Everything You Wanted to Know About NFTs

A Beginner's Guide

Title: It' Showtime. Artist: Maya Frost. NFT on Voice.com

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Foreword

The genesis of this effort to put an easy flowing, non-technical introduction to the world of NFTs began with a statement that I hear often: “I don’t know where to start”.

These are early days; technology is evolving at a fast pace and simultaneously a lot of great and not-so-great projects are being launched every day. There is a lot of hype that makes it difficult to cut through the noise. Resources are scattered and continuously updated. This makes it difficult when one is just starting up.

My blockchain journey began in 2018 and the first step ended up being a trip down the rabbit hole (albeit in a good way) and I haven’t surfaced since. When NFTs happened in early 2021, my understanding of blockchain technology helped me appreciate the potential of NFTs and a million light bulbs lit up.

We are where the internet was in the late 1990s. This is the perfect time for individuals, artists, creators, and brands to take the first steps. There will be learnings, and they will be rewarded with time. Citi estimates the metaverse potential to be between $8trillion to $13trillion in approx. eight years from now. That should be a good enough reason.

What follows in the subsequent pages is an easy introduction to blockchain and smart contracts. This forms the bedrock which helps NFTs deliver on multiple fronts. Subsequently, the content goes on to look at a bit of the history, process of buying NFTs, the process of selling NFTs, how NFTs power the metaverse, and finally a few use cases for brands to consider.

The content ends with some useful resources to keep yourself updated and includes links to some amazing people on Linkedin to follow and learn from, websites, podcasts and more. The web3 community is super connected and super supportive. Get connected today.

I hope you enjoy reading through the rest of the pages as much as I enjoyed creating them.

We are all travelers here, just that some boarded the train a little earlier. Hop on!

About me:

I love helping brands and projects build strategies and navigate web3.

I am a growth strategist and a brand builder with over two decades of experience with Global Brands.

Follow me on Linkedin. I post on web3, metaverse and NFTs.

BLOCKCHAIN

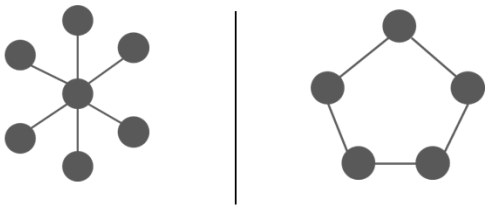
It is said that if the technology is advanced enough then it is nothing short of magic. This is so true. Our ancestors would have thought of Airplanes, and Television as nothing short of sorcery. Today, we don't think twice before using them.

Consider this

A software code in the cloud spread over hundreds of computers that is

- visible to everyone
- executes transactions without any intervention
- enforces compliance and
- provides governance for the entire network

and yet no single authority manages the network. This is the magic of computer science that brought Bitcoin to life in 2008. For the first time, you could pay anyone on the planet without any middleman like banks, Paypal, Western Union etc. Peer-to-peer!



The computers on the network are referred to as nodes. A node can join or leave the network at any time. Nodes operate as per defined protocols of the blockchain they join. No one controls them.

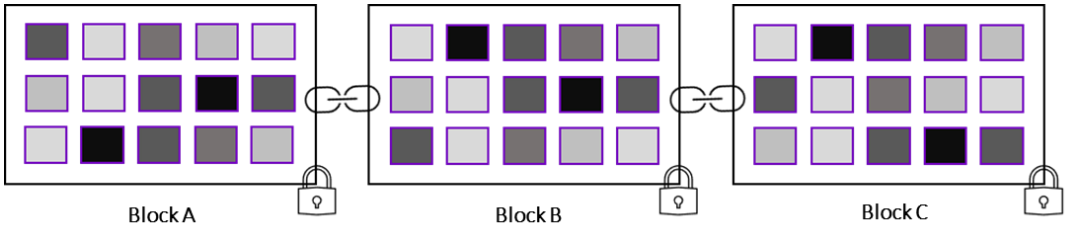
A blockchain is referred to as Distributed technology (DLT). A public database of transactions that is updated and shared across hundreds of computers in a network. Every time a new set of transactions is added, it's called a 'block' - hence the name blockchain.

A transaction may be a money transfer from one wallet to another. For example, Alice wants to send 1 Bitcoin to Bob. Alice will input Bob's wallet address in her wallet, input the amount and press send. This transaction will then be announced to the network. The node that gets to process the transaction will verify the availability of bitcoin in Alice's wallet, transfer 1 BTC to Bob's wallet and remove the same permanently from the wallet owned by Alice. Verified transactions are grouped and included in a block that goes on the chain.

Before a block is added the nodes must agree to its validity. There are different consensus mechanisms that are used by the nodes to approve transactions and accept the next block. Two main protocols are proof-of-work (PoW) and proof-of-stake (PoS). In PoW, the nodes have to solve a mathematical problem to receive the right to create the next block. In PoS,

pre-defined rules give this right to a node based on the tokens they have staked to earn the right. The node selection process is still unpredictable. This ensures that malicious acts are not only very difficult to execute but are also heavily disincentivised. A malicious node can lose all of its staked tokens if it goes rogue.

A cryptographic proof links the new block being created to the previous block. This ensures that once written, transactions in a block cannot be tampered with. Further, if someone wanted to tamper with the transactions then they would have to do this on a majority of the computers and that makes the task extremely difficult to execute.



What's in it for the participating nodes for doing all this work? They earn the native token of the blockchain in return for the work done which keeps the economy going.

Key features of blockchain that make it unique and powerful are

Immutability:

Transactions once recorded on the blockchain cannot be reversed or edited. Transaction details are publicly available at all times with no authority having rights over them.

Authenticity:

Transactions go on the blockchain once they are verified. The blockchain is replicated across multiple nodes and a new block is only added to the longest chain. The authenticity of the transactions can thus be taken as guaranteed.

Provenance:

Every transaction that ever happens goes on the blockchain. It is therefore easy to verify the origin and subsequent transactions for a particular wallet or of a particular asset. This has great use cases where the origin and movement through a supply chain with multiple nonrelated parties need to be tracked.

Smart Contracts:

A Smart contract is a code that auto executes once the conditions are met (more on that in the later chapter). Not all blockchains can handle smart contracts. The bitcoin blockchain cannot handle smart contracts whilst Ethereum blockchain can. It is for this reason that most of the NFTs today are on the Ethereum blockchain.

Blockchain, with its above features, enables transactions to occur between unknown entities in a trustless and permissionless manner. No permission is required to enter into a transaction, and no trust is required between parties. This eliminates the need for a middle-man. Theoretically, functions performed by banks, and aggregators like Amazon, Airbnb, and Uber can now be done on the blockchain eliminating the need for such platforms. T

The future is going to be different from what we know it today

Limitations:

Some of the key limitations of the blockchain are as follows

Speed:

Blockchains have typical transaction speeds defined in transactions per second. Backlog can result if the number of transactions increases and this could also lead to an increase in the cost of processing. Ethereum blockchain using PoW can currently handle 12-15tps. Layer 2 (L2)solutions that work on top of layer 1 (L1) blockchain offer faster speeds and lower transactions whilst drawing upon the security of L1the blockchain

Security:

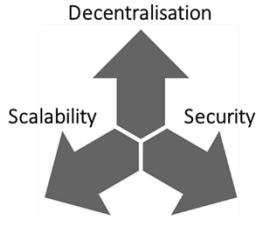
Blockchains require consensus from several nodes for the transactions to be approved. Consensus protocols ensure the safety of blockchain against malicious attacks but also tend to slow down the speed.

Cost:

The cost of processing transactions in some blockchains can vary significantly depending on the demand for transaction processing. For Ethereum, the transaction (gas) fees have gone up to a few thousand dollars in extreme cases. Unpredictable and high costs act as a deterrent to mass adoption. There are layer 2 solutions that ride on top of Layer 1 and help lower costs. Eg Polygon

Interoperability:

Most blockchains have their standards and protocols and users are locked into them This limits the transferability of NFTs. There are workarounds available that help creates bridges between different blockchains but they are not easy to execute for most people. A lot of work is now underway to make blockchains interoperable and we should see improved solutions very soon.



BLOCKCHAIN TRILEMMA: Choose any two. The blockchain trilemma is a concept coined by Vitalik Buterin that proposes a set of three main issues — decentralization, security and scalability that developers encounter when building blockchains, forcing them to sacrifice one "aspect" as a trade-off to accommodate the other two.

Top 5 Blockchains for NFTs:

When creators choose a blockchain for deploying their NFTs they consider the following factors

- Transaction Speeds
- Cost to develop, deploy and transact
- Security robustness of the blockchain
- Robust smart contract functionality
- Strength of developer community
- Environment impact

The choice of blockchain that is most compatible with the project's objectives can impact the success in a major way. Below is a list of top blockchains by the value transacted. From a project perspective, a blockchain with lesser transaction volume may still be better suited

Rank	Blockchain	Sales $ Million	Buyers	Txns Million	Sellers
1	Ethereum	$28,946	1,533,329	13	988,239
2	Ronin*	$4,080	1,774,374	16	1,311,822
3	Solana	$2,505	658,612	9	723,981
4	Flow	$1,082	458,499	22	449,345
5	Polygon	$453	375,902	1	196,850

Source cryptoslam. All time (up to 30Jul 2022)

* Ronin is a side chain that runs on Ethereum for Axie Infinity.

From a trading perspective, it is usually good to have a large community of buyers and sellers as that increases the chances of quicker transactions. Transaction costs play an important role in this decision as well. This is especially important if the NFT cost is sub $100. The gas fee on eth can easily be 10-30% of the cost of the NFT making it unattractive or costly. Ethereum 2.0 is in the works which is expected to boost the tps from 12-15 transactions to 100K transactions per second. This is expected to roll out sometime in Sept 2022 though delays can be expected as this is a very complex process.

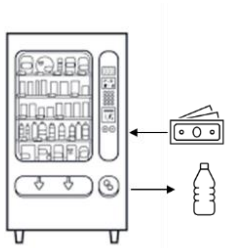
SMART CONTRACTS

Smart contracts are digital representations of contracts from our traditional world. A bet to pay your friend $50 if your favorite team loses in a soccer match, is a contract. Enforceability of this contract is another matter. if you renege on your promise, there is little that your friend can do. Consider another example. You like a rug at an online store. You pay online but the rug never arrives from overseas. You could take legal recourse, but the cost and effort required will outweigh the benefits.

Smart contracts are contracts converted into pieces of code that auto-execute. Once the conditions are met, for instance, availability of a product for sale and receipt of payment from the buyer, the code executes and the transaction completes.

To understand the concept further, consider a vending machine and how it operates.

- Items are displayed in the window with prices
- You insert the correct amount
- You choose the product you need
- The vending machine checks the inventory
- The vending machine checks the amount inserted
- If the amount matches the list price for the chosen product then it dispenses the same



There is intervention needed. The code running in the background checked for conditions to be met and then *irreversibly* executed the transaction.

In the digital world, a contract is encoded on the blockchain as a piece of code. Say you wanted to purchase a digital art NFT and clicked the buy button. The smart contract on the blockchain would check fund balance in your wallet, check the availability of the NFT in the seller's wallet and then auto execute the transaction. Funds would be transferred to the seller's wallet and the NFT to your wallet. This would be an irreversible transaction and will be captured on the blockchain permanently to prove provenance and ownership.

Smart contracts live on the blockchain and have an address. Anyone can go to the address and verify the smart contract at any time but they cannot change it as it is already written.

Below are a few important features of Smart contracts

- they provide predictable outcomes
- have a permanent address on the blockchain

- send transactions to the blockchain and
- are publicly viewable.

Smart contracts interact with other addresses on the blockchain and can respond as programmed. This makes them extremely versatile and powerful. For example, NFT projects use this functionality to create new NFTs for their holders based on the traits of the existing NFTs.

In the physical world, a centralised entity or authority may require an individual's identity and other verifications before executing a transaction. On a decentralised blockchain, smart contracts transactions are permissionless (i.e. no permission is required to enter into a transaction) and trustless (i.e. there is no need for trust between transacting parties) as the smart contracts only execute when the transaction conditions are met.

Smart contracts can be used in many different ways. Web3 projects use smart contracts extensively to structure how their digital tokens will be created and used (tokenomics) so as to create long-term value for the token holders. NFTs projects use smart contracts to manage characteristics, traits of NFTs, and so on. Smart contracts are used for lending digital assets, earning rentals, earning interest on cryptocurrency and so on.

Smart contracts can be considered as tools that help program the blockchain itself without impacting the core attributes of the blockchain like provenance, immutability and so on.

Limitations:

Two Common limitations of smart contracts include

Hacking risk:

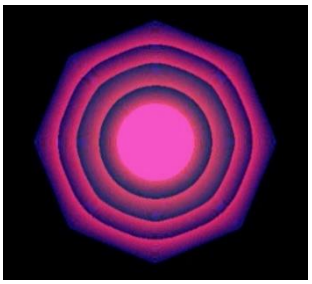
Since smart contracts are publicly viewable, bad actors can look for vulnerabilities in the code and try to hack for personal advantage

No external data:

Smart contracts cannot pull information from the outside world via the web. For instance, a smart contract in itself will be unable to pull weather information from the internet if that was a factor to be considered. Workaround by way 'oracles,' then need to be used.

NON-FUNGIBLE TOKENS

“Quantum" an octagon-shaped animation by New York artist Kevin McCoy is considered the first ever NFT. ‘Quantum’ sold for over $1.4 million in a Sotheby auction in Nov 2012.



Next to make headlines was Artist Mike Winkelmann, also known as Beeple, when he sold his famous NFT – "Everydays: The first 5000days 2021", for $69Mil. Other notable mentions include Jack Dorsey’s first tweet as he built Twitter was sold for $2.9million and Nyan cat that sold for $550K.

NFT stands for non-fungible-tokens.

Fungible is the property of a good/commodity whose individual unit is replaceable by another identical item. For example, a $10 bill can be replaced with any other $10bill and it would make no difference. Likewise, all crypto tokens are fungible. A bitcoin is easily replaced by another.

Conversely, non-fungible is when the good/commodity cannot be replaced with another. Every NFT can be differentiated from another through a 1-of-1 tokenID and its unique contract address. From there, metadata such as images, video files, or other data can be attached, meaning that it’s possible to own a token that represents a unique digital object.

Non-fungible items retain their value irrespective of how many copies might exist. You may have the image of Monalisa clicked from the original from your visit to the Louvre Museum, but Mona Lisa at the Louvre retains its value because it is non-fungible, i.e. irreplaceable.

Transactions on blockchain cannot be tampered with and are publicly verifiable. NFTs are blockchain native and these attributes make NFTs super powerful when it comes to proving ownership.

This opens a sea of possibilities for NFTs to be used in many different ways. The most prominent use of NFTs so far has been to hold art or other digital collectibles. The use case for NFTs goes much beyond that.

NFTs are increasingly being used as digital identities and as membership to a community, club, and more. NFT can serve as a gate pass to virtual and IRL (in real life) events. These functionalities empower brands, artists, athletes, celebrities, and project owners to build some amazing use cases and engage with their fans and customers. Some of the popular use cases for NFT are as below

Here are some examples of how NFTs exist today

- Unique digital art
- Music

- Sporting Moments in video format
- Digital twin of a physical product
- Digital wearables in the metaverse
- In-Game assets like skins, weapons, lands, etc that can be traded
- Domain names
- Event Tickets
- Trading cards
- Membership cards with privileged access
- Digital Identity

Another exceptional benefit that NFTs bring is the opportunity for creators and artists to earn royalties in perpetuity for their work. In the physical and web2 world, an artist earns once at the time of primary sale. If the price of the artwork grows multifold and it is resold, then the only beneficiary is the person selling the artwork. Artists or creators do not earn anything from secondary sales of their art.

In the web3 world smart contracts on the blockchain ensure that a fixed royalty amount as determined by the artist at the time of mint gets deposited in the artist's wallet every time their NFT is sold. This is an incredibly powerful feature that creates a permanent revenue stream and helps the artists get compensated for their work as it appreciates. An entire creator economy is therefore set in motion.

NFTs are created based on token standards best suited for the intended utility.

Token Standards:

Different NFT use cases require different functionalities to be built into the NFT. Ethereum is a programable blockchain that allows users to send cryptocurrency (digital tokens) for a fee. Ethereum's native currency is called ether or ETH. Ethereum has different smart contract standards that allow applications like dApps (Finance, gaming social), NFTs, and DAOs (Decentralised Autonomous Organisations) to be set up on Ethereum.

Ethereum is the most popular blockchain at this time for deploying NFTs, and yet it was not developed for NFTs as the primary use case. However, EVM (Ethereum virtual machine) makes it very easy to deploy NFTs using smart contracts. On the other hand, the Bitcoin blockchain is not designed to handle smart contracts.

Ethereum provides different token standards that can be chosen based on the desired characteristics of the NFT.

ERC 721 Standard:

This is the most used token standard. This type of token is unique, and each can have a different value than another token from the same smart contract.

All NFTs have a unique unit256 variable called the tokenID. This token id is globally unique and that makes it non-fungible. The uniqueness can be based on age, rarity, or visual traits carried by the NFT. The dApps can use tokenID as input and output an image which may be a digital wearable, weapon in a game, a cryptokitty, or a BAYC Ape. Each non-fungible.

ERC 20 Standard:

An ERC 20 token is the same in quantity and value as another token from the same smart contract. In real life, this is the same as dollar bills. Every one-dollar bill is the same as any other one-dollar bill and is replaceable as an equivalent. There is nothing unique. Digital currencies are ERC20 tokens. They are fungible.

ERC1155:

ERC1155 is a multi-asset token standard that can be used to create both fungible and non-fungible tokens in the same contract. ERC1155 can do the same functions as ERC20, ERC721, or both at the same time. ERC1155 can save on transaction costs as it makes batch processing possible avoiding the need to verify the tokens individually. This is ideal for fungible in-game currency and non-fungible collectibles.

Choosing the right blockchain and token standard that will support the delivery of the planned utilities is very important.

Where Is The NFT Data Stored?

NFTs are blockchain native. However, if you thought that the underlying digital art, content, also lived on the blockchain, then you may be in for a surprise.

An NFT can represent any digital or physical asset, including digital art, music, movies, fine wine, and even real estate. A smart contract connects this data and manages token ownership and transferability. On the simplest level, an NFT is a record on the blockchain that points to where its associated content (the image) lives on the internet.

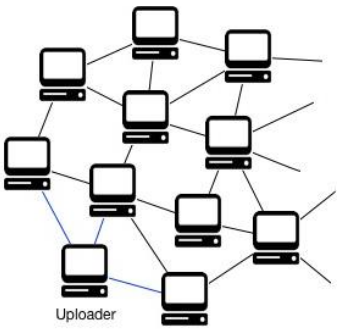
The actual content of the NFT, such as a piece of art, is not typically stored on the blockchain. The reason why the content (such as a JPG, MP3, or Gif) associated with the actual NFT is stored on the web and not the blockchain is because of the size and high cost of storing it on the blockchain.

Creators have the option of storing content files on cloud-based (e.g. AWS) or on-premises centralised servers. However, given the fundamental importance of decentralization to the NFT space, centralized servers are the least desirable option. Centralised storage also exposes the owners to the risk of their favorite art disappearing due to malicious attacks or the server or simply the server shutting down for some reason.

Off-Chain Storage on IPFS

IPFS stands for InterPlanetary Filing System.

The IPFS is a peer-to-peer, decentralized web made up of all the computers connected to it, known as nodes. Nodes store data and make it accessible to anyone who requests it. Large files are broken up, links are created and stored in a distributed manner as hashes of those files. Files are then served from the nodes on request.



If someone requests a file or a webpage, a copy of the file is cached on the nodes. As more and more people request that data, more and more cached copies will exist. Subsequent requests for that file can be fulfilled by any node—or combination of nodes—that has the file on it. Since there is no single repository, this decentralised service can never be shut down or hacked, or censured by any authority.

When using IPFS, NFTs are securely stored off-chain.

On-Chain Storage

Some NFTs are stored completely on-chain with their smart contracts and metadata.

In some ways, this is the optimal way to store NFTs. It takes advantage of the best features of the blockchain, storing complete NFT information on a secure, decentralized network. The downside is the high cost (if tokens have large file sizes).

Larva Labs moved the CryptoPunks collection on-chain in August 2021. Other examples of on-chain NFTs are Loot, Autoglyphs, and Nouns.

What Are Dynamic NFTs

The most common NFT use case is digital art. An artist mints a token representing a digital artwork and a collector can purchase that token and the ownership is written on the blockchain.

Once NFTs are minted, their tokenIDs never change. Every NFT can be differentiated from another through a 1-of-1 tokenId and its unique contract address. From there, metadata such as images, video files, or other data can be attached. Static NFTs play an important role where the metadata, like an artist's artwork, needs to stay constant and verifiable as the original version.

Use cases such as video games where in-game assets need to evolve based on user interaction, tokenised real-world assets where real-world characteristics change, athlete trading cards that get updated with new rankings, and more require dynamic NFTs. dNFTs offer a best-of-both-worlds approach, with NFTs retaining their unique identifiers while being able to update aspects of their metadata.

BAYC dropped a set of NFTs for BAYC owners and called it the 'serum. The idea was to create a new bored ape mutant based on the unique traits of BAYC held by the owners in their wallets. The smart contract then interacted with the traits of the original BAYC and

delivered a brand new mutant to the BAYC holder. Every mutant was unique as it was created based on the unique traits of the BAYC held in the wallet.

Dynamic NFTs can be triggered by on-chain or off-chain events and open new possibilities and uses cases for NFTs. Athlete rankings are a great example of this.

What Are POAP NFTs - Proof of Attendance Protocol

POAPs are digital mementos, minted to preserve and celebrate life's remarkable moments.

The POAP NFT was initially introduced during ETHDenver, the largest Web3 #BUIDLathon in the world. POAPs are minted through smart contracts as NFTs on the Ethereum blockchain. They are ERC-721 tokens, which means they are non-fungible.

Each time a person takes part in an event or visits a particular place, they get a unique badge issued in the form of an NFT that is supported by a cryptographic record. The POAP NFT proves attendance. POAPs may be issued during the following events

- seminars
- conferences
- sporting events
- launch events
- training sessions
- talks
- book launches
- concerts
- as wedding mementos
- in-game milestones

POAPs can be issued for virtual or IRL events. POAP allows event organizers to better engage with their audiences by providing a customized experience. Post-event, organisers, and brands can continue to engage with the audience by way of special offers, privileges, and invitations and build their community of fans and followers.

POAPs may be delivered to the attendees by way of scanning QR codes that are made available at the venue or by clicking marked images in the metaverse. The POAP NFTs are then delivered directly to the collector's Ethereum wallet at no cost.

POAPs may be sold on secondary market places or be transferred to other wallets. This however defeats the purpose of POAP. POAP is a record of life events and memories that are personal.

Soul Bound Tokens (SBTs)

A non-fungible token is a digital token of information that lives on the blockchain. Every NFT is unique with its identification code and the data it contains cannot be falsified. Regular NFTs can be sold or transferred for free. In other words, they are not tied to one specific wallet.

In real life, there are use cases where certain data needs to be tied to an entity. For example identification, credentials, medical records, educational certifications, date of birth, professional certifications, awards, etc.

Soul bound Tokens (SBTs) were proposed in May 2022 by economist & social technologist E. Glen Weyl, lawyer Puja Ohlhaver, and Ethereum creator Vitalik Buterin.

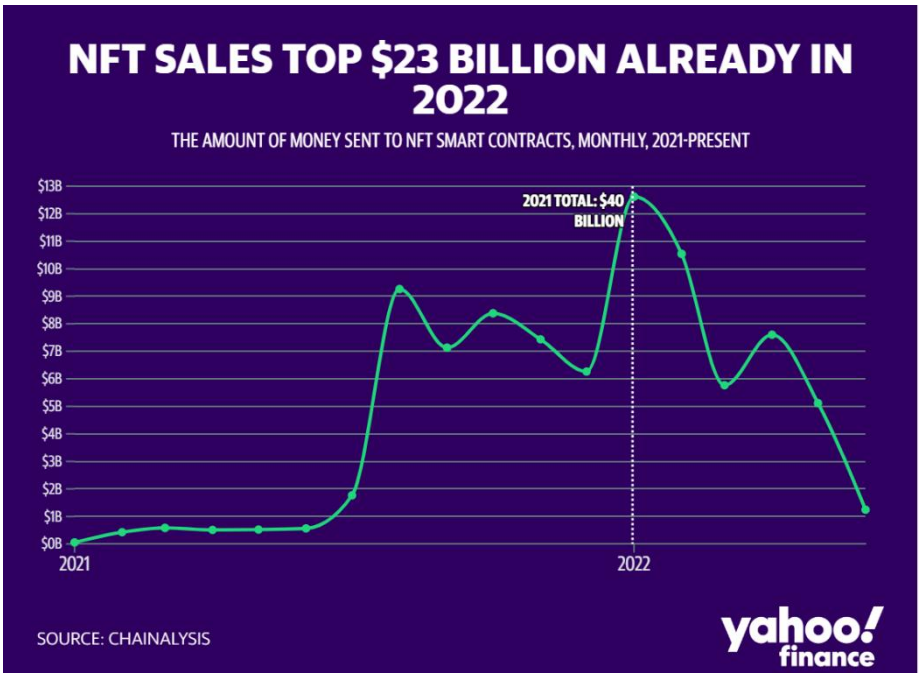
SBTs are non-transferable identity and reputation tokens. They allow individuals to verify all of their information using blockchain technologies. SBTs are permanently linked to the owner's private blockchain wallets and cannot be sold, transferred, or taken away.

There are some downsides to the SBTs as well. SBTs could be used by bad actors to identify, target, and harm members of specific communities. Governments and institutions could deny certain services, and rights or even target certain communities by denying travel permits, medical care, voting rights, or other benefits that would otherwise be available.

SBT is currently not available and it appears that more thinking needs to go into it before release so that the downside risks are minimised and the owners get the right to discard the NFTs from their wallets if they so desire.

BUYING AND SELLING NFTs

NFTs have attracted a lot of attention since 2021. Sales hit a high of $40Bn in 2021 which is not a small number by any means.



This then begs the question that where do NFTs get their value? Most NFTs are speculative assets and derive their value from speculation, especially when it comes to digital art. This is similar to art being a speculative asset in the real world. NFTs can cost from a few to tens of millions of dollars. A few NFT projects like the Bored Apes Yacht Club, Moonbirds, Art Blocks, and Mutant Apes have been very successful with individual NFTs costing a few hundred thousand to millions of dollars.

NFT projects can be classified into eight different types

1. 1/1 Art – e.g. Beeple's "Everydays: the First 5000days"
2. PFP/Avatars – used a Profile Pictures/ Avatars – e.g. Doodles, BAYC
3. Generative Art – randomly generated digital art - e.g. Artblock
4. Collectibles – Trading cards
5. Photography – photographers tokenising their craft
6. Music – tokenised version of pieces of music
7. Game NFTs – in-game assets – e.g. Axie Infinity
8. Virtual land – in metaverses – e.g. decentraland

Each of these appeals to a different set of customers. NFTs are always released in limited numbers i.e. they are kept scarce to keep the demand high. This tends to drive the price upwards as the NFT gains popularity.

How to Buy and Sell NFTs

Essentials to start buying and selling include

a. Crypto currency
b. Crypto wallet
c. A user account on a relevant marketplace

Buying Crypto Currency

NFTs can be minted on different blockchains. Each blockchain has its native token. So the first step is to own this native token (Eth, Matic, ADA, etc). Cryptocurrency can be acquired in different ways

a. Purchase on centralised eg Binance, FTX, KuCoin
b. Purchase on decentralised exchanges e.g. Uniswap, Pancakeswap
c. Swap one cryptocurrency for another from inside the wallet e.g. Metamask

Rank	Exchange	Weekly visits	Coins
1	Binance	2,09,60,370	393
2	FTX	4775720	285
3	Coinbase Exchange	19,25,558	209
4	Kraken	16,19,546	197
5	KuCoin	28,64,323	726

Source: CoinmarketCap (31Jul 2022)

All exchanges may not be available in all geographies. It is advisable to deal with large reputed exchanges for two reasons viz security and ease of transactions (will large number of buyers and sellers).

Understanding Crypto Wallets

Crypto wallets are applications that function as a wallet for your cryptocurrency. They are called wallets because they are used similarly to a wallet you put cash and cards in. Instead of holding these physical items, it stores the *passkeys* you use to sign for your cryptocurrency transactions and provides the interface that lets you access your crypto.

Crypto wallets make the blockchain accessible for transactions to occur. A crypto wallet consists of two key pairs: *private keys and public keys*. A public key is derived from the private key and serves as the address used to send or receive crypto to the wallet.

A private key is like a password to access/recover the wallet and it must never be disclosed to anyone. *If the private key is lost then it is impossible to recover a wallet and access is lost forever.* So the private key must be stored in a secure place and never disclosed to anyone.

Wallets are classified as hot wallets and cold wallets. Hot wallets are those that are connected to the internet whereas cold wallets are offline and connected only when needed. There are different types of hot wallets and they are classified as

- Web-based – Metamask
- Desktop wallets – Electrum
- Mobile app – Blockchain.com

Metamask is the most popular web-based wallet that is compatible with eth. It can also be set up to hold a few other tokens like Matic and BNB. Cold wallets can be paper wallets or hardware wallets. A paper wallet is a piece of paper with public and private keys printed out. While the owned tokens stay on the networks, the keys once printed are removed from the network. Transactions can only be processed by using printed keys.

Hardware wallets are akin to a pen drive and are used for storing large amounts of crypto-currency or high-value digital assets. They are considered safer as they are not connected to the internet all the time. Examples of hot wallets include ledger nano and trezor.

All wallets are not compatible with all cryptocurrencies and thus a user may need to own different wallets. Also, there is a learning curve that a user must go through to be able to use the crypto wallets.

How To Buy NFTs:

There are two ways to acquire an NFT

1. Get it in the original mint
2. Buy on secondary market places

Original Mint:

Original mint refers to the first release of the NFT. Usually, NFT drops (are made available) at a specified date and time and a specified price. The payment may be made in the native token of the concerned blockchain or fiat currency as determined by the project owners.

Projects spend a lot of time and effort promoting a project before launch. This is the time to get engaged with the project and the community via channels like discord, Twitter, and telegram. This gives an opportunity to get a feel of the project, its owners, and the community supporting it. During this time projects create reserve lists (RL) / white lists (WL) of early supporters. People who manage to get on the WL get special privileges like guaranteed availability, lower price, OG status with special privileges in the future, airdrops, etc. This is an ideal opportunity to evaluate a project and arrive at an investment decision.

To purchase the original mint one must head to the project's website, connect the wallet and click on the mint tab to make the purchase. Other than the mint price, a gas (transaction) fee may be applicable. The transaction fees go to the nodes for processing the transaction on the blockchain.

Secondary Market:

When buying from the secondary market one of the first things to look at is the floor price. The floor price is the lowest price at which a collection is available at that moment. Some marketplaces also provide basic information like average price trends and activity levels at specific NFT and at the collection level. Higher trading activity indicated higher liquidity.

OpenSea is the number one marketplace for NFTs. Think of it as the Amazon for NFT but with a limitation that it is compatible with limited blockchains ie Ethereum, Polygon, and Solana. Over 80% of transactions happen on the Ethereum blockchain so you are well covered.

Below is a list of top marketplaces and the blockchains they work with

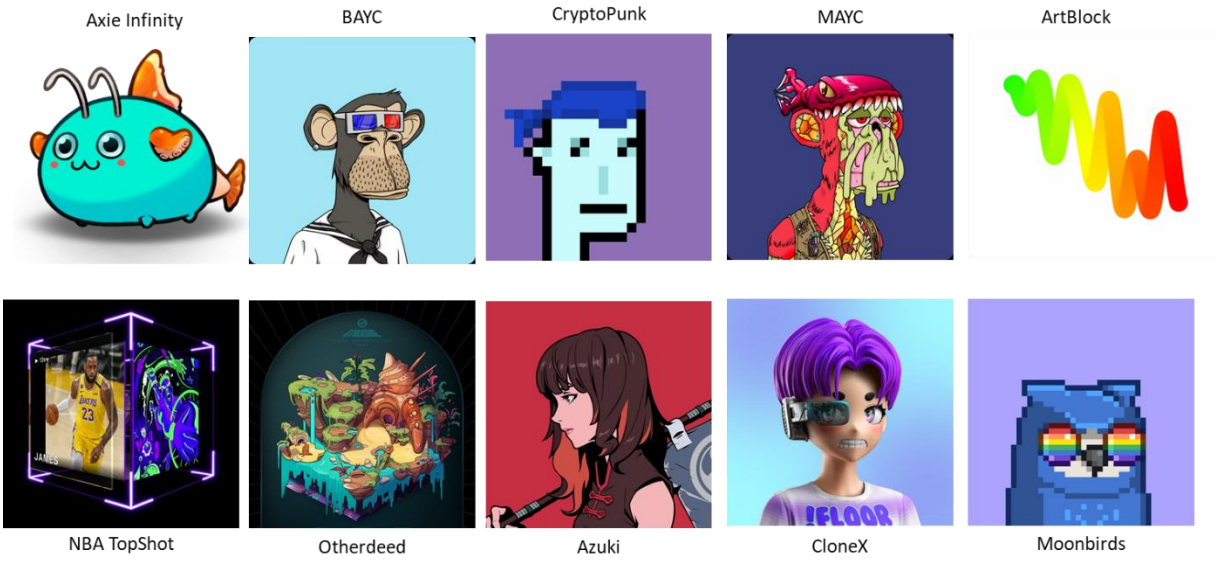
Marketplace	**Blockchains**
Opensea	Ethereum, Polygon, Solana
MagicEden	Solana
NBA TopShots	Flow
LooksRare	Ethereum
Atomic Market	Wax
X2Y2	Ethereum
Rariable	Ethereum, Tezos
Foundation	Ethereum
Solanart	Solana

This is not an exhaustive list. Crypto exchanges like Binance and a few others have their NFT marketplaces. Games and metaverses like Axieinfinity, and decentraland have created marketplaces to make it easy for gamers to trade their in-game NFTs.

Top 10 Blue Chip NFTs with their all-time trading volumes are as below

Rank	**Collection**	**Sales $ Million**
1	Axie Infinity	$4,080
2	Bored Ape Yacht Club	$2,352
3	CryptoPunks	$2,344
4	Mutant Ape Yacht Club	$1,702
5	Art Blocks	$1,293
6	NBA Top Shot	$1,021
7	Otherdeed	$1,016
8	Azuki	$785
9	CloneX	$714
10	Moonbirds	$571

Axie Infinity was the first P2E (Play to Earn) game that triggered interest in the P2E economy where gamers, instead of paying to play, earned money by playing the game. Looking at the sales volume it is evident that the space has attracted a lot of interest. NFTs are just over a year old and to hit this level of volume points towards a bright future.



NFTs have images. Above are not NFTs but 'right-click-save' images of NFTs. Do these images carry the same value as the NFTs they represent? Something to think about.

How To Sell NFTs:

The process to sell is simple and is completed on the secondary marketplaces. Marketplaces may permit a fixed price or an auction-based approach to selling NFTs. Under the fixed price approach, the seller specifies the price, if the same is met by a buyer then the smart contract executes the transaction.

Under the auction approach, the seller indicates a reserve price. If the reserve price is met the transaction is executed. If the reserve price is not met then the seller still has the option to accept a lower price and make a sale.

Seller may be required to pay the following charges when making a sale

- Gas (transaction) fee that goes to the nodes processing the transaction. The fee varies depending upon the load on the blockchain at that moment
- Marketplace processing fee – charged by the marketplace to facilitate the transaction. Opensea charges 2.5% of the sale price
- Creator/Artist/Project owner royalty. Royalty is set by the creator/artist at the time of mint and this is deducted by the marketplace and transferred to the creator/artist. Usually, this number is under 10%

The net amount after the above deductions is then credited to the seller's wallet and the NFT is transferred to the buyer's wallet.

With thousands of projects listed and new projects getting released every day it is important to consider the following aspects before deciding on a purchase decision

- Team behind the project (experience, expertise)
- Project Road Map
- What makes the project unique
- Influencers, Ambassadors, and KOLs supporting the project
- Community size and opinions being expressed
- Partnerships with other projects

The best way to learn is to allocate a small budget, say $50 and then go through the process of buying crypto, setting up a wallet, transferring funds to the wallet, and then making a purchase at one of the marketplaces. A hands-on experience is truly the best way to learn how this works.

It is very important to remember that these are highly speculative investments. Do extensive research before investing. Always consult an investment advisor before making investment decisions. None of the information must be construed as investment advise.

NFTs AND THE METAVERSE

Neal Stephenson coined the term 'metaverse' in his 1992 cyberpunk novel “Snow Crash". More recent inspiration comes from the Sci-Fi movie "Ready Player One" based on Earnest Cline’s 2011 novel of the same name. However, the metaverse is no longer in the realm of sci-fi. It is here.

To define the metaverse in a very simplistic manner –

The metaverse is an extensive online world where people interact with each other as digital avatars. It is an extension of the physical world into the virtual and vice versa.

Metaverse is being enabled by an amalgamation of different technologies like AR, VR, blockchain, and AI. These technologies have existed for quite some time and what we are seeing now is the reaching of the inflection point, beyond which lies hyper-growth. The virtual worlds will exist seamlessly and will be mainly accessed via mobile phones, just as we access the internet today.

The first applications are around gaming and fashion. Decentraland, Sandbox, and Axie Infinity are popular P2E (play-to-earn) games that are making rapid progress. Top brands and celebrities have a presence in the metaverse and they use the same to launch products and interact with their followers. In recognition of the huge impact, MTV has recently announced a new “Best Metaverse Performance Category’ award.

Luxury house Burberry created NFT accessories for the Blankos Block Party video game. Louis Vuitton has launched its own NFT-studded video game, 'louis the game'. Gucci has digital items in Roblox.

Nike has just acquired the bespoke virtual sneaker company RTKFT and has created NIKELAND in Roblox. Adidas Originals Twitter handle has a bored ape PFP. It owns real estate in The Sandbox and recently launched its NFTs with great collaborations with BAYC, gmoney, and PUNKS comics. This space evolves every day.

How NFTs Enable The Metaverse:

NFTs are the ultimate transaction tokens in the metaverse. As NFTs change hands, value is paid for in terms of cryptocurrency or the in-game, in-metaverse utility token. The real store of value in the metaverse is the NFT.

Consider P2E (Play to earn) games in the metaverse. A gamer’s assets like skins, weapons, and land are all NFTs. As they acquire more value by way of the gamer’s effort or gameplay, the value accumulates in the NFTs. These can then be sold for higher prices or even rented for income.

Land in the metaverse transacted as NFTs. Fashion is a huge market in the Metaverse.

As we create multiple Avatars of ourselves in the metaverse, they need to be dressed and accessorised, just as we dress and accessorise ourselves in the real world. Digital wearables is a whole new business segment that has opened up for discerning brands. *A significant portion of the revenue of brands in the wearables business in the real world will come from digital wearables in the future.*

A host of premium luxury, luxury, and sports brands have taken the lead and have launched NFTs. This includes the likes of Louis Vitton, Gucci, Tommy Hilfiger, Nike, Adidas, Diesel, and many more. *Their uptake of the web3 world from web2 has been nothing but a huge validation of the future value and importance of the metaverse in their customer acquisition and engagement strategy*.

Successful NFT projects have tied up with other NFTs projects and brands and launched wearables for their community. DeadFellas (a PFP NFT project), Diesel, Giuseppe Zanotti (an Italian footwear and luxury designer) collaborated with 'Neuno', a Digital wearable marketplace to drop wearable NFTs.

Fashion week in the metaverse at Decentraland

Furthermore, web3 commerce-enabling solutions are now available and are decentralising eCommerce. Current eCommerce business in the range of $2.5trillion transacted via a centralised platform like Amazon and a host of others. These platforms play the important role of verifiers and enforcers. This role is easily taken over by solutions built on blockchain in most cases and the technology continues to evolve. Fashion week in the Decentraland Metaverse saw the coming together of the Phygital experience wherein visitors could order a Tommy Hilfiger or other brands wearable in the metaverse, receive a collectible or a digital wearable NFT, and also receive a physical version in real life.

In a nutshell, NFTs are the transaction-enabling units and store-of-value in the metaverse. Without NFTs, the metaverse would be a virtual world with very limited utility.

5 NFT USE CASES FOR BRANDS

To quote Steve Jobs

You've got to start with eh customer experience and work back towards the technology, and not the other way around.

Technology is not the solution, it is a huge enabler if you know what to do with it. Brands do not compete on products. Products deliver a solution, an experience that their customers are seeking. As per Gartner, 81% of the brands compete on experience and this is where NFTs can help deliver a differentiated experience. Below are a handful of use cases

1. Digital Twins:

According to a Scalefast survey, 25% of customers who are interested in purchasing an NFT are more likely to do so if it came with a physical good. Dolce & Gabbana's 1st Luxury collection - Collezione Genesi, which included an NFT brought in $5.7m at the auction. Winning bidders received both a physical and virtual version of the design.

As per some estimates, the fake goods industry is worth over $600bn. Luxury brands suffer the most. A digital twin of a physical product by way of an NFT provides a bulletproof solution to this problem. Digital twins provide ownership and authenticity verifiable on the blockchain.

2. New Revenue Streams

NFTs empower brands to create new revenue streams beyond their physical line of products. With digital collectibles and digital wearable lines, brands have the opportunity to engage their customers in new ways and also attract new customers seeking such products. As the user base begins to engage in the metaverse with multiple avatars, the need for digital wearables is expected to grow exponentially. This also creates a more planet-friendly line of revenue stream when compared to the environmental impact created by the fast fashion industry.

3. Lower CAC and Increase CLTV

Customer acquisition costs and customer lifetime value are two metrics that go hand in hand. The value created by a customer over her lifetime for a brand is dependent on the long-term value and relevance that a brand can create for the customer. NFT's provide a great opportunity to create membership-based loyalty and customer engagement programs.

4. Exclusive Content and VIP experiences

Adidas embarked on the metaverse journey with BAYC, gMoney, and Punks Comics. All 30,000 Adidas Into the Metaverse NFTs were minted within a matter of hours. Adidas earned more than $22 million from the sales. Once the community is created via this approach, it becomes easy to create VIP experiences for this set of loyal customers who have shown commitment by investing in the brands. These experiences can be diverse and include exclusive merchandise, token-gated access to VIP events IRL and virtual, future NFT drops, Limited edition product lines, and so on.

5. Create a New Class of Assets

Brands in the sports, and media business, can naturally use NFTs to create a new class of assets. NBA's TopShot is a classic example of this use case. Sporting moments of top athletes have found favor with sports fans. Companies like Disney have partnered with VeVe – a mobile-first NFT platform to launch NFTs of its iconic characters. Characters like Disney Partners Statue, Mickey from the first talkie movie from the '40s, and the like make for great collectibles for fans of the characters and create a deeper connection with the brand.

This is a brief snapshot of use cases but it does set the ball rolling in terms of ideas that can be adapted to specific industries, segments, and above all specific sets of customers. Much like the early days of the internet, earnest adoption and experimentation in web3 will attract greater rewards over time. Technology is evolving at a rapid pace and customers are experimenting with the metaverse and the web3. It is important to develop a web3 strategy and begin the journey. There will be learning along the way, which will pay dividends in the future.

RESOURCES FOR CONTINUOUS LEARNING

It is said that the best place to find a helping hand is at the end of your arm. For web3, this is the real truth. There is no pill to have or popeye's spinach to be gulped for an immediate superpower.

These are very early days. NFTs in the real sense are just about a year old. The Internet came to life about two decades ago. The only way to learn is to commit yourself and learn every day. The web3 community is super helpful and super committed. Tap into it.

The first step is to understand the underlying technology which is the blockchain and how it works. A brief introduction was given in the first chapter for this very purpose. A deeper dive is highly recommended. No technical or coding knowledge is needed. What is needed is conceptual clarity of the underlying concepts and principles of blockchain. There are enough free resources available on the popular learning platform.

Once a basic understanding is achieved then it moves to continuous learning methods. Here are a few suggestions

- Follow key people on linked
- Follow key podcasts on your favorite platform
- Tune in to Linkedin Voice sessions from key projects/people
- Tune into AMA's of key projects on Twitter
- Follow key web resources that aggregate data across NFT, the crypto world
- Set up google alerts with key terms to get filtered news into your mailbox
- Allocate a fixed time slot to learning and upgrade yourself every day

Web Resources to Keep Tab On The Market

- www.dappradar.com – NFT, Defi
- www.cryptoslam.io – NFTs
- www.coinmarketcap.com – crypto

Amazing People to Learn From On Linkedin

- Randy Zukerberg
- Cathy Hackl
- Anthony Day
- Tom Emrich
- Dr. Mark Van Rijmenam
- Charles Adkins
- Jamie Burke
- John Kraski

- Delphin Miloudi-Druelle
- Peter Huang

Podcasts to Binge On

- Web3 Academy
- Web3 with A16Z
- Welcome to the Metaverse
- NFT Alpha Podcast

Tools to Research NFT Projects

- https://nftgo.io
- https://icy.tools
- https://uniq.cx/

Innovative NFT Projects to Watch

- AO Metaverse - @AOMetaverse
- Bored Ape Yacht Club - @BoredApeYC
- RTFKT - @RTFKT
- Bapes clan - @bapesclan
- Psychedelics Anonymous - @psychedelic_nft

Digital Ids

- ENS Domains - @ensdomains
- Tokenproof - @tokenproof

Fashion Forward and Utility

- The Fabricant - @thefabricant
- UNXD.com - @UNXD_NFT
- The Dematerialised - @dematerialised
- Dressx - @dressxcom
- Exclusible - @exclusible

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Helping brands navigate to web3

I post on web3, metaverse, and NFTs. Follow me on Linkedin

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