards, such as ERC-721. Tokens that follow this standard are compatible with any Ethereum-based project.

Ethereum is currently the most popular blockchain for NFT development, with the ERC-721 and

ERC-1155 standards being widely used.

Other blockchain platforms such as Cardano, Binance Smart Chain and Solana are also being used for the creation of NFTs and app development.

There are many NFT marketplaces available today, including well-known platforms like OpenSea and Rarible, as well as newer startups like Nifty Gateway and SuperRare. Each platform has its own unique features and target audience, with some focusing on specific types of NFTs oruse cases.

In addition to the buying and selling of NFTs, many marketplaces also offer features such as metadata and the ability to create and manage a personal NFT collection.Metadatais additional information about an NFT, such as the artist's name or a description of the artwork.

Despite being the first and largest crypto, by prioritizing security over programmability, Bitcoin long lacked the world computer aspect of ETH, making the take off of NFTs in the Bitcoin ecosystem difficult.Stacksenables smart contract functionality for Bitcoin, allowing developers to build Web3 dApps (decentralized applications), DeFi andNFT marketplaces (the largest beingGamma.io), beyond Ethereum (ETH) and other blockchains, while enjoying the security of Bitcoin.

Gamma is an open NFT marketplace, a home for creators and collectors, a hub for the world's Web3 social identity. We specialize in collectibles and digital art.

Join the Stacks community and discovermajor NFT projectssuch as theMegapont Apes,Bitcoin Monkeys,Crash Punksand many more.

TheGammaplatform offers three core products, offering options for minting, selling, buying and auctioning NFT tokens. Gamma helps collectors discover incredible NFT collections and helps promote curated works from unique creators who share their story.

Auser-first marketplaceto find, explore, and collect extraordinary NFTs secured by Bitcoin, the most trusted and decentralized blockchain technology for digital assets.

A creator-firstlaunchpadfor artists to deploy their own NFT collection with fully tested, creator-owned, no-code smart contracts in minutes. Creators can sell their art at a fixed price or auction it, making it

easy for beginner crypto artists to join the ecosystem.

A social platform, with user profiles, bringing together creators and collectors in an engaging and Web3-native way.

Before you can start buying Stacks NFTs, you'll need a digital wallet compatible with the Stacks blockchain as well as STX (the Stacks cryptocurrency).

The two Stacks-compatible wallets we recommend using areHiro Wallet(desktop and chrome extension) andXverse(mobile wallet and chrome extension). The crypto is available for purchase on exchanges such as OKCoin, KuCoin, andGate.io.

One of the key considerations for those looking to own or develop their own NFT marketplace is the selection of a domain name and the development of a user-friendly and visually appealing platform. UX design is an important factor in the success of an NFT marketplace, as is the ability to easily browse, mint and trade NFTs.

The development of NFT marketplaces typically involves both frontend and backend work. The frontend is the user-facing part of the platform, including the storefront and user experience. The backend is the behind-the-scenes technology that powers the platform, including the use of APIs and the integration of blockchain technology. The architectural components of an NFT marketplace must include a chosen blockchain, crypto wallets that can be integrated (think MetaMask or Coinbase), smart contracts and IPFS. Since NFT marketplace development requires specific technical skills and expertise, enlisting the help of a blockchain software development company can be useful to assist with the development process.

As with any emerging technology, there are still many unknowns and challenges when it comes to the development and use of NFTs and NFT marketplaces. However, the potential for the growth and adoption of this technology is significant, and it will be interesting to see how the NFT ecosystem evolves in the coming years.

What is blockchain art?

The rise of art on blockchain technology

From traditional art to NFT art

Fine art on the blockchain

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The convergence of blockchain technology, NFTs, and digital art has ushered in a new era for the art market. Artists, collectors, and enthusiasts are increasingly embracing the idea of blockchain art, revolutionizing the way we create, buy, and sell artwork.

Let's explore the impact of the blockchain network on the art world, the dynamics of NFTs and cryptocurrency, and the innovative technologies shaping the future of the art industry.

Blockchain technology, the underlying foundation of cryptocurrencies like Bitcoin and Ethereum, is also now known as the technology on whichnon-fungible tokensrely. NFTs are unique digital assets that are verifiably scarce and indivisible, making them an ideal solution for representing ownership of digital art.

NFTs began to go mainstream in 2017 onEthereum, but the first-ever NFT named "Quantum", was minted by Kevin McCoy on Namecoin in 2014. Spells of Genesis was introduced in 2015 and was the first blockchain-based game, and in 2016 the Rare Pepes were released on the Bitcoin blockchain, inaugurating the crypto art market. These projects remained mostly unknown to those who weren't deep into the crypto ecosystem.

The Ethereum blockchain'ssmart contractcapabilities enabled the creation and transfer of NFTs, providing a decentralized and secure platform for crypto artists to tokenize their works of art. Trading and transferring ownership on other and earlier blockchains posed considerable challenges, due to lack of scalability or programmability.

Among pioneering projects on the Ethereum blockchain was CryptoPunks, a collection introduced by Larva Labs, which has become emblematic of the early history of NFTs. A few months later,

Canadian studio Dapper Labs launched CryptoKitties, one of the first blockchain games to be built on Ethereum. CryptoKitties was the first project to become very popular outside of the already in-the-known community, and inspired theERC-721 NFT standardthat describes how to build NFTs on ETH and compatible blockchains.

Many think of NFTs as PFP collections and GIFs, butNFT art marketplacessuch asGamma.io, SuperRare and Foundation focus largely on fine art and bridging those two worlds. Through the popularization of blockchain technology, digital art has gained prominence and led to a shift in the traditional art market. This democratization of the art world eliminates intermediaries and opens up new possibilities for traditional and digital artists to connect directly with their audience through social media and events, rather than rely on agents and art galleries.

Artists can easily showcase their NFT artwork on NFT marketplaces such as OpenSea on Ethereum, Gamma.io on Bitcoin, and many more. The technologies behind NFTs ensure the protection of intellectual property through blockchain's immutability and transparency --- and art collectors can purchase digital assets with the assurance of ownership and traceability.

Renownedauction housessuch as Christie's have also ventured into the realm of digital art auctions. Christie's New York was the first auction house to register a sale on a blockchain platform, with a $318M USD sale of the Barney A. Ebsworth collection, and Beeple's "Everydays: The First 5000 Days" for $69M USD. Very notable events such as Art Basel have started including NFT digital artwork to theirexhibits, showing the growing acceptance and value of crypto art in the art industry.

While digital art takes center stage, blockchain technology also extends its influence into the traditional art market. The use of blockchain provides a secure and transparent way to verify the authenticity of physical art through certificates of authenticity, addressing concerns related to provenance and counterfeit art.

With the rise of Bitcoin Ordinals in 2023, artists can inscribe their work directly on theBitcoin blockchain. With Ordinals, the image or file is inscribed directly onto a Satoshi, unlike ERC-721

tokens that point back to IPFS.

Although there is no smart contract functionality, fine artists have been attracted to this technology, as Bitcoin is the most secure and time-tested blockchain, and Bitcoin Ordinals can never be deleted or lost, preserving the artists' legacy forever.

NFT Art marketplacessuch as Gamma.io have developed tools to enable artists and creators to inscribe their work, from fine art,generative workscreated through algorithms, to photography and collage art, directly on the Bitcoin blockchain. The Gamma Partner Program also allows Partner artists to sell digital prints of an original piece of art, as open or limited editions, much like they would in the real world. This innovative feature leverages recursive inscriptions and empowers artists to efficiently produce and share exceptional, exclusive digital artworks while upholding the utmost standards of quality. ThroughPrints, a diverse range of bitcoin artists and their distinctive creations are made readily available, fostering a dynamic community. This platform allows art enthusiasts and art collectors to seamlessly discover, admire, and support their preferred web3 artists.

It is still early in the Bitcoin Ordinals ecosystem, and new tools for artists and collectors are emerging every day. With the rise of digital art on the blockchain, artists are exploring new formats and art forms within virtual worlds and the metaverse, creating immersive experiences that redefine the boundaries of traditional and digital art. Gamma.io has seen many artists auction their digital piece and their collectors physical art pieces, bridging the NFT world and the physical space. The integration ofDeFiinto the art industry also allows for novel financial models, empowering artists to monetize their work through tokenization and decentralized platforms. Keep reading articles in this section to learn more about art on different blockchains, fine art marketplaces and generative art.

DAOs

What is a DAO?

How do DAOs work?

Why use a DAO?

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Decentralized Autonomous Organizations (DAOs) are a type of blockchain-based organization that operates on smart contracts and is governed by its stakeholders, rather than a central authority, eliminating the need for intermediaries.

These organizations have the potential to revolutionize the way that businesses, non-profits, and other types of organizations operate by enabling decision-making, with the DAO governance being decentralized and transparent. Let's explore what DAOs are, how they work, and some of the potential use cases for this technology.

A DAO operates on the blockchain, usingsmart contractsto facilitate decision-making and governance. Instead of a traditional hierarchy, a DAO is governed by its stakeholders. Members of a DAO hold governance tokens in a cryptocurrency wallet and have voting rights proportional to their stake in the organization. These tokens are often distributed through crowdfunding or other means, and can represent equity in the organization or other incentives.

In 1977, Wyoming invented the LLC, which protects entrepreneurs and limits their liability. They pioneered the DAO law that establishes legal status for DAOs and became the first US state to recognize DAOs as a legal entity. The legal status of this type of organization may vary by jurisdiction and is generally unclear.

One of the most well-known DAOs is The DAO, which was launched by German startup slock.it on theEthereum blockchainin 2016. The DAO was a decentralized venture capital fund that allowed token holders to propose and vote on investments. However, hackers attacked the DAO, gained access to $50M USD worth of ETH, eventually leading to a hard fork of the Ethereum network, resulting in the creation of Ethereum Classic. Crypto exchanges such as Kraken de-listed the DAO token, marking the end of the DAO as it had been envisionned.

Although Bitcoin (BTC) isn't considered a DAO by current standards, it is to many the earliest

example of a functional DAO: it has programmed rules, functions autonomously, and is coordinated through a consensual protocol.

DAOs operate on the blockchain and use smart contracts to facilitate decision-making and governance. A DAO's code is open-source and transparent, allowing all stakeholders to see the inner workings of the organization and anyone to read the code.

A DAO initially raises capital by trading fiat currency for its native token. This native token represents voting power and ownership proportion across members of the DAO. In other words, when decisions need to be made, token holders cast their votes proportional to their stake in the organization. Because inactive holders of governance tokens can be problematic for DAO governance, implementations have been made to allow voting power to be delegated to other parties. These tokens can often be traded permissionlessly on adecentralized exchange, but others must be earned through providing liquidity.

DAOs can be used for a variety of purposes, including crowdfunding projects, managing assets, and operating as a traditional business or non-profit. Some DAOs, like MakerDAO which revolutionized the DeFi space with its DAI stablecoin, and Uniswap, have become major players in thedecentralized finance (DeFi)ecosystem, offering lending, borrowing, and trading services.

DAOs offer a number of benefits over traditional organizations, including increased transparency, decentralization, and automation through blockchain technology. Because DAOs are operated through smart contracts, many of their processes can be automated, making them more efficient and cost-effective.

DAOs are a promising technology, which could revolutionize the way that organizations are structured and governed. For example, ConstitutionDAO is a DAO that implemented governance mechanisms inspired by the U.S. Constitution, aiming to create a decentralized version of the U.S. government.

However, there are also potential vulnerabilities to consider when using DAOs. For example, if the

code of a DAO is not properly audited, it may be susceptible to hacking or other security issues. As mentioned above, they may also be subject to real-world challenges, as it is not always clear which laws and regulations apply to them.

DAOs have many possible use cases, from charities, where token holders could vote on which causes to fund, to collective ownership, where members could vote on how to use physical or digital assets such as NFTs.

Fine Art on the Blockchain

Blockchain and NFTs

Art in Web3

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The fusion of fine art and blockchain technology is reshaping the art industry, offering new avenues for both artists and collectors. In this article, we explore the impact of blockchain, NFTs, and cryptocurrency on the fine art market, seeing how these innovations are democratizing access and redefining traditional art investments.

Blockchain technologyprovides a secure and transparent ledger for recording and verifying transactions. The decentralized nature of blockchain ensures the authenticity and provenance of tokens, mitigating concerns related to forgeries and fraud.Smart contracts, enabled by blockchain technology, streamline the art acquisition process. These self-executing contracts automate tasks such as payment processing and verification of ownership, ensuring real-time and secure transactions.

NFTs ---non-fungible tokens--- are unique digital assets secured by blockchain technology and stored in digital wallets. They each have unique metadata, such as images or descriptions, making them resistant to copying or substitution. NFTs serve as certificates of authenticity and provide

immutable proof of ownership. Unlike traditionalcryptocurrencytokens, NFTs are distinct and irreplaceable, similar to unique trading cards or pieces of art. Their values can fluctuate independently of the currency, and as awareness around NFT art grows, NFT projects are evolving towards initiatives with utility, finding long-term applications in both the metaverse and the real world. NFTs have many use cases but are most known for representing fine art pieces, introducing a new dimension to the art market by combining technology and art.

The advent of Web3 technologies is democratizing the art world. Blockchain-based platforms eliminate intermediaries, providing artists with direct access to a global audience and empowering collectors to engage in transparent, peer-to-peer transactions. The integration of crypto in the art market facilitates seamless and borderless transactions. Bitcoin andEthereumare increasingly accepted in art sales, providing collectors with a decentralized and efficient way to invest in fine art. Startups, especiallyNFT marketplacesand launchpads, are leveraging blockchain to change the way fine art investment works. Launchpads and marketplaces allow artists, art collectors and investors to tokenize and trade works of art, increasing liquidity in the art market. These platforms provide experiences similar to the traditional art industry, with auctions as an example. On marketplaces such asGamma, artists can sell their piece of art to the highest bidder onauction, but also createdigital printsfrom an original inscription, as they would with physical pieces.

NFTs have become a prominent space for contemporary art: artists, inspired by the possibilities of blockchain, are creating unique digital pieces that find a home in the growing NFT art ecosystem. Art galleries and establishedauction houseslike Christie's New York are incorporating blockchain technology to enhance transparency and traceability in art auctions. Blockchain ensures the integrity of the auction process, from bidding to the final sale, creating a secure and tamper-proof record.

Platforms like Maecenas enable fractional ownership of blue-chip artworks, allowing a broader range of investors to participate in the art market. The first instance of fine art undergoing tokenization through blockchain technology occurred with the Andy Warhol masterpiece "14 Small Electric

Chairs," appraised at $5.6 million. In 2018, a gallery in the U.K. specializing in crypto art, in collaboration with its tech partner Maecenas, successfully auctioned off 31% ownership of the Warhol painting, generating $1.7 million in proceeds. Thisblockchain artauction was conducted exclusively on the Ethereum platform. Interested buyers had the flexibility to acquire fractional shares of the Warhol painting using various currencies, including bitcoin (BTC), ether (ETH), or ART coins.

It should be noted that blockchain is not limited to digital art; it extends its benefits and use cases to physical art as well. Certificates of authenticity linked to the blockchain enhance the trustworthiness of physical artworks, providing collectors with verifiable proof of ownership.

As blockchain, NFTs, and cryptocurrency continue to permeate the fine art landscape, the industry experiences a shift. From enhancing security and transparency to democratizing access and redefining investments, these advancements are reshaping the way we perceive, collect, and invest in fine art. The art world is entering a new era where blockchain is the foundation of innovation and transformation.

What is blockchain technology?

Blockchain explained

How blockchain works

Blockchain use cases

Blockchain networks

Cryptocurrencies vs blockchain

The future of Blockchain

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A blockchain is a type of distributed ledger technology (DLT) that consists of growing lists of records, calledblocks, that are securely linked together using cryptography.

The concept of blockchain technology first emerged in 1991, with apaperexplaining the use of a continuous chain of timestamps to record information securely, and now forms the bedrock of cryptocurrencies such as Bitcoin and Ethereum.

Bitcoin was largely created to facilitate the exchange of bitcoin cryptocurrency (BTC), but its potential was quickly discovered. TheBitcoin blockchainwas designed to store a lot more than just data on the crypto token's movement.

Blockchain is a distributed ledger technology that facilitates the process of recording transactions and tracking assets in a network. The distributed database is managed by multiple participants.

Anassetcan be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.

All network participants can access the digital ledger and its immutable record of transactions. With this shared and public ledger, transactions are recorded only once.

Transactions are recorded using an immutable cryptographic signature (a fixed-length string known as a hash). They show the movement of an asset and can record the information of your choice called metadata.

The transactions are then organized into blocks, and each block contains a number of transactions, every one of which are recorded on the participants' ledgers.

Each block is connected to the ones before and after it: blocks are "stacked" on top of each other and each new block includes a hash of the previous block, effectively chaining them together, thus the term "blockchain". Every time a new block is added, the previous one becomes unmodifiable, making each block more and more secure over time.

To sum this up, the blockchain's critical parts include records (block records and transaction records), blocks, hashes and chain. Transaction records include the digital asset, price and ownership data that are recorded, approved and settled across all nodes.

Blockchains are becoming an increasingly important part of daily life and work, with the growing popularity of Bitcoin, Ethereum, Litecoin and other cryptocurrencies as well asNFTs.

A blockchain platform allows users and developers to create novel uses on top of an existing blockchain infrastructure. One example is Ethereum, which has its own native cryptocurrency (ETH). TheEthereum blockchainalso allows the creation of smart contracts and programmable tokens, and NFTs. These are all built up around the Ethereum infrastructure and secured by nodes on the Ethereum network.

NFTs, unique digital assets secured by blockchains, are one of the most widely known blockchain applications.Smart contractsallow collectors and artists to sell, trade and authenticate original artwork on the blockchain, removing the need for intermediaries such as galleries. Creators can sell their digital art and getroyaltiesfor every sale on the secondary market thus creating another revenue stream, put their work up for auction, and connect with their communities.

However, whileNFTsand cryptocurrencies such as Bitcoin or Ethereum are the first to come to mind when blockchain is mentioned, the ecosystem is growing beyond financial services and has many other use cases and real-world applications.

Healthcare providers can use blockchain technology to securely store, track and share electronic medical records, improving the efficiency and accuracy of healthcare delivery. Blockchain can also be leveraged to manage clinical trials data while maintaining regulatory compliance, amongst other things.

Blockchain and NFTs can also be used for supply chain management purposes.Koinearthis a startup that creates enterprise NFTs that enable the tracking of physical goods and documents across the supply chain. As another example, IBM has created its Food Trust blockchain to trace the journey that food products take to get to their locations. Metadata of products can be stored on the blockchain, preventing data elimination or unauthorized manipulation, while enabling tracking of the goods from their origin to their destination.

When it comes to finance and record-keeping, blockchain removes the need for financial institutions such as banks, and central authorities. The peer-to-peer network cuts out the middle man and allows for a highly secure way of recording transactions. Blockchain can also be used to facilitate cross-border payments or create tamper-proof records for voting systems. DeFi, decentralized identity, copyright and royalties protection and dApps are other examples of possible blockchain use cases. Blockchain could also become a regulator of IOT (Internet of Things) networks to identify devices connected to a wireless network, monitor their activity, and determine how trustworthy they are. Blockchain could also help automatically asses how trustworthy new devices are.

The two main types of blockchain, public and private, offer different levels of security and use cases. Public blockchains use computers connected to the public internet to validate transactions and bundle them into blocks to add to the ledger. This means that with a public blockchain such as the Bitcoin blockchain, anyone can join the network freely and establish a node. Public blockchains are known as permissionless, because they are open, and are typically designed around the principle of anonymity.

To validate new entries or records to a block, a majority of the decentralized network's computing power must agree to it. To prevent bad actors or hackers from validating bad transactions ordouble spends, blockchains must be secured with cryptography and a consensus algorithm such asProof of Work(PoW) (where miners mine blocks) on Bitcoin orProof of Stake(PoS) (where validators validate blocks) on Ethereum. These mechanisms allow for agreement even when no single node is in charge.

Private blockchains, on the other hand, typically only permit known organizations to join. These permissioned blockchains require each node to be approved before joining. Because nodes are considered to be trusted, the layers of security do not need to be as robust. Private blockchains are mainly used by businesses. Consensus can be achieved through a process called 'selective endorsement,' where known users verify the transactions, so only participants with the appropriate

access and permissions can maintain the ledger.

As of 2022, there are more than 10,000 active cryptocurrencies based on blockchain, with several hundred more non-cryptocurrency blockchains.

It is important to understand the difference between cryptocurrencies and blockchain technology. Blockchain is the bedrock for crypto, which is built on a blockchain protocol. Cryptocurrency uses blockchain as a means to transparently record a ledger of payments, but blockchain can be used to immutably record any number of data points, whether related to currencies or not.

Bitcoin is both a cryptocurrency and a blockchain protocol. It is the first and largest cryptocurrency in the world, with the highest market cap. TheBitcoin blockchainis an amalgamation of Bitcoin (BTC) and blockchain. The original 2008Bitcoin white paperthat first described the blockchain system and its set of computational rules --- that would serve as the backbone of the entire crypto market --- was written by a person or group of people known as Satoshi Nakamoto. The Bitcoin protocol was officially released in 2009 as open-source software.

The Bitcoin blockchain aims to decentralize financial services and allows users to be in full control of their digital currency, with no third party needed. Users no longer need to go through any financial institution to make or receive online payments. The Bitcoin blockchain is a public ledger that contains the history of every bitcoin transaction. In other words, Bitcoin is a trustless form of money that removes the need for a trusted third party to keep a ledger, because everyone part of the Bitcoin network has a copy of this ledger. A copy of the blockchain can be downloaded, and any user can inspect the path of bitcoins from one transaction to another with public data being accessible through an API. Bitcoin transactions are pseudonymous, meaning users are not required to provide proof of their identity.

Of course, the records stored in the Bitcoin blockchain are encrypted. This means that only the owner of a record can decrypt it to reveal their identity (using apublickey andprivate keypair). This allows users to remain anonymous while preserving transparency.

Despite Bitcoin (BTC) being the most well-known blockchain and biggest cryptocurrency, itssmart contract use caseshave been limited due to its scalability, speed and syntax limitations. TheStacks blockchainaims to change this, and unlock Bitcoin's potential. The Stacks blockchain provides a blockchain technology that uses Bitcoin's high security while allowing the creation ofsmart contracts.

Many in the crypto ecosystem have expressed concerns about government regulation over cryptocurrencies. While it is getting near impossible to end a crypto like Bitcoin, considering its large decentralized network, governments could theoretically make it illegal to own cryptocurrencies or participate in their networks. However, this concern has grown smaller over time, as countries have made Bitcoin payments possible and large companies such as PayPal have started allowing the ownership and use of crypto on their platforms.

As we prepare to head into the third decade of blockchain, the only remaining question iswhenlegacy companies will catch on. Today, we see a proliferation of NFTs and the tokenization of assets as well as companies purchasingBNSnames, ensuring the future of their Web3 identity. Important growth is predictable for blockchain over the next decade.

How do Ordinals Marketplaces Work?

Introduction to Ordinal NFTs

How do NFT marketplaces usually work?

The rise of Ordinals marketplaces

Partially Signed Bitcoin Transactions

Gamma's trustless marketplace

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Non-fungible tokens have been at the forefront of the crypto ecosystem for a while now, but a new development has recently taken crypto news by storm: Bitcoin Ordinal NFTs. The Ordinals protocol was launched in February 2023, and it was only a matter of a few days and weeks for startups in the

space to join the hype and build inscription services, ordinals wallets, and marketplaces.

Ordinal inscriptionsare essentially Bitcoin NFTs, made possible by Bitcoin's recentTaproot upgrade. The Ordinal Theory Handbook, which describes the protocol released by Bitcoin Core software engineer Casey Rodarmor, states that "individual satoshis can be inscribed with content, creating unique Bitcoin-nativedigital artifactsthat can be held in Bitcoin wallets and transferred using Bitcoin transactions. Inscriptions are as durable, immutable, secure, and decentralized as Bitcoin itself."

Satoshis are the smallest unit of bitcoin, and each bitcoin is made of 100,000,000 satoshis. Each one of those satoshis is serially numbered and can now be inscribed with data. Since bitcoin is capped at 21 million, we'll let you do the math, but that's a lot of satoshis.

Because the data is inscribed directly onto the satoshi, the Ordinal inscription lives on-chain. Block size on the Bitcoin network is limited, so the size of an inscription is also limited.

Although blockchains such asEthereumandStacksaim to improve upon Bitcoin's limitations and help with the creation of dApps, DeFi and more, adding smart contract functionality to the mix, Ordinal inscriptions have been a massive development in theBitcoin blockchainecosystem. They are a trending topic in the NFT market and are sometimescontroversial, but already offer manybenefitsincluding high security, true immutability, the growth of the Bitcoin ecosystem and increased adoption.

With "traditional"NFT marketplaces, NFTs are minted and verified via token standards.NFT standards(or token standards) describe how to build NFTs on a particular blockchain protocol. There are many different standards on different blockchains, you may have heard of the ERC-721 standard forEthereum NFTs, or the SIP-009 standard forStacks NFTs. The NFTs built on top of those standards can be traded on NFT marketplaces that support such standards: for example, OpenSea, the leading marketplace on ETH, supports the ERC-721 token, but doesn't support the SIP-009 token, which is however supported byGamma, the leading NFT marketplace on Stacks. Transactions that meet those standards will also require wallets which support them (not all wallets

support all standards or are compatible with all blockchains).

NFTs are enabled bysmart contracts, and while the non-fungible token itself lives on the blockchain, its metadata generally points to off-chain decentralized storage services such as IPFS. With some NFT marketplaces, there is an option to refresh metadata, i.e. creators can update the metadata associated to the NFT if need be. TheNFT metadatadescribes its features: name, description, visual traits and trait types, and anything else the author deems important. NFTs can range from generative digital art to game items and anything in between includinguse casesin the metaverse.

Before the launch of marketplaces, inscribing services were the first to appear on the market, with Gamma.io'sno-code Launchpad, Ordinals Bot, and a few others. Users can easily upload their content and inscribe it directly on the Bitcoin blockchain without needing to run a Bitcoinnodeor any particular technical skills. All they need is a compatible wallet to store their digital assets, and enough BTC cryptocurrency to cover the cost of transaction fees and the purchase itself.

Major NFT projects such as Yuga Labs and Taproot Wizards joined the movement and launched NFT collections as Ordinals, bringing even more attention to the trend.

Soon after, many players in the space includingGamma.io, Ordinalswallet and Magic Eden, added functionality to their platforms to support the trading, selling and buying of Bitcoin Ordinals. It should be noted that because Ordinals live directly on the Bitcoin blockchain, the way marketplaces work is a little different. There are a few technical solutions in the background that marketplaces can decide to implement, but all in all,Ordinals marketplacesoffer users a similar experience to purchasing Ethereum, Stacks, Polygon or Solana-based NFTs.

Most Ordinal marketplaces use aPSBTsolution to facilitate trading Ordinal NFTs. A Partially Signed Bitcoin Transaction is a standard that facilitates portability of unsigned Bitcoin transactions, which means multiple parties can easily sign the same transaction.

PSBT was introduced by BIP-174 (Bitcoin Improvement Proposal) as a community standard. The original intention behind the development of PSBT was to improve the compatibility between Bitcoin

wallets and other software, streamlining the process of constructing a transaction in one wallet, transferring it to another for signing, and ultimately transmitting it to a Bitcoin node for broadcasting.

By utilizing PSBTs, it is possible to create a transaction using a watch-only wallet that lacks the necessary private keys to sign it. The watch-only wallet can generate a PSBT file, which can then be imported into a wallet that does possess the requisite private keys. After the transaction has been signed, the signing wallet can produce an updated PSBT file, which can be transmitted to a Bitcoin node for broadcasting.

PSBT is a valuable tool for facilitating collaboration among multiple parties who intend to sign a single transaction. This is particularly relevant in scenarios such as multisig outputs, which necessitate the participation of numerous actors in signing the transaction. The PSBT format offers a mechanism for crafting the transaction, transferring it between the various signers, and ultimately constructing the final transaction that will be transmitted. BIP 174 is currently widely adopted as a community standard.

At Gamma, we put creators and user safety first. The marketplace is built directly on Bitcoin L1 infrastructure and insures that the platform's solutions will remain trustless over time, also using a PSBT solution. Gamma does not leverage another chain such as Ethereum or Stacks to enable trading Ordinals, nor does it need to employ tools such as Emblem Vault. Users can confidently participate in decentralized exchanges without compromising their assets.

However, not all PSBT solutions are created equal. PSBTs enable trust-minimized trades without a central custodian, but some other design choices like on-chain unlistings, are necessary to ensure a truly trustless solution. While on some marketplaces, unlisting an ordinal doesn't require transaction fees, on-chain unlistings are crucially important for user safety, which is why Gamma.io implemented them.

The Ordinals marketplace allows users, collectors and creators to explore, sell, trade and buy crypto assets directly on the Bitcoin blockchain. The platform also offers a crypto on-ramp, allowing users

to purchase BTC with their fiat, directly from the platform. BTC can also be purchased throughcryptocurrency exchangessuch as Binance and Coinbase, which allow for several payment methods such as credit card, other crypto,stablecoins, apple pay, and more.Ordinal walletscompatible with Gamma include Leather, Xverse and Sparrow Wallet.

NFT Floor Price

Introduction

What is the NFT floor price?

Why does the Floor Price of an NFT collection fluctuate?

Increasing and declining floor price

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In 2021, the NFT market saw a significant increase in interest, and the trend is expected to continue, with startups building newdApps,DeFi appsand NFT marketplaces as well as spreading to other blockchains beyond Ethereum, including Polygon and Bitcoin (BTC) via Stacks, a blockchain layer built on Bitcoin, the most trusted blockchain with a market cap of nearly $400B as of February 2023.

NFT projects such as Bored Apes Yacht Club and CryptoPunks sparked a new wave of interest in digital art and games in the crypto community. Social media, the quality artwork produced by creators and digital artists for their digital collectibles and the sense of community within the ecosystem also play a huge part in the popularity of these digital assets.

If you're interested in buying NFTs, the floor price is an important metric to consider, but there are a few steps before you can start collecting. For more information on how to buy NFTs, you can visitthis article. If you don't have any cryptocurrencies, you will need to exchange your fiat (currencies such as dollars, euro etc) for cryptocurrencies (such as bitcoin, ether, stacks). You can head over to acrypto exchangeplatform such as Binance or Coinbase. Once you have cryptocurrencies and a crypto wallet compatible with theNFT marketplaceyou'd like to use, you can

get started!

If you've just started exploring the NFT space or the OpenSea orGamma.ioNFT marketplaces, you've probably heard about the NFT floor price.

The NFT(non-fungible-token)floor price is the current lowest price of an NFT in a given collection or project. It can fluctuate depending on community activity and sales, and is one of the essential crypto metrics and a decisive factor of the value of an NFT project. Whenever purchasing an NFT, whether it's selling at its floor price or higher, it is important to do your own research.

Initially, the floor price of an NFT is decided by the creator of the NFT project when they deploy the contract. Once the minting process ends, the floor price is determined by sellers on the secondary market: when an individual who owns an NFT in a particular project lists the NFT for sale at a lower price than other sellers within that project have, this lowers the floor price. Suppose most holders of a specific NFT collection list their NFTs for 0.5 ETH and you list yours for 0.4 ETH, then the floor price becomes 0.4 ETH.

While most NFT holders prefer to list their NFTs at a price higher than the current floor price, some may list their NFT at a lower cost to free up liquidity.

Several factors are at play when it comes to floor price fluctuations and how the floor pricing is determined.

If the demand for a certain NFT collection increases, chances are the floor price will too. Likewise, if the demand is minimal, the market may set the price lower.

Companies that have used NFTs to build brands and ecosystems around them usually provide value and utility to their holders. Let's say an NFT project announces additional benefits for their NFT holders: that will likely boost the floor price.

The trust between the creator and their community is also an important factor: the floor price will likely to be higher when a well-known creator drops an NFT collection than when someone new to the NFT market does.

When influential personalities collaborate on a project, the NFT's value can double up: if Beeple and XCopy (both renowned artists in the NFT space) were to come up with a collaboration piece, you could expect the floor price to be impressive.Snoop Dogg's collaboration with NFT artist Coldieis also a good example: they launched 'Decentral Eyes Dogg' NFT, which sold for a gobsmacking 188.8 ETH (that's roughly 253k USD at the time of writing). Collections such as these continue to command a high floor price on secondary markets, due to their popularity.

Although there are tools that can help you track trends and NFT collection floor prices in real-time, it is important to keep in mind that the NFT market and floor prices can be unpredictable and don't necessarily depend on trading volumes. Some collectors may be taking advantage of lower floor prices, thus increasing the trading volume of a collection rapidly.

Last December, the floor price of the Bored Ape Yacht Club (BAYC) NFT collection surpassed thefloor price of CryptoPunks NFTfor the first time. This generated a lot of media attention, as the BAYC NFTs are a lot more recent than CryptoPunks, which are regarded as the OG NFTs, introduced in 2017. In June, the BAYC was at the top of the trading volume list, with Mutant Apes second and virtual land for the Otherside metaverse right behind. However, according to data fromCoinGecko, BAYC has been on a downtrend since reaching its all time high in May. Though an NFT's floor price is a strong parameter to judge where an NFT project is headed, these examples demonstrate how floor prices and trading volumes can unexpectedly rise or decrease, and show the importance of doing research before purchasing NFTs.

Fine Art NFT Marketplaces

Best NFT art marketplaces for fine art

SuperRare

Foundation

Rarible

Nifty Gateway

Makersplace

Gamma.io

A few more popular NFT marketplaces...

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Blockchain technologies and the NFT market have transformed, through their dynamism, the way collectors engage with digital assets. In this article, we will explore the diverse landscape of the NFT space and fine art NFT marketplaces.

While OpenSea remains one of the most knownnon-fungible tokenmarketplaces on the Ethereum blockchain, many others have emerged, specialising in different areas of the art market. When selecting thebest NFT marketplacefor you to mint on, whether it be your first NFT or you be a seasoned collector, it is important to keep in mind some factors such as thetype of NFTsyou're interested in, liquidity, the crypto you'd like to use, and so on. Some also focus on different blockchain networks such as Polygon, Bitcoin, Solana, and Tezos, some of which are gaining traction for their scalability and reduced gas fees, offering alternatives to traditional ETH-based NFT marketplaces.

SuperRare stands out as an NFT Marketplace on the Ethereum blockchain. It distinguishes itself as an art-centric platform, prioritizing the credibility and creativity of artworks over meme-friendly content. Notably, reports suggest that only 1% of applying artists are accepted, ensuring that those selected have an elevated opportunity to showcase their artwork to an interested audience. This distinctive strategy imparts a sense of exclusivity to SuperRare, making it an exclusive NFT Marketplace. Consequently, SuperRare comes highly recommended for artists who are serious about their craft and seek a platform that values and promotes artistic integrity.

Foundation operates as an NFT Marketplace owned by artists and on an invitation-only basis. To list

an NFT on the platform, an invitation from a creator who has already showcased their work on Foundation is required. While this approach may result in less exposure compared to other platforms, it caters to a more focused customer segment.

For newcomers, Foundation offers a distinct advantage with lower competition for NFT artists. This makes it more accessible for artists to list, sell and trade NFTs, providing an easier entry point for those starting their journey in theweb3space. One thing worth mentioning is that transaction fees are pretty high, as Foundation charges you 5% whether on the primary or secondary sales, where other platforms charge half.

Rarible functions as a community-driven NFT marketplace, created for the purpose of selling individual artworks as well as entire collections. Utilizing its proprietary token, RARI, the platform empowers its users with the right to participate in voting for any updates to the platform. Users can mint NFTs on Ethereum, Flow and Tezos and specialises in art, photography and gaming collectibles.

Recognized as a high-end marketplace, Nifty Gateway has established collaborations with renowned brands and creators and stands as yet another exclusive NFT marketplace forfine art, having successfully traded digital collectibles associated with notable celebrities and artists like Beeple, Grimes, Pak, and Daniel Arsham.

One distinctive feature of Nifty Gateway is its provision of NFT Marketplaceroyalties, enabling creators to earn a percentage from the resale of their works in the secondary market. Additionally, Nifty Gateway provides a high quality user experience and demonstrates robust support for addressing any technical issues that may arise. The platform facilitates transactions through credit card payments, making it easy for beginners to buy NFTs.

MakersPlace caters to artists, musicians, and NFT creators. It provides a unique tool designed to empower the creation and exclusive sale of digital art directly to their fans and collectors. The site maintains accessibility for everyone, adopting a straightforward yet efficient approach for signing in,

creating, buying, and selling digital artwork. MakersPlace is committed to NFT creators and rewards its creative community with every new feature.

Gamma.iois a user-friendly creatorlaunchpadand NFT marketplace on Bitcoin. For a long time, NFTs were not popular on Bitcoin because of the lack of smart contract functionality and limited programmability. However, in 2023, the rise ofBitcoin Ordinals, which allows for the inscription of data directly onto Satoshis, the smallest unit of Bitcoin, changed the game.

Gamma.io offers artists partnerships with the Gamma Partner Program, showcasing their work at IRL events such asArt Basel Miami, and more. Partner Artists have access to thePrintsfeature, which lets NFT creators make digital prints (throughrecursive inscriptions) from a single art piece they'veinscribed, as they would in traditional art. Of course, Gamma also put in place royalties on secondary sales, which are controlled by the artist.

Gamma.io positions itself as one of the leading marketplaces and launchpads on Bitcoin, supporting artists in the creation of their NFT projects, every step of the way. Gamma has collaborated with well-known projects such as Yuga Labs, FAR, Jack Butcher, Nullish, and many more.

KnownOrigin focuses on limited and high-quality artworks, particularly in the realms of art and photography. Being one of the earliest NFT Marketplaces, NFTs are mintable on the Ethereum network.

Async Art has established its identity as a dedicated NFT Marketplace exclusively catering to programmable digital art. As of April 13, 2021, the platform showcased a diverse collection of 1,400 artworks, encompassing both individual pieces and bundled art. While a preference is given to art and music, Async Art is open to various other types of NFTs. Presently, the platform hosts over 10 different types of NFTs within its expansive ecosystem.

Known for its user-friendly interface, Mintable is particularly accommodating for beginners. Navigating and managing the platform does not necessitate advanced knowledge of NFTs, crypto wallets, or blockchains. Mintable allows users to mint NFTs from a wide range of digital files,

including images, gifs, audio, text documents, and more. The platform operates on Ethereum and Immutable X. To further support crypto enthusiasts, Mintable has introduced Mintable University, a valuable resource providing free learning materials for those looking to enhance their understanding and proficiency in the realm of NFTs.

While BakerySwap may be a relatively small marketplace, its distinctive feature lies in the gamification reward program it offers. This NFT Marketplace accommodates art and meme collections, extending support to a diverse array of content. Notably, BakerySwap is highly user-friendly, making it particularly accessible and suitable for beginners.

Gemini, known for its cryptocurrency exchange, has ventured into the NFT space, providing a fiat gateway for collectors. This platform facilitates credit card transactions, making it accessible to users who may be new to the world of cryptocurrency.

Binance NFT, built on the Binance Smart Chain, has rapidly gained prominence. With low transaction fees and a wide range of offerings, Binance NFT is expanding the NFT ecosystem and attracting collectors from diverse backgrounds.

Many NFT marketplaces are exploring integration with virtual worlds and the metaverse, creating immersive experiences for collectors. Decentralized Autonomous Organizations (DAOs) are becoming integral to NFT platforms, involving the community in decision-making processes and the curation of NFT collections.

The world of fine art NFT marketplaces is dynamic and continually evolving, with the rise of new technologies such as Ordinals,generative art, music NFTs... As blockchain technology, digital assets, and NFT platforms continue to advance, collectors and artists alike have an array of options to explore within this thriving ecosystem. Whether you are a seasoned collector or a newcomer to the NFT space, staying informed about the latest trends and platforms is crucial for navigating this exciting intersection of art and technology. Join Gamma'sdiscord serverto learn more about the platform and Partner Artists --- andapplyif you're a creator looking to join our exclusive partnership

program!

OKX Wallet

What is OKX Wallet?

OKX Wallet and Bitcoin Ordinals

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With the rise ofBitcoin Ordinal inscriptionsin the cryptocurrency space, more and more Web3 wallets have added support for them.

By using ordinal inscriptions, users can create and manage non-fungible tokens (NFTs) --- essentially BTC NFTs, commonly called BTC Ordinals --- directly on theBitcoin blockchain. This capability introduces a new use case for Bitcoin, traditionally seen as a store of value. To sell, buy and store Ordinals, users need to install and Ordinals wallet. There are many factors in choosing the best wallet for your needs, and it is important to research thebest ordinals walletsout there.

TheOKX web3 Walletnow supports Bitcoin Ordinals. This update enhances the wallet's functionality, making it a versatile tool for users interested in managing various digital assets across multiple blockchains. Let's dive in!

OKX Walletis a multi-chain crypto wallet known for its robust security features and support for a wide range of digital assets. Originally designed to handlecryptocurrencies like Ethereum(ETH), it now supports Bitcoin Ordinals on the BTC blockchain, and BRC-20 tokens, expanding its utility in the Bitcoin ecosystem.

OKX Wallet supports over 70 blockchains, including Bitcoin, Ethereum, andSolana, making it a true multichain wallet. Combined with its Ordinals market, OKX wallet allows users to mint and trade ordinals and NFTs across 70 blockchains via just one solution.

The wallet utilizes multi-party computation (MPC) technology, eliminating single points of failure and simplifying asset recovery. Available on both iOS and Android, the wallet offers a seamless user

experience for managing digital assets and interacting withdecentralized applications (dApps).

OKXoffers a comprehensive suite of products designed for both beginners and experts. The OKX Wallet is one of the most powerful, secure, and versatile crypto wallets, providing access to over 70 blockchains and allowing users to take custody of their own funds.

OKX Wallet's integration of Bitcoin Ordinals makes it easier for users to manage these digital assets. Users can now view and transfer Bitcoin Ordinals directly within the OKX Wallet. TheGammaOrdinals marketplace now supports OKX,Phantom Wallet,LeatherWallet,Xverse,UnisatandSparrow wallet.

Let's take a look at a few key features that OKX wallet provides. Users can participate in staking and decentralized finance (DeFi) activities, further leveraging their digital assets. As OKX wallet supports lightning network, it enables faster and cheaper Bitcoin transactions. OKX offers robust API support, enabling developers to build and integrate new applications seamlessly.

It features MPC technology for easy, independent wallet recovery without traditional seed phrases. The wallet's account abstraction-powered Smart Account lets users pay for transactions on multiple blockchains using USDC or USDT and interact with multiple contracts in a single transaction.

Other products include the DEX, OKX Ordinals marketplace, and DeFi. The OKX DEX is a multi-chain, cross-chain decentralized crypto exchange aggregator, connecting over 300 other DEXs and approximately 15 bridges, supporting more than 200,000 coins and over 20 blockchains. The NFT Marketplace is a multi-chain, zero-fee platform giving users access to NFT listings across seven top-tier marketplaces, including OpenSea, LooksRare, and Blur. Their DeFi platform supports earning and staking on about 70 protocols across more than 10 chains.

By offering a comprehensive platform that supports multi-chain transactions, enhanced security, and user-friendly interfaces,OKX Walletis poised to become a leading tool for managing digital assets. Whether you are a seasoned crypto enthusiast or new to the space, OKX Wallet provides the tools and capabilities to explore the evolving world of Bitcoin Ordinals. Simply go tookx.comto download

the wallet and connect it to Gamma.io to start collecting!

What is a PSBT?

What is a PSBT?

How does a PSBT work?

When would you use a PSBT?

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Most people use the Bitcoin blockchain for storing wealth and making payments, but asblockchain technologyevolves, other uses cases and features are constantly arising. As the network matures, developers are addressing edge cases to offer unique experiences, while maintainingblockchain decentralizationand adhering to Bitcoin's consensus rules. If users want to use Bitcoin collaboratively with two or more parties, they will need to utilize a PSBT. PSBT or Partially Signed Bitcoin Transaction allows for greater flexibility in transaction processing. In this article, we'll take a closer look at what PSBT is and how it works, including its functionality, format, and workflow.

PSBT was introduced as part of Bitcoin Improvement Proposal BIP174, which is a standard for the serialization and deserialization of partially signed transactions. The PSBT transaction format is designed to be interoperable, meaning that it can be used by any wallet or service that supports it, regardless of the software or hardware being used.

Transactions can to be partially signed, which means that some inputs are signed and some are left unsigned. This enables multiple signers to collaborate on the creation of a transaction without the need for them to be present at the same time. This is particularly useful for multisig transactions, which require multiple signatures to authorize a transaction.

PSBT can be used with any wallet that supports the PSBT format, including Bitcoin Core and hardware wallets such as Trezor and Ledger. It is also compatible with SegWit and Taproot, two popular BTC transaction formats.

The PSBT format includes information about the transaction inputs, including the UTXOs, satoshis, public keys, and scriptsig. The private keys are not included in the PSBT file, as they are only needed to finalize the transaction. The PSBT file can be shared between signers, allowing them to collaborate on the transaction creation process.

The workflow for using PSBT involves creating an unsigned transaction, which is then shared between the signers. Each signer adds their signature to the PSBT file, until all required signatures are obtained. Once all signatures are obtained, the transaction can be finalized and broadcast to the Bitcoin network.

PSBT enables the use of coinjoin transactions, which are a type of transaction that combines multiple inputs and outputs into a single transaction. This can help to increase the privacy and anonymity of the final transaction, as it is more difficult for an observer to determine which inputs and outputs are associated with which participants.

The PSBT standard also advances interoperability between different wallet software. Using PSBTs, a transaction can be crafted with a watch-only wallet, which does not have access to the private keys needed to sign the transaction. The watch-only wallet can then export a PSBT file, which can be imported to a wallet which does contain the required private keys. Once the transaction is signed, the signing wallet can export an updated PSBT file, which can be sent to a Bitcoin node to be broadcast to the network.

PSBT is a format for Bitcoin transactions that are not completely signed, along with corresponding metadata to facilitate the signing process. Its purpose is to streamline workflows where multiple parties need to collaborate on generating a transaction. PSBT is frequently utilized in hardware wallets, multi-sig arrangements, and CoinJoin transactions. PSBT can also be employed in tandem with the Lightning Network, enabling the creation, signing, and funding of channels with PSBTs.

With the rise ofBitcoin Ordinal NFTs,Ordinals marketplacessuch as Gamma.io have implemented PSBT solutions and Bitcoin L1 infrastructure to ensure the platform would remain trustless over

time, and make user safety a priority.

PSBT is a powerful tool for enabling collaborative transaction processing and enhancing the portability of unsigned transactions. It provides a standardized format and specification, and with its support for coinjoin transactions and the ability to finalize transactions with hardware wallets, PSBT is a valuable addition to the world of crypto and blockchain technology.

Smart Contract Use Cases

What are Smart Contracts and how do they work?

What are some use cases of smart contracts?

Decentralized Finance

Non-fungible tokens

Healthcare and the insurance industry

Supply chain management

Trade finance

Decentralized autonomous organizations

Digital identity

Bitcoin Smart Contracts

Smart contracts are one of the key components of blockchain-based technology.Smart contractswork by following simple "if/when...then..." statements that are written into self-executing code on a blockchain, meaning they are blockchain applications designed to run autonomously when predefined events or actions occur. There is no central authority necessary to run the software: the terms of a smart contract are specified in code and can't be tampered with, thus making them trustless and eliminating the need for intermediaries and human intervention. A blockchain-based smart contract is visible to all users of said blockchain, and as the blockchain is copied to every node in the network, the information remains safe. Trustlessness, transparency and

immutability are only a few of the benefits of smart contracts.

TheBitcoin blockchainintroduced the concept of decentralization, and how this emerging technology could be used to solve a number of problems for many industries in the real world. TheEthereum blockchain, which uses the Solidity programming language, started a second generation of blockchain technology, introducing new concepts to handle distributed ledgers. This included smart contract technology that brought automation to the whole blockchain network.

There are many applications of smart contracts, both in the real world and in the metaverse. Let's dive in!

DeFi(decentralized finance) has grown to be more than peer-to-peer transactions, with many blockchain platforms and startups diving into it. Smart contracts and cryptocurrencies have allowed sophisticated transactions to take place and DeFi platforms to provide financial services without the need for a third party. By the end of 2021, DeFi had a total value locked of$94billion.

NFTsare one of the most popular smart contract use cases. $17 billion worth of these digital assets were traded in 2021.

Prior to the creation of theStacks blockchain, Ethereum provided smart contract functionality to developers when Bitcoin could not. With Stacks, you can build dApps and smart contracts that make the most of Bitcoin's powers, from Bitcoin DeFi to NFTs. The Stacks ecosystem has its own smart contract language calledClarity. Compared to other smart contract languages such as Ethereum's Solidity, Clarity isoptimized for security and predictability.

With new scalability and programmability thanks to Stacks, Bitcoin NFTs are poised to take over the NFT market. If you'd like to learn more about Stacks NFTs secured by Bitcoin, head over to Stacks' largest NFT marketplace,Gamma.io.

When archived, patient data needs to become automatically immutable and accessible only to specific researchers, and records must be kept when parties access specific data. As an example,Encrypgenuses smart contracts to transfer patients' DNA data to researchers for clinical

trial purposes. This smart contract application combines DNA data and payment data on the blockchain, facilitating workflows, data access and authentication, as well as payments.

Smart contracts can also improve insurance processes by automating claims management & data collection. Some large insurance companies have been experimenting with blockchain technology. Fizzy, launched in 2017 by AXA, used smart contract technology to handle flight delay insurance claims. The smart contract was connected to global air traffic databases in real time, so that refunds were automatically triggered when a long delay occurred. Although the demand for blockchain-based insurance products wasn't high enough for Fizzy to thrive, this is a good example of possible smart contract applications.

With smart contracts, everyone can track the location of an item with the help ofIoT(Internet of Things) sensors and smart contracts, with full visibility and transparency. Smart contracts can also automate routine tasks and payments, to facilitate organizations' workflows and reduce paperwork. Verification is reduced, and tracing and tracking is enhanced, leading to fewer frauds and thefts. HomeDepot, for example, has improved its vendor management process by using blockchain technology and smart contracts. Because they provide a single source of information, vendors and retailers can view the same information at the same time, reducing the time spent on problem-solving, and improving overall management and shipping issues.

Trade finance reduces the trust needed between parties. Smart contracts are automatically self-executed upon duty fulfilment of the other party. Document processing speed is increased and optimized, as all documents are digitally available. The use of smart contracts also improves the liquidity of financial assets, increasing financial efficiencies of suppliers and buyers.

Smart contracts can also be useful for platforms where money needs to be held in escrow. Escrows are the process of storing value between parties while the contract is still active. For this, the payer must take action to release the funds. Smart contracts allow them to automate that workflow and ensure that the funds are sent to a wallet or bank account at the right time.

With proper integration, smart contracts could solve legal complications and disputes in trade finance, especially cross-border payments and international trade.

DAOgovernance depends on a core group of community members, who take critical decisions regarding the future of the project. Smart contracts define a set of rules for the DAO and how community member votes are counted. For example, you could need to own a number of crypto tokens, or hold a specific NFT, to have a say in the DAO's future.

Digital identity is a great smart contract use case. It can contain data and digital assets, and bring opportunities to the individual while protecting their identity from counterparties and have full control over how it's shared and who with, and frictionless KYC can help improveinteroperabilityand compliance.

Thanks to blockchain technology and smart contracts, governments could issue passports in the form ofdynamic NFTsthat would update as a person travels, removing the need for stamps and additional paperwork, as well as reducing the possibility of fraud or identity theft.

Bitcoin was rarely a part of the discussion on smart contracts until just a few years ago. It has limited scripting language and prioritizes security over programmability, making it difficult for developers to work with the syntax. It was designed to be a decentralized cryptocurrency, leaving out smart contract functionality.

Stacks, formerly known as Blockstack, made bitcoin smart contracts possible, allowing developers to buildWeb3 dAppsbeyond Ethereum and other blockchains, while enjoying the security of Bitcoin. Stacks functions as the smart contract layer for Bitcoin, enabling projects that can natively use BTC, unlocking immense value and offering many benefits including lower transaction fees and unrivalled security. Stacks uses theClarityprogramming language, which offers transparency and scalability.

Stacks enables developers to write fully expressive smart contracts, allowing the creation of new types of apps, use cases, NFT marketplaces and DeFi apps.NFTssuch as music, collectibles, arts and even real estate can be minted through the Bitcoin ecosystem on NFT marketplaces such

asGamma, the largest NFT marketplace on Stacks.

Decentralized Apps (dApps)

What is a dApp?

Differences between centralized and decentralized apps

The future of dApps

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A decentralized application, also called dApp, is a digital application that can run autonomously through the use of smart contracts on the blockchain or other peer-to-peer networks. While often built on the Ethereum network, dApps are spreading to a number of blockchains including Bitcoin viaStacks, Solana, BNB, EOS and Polygon. The Binance Smart Chain, for example, is specifically designed for small DApps to reduce delays and high transaction fees.

Dapps follow blockchain-basedWeb3core principles and aren't controlled by a single authority. A dApp is operated on a blockchain or peer-to-peer network, enabling users to make transactions without relying on a central authority or third party. The user of a dApp will pay an amount of cryptocurrency to download and use the program's source code, otherwise known as asmart contract, and will not be required to reveal any personal data.

Dapps are open-source and their data and records are public. The network is secured through cryptographic tokens and maintained by multiple users (nodes). Use cases of dApps includeDAOs,DeFi(decentralized finance),DEXs, digital asset exchanges and NFT marketplaces such as LooksRare on the Ethereum blockchain. They can be accessed with a cryptographic token and can adopt cryptocurrencies like ETH, or generate a native token using a consensus algorithm, such asProof of Work (PoW)orProof of Stake (PoS). As an example, Steemit, a blogging platform, has its own token. The token can also be used to reward validators (miners) and stakers.

The dApp ecosystem is still experimental, and testing the limits of decentralized networks and

blockchain technology. The growing popularity of decentralization has led to many new businesses being built on the blockchain network.

Some examples of dApps include Augur, a decentralized betting marketplace; Peepeth, a social network alternative to Twitter;Cryptokitties, a dApp game that allows users to buy and sell virtual cats; Uniswap, a DEX that enables users to swap tokens peer-to-peer; Decentraland, ametaverseplatform in which users can interact as avatars and buy NFTs representing virtual objects or land; and MakerDAO, a decentralized credit service supporting thestablecoinDai and allowing users to open a collateralized debt position (CDP).

Unlike centralized apps and social media platforms which use centralized servers, dApps are censorship resistant. As there is no single point of failure, decentralization makes it very difficult for governments or powerful individuals and companies to control the network. Users use acrypto walletto connect to DApps and fully control what information they share.

Like traditional applications, dApps offer functionalities and utility to their users. They use the same frontend code to render a web page, but the backend code is different. User interface and user experience can be trickier with dApps, as they are often developed to prioritize functionality, maintenance and stability. Difficulties in making changes in the code and the potential difficulty to scale are some other drawbacks of dApps.

It is important to note that in an ecosystem without intermediaries, users must do their research, and identify and verify each app to avoid scams.

Dapps are still in their early stages, but are expanding rapidly. Through the use of blockchain technology and smart contracts, dApps have the undeniable potential to bring even more innovative use cases to the market. There are thousands of dApps, and as DappRadar reported, there were almost2.4 milliondaily active users of dApps by Q1 of 2022.

Dapp developers and the blockchain networks they build on have many challenges to address before they reach the mainstream, including scalability and user experience.

Proof of Transfer

Introduction to consensus mechanisms

What is Proof of Transfer (PoX)?

How does PoX work?

Why build on top of Bitcoin?

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Theconsensus mechanismis used to reach an agreement on a single truthful state of a network. In decentralized networks such as decentralized blockchains, a consensus mechanism enables agreement, trust and security among all network participants. They require compute or financial resources to secure the blockchain, and the general practice is to make it impossible for any single malicious actor to have enough computing power to attack the network.

There are different types of consensus mechanisms that function differently.

Proof of Workhas nodes that dedicate computing resources to secure the network and has high decentralization and security levels. Those computational resources are generally put towards solving mathematical problems for a chance to validate transactions and earn a block reward.Proof of Stakehowever, has nodes dedicate financial resources.

Proof of Stake and Proof of Work both had to sacrifice something: PoS (Proof of Stake) compromised security for scalability, while PoW (Proof of Work) have syntax limitations by design, making them safe. This is the case of theBitcoin blockchain, for example.

With Proof of Burn, which is a quite novel consensus mechanism, miners compete by destroying ('burning') a proof-of-work cryptocurrency as a proxy for computing resources.

Proof of Transfer (PoX) solves the programmability problem of the PoW consensus mechanism: it enjoys the security provided by the PoW blockchain, but also enables more day to day activities by users and more programmability. This mechanism was designed to leverage the security of Bitcoin,

while allowing more complex interactions within the Stacks ecosystem.

PoX uses an established cryptocurrency of a PoW consensus mechanism to create a new and secure blockchain. On a PoX blockchain, rather than committing computational resources, miners commit financial resources by transferring the PoW cryptocurrency of the more established blockchain to another participant in the network. In turn, these miners are rewarded the new blockchain's cryptocurrency.

PoX is an extension of Proof-of-Burn, which was the mining mechanism originally proposed for theStacks blockchain(founded by Muneeb Ali and formerly known as Blockstack), however, unlike with PoB, the anchor crypto is distributed instead of burned.

PoX offers a model where new blockchains can be anchored to one extremely secure PoW blockchain. This is the case of the Stacks 2.0 blockchain, which is anchored to the Bitcoin Blockchain, enabling the creation of smart contracts secured by Bitcoin. The use of PoX has enabled the creation of apps,NFTsandDeFiproducts without having to sacrifice security.

PoX can address two challenges: securely bootstrapping new blockchains as well as giving incentives to people to participate in the consensus algorithm, thus stimulating general interest, which helps grow new cryptocurrency systems.

PoX can also enable a powerful smart contract language likeClarityon a new blockchain that benefits from Bitcoin's security without any modification to Bitcoin.

If you'd like to know more about the Proof of Transfer consensus mechanism, you canread the full PoX whitepaper here.

Let's use the Stacks blockchain as an example. The anchor cryptocurrency in the Stacks chain is BTC, and the blockchain-specific cryptocurrency is STX. There are two major players in Proof of Transfer: Miners and Stackers.

Miners commit BTC, and the PoX consensus selects a winner by using averifiable random function (VRF). The winning miner writes new blocks on the Stacks blockchain and receives a newly minted

STX token as a reward.

The Bitcoin transferred by miners is then used to provide Stacking rewards, paid in BTC to token holders for helping to ensure a stable network. In other words, STX holders lock up their Stacks tokens and in exchange, receive BTC that has been committed by the Miners.

Such rewards were not possible before PoX. These rewards could be used for use cases such as consensus participation, ecosystem developer funds, incentives for specific players, etc.

Both simple and stable, the Bitcoin network provides extensive infrastructure to support the proof-of-transfer consensus mechanism. It is the oldest blockchain protocol, has held the highest market capitalization of any cryptocurrency for the past decade, and has become an asset outside of the cryptocurrency community. It is recognized as an asset by governments, large corporations, and legacy banking institutions, and makes it infeasible for any potential hacker to influence or attack the system.

These are just a few of the reasons the Stacks network was built on top of Bitcoin.

Bitcoin and Stacks progress in lockstep, and their blocks are confirmed simultaneously. On Stacks, this is referred to as an 'anchor block'. Each anchor block is composed of micro blocks, and an entire block of Stacks transactions corresponds to a single Bitcoin transaction. Through the PoX consensus mechanism, each Stacks block is anchored to a Bitcoin block. Stacks is therefore limited to the same block times as Bitcoin.

Claritysmart contracts, which are enabled by PoX, also have unique visibility into the state of the Bitcoin blockchain. The contract logic in a Clarity file has the ability to trigger when specific Bitcoin transactions are confirmed. The Clarity smart contracts make interacting with Bitcoin's state a lot easier for developers, and can fork with the original Bitcoin chain, meaning developers wouldn't need to adjust the deployment of their smart contracts in the event where Bitcoin forks.

Ready to give join the Stacks ecosystem and give PoX a try?

NFT Metadata

What is NFT Metadata?

How does NFT metadata work?

NFT Metadata on Gamma

Intro to Stacks and Gamma

Metadata on Gamma

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Metadata is information about other data. A non-fungible token, which is a unique digital asset secured by blockchains and stored in a digital wallet, has unique metadata, which defines what the digital asset actuallyis. The data is created by the token minter who owns the contract, and can help expand possibleuse casesfor NFTs. The metadata of an NFT describes its features: name, description, visual traits and trait types, and anything else the author deems important, as well as connections to the visual or auditory file associated with the NFT. NFTs can range from digital art to game items and anything in between.

Large files can't be hosted natively on-chain, as this is technically and financially impossible. As an example, all Ethereum related matters,DeFi, NFTs, anddAppsmake up just under 1,100 GB. If images, which can easily reach over 20MB, were stored on the Ethereum blockchain, it would be much too data-consuming. If you wanted to run an ETH node, you'd have to download the 1,100 GB: can you imagine downloading it if it contained all the NFT images as well?

As the file the NFT represents (for example a jpeg or png) can't be hosted on the blockchain itself, it is hosted off-chain. The NFT metadata reduces the burden on the blockchain, and specifies what that data is. In short, the NFT lives on the blockchain, but the asset itself lives off-chain.

Whatever the blockchain, whether on Solana, on Ethereum with the ERC-1155 and ERC-721 token standards or on Stacks with theSIP-009 standard, the token's metadata is permanent and unalterable, describes what the token represents, and its ownership and transaction history.

Each NFT references a file (it could be a JPG, MP4, etc) that exists online somewhere. Some creators opt to store their metadata on centralized services such as Amazon Web Services (AWS), but most often than not, the data usually points to a decentralized storage server likeIPFS(InterPlanetary File System), or a URL to somewhere on the web. This "somewhere" is usually hosted by the platform, orNFT marketplace, that hosts the NFT project.

The NFT metadata is specified in a standardized JSON format (JavaScript Object Notation). The JSON metadata typically only identifies the asset and doesn't provide much in-depth information, depending on how granular the information provided by the author is.

The information is stored as a URI (Uniform Resource Identifier) inside the blockchain contract. The token URI string points to a location where the user can find the token's metadata (think NFT image), which is stored in a JSON file. An IPFS URI is just the stringipfs://followed by an IPFSCID.

An NFT smart contract defines the parameters that allow access to the metadata for a given token ID. The connection between the token ID and the contract address is unique. Blockchain explorers such as Etherscan on Ethereum are tools that allow users to locate and confirm NFTs.

Gas fees (or transaction fees) paid in cryptocurrency are generally higher for trading or minting NFTs compared to sending crypto tokens on the network, because the token standard smart contracts record transfers and changes of ownership for each NFT, which requires more computation power.

IPFS launched theNFT.Storageprovider this year, to help users store NFTs for free via IPFS and Filecoin, in a decentralized way. The platform is trusted by many NFT marketplaces including OpenSea.

To ensure that your NFTs are compatible with as much of the ecosystem as possible, it is recommended to use an existing metadata standard and schemas.

Gamma is an NFT marketplace built on Stacks, launched in 2018. In early 2021,Stacks 2.0main net went live. The Stacks blockchain leverages Bitcoin as a secure medium for storing and broadcasting

and is enabling the creation of many projects and applications. The most notable examples areStacks-based NFTs(non-fungible tokens) and DeFis. Stacks using theClarityprogramming language which is decidable and human-readable, making Stacks a sort of github for smart contracts.

Gammahas its owncreator launchpad, which allows non-technical artists and creators to launch their own NFT collections in minutes, no-code needed. The Gamma platform supports launching and trading Stacks NFTs as well asOrdinal NFTs, which are Bitcoin-native and where unlike traditional NFTs, the metadata lives on-chain.

Users can also connect their Ethereum wallet (for example Metamask) to view their ETH NFTs on their Gamma profile. Although ETH NFTs cannot be traded directly on Gamma, the platform offers a showcase of all NFTs held in one's wallets, as those accounts can be linked to one another.

We'd love to see you join the ecosystem, and as always, we're here to help!

Creators deploying their NFT projects using the Gamma Creator Portal have the option to upload a custom file containing custom metadata. It is optional, but can help set collections apart from others and provide added benefits.

The NFT metadata CSV file is fully dependent on your specific collection requirements, and there is no single correct method of entering values. That said, there is a format required for the system to correctly read and interpret your metadata in the way you intend. For this, we've put together a visualtutorialto help explain how to correctly input and format your file.

When it comes to Ordinals collections, new developments are ever-arising. Creators can upload Metadata to their Ordinals collections, in the form of a JSON file. For more information on the requirements, feel free to visit thisarticle.

ENS

How do ENS domains work?

What are other BNS domains?

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Web3 domain name services such as the Ethereum Name Service ("ENS"), the leading decentralized domain name registry service, have become ubiquitous in crypto news feeds.

DNS (Domain Name System) make the internet easier to use, allowing users to simply remember a human-readable name rather than an IP address. With BNS (Blockchain naming systems such as ENS), users have more functionality than with DNS, as well as full control over their private keys. Data is securely stored and cannot be tampered with, or deleted.

TheEthereum Name Serviceis a distributed, open and extensible naming system that interacts with the Ethereum blockchain. Nick Johnson and Alex Van de Sande of the Ethereum Foundation led the initial development of the ENS DAO, where the governance token is ENS.

In November 2021, ENS launched with a very successful airdrop: ENS tokens were sent to users of the service (ETH holders, ENS contributors...) and established a decentralized autonomous organization (DAO) to manage it. ENS token-holders use their assets as company shareholders would. Note that ENS is not a company but an open-source project.

ENS domains enable users to register domains issued on theEthereum blockchain. Similar to the role of the DNS mentioned above, the role of the ENS is to map human-readable names such as "john.eth" to a machine-readable name such as an Ethereum address, content hashes,metadata, and other cryptocurrency addresses.

These domains are programmable and interact with other Ethereum-based dApps. Since they use the ERC-721 token standard, ENS domains can also be traded as NFTs. ENS is composed of twoEthereum smart contracts: the ENS registry, which records domain names, and the Resolver, which translates domain names to machine-readable addresses and vice-versa. ENS also allow users to launch censorship-resistant decentralised websites and to upload their website to IPFS and access it with their ENS name.

To register an ENS domain, go toens.domainsand search the name you'd like to purchase. You will need an ETH-compatible wallet such as Metamask or Coinbase Wallet. ENS tokens are also tradable for USD and other cryptocurrencies oncrypto exchangessuch as Binance. To date, over 2.6 million total ENS names have been created.

Other assets that have a similar market cap to Ethereum Name Service include IoTeX, Gnosis, Terra, and many others.

Other Blockchain naming systems (BNS) include.btc domains, which are theStacks blockchain'sdecentralized web identityand human-readable wallet address system.

The domains are registered through a smart contract on Stacks, secured by Bitcoin. Given Stacks' unique connection to Bitcoin, registering .btc names automatically generates a pair of corresponding Bitcoin and Stacks addresses and ownership of every .btc name is represented in a hash of the Bitcoin blockchain. Stacks is uniquely positioned to enable BitcoinDeFiand help grow the web3 ecosystem. TheBTC.usweb bridge also allows users to generate subdomains for their personal use.

OnGamma, Stacks' leading NFT marketplace, you can use your blockchain domain (.btc name) to transfer NFTs to someone by typing in their .btc name instead of the longer alphanumeric wallet address, or you can use it to view your profile and NFTs on Gamma (or someone else's). Your BNS name is automatically reserved as your unique profile address, likegamma.io/example.btc.

For more information on selling, buying and transferring .btc domains, head over tothis article.

Recursive Inscriptions

What are recursive inscriptions?

Recursive ordinals collections

Prints on Gamma

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Early 2023, the crypto ecosystem was rocked by Bitcoin Core developer Casey Rodarmor's Ordinal

Theory and the rise ofBitcoin Ordinals. The Ordinals protocol brings non-fungible tokens directly to the Bitcoin blockchain, by allowing users to inscribe data directly onto individual satoshis. If you're new to Ordinals,read more here. As Leonidas, founder of Ord.io,puts it, Bitcoin has "entered a new era", with over 30 million inscriptions created by early September 2023, as shown by Dune Analytics.

From the launch of Bitcoin Ordinals to Bitcoin Stamps and BRC-20 tokens, the Bitcoin ecosystem has known many developments in just a few months and seen the rise ofno-code toolssuch as Gamma.io, that allow artists and collectors alike to inscribe Ordinals in just a few easy steps, no complex software needed. Recursive inscriptions, which bring newuses cases to Ordinals, are gaining in popularity in the Bitcoin ecosystem, so let's take a look at why.

Recursive inscriptions allow independent inscriptions to reference each other, creating a new, smaller sized ordinal inscription. In other words, the most rudimentary use case of recursive inscriptions is to establish connections between code elements from distinct inscriptions, which were previously self-contained. Information from one inscription can be utilized across multiple inscriptions to generate a comprehensive image that incorporates multiple inscriptions simultaneously. In summary, a more "sophisticated"digital artifact, which would have originally demanded a substantial amount of code or space, can be fashioned by employing multiple inscriptions, with the primary inscription referencing auxiliary "side" inscriptions to produce the final outcome.

This newfound composability empowers creators to create more intricate and higher-resolution work without incurring the initial high costs associated with limited block space. For context, the size limit of a Bitcoin block is 4MB, and creating an inscription of such magnitude is typically unattainable unless one has access to a Bitcoin miner, as exemplified by Bitcoin Magazine's 4MB inscription or DeGods' inclusion of all their Bitcoin DeGods within a single block---although this approach is notably costly.

By inscribing repetitive code elements independently, it becomes possible to reduce the data requirements for each individual inscription. Consequently, the cost of inscription experiences a substantial decrease, enabling the final Ordinal to have greater detail and enhanced quality and resolution. Additionally, recursion can facilitate on-chain reveal processes, raffles for new mints, and the creation of Dynamic Ordinals, (the Bitcoin L1 version ofdynamic NFTs). All in all, recursive inscriptions prove to be an enormous boon for both creators and collectors.

There hasn't been any change to the ord binary or protocol to enable this functionality. It's an enhancement to the primary Ordinals block explorer, permitting the inclusion of links to other inscriptions. The explorer has also been updated to accommodate Javascript and CSS file types. This latest update endows inscriptions with significant capabilities, allowing them to inherit attributes from preceding inscriptions. For instance, someone could inscribe well-known Javascript and CSS libraries, making them accessible for anyone to utilize, thereby enabling the direct inscription of rich HTML files onto theBitcoin network, with the potential for interlinking. Recursive inscriptions can also create new types of software by allowing users to call already-existing repositories of inscriptions that already have complex code or data.

The interlinking of data through a series of consecutive calls implies that recursive inscriptions, in theory, have the potential to underpin sophisticated software,smart contracts, video games, or even movies within the blockchain. This innovative technology could potentially accomplish all these tasks while simultaneously decreasing network fees and improving storage efficiency, all without the necessity of introducing new cryptographic methods. However, as with the Ordinals protocol, critics of recursive inscriptions argue that they could congest the Bitcoin network resulting in higher transaction fees, in the end filling up the Bitcoin mempool.

Recursive Inscriptions essentially aim to allow more complex functionality to be built on Bitcoin's blockchain, likesmart contracts on Ethereum. To this day, ETH stands at the center of developer activity and dominates DeFi (decentralized finance), and other protocols such as Cardano and

Solana have been competing with Ethereum, but have yet to succeed. Until this year, the notion of constructing authentic smart contracts remained unattainable within the Bitcoin realm. However, it is now suggested by members of the community that Ordinals and recursive inscriptions might pave the way for the emergence of aDeFiecosystem on BTC in the relatively near future, which would imply the creation of new financial ecosystems and the ability to lend, borrow, swap and stake.

Recursive inscriptions offer diverse avenues for constructing collections, simultaneously lowering expenses while enhancing the level of detail and quality achieved. Let's delve into a few illustrative examples.

OnChainMonkeys inscribed p5.js and 3js libraries which they then referenced in order to create the highly successfulOCM Dimensionsmint, rendering a complex 3D model on chain. More code libraries will be inscribed directly on the blockchain over time. With recursion, others can reference these inscriptions for use, similar to open-source software development.

Metablocks, a creation by Billy Restey, serves as a prime instance. This artwork, comprising a final image measuring 16,000 x 16,000 pixels, draws references from a total of 400 other inscriptions. The final image undergoes a recursive inscription process by being dissected into fragments and then meticulously reassembled. These 400 inscriptions essentially function as puzzle pieces, converging to compose the ultimate image.

Counterfeit Cvlt, on the other hand, employed recursion to establish an editions Ordinals collection. This entailed inscribing the "master" digital asset and then referring back to it to generate further copies, akin to how a photocopying machine relies on the original each time it reproduces a new copy.

Cirque Le Noiradopted a unique approach by inscribing the traits for their collection and subsequently crafting an additional 10,000 new inscriptions. Each of these inscriptions employs a small segment of code to request traits and programmatically generate the corresponding image. This method proves more cost-effective and efficient compared to inscribing 10,000 individual JPEG

files for a PFP (Profile Picture) collection. In this case, every layer resides on-chain, and each individual piece skillfully combines and matches these layers to arrive at the final artwork.

Disclaimer: Please do your own thorough research before investing in any cryptocurrency or digital assets such as Bitcoin NFTs.

We are thrilled to present our latest offering: "Prints," an innovative concept by Gamma that reimagines limited editions. This feature empowers partner artists to craft cost-effective, recursive editions from a single, high-resolution original masterpiece.

Prints represent digital collectibles curated from the most talented Bitcoin artists, harnessing the potential of recursive inscriptions. This technology allows artists to create and share exceptional and exclusive digital artworks efficiently, all while preserving the highest quality standards. With a diverse array of artists and their unique creations accessible through Prints, it cultivates a vibrant community where art enthusiasts and collectors can effortlessly explore, appreciate, and support their favorite web3 artists.

Blockchain Privacy

What is blockchain?

Blockchain use cases for data privacy

Challenges

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A blockchain is a digital distributed ledger that consists of growing lists of records, calledblocks, that are securely linked together using cryptography. The distributed database is managed by a peer-to-peer network of participants called nodes, who can access the digital ledger and its immutable record of transactions. Malicious uses are prevented by consensus mechanisms such as Proof of Work. Virtually anything can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.

The concept ofblockchain technologyfirst emerged in 1991, with apaperexplaining the use of a continuous chain of timestamps to record information securely. It was then proposed by Satoshi Nakamoto in the Bitcoin whitepaper, and now forms the bedrock of cryptocurrencies such as Bitcoin and Ethereum.

Bitcoin and Ethereum are some of many decentralized networks.Decentralizationmeans that there is no central authority: the need for third parties is removed, and control and decision-making are transferred to the distributed network. Although there are many advantages to blockchain systems including increased cybersecurity, impossible data breaches, and immunity to tampering, they also raise questions regarding privacy. Is using a pseudonym enough to protect your data? What becomes of user privacy if everything on the blockchain is public?

The use of private and public keys is a key aspect of privacy in blockchain systems. They use cryptography to secure transactions, and each user has both keys. They are random strings of numbers, and no user can guess someone's private key from their public key, thus protecting users from hackers. The public key, essentially your 'wallet address', can be shared with other users without giving away any personal data, allowing you to transfer assets such asNFTsand cryptocurrencies. User identity is not revealed, the only thing that you can see in the past transactions on the blockchain is the public address associated with said transactions. Not using the same public address more than one is a tactic to avoid someone tracing transactions. Private keys are used to access funds and personalwallets, adding an extra layer of identity authentication and security.

In large organizations (think Google, Amazon, etc), a large amount of personal data is stored on single devices. If the system is hacked, lost or mishandled, users may lose all of their information, or it could leak to malicious users. Blockchain technology removes the reliance on a central authority through decentralization. Peer-to-peer networks allow users to control their data and own it.

Some methods such as Zero-knowledge proof (ZKP) allow for increased data security. With ZKP,

the prover (one party) can prove the verifier (the other party) that a statement is true, without giving away any personal information nor information about the transaction itself. In typical public blockchains such as Bitcoin, the public information contained in a block could theoretically be used to link pseudonymous addresses (public keys) to users or real-world identities. Since zero-knowledge proofs don't reveal any information about the transaction (except that it is valid), it makes it a lot harder to link addresses to people.

As the use of blockchain technology becomes more widespread, privacy concerns have come to the forefront.

One of the key features of blockchain technology is that it is a public ledger, meaning that all transactions are recorded and can be viewed by anyone on the network. This transparency is beneficial for many use cases, such as financial transactions and supply chain management, but for situations where personal data is involved, it can raise privacy concerns.

Many public blockchains such asBitcoinandEthereum, are designed to provide pseudonymity for users by using a public key for authentication and a private key for access control. However, as more data is added to the blockchain, it becomes increasingly possible to link pseudonyms to real-world identities, leading to privacy issues. Analyzing blockchain transactions could theoretically allow someone to link public keys to individuals.

Privacy laws, such as the General Data Protection Regulation (GDPR) in the European Union and the California Consumer Privacy Act (CCPA) in the United States, also have implications for the use of blockchain technology. Blockchains that process personal information are at odds with the clear distinction that these privacy regulations make between data controllers or data processors and individual data subjects. The distributed architecture of the blockchain means that it's often unclear which party determines the means of data processing. These privacy laws place strict requirements on how personal data is collected, stored, and shared, making it important for blockchain providers to ensure compliance. As an example, GDPR addresses the right to be forgotten, but blockchain's

immutability is in direct conflict with this: blockchain data can't be altered.

In contrast, private blockchains, also called permissioned blockchains, are designed for use cases where privacy is a priority, and are generally used by businesses, presenting a simpler case. In these ecosystems, access to the blockchain is restricted, and the network is typically made up of known and trusted participants. This can provide a higher level of privacy protection as compared to public blockchains.

Hybrid blockchains allow for more flexibility in determining which data remains private and which data can be shared publicly. A hybrid blockchain can be compliant with GDPR and other local laws in order to protect user data privacy. This approach mixes characteristics of public blockchains and private blockchains.

Other examples of privacy concerns include smart contracts and the IoT.Smart contracts, which are blockchain-based self-executing contracts with the terms of the agreement directly written into code, can include personal data. Once the data is added to the blockchain, it becomes immutable and can be difficult, if not impossible, to remove. Blockchain technology is also used in the Internet of Things (IoT) to manage data from connected devices. However, as its use expands, more concerns arise regarding data management, and the storage and sharing of personal data.

As the use of blockchain technology becomes more widespread, it is important for companies, startups, and providers to ensure compliance with data protection laws and regulations, and for individuals to be aware of the privacy risks associated with blockchain technology. On-chain privacy is key to mass adoption, and it is important for the blockchain ecosystem to continue developing privacy-enhancing technologies such as zero-knowledge proofs and other cryptographic algorithms to ensure that the benefits of blockchain technology can be fully realized while protecting the privacy of individuals.

Blockchain Decentralization

What is decentralization?

Decentralized blockchains

Decentralization use cases

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In blockchain, decentralization is the fact of transferring control and decision-making from a centralized entity (i.e a central authority such as an individual or organization), to a distributed network.Blockchainsare also called Distributed Ledger Technology, because they are essentially a distributed ledger, with the power being distributed within the blockchain network. Each block contains records of multiple transactions, and these blocks are attached to each other through hashing, making it impossible to introduce any changes in a confirmed block.

The digital record of transactions is maintained by a network of nodes, eliminating the need for intermediaries and allowing for the creation of peer-to-peer transactions, smart contracts, and other decentralized applications (dApps). The nodes check the validity of the data before it becomes permanently added to a blockchain, by using an agreed-upon consensus mechanism. Decentralized blockchains are most often open-source, allowing anyone to see the code, and secured with cryptography. A permissioned blockchain (private), unlike a public blockchain (permissionless), requires each node to be approved before joining.

The interest in decentralized blockchain solutions is growing rapidly, with more and more startups and organizations of all sizes taking the leap and joining the crypto ecosystem. The most well-known examples of decentralized blockchains are theBitcoin blockchainand theEthereum blockchain.

The adoption of a decentralized blockchain platform is usually based on the maturity of the solution and its proven reliability, its incentive models and consensus mechanisms, as well as blockchain security.

Decentralization is the foundation of cryptocurrencies such as Bitcoin, which was created as a decentralized digital currency by Satoshi Nakamoto. The Bitcoin blockchain uses a peer-to-peer

network, theProof-of-Work consensus mechanism, and a decentralized algorithm known as Nakamoto consensus.

Smart contracts are a key feature of the Ethereum blockchain, allowing for decentralized decision-making and the automation of some processes such as the transfer ofNFTsand other digital assets. The ETH blockchain is also used as a platform for building decentralized blockchain applications (dApps), marketplaces, DAOs and DeFi apps.

In distributed systems such as these, there is no single point of failure. This means that the network can continue to function even if onenodegoes down. Decentralization and the use of consensus mechanisms such as Proof-of-Work orProof-of-Stakealso increase security, fault tolerance and the integrity of the network. Miners and investors can access all the data in real-time, leaving no space for incorrect or lost data.

Decentralization has led to the emergence of many new blockchain-based apps, which leverage decentralized networks for the development of other decentralized systems. Some examples include decentralized social media platforms and supply chain optimization systems, as well as DeFi. While often built on the Ethereum network, dApps are spreading to a number of blockchains including Bitcoin viaStacks, Solana, BNB, EOS and Polygon

Decentralized finance, known as DeFi, is one of the major use cases of decentralization. It is often seen as an alternative to traditional finance, as users can access financial services directly without the need for a central authority, intermediaries or institutions such as banks and financial service providers.

DAOsare another popular example of decentralized apps. A DAO operates on the blockchain, usingsmart contractsto facilitate decision-making and governance, and is governed by its stakeholders. Members of a DAO hold governance tokens in a cryptocurrency wallet and have voting rights proportional to their stake in the organization. These tokens are often distributed through crowdfunding or other means, and can represent equity in the organization or other

incentives.

DEXs (decentralized exchanges) allow users to buy and sell cryptocurrency and other digital assets without the need for a central authority or third party to facilitate the transactions. Instead of relying on a central server to hold users' funds and execute trades, decentralized crypto exchanges use smart contracts on a blockchain network to facilitate peer-to-peer crypto trading.

Despite some of decentralization's challenges such as volatility and the need for optimization, the advancements in blockchain technology are also helping to drive the development of decentralized systems in industries such as healthcare. As blockchain technology continues to advance and more real-world use cases are discovered, the potential for decentralized solutions in various industries will continue to grow.