

"This is the single best resource on NFTs I have ever seen in my life."
Cooper Turley, Advisor at Audius

HOW TO NFT



NFTs are permeating every industry.
Be a part of the movement that revolutionizes value
and digital ownership rights.



CoinGecko

HOW TO NFT

1st Edition, January 2022

Benjamin Hor, Khor Win Win,
Shaun Paul Lee, Dillon Yap, Chin Yi Hong

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“This is the single best resource on NFTs I have ever seen in my life.”

– Cooper Turley, Advisor at Audius

“If you are new to the NFT space or want to take a deep dive into the NFT revolution we are currently experiencing, be sure to get your hands on the *How to NFT* book brought to you by the CoinGecko team. It's a great resource to have at your fingertips for those who need a well-researched introduction into all things NFTs.”

– Jeff Zirlin, Growth Lead and Co-Founder of Sky Mavis

“This book is a great cheat sheet for investing in NFTs. It condenses 6 years' worth of experience into one easy read.”

– Benjamin Rameau, Co-founder of Jenny DAO

“What DeFi is doing to finance, NFTs will do to social networks. *How to NFT* will give you the tools to thrive in the metaverse.”

– Alex Masmej, Founder of Showtime

“This book gives an incredibly comprehensive insight into the NFT landscape, a must-read for anyone trying to stay on top of the madness that is NFTs.”

– Joe Grech, Head of Crypto at Chiliz

“Onboarding into NFTs is often an intimidating and complex process. This is a great resource for everyone who is curious about it and didn't know where to start before.”

– pplpleasr

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INTRODUCTION

Non-Fungible Tokens (NFTs) have taken the world by storm in 2021. Many in the crypto space were surprised by the massive growth of the NFT market and the various mentions by mainstream media this year. Unlike more complicated concepts such as DeFi, the general public could intuitively understand NFTs and the digital collectibles they represent. NFTs may very well be the killer blockchain product that the crypto industry has been waiting for to drive further adoption amongst the masses.

Sales of NFTs have gained significant traction since the start of 2021. The NFT mania was kickstarted by the launch of Dapper Lab's NBA Top Shot - digital trading cards represented as NFTs featuring video highlights or "Moments" of top NBA plays. These NFTs, officially licensed by the NBA, garnered huge public recognition and marked one of the first successful forays of sports organizations into NFTs. Fans have taken their passion for NBA and began collecting digital cards representing their favorite athletes or sporting moments, giving birth to a new fan economy.

Soon after NBA Top Shot took off, artists also turned to NFTs as a new gateway to marketing and monetizing their art. Christie's, one of the premier auction houses, further legitimized the art NFT movement by collaborating with NFT artists to auction off their artwork. The most prolific example was Beeple's historic \$69 million sale of "*Everydays - The First 5000 Days*".

The crypto bull market of 2020–2021 also contributed to the NFT craze as crypto natives looked for a way to signal their status and wealth online,

Introduction

particularly on Twitter, Discord, and Reddit. With digital identities gaining more significance, digital avatars such as CryptoPunks have also quickly risen in value.

Collectively, NFTs have provided creators globally with an alternative way to gain value from their work. The impact of NFTs has not just been felt in the creative space. In the gaming space, we are starting to see the emergence of a new “Play to Earn” model enabled by NFTs, which upends the traditional model in which players pay for games.

Following the publication of our *How to Bitcoin* and *How to DeFi* books, we wanted to follow up with a book on NFTs. The target audience of this book is NFT beginners, with step-by-step guides on how to buy, sell, store, and mint NFTs. We will also be looking at various categories of NFTs such as Art, Music, Collectibles, Metaverses, Sports, and Utilities. In each of these NFT categories, we will be looking at some of the top NFT projects and how they generate value.

We are still in the early innings of the NFT revolution, with new NFT projects coming out daily with novel ideas on utilizing this new technology. It is our pleasure to be a part of this movement. Join us in experiencing the new world of NFTs.

CoinGecko Research Team

Benjamin Hor, Khor Win Win, Shaun Paul Lee, Dillon Yap, Chin Yi Hong
1 January 2022

PART ONE: NFT 101

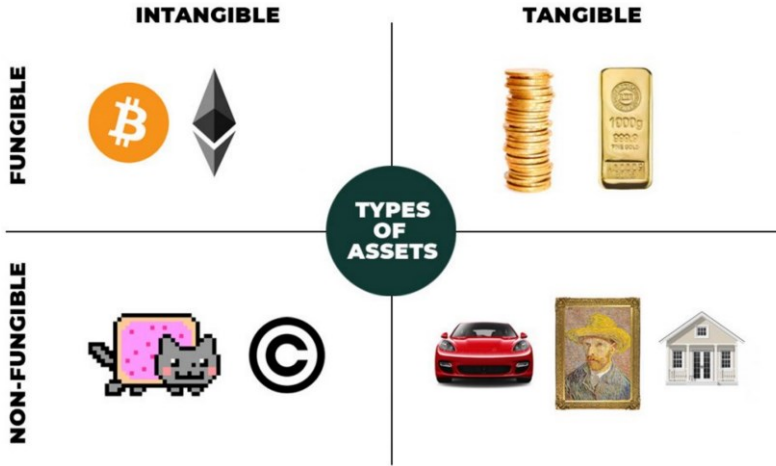
CHAPTER 1: THE NON-FUNGIBLE TOKEN (NFT) LANDSCAPE

In simple terms, a fungible good is an item that is mutually interchangeable with another. Money is a good example. A \$100 bill is worth the same as other \$100 bills (or even two \$50 bills). Despite minor distinctions such as serial numbers and issue dates, paper money is considered fungible as they are interchangeable and facilitate transactions in our daily lives.

On the other hand, vehicles, art, and properties are examples of non-fungible items that are unique and not interchangeable with one another.

Think of two houses located next to each other—they may reside within the same neighborhood, share the same property developer, and even look completely identical from the outside, but they are technically not similar nor interchangeable. Their decor and interior layout may be different. One of them could be that much closer to a high-traffic train station, which makes it marginally more valuable than the other.

Simply put, unlike two \$100 bills, these two houses do not share the same intrinsic value and thus are not mutually interchangeable, making them non-fungible.



Fungible and non-fungible items are traditionally tangible items. As our world gets increasingly digitized, intangible items are now becoming increasingly common.

In the past few years, we have seen the rise of intangible and fungible tokens such as Bitcoin, Ethereum, and others. These items are intangible because they do not exist in a physical form that can be felt or touched, much like how your Instagram account only exists digitally.

With the rise of smart contract platforms like Ethereum, the technology now exists for Non-Fungible Tokens (NFTs) to be created. Examples of NFTs include avatars CryptoPunks and Bored Apes or even masterful pieces from distinguished artists such as Tom Sachs and Damien Hirst.

The easiest way to understand NFTs is to imagine Pokémon trading cards. Each Pokémon trading card is unique, and no two cards are interchangeable since they may have different move sets, rarities, and physical conditions.

You would not want to trade a mint condition Holo Charizard card for a physically-battered Rattata card. Even though both these cards are first edition copies, the Holo Charizard card is more sought after due to its rarity, ability, and physical condition.



In essence, NFTs are digital representations of such items stored on the blockchain. NFTs allow us to differentiate our Rattatas from our Charizards digitally. Besides that, NFTs also enable us to prove whether our Pokémon cards are authentic or not in a simple manner, a problem that is all too common with physical trading cards and collectibles.

Before we dive deeper into NFTs, let's consider how NFTs are different from fungible tokens such as Bitcoin and Ethereum.

Fungible versus Non-Fungible Tokens

We keep hearing about NFTs, but what exactly are they? In simple terms, an NFT is a token that possesses a unique identifier and has additional parameters that allow you to store certain information on it. That unique identifier is what makes a token non-fungible. The additional information can be any information such as text, images, audio, and videos files.

Unlike fungible cryptocurrencies, NFTs are unique and not interchangeable. Since each bitcoin or ether is uniform and practically indistinguishable from the other, you can freely trade them on cryptocurrency exchanges without much hassle.

Fungible Tokens (BTC/ETH)	Non-Fungible Tokens (NFTs)
Interchangeable	Non-interchangeable
Uniform <ul style="list-style-type: none">- Tradeable on exchanges- Similar to currencies or stocks	Unique <ul style="list-style-type: none">- Tradeable on marketplaces- Used in games, collectibles, art pieces, intellectual property
Divisible <ul style="list-style-type: none">- Can be divided into fractional amounts.- For example, 1 BTC is divisible up to 0.00000001 BTC, allowing for better liquidity for swapping your tokens.	Non-divisible <ul style="list-style-type: none">- Cannot be divided into parts- Generally illiquid and is difficult to sell instantly

However, you cannot easily trade an NFT as no two NFTs are the same. Each NFT has its unique identifier and trait, thus making each piece different, even though they may look similar on the surface.

Additionally, NFTs cannot be divided into smaller pieces like conventional cryptocurrencies. Bitcoin, for example, is divisible up to 8 decimal places. Therefore, NFTs are usually illiquid and harder to sell since the NFT has to be purchased in its entirety.

That said, there are projects which allow NFTs to be fractionalized into smaller fungible pieces (discussed under Chapter 10). This allows users the opportunity to own portions of an NFT instead of the whole piece, lowering the entry barrier for highly-priced NFTs and improving the liquidity of these NFTs.

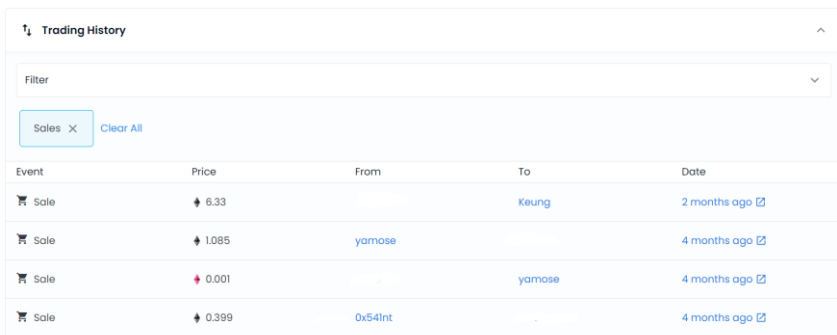
Authenticity and Efficiency

Verifying authenticity and transaction efficiency are usual pain points when it comes to non-fungible goods. For instance, if someone were to run off with the *Mona Lisa* and then attempt to sell it, it would be difficult to verify its authenticity without bringing in art experts. The thief might create multiple replicas and sell them to different buyers.

With digital art, it is even easier to create copies and claim the piece as their own; and unlike the real world, there is no way to verify which digital image is the original. This is where NFTs come in.

NFTs take advantage of smart contract technology to store and record unique information on the blockchain, which means that whenever an NFT is created, only one of it verifiably exists. NFT creators can also encrypt details such as rich metadata or secure file links, allowing people to create all sorts of verifiable digital assets based on images, audio, and video files. These technologies allow everyone to verify the authenticity of digital assets, and simplify the process of establishing ownership. It also allows the transfer of assets safely, efficiently, and verifiably.

With NFTs, you can digitally certify that an asset is authentic, and artists can easily prove that a particular work is original. Additionally, you can verify the provenance of digital assets through the blockchain. For example, you can easily track when an asset was first created and subsequently sold. You can then follow the trail and track the list of past owners and view how much each buyer paid for the piece.



Event	Price	From	To	Date
🏷️ Sale	⬆️ 8.33		Keung	2 months ago 🔗
🏷️ Sale	⬆️ 1.085	yamose		4 months ago 🔗
🏷️ Sale	⬆️ 0.001		yamose	4 months ago 🔗
🏷️ Sale	⬆️ 0.399	0x54Int		4 months ago 🔗

NFTs mitigate issues such as fraud and plagiarism, which is a common problem all non-fungible goods face. Rather than hiring an expert, we can verify the authenticity of an NFT using the blockchain. In addition, we can also check whether an NFT is part of a larger collection by checking whether the contract addresses match.

NFTs are already disrupting many industries. For example, artists do not need intermediaries like art galleries (often gatekeepers and highly selective) to market and sell their work. Art galleries also charge exorbitant commission fees of up to 50%, reducing the net pay to the artists.¹ With NFTs, artists can sell their work directly to purchasers on NFT marketplaces such as OpenSea.

NFTs are Disrupting Intermediaries

Art is just one example where NFTs are disrupting intermediaries. The key takeaway is that NFTs can tokenize anything and remove layers of inefficiencies beyond authenticity.

Have you ever wondered why some crucial documents are still recorded using paper? This is because there was no way of verifying whether a particular digital copy was unique and trustworthy. NFTs will change that, opening up the creation of outstanding digital art, collectibles, in-game items, and even important documents like wills, passports, and land titles.

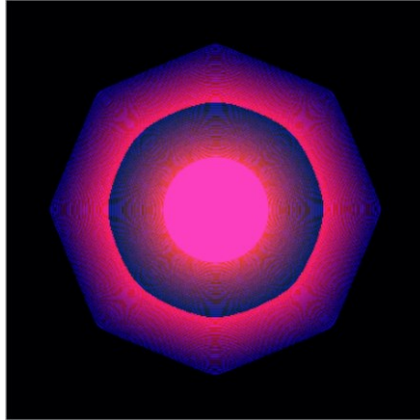
An example of NFTs holding real-world assets can be seen with the work done by Centrifuge. Centrifuge integrates with MakerDAO to onboard non-digital assets as collateral through their app, Tinlake. Tinlake turns real-world assets such as mortgages into NFTs with all of the necessary legal documentation attached. On 21 April 2021, the company successfully executed its first MakerDAO loan for \$181,000 by using a house as collateral, effectively creating one of the first blockchain-based mortgages.

Imagine if governments and other companies start using NFTs for their documents and processes. How much more efficient will it be when everything is tokenized? The possibilities are endless, and it is only a matter of time before the world catches on!

¹ Martin, J. (2014, November 14). *Selling Art in Galleries: Everything You Need To Know*. Retrieved September 23, 2021, from <https://petapixel.com/2014/11/14/selling-art-galleries-everything-need-know/>

History of NFTs

Quantum, an NFT minted in 2014 by New York artist Kevin McCoy on the Namecoin blockchain is often considered the first NFT in history. However, while it is one of the oldest, it is not technically the first NFT in existence.



Quantum NFT

The first NFTs can be traced back to Colored Coins, designed on the Bitcoin network back in 2012.² Colored Coins was an experimental project designed to explore the idea of Non-Fungible Tokens.

Several whitepapers analyzed its capabilities and hailed it as an achievement for distinguishing itself from regular Bitcoin transactions. However, because it was created on the Bitcoin network, there were technical limitations in place because Bitcoin’s scripting language required full consensus on its value.

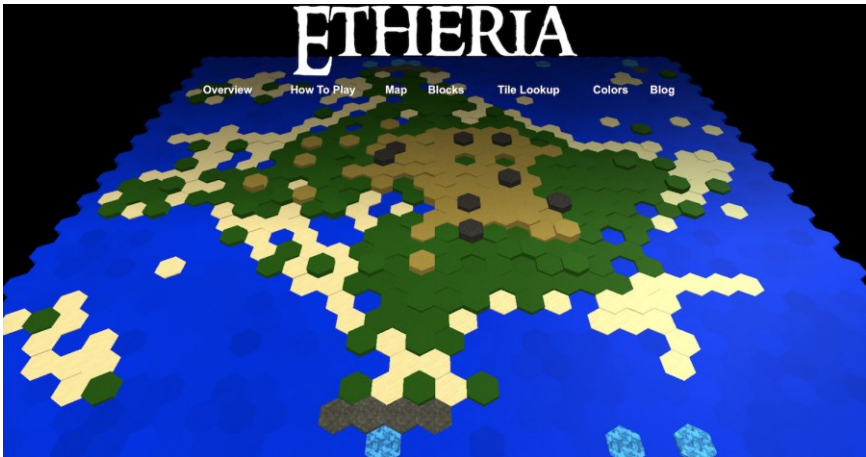
*“For example, 3 people agree that 100 Colored Coins represent 100 company shares. If even one participant decides they no longer equate Colored Coins to represent company shares, the entire system falls apart.”*³

² Rosenfeld, M. (2012, December 4). *Overview of Colored Coins*. Retrieved September 21, 2021, from <https://bitcoil.co.il/BitcoinX.pdf>

³ Steinwold, A. (2019, October 7). *The History of Non-Fungible Tokens (NFTs)*. Retrieved September 24, 2021, from <https://medium.com/@Andrew.Steinwold/the-history-of-non-fungible-tokens-nfts-f362ca57ae10>

Nonetheless, Colored Coins spurred further innovation and established the foundation for NFTs. Subsequent projects like Counterparty (asset creator and decentralized exchange) reaffirmed the potential of putting real-world assets onto distributed ledgers. However, it was evident that developers require a more versatile blockchain to showcase the full potential of NFTs.

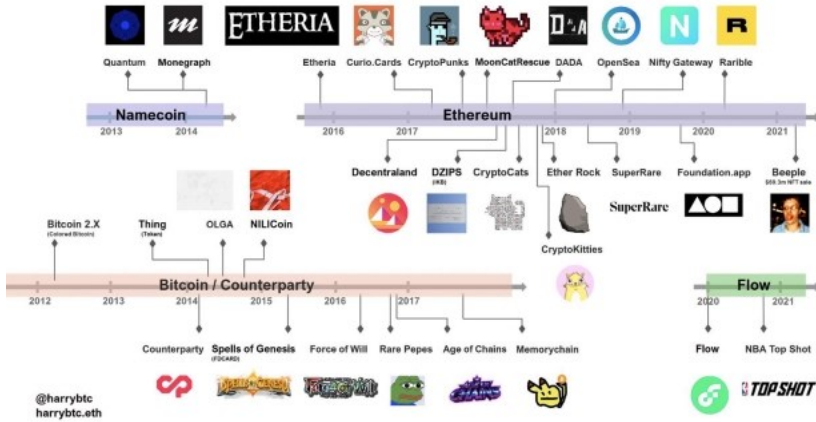
When the Ethereum network launched in July 2015 and introduced programmable code through smart contracts, developers finally had a viable platform to develop NFT projects. One of the first NFTs on the Ethereum network was Etheria, a virtual isometric world where players can own tiles, farm them for blocks, and build things. The project was created in 2015 and has since become a collector's item for being a part of Ethereum's history.⁴



Fast forward to 2017, and we saw the release of notable projects such as CryptoPunks, Mooncats, and CryptoKitties which are now widely known.

⁴ Hakki, T. (2021, March 14). *An NFT game almost as old as Ethereum Just resurfaced and players are cashing out.* Retrieved September 21, 2021, from <https://decrypt.co/61359/an-nft-game-almost-old-as-ethereum-just-resurfaced-and-players-are-cashing-out>

History of NFTs



Source: HarryBTC (this list is meant to be illustrative and non-exhaustive as there are other NFTs that have not been listed here)

It was also around this time that proper NFT development standards started taking shape. Before this, most fungible tokens on Ethereum utilized the ERC-20 standard (ERC stands for Ethereum Request for Comment). The ERC-20 standard works well for many functions on Ethereum used in building fungible tokens, but it is not well-equipped to create unique tokens.

In September 2017, Dieter Shirley, a Github contributor, proposed ERC-721 to standardize token standards for unique tokens. The proposal aimed to improve past iterations such as gas efficiency and enable the blockchain to recognize non-fungible tokens.⁵

It was also in this proposal that the term “NFT” was first coined. This new standard will be used later by CryptoKitties, the first project to implement ERC-721. Since CryptoKitties, many NFT projects have followed suit and adopted the ERC-721 standard.

⁵ William Entriken, D. S. (2018, January 24). *Eip-721: Non-fungible token standard*. Retrieved September 21, 2021, from <https://eips.ethereum.org/EIPS/eip-721>

ERC-721 v ERC-1155

Prior to the creation of ERC-721, older NFTs like CryptoPunks were built on a derivative of ERC-20 and are today considered hybrids. ERC-721 grew to become the most popular NFT standard, but in 2018 an alternative common NFT standard known as ERC-1155 was created and introduced

ERC-1155's thesis was simple: it aimed to merge the functionalities of both ERC-20 and ERC-721 into one NFT standard, while addressing some of the inherent flaws of ERC-721, such as higher gas consumption.

As a result, ERC-1155 is highly gas efficient, especially when doing batch transfers. For instance, it could process 10 NFTs in 1 transaction, as opposed to ERC-721 which requires 10 separate transactions to transfer 10 NFTs. However, the main trade-off is that the ownership history for ERC-1155 tokens is harder to track because of how it is programmed.⁶

Both standards have their pros and cons and are designed for different types of assets. Notably, ERC-1155 is often seen as a semi-fungible standard because it allows the smart contract interface to represent and control both ERC-20 and ERC-721 type tokens simultaneously. Nonetheless, the core principle remains the same and allows for non-fungible assets to be tokenized and authenticated on the blockchain.







NFTs on Other Blockchains





Blockchains are public playgrounds for decentralized applications. Anyone can create anything on blockchain networks, but that also means there are no requirements or standards to conform to. For example, we can build a slide with plastic, but another person may build a slide using a different material such as cement. The point is that due to its decentralized nature, there are no enforceable standards.

ERC-721 and ERC-1155 are clear examples of different NFT standards on Ethereum. However, we are now part of a multi-blockchain world, each with

⁶ CryptoYuna (2021, May 27). *ERC-721 vs. ERC-1155: The great contract debate*. Retrieved September 21, 2021, from <https://www.one37pm.com/nft/tech/erc-721-vs-erc-1155-nft-contract-what-to-use>

its own technical specifications for NFTs. Below is a (non-exhaustive) list of different NFT standards and NFT projects on other blockchains.

		NFT Projects		
	NFT Standards			
 Ethereum	ERC-721, ERC-1155, ERC-998	 CryptoPunks NFT Collection	 Ethereum Name Service Domain name for Ethereum addresses	 CryptoKitties First Inflationary (breedable) NFT Collection
 Binance Smart Chain	BEP-721, BEP-1155	 CryptoDoggies Decentralized meme tokens with burning mechanism	 Plant vs Undead Multiplayer tower defense game.	 Cryptoblades NFT Role-Playing Game (RPG)
 Solana	Metaplex (SPL)	 Degen Ape Academy Collectibles	 Aurory Blockchain-based game and NFT ecosystem on Solana	 Frakt Generative art NFT project
 WAX Wax	Atomic Assets, Simple Assets	 John Van Hamersveld "Post-Future" vIRL Iconic pop art collection	 Topps Series 1 MLB baseball cards	 Street Fighter Collectible cards

	NFT Standards	NFT Projects		
 Tezos	FA2 (TZIP-12)	 Pupila Dilatada Art Collection	 Neonz Collectible Animated Avatars	 The Rise of Planet Doja Collectible VIP Concert Ticket

You might be wondering whether it is possible to bridge and move your NFTs between the various blockchains. On Ethereum, for example, bridging is currently possible but is in an experimental phase on Ethereum’s Rinkeby testnet.

In the not-so-distant future, you should be able to bridge NFTs on Ethereum Virtual Machine (EVM) compatible chains that use a similar ERC-721 token standard such as Binance Smart Chain and Polygon. On the other hand, non-EVM compatible chains like Solana, which uses the SPL NFT standard, will require new infrastructure to be built before you can move your NFTs over.

How Big is the NFT Sector?



The NFT industry is rife with innovation. New use cases pop up every day, stretching our imagination of what we can do with NFTs. Nevertheless, properly categorizing the industry is difficult as there are many different interpretations.































For this book, we are focusing on NFTs themselves, i.e., the different use cases for NFTs, not the infrastructure or supplementary segments for NFTs. Based on this approach, we can broadly categorize the industry into eight segments:

1. Art
2. Music
3. Collectibles

4. Games
5. Sports
6. Metaverse
7. Utility
8. Financial

Collectibles are by far the biggest segment and usually boast expensive sales. As of 25 October 2021, 7 out of the top-10 NFTs in CryptoSlam are collectibles, totaling over \$3 billion in sales volume.



 **NFT Collection Rankings by Sales Volume (All-time)** 

	Collection		Sales	Buyers	Txns	Owners
1	 Axie Infinity	Gaming	 \$2,624,378,069	 813,363	7,285,512	2,270,360
2	 CryptoPunks	Collectibles	 \$1,514,628,029	 4,593	18,669	3,229
3	 Art Blocks	Art	 \$1,006,694,595	 19,453	111,375	22,633
4	 NBA Top Shot	Sports	 \$755,320,401	 360,641	10,745,321	579,506
5	 Bored Ape Yacht Club	Collectibles	 \$592,498,918	 7,756	21,684	5,660
6	 Mutant Ape Yacht Club	Collectibles	 \$303,971,145	 8,033	13,331	9,675
7	 Loot	Collectibles	 \$259,921,126	 3,465	9,728	2,547
8	 Meebits	Collectibles	 \$225,142,245	 4,836	12,976	5,324
9	 Cool Cats	Collectibles	 \$160,710,256	 7,565	22,287	4,867
10	 MekaVerse	Collectibles	 \$144,668,246	 3,932	7,643	5,182

Source: CryptoSlam

One way we can estimate the size of the NFT market is by calculating the total volume of NFTs sold on marketplaces for each chain. As of 25 October 2021, total NFT sales volume across all chains added up to \$12.3 billion.

⚡ Blockchains by NFT Sales Volume (All-time) ⓘ

Blockchain	Sales	Buyers	Txns	Sellers
1  Ethereum	\$8,156,367,131	 364,287	3,528,309	214,833
2  Ronin	\$2,624,378,069	 813,993	7,285,512	467,780
3  Flow	\$757,825,320	 362,645	10,750,209	355,650
4  Solana	\$477,771,057	 72,041	314,037	78,433
5  WAX	\$128,591,580	 430,308	7,365,452	832,715
6  Polygon	\$124,146,154	 43,312	158,924	26,493
7  Theta	\$14,519,757	 310	2,992	441
8  BSC	\$4,188,313	 1,854	5,345	1,782

Source: *CryptoSlam*

With a total sales volume of over \$8 billion, Ethereum far outstrips other chains. The next largest is Ronin, Axie Infinity’s sidechain. However, we are starting to see more and more NFTs being minted and sold on other blockchains such as Binance Smart Chain, Polygon, and Solana.

Nevertheless, it is worth noting that the numbers above are just an estimate as some chains like Tezos are not tracked on CryptoSlam, which means the entire NFT industry may be a lot bigger than it appears. Moreover, both Utility and Financial NFTs are not tracked by CryptoSlam either—this could be because they are less popular as speculative investments and represent a smaller portion of the entire NFT market.

Aside from project availability, one of the main reasons project owners and investors choose between different blockchains to mint or invest in NFT projects is the on-chain cost. For instance, if an NFT on Ethereum costs \$50, gas fees often cost more than the artwork itself. Aside from the cost, some blockchains are faster and more accessible for users than others. Some popular non-Ethereum NFT projects include Zed Run, a horse racing game on Polygon, and Degen Ape Academy on Solana.

Ultimately, Ethereum remains (for now) the market leader in this space, as it houses the earliest projects and has the first-mover advantage, combined with its vibrant culture and large community. This may change, however, as NFTs begin to see widespread adoption across different chains.

Recommended Readings

1. Fungible v Non-Fungible Goods
<https://www.investopedia.com/terms/f/fungibles.asp>
2. Example of DeFi + NFI + Real World Assets
<https://medium.com/centrifuge/investing-in-your-first-tinlake-pool-how-to-dyor-5b79cf88861c>
3. Understanding the Hype Behind NFTs
<https://www.coingecko.com/buzz/understanding-the-hype-behind-nfts>
4. History of NFTs
<https://medium.com/@Andrew.Steinwold/the-history-of-non-fungible-tokens-nfts-f362ca57ae10>
5. Coding Explanation of ERC-721
<http://erc721.org/>
6. NFTs then and the Future
<https://www.linkedin.com/pulse/brief-history-nfts-look-future-brad-bulent-yasar/>
7. Bridging NFTs
<https://anyswap.medium.com/anyswap-nft-cross-chain-bridge-alpha-f4ad72ee74da>

CHAPTER 2: CREATING AND TRADING NFTS

Before we dive into buying or creating an NFT, we first need to answer one question - how do we choose which NFT to buy? There are many subjective reasons for purchasing an NFT, such as aesthetics, emotional resonance, and social value. As with all items of value, scarcity also plays an important role.

If we reuse the Pokémon analogy for trading cards, we will be looking at rarities. In Pokémon, each card displays the number of cards in its collection (refer to 1) and its rarity tiers (refer to 2).



Similarly, each NFT has its own limited supply as well as specific traits, also known as metadata. Not all pieces are equal, and some will be rarer than others, especially if a particular trait is highly sought after. Therefore, a key factor in valuing NFTs lies in its metadata, which is the source of the piece's properties, such as the name, image, or video associated with it.

How Metadata Works

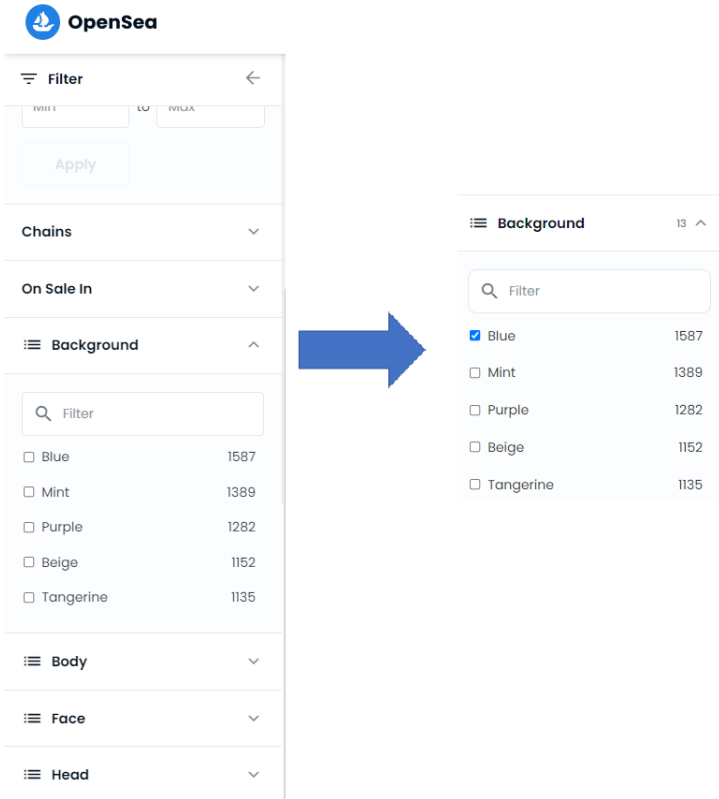
Most ERC-721 tokens come with an attached standardized set of metadata used for name display, description, and image of a digital asset. As part of the minting process, the metadata and associated files are deployed onto the InterPlanetary File System (IPFS).

IPFS provides us with a secure, transparent, decentralized, and public way to host asset metadata. The metadata on NFTs is usually frozen to ensure that your NFTs can still be proudly displayed for years to come. This means that the NFT's properties will be permanently locked and stored using the decentralized file storage system and cannot be edited or removed.

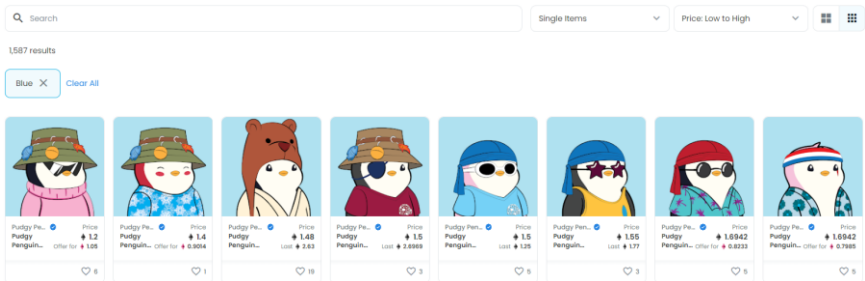
For NFTs that may serve as functional game pieces, the metadata can also be left unfrozen and used to display dynamic abilities and statistics. In this case, the NFT metadata can be changed or evolved in-game, unlocking additional properties. In some cases, it makes them even more unique—imagine combining different pieces to create a new, unique NFT character! This is all possible by leveraging the token's metadata.

You may view an NFT's metadata on the smart contract directly or on an NFT marketplace like OpenSea that pulls the smart contract data. Most people rely on the latter method, which is more intuitive and as simple as clicking on an NFT in the marketplace and viewing its properties.

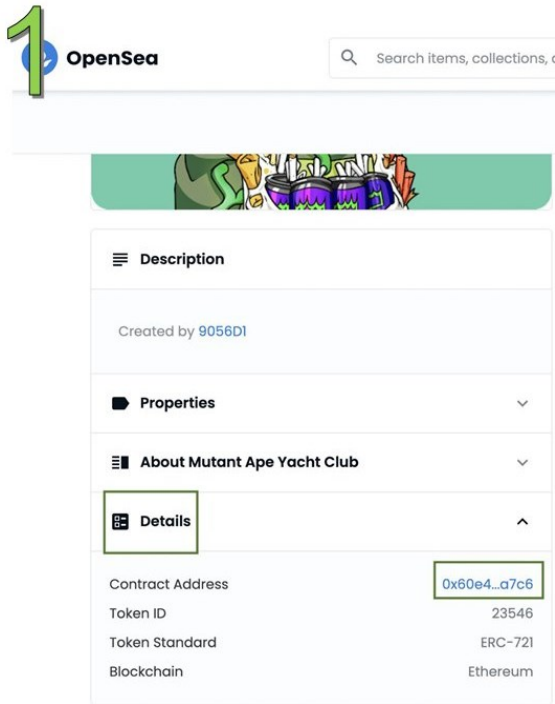
In the example below, we used OpenSea to view the “trait” panel for the Pudgy Penguins collection. For this collection, there are several main traits (Body, Face, Head, Background), each with its own sub-traits. Under Background, we can see five traits (there are more traits, but OpenSea's interface only shows five at a time and needs to be scrolled down).



If we click on the Blue tickbox, OpenSea will automatically filter and display all NFTs within the collection that has a Blue Background.



However, if you are interested in the former method to view the NFT's metadata on the smart contract, you can refer to our step-by-step guide below.



Step 1:

- Go to an NFT marketplace where your NFT is listed (in our example, we used opensea.io). However, if you already have the Contract Address, skip Step 1.
- Choose an ERC-721 NFT.
- Scroll down to Details and click on the Contract Address.

Creating and Trading NFTs

2

Etherscan

Eth: 53,217.88 (-5.79%) | 7:56 GMT

All Filters Search by Address / Txn Hash / Block / Token / ENS

Home Blockchain Tokens Resources More Sign In

The screenshot shows the Etherscan interface for a contract. At the top, there's a search bar and navigation links. The main content area is titled 'Contract Overview' for 'MutantApe Yacht Club: MAYC Token'. It displays the contract address '0x60E4d786628F6a6478F785A6d7e704777c86a7c6'. Below this, there are sections for 'Balance' (0 Ether), 'Ether Value' (\$0.00), and 'Token'. To the right, a 'More Info' section shows 'My Name Tag' as 'Not Available', 'Contract Creator' as '0x9056d15c49b19df52ff... at bn 0x625f185282da3c52b9...', and 'Token Tracker' as 'MutantApeYachtClub (MAYC)'. A banner for 'Buy crypto with 0% fee' is visible. At the bottom, there are tabs for 'Transactions', 'Internal Txns', 'ERC721 Token Txns', 'Contract', 'Events', 'Analytics', 'Info', and 'Comments'. The 'Contract' tab is selected, and a 'Read Contract' button is highlighted with a green box.

Step 2:

- By clicking on Contract Address, it will guide you to Etherscan, an Ethereum block explorer.
- Click on Contract followed by Read Contract.

3

The screenshot shows the 'Token URI' search interface on Etherscan. It has a search bar with 'tokenURI' in the placeholder. Below the search bar, there's a 'Query' button. A dropdown menu shows the result: 'tokenURI(token256) method Response' with a link to 'string : https://boredapeyachtclub.com/api/mutants/23546'. The link is highlighted with a green box.

Step 3:

- Scroll down and search for Token URI.
- Key in your Token ID and press on Query.
- A URL will pop out.

4

Step 4:

- Click on the URL.
- It will show you the traits of your token.

Now that you understand how metadata works, we can move on to the community hub of NFTs - NFT Marketplaces.

NFT Marketplaces

Fungible assets have the property of being uniform and interchangeable, and thus, makes trading easier. For example, shares are traded on stock exchanges, for instance the New York Stock Exchange, NASDAQ, and London Stock Exchange. Fungible cryptocurrencies are also interchangeable and thus traded on crypto exchanges such as Coinbase, Binance, and Uniswap.

Non-fungible assets, particularly those that are unique and rare, are not suitable to be traded on such exchanges. The value of each asset is subject to many different considerations and can vary significantly. In the real-world, non-fungible items are listed and sold on marketplaces like eBay and Etsy or consigned and auctioned off via auction houses like Christie's and Sotheby's.

For NFTs, a marketplace is also needed to facilitate the minting, sale, and secondary trading of NFTs between prospective NFT buyers and sellers. There are multiple NFT marketplaces available, each specializing in catering to different groups of NFT buyers and sellers. For this section, we use OpenSea as an example to show you the various functions available on a typical NFT marketplace.

OpenSea

Founded in December 2017 by Alex Atallah and Devin Finzer, OpenSea is a generalized marketplace set up to facilitate the trading of NFTs. One may mistake OpenSea as a place solely for trading NFT art pieces, but that's far from the truth. The platform comprises many NFT categories, including digital art, music, domain names, virtual land, trading cards, and more.

The idea to start OpenSea came to Alex and Devin during CryptoKitties' surge of popularity. Both founders saw a need for an NFT marketplace to facilitate NFT trades. In July 2021, OpenSea completed its Series B funding











round, raising \$100 million from notable investors such as Andreessen Horowitz, and is now valued at \$1.5 billion.⁷

OpenSea is by far the largest NFT marketplace by trading volume. It saw about \$3 billion in trading volume in September 2021 alone, making up more than 99% of the total market.

The OpenSea Interface

Learning how to use OpenSea is essential for aspiring NFT collectors. Below, we will cover the core features on OpenSea's user interface.

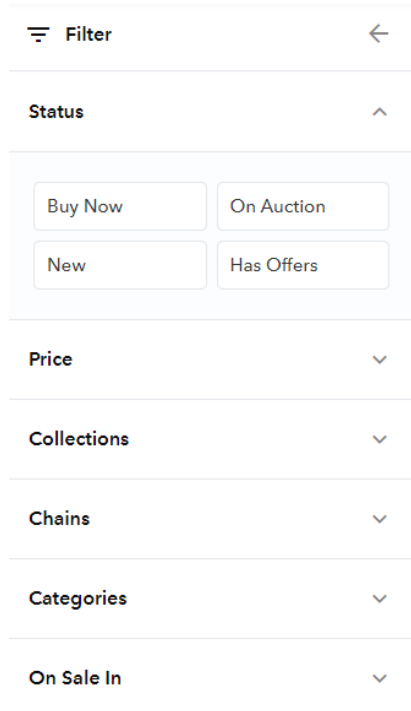
Marketplace Categorization Tool

Marketplace	Stats
 All NFTs	
 New	
 Art	
 Music	
 Domain Names	
 Virtual Worlds	
 Trading Cards	
 Collectibles	
 Sports	
 Utility	

⁷ More, S. (2021, July 20). *OpenSea secures \$100 million in Series B round at \$1.5 billion*. Retrieved November 5, 2021, from <https://www.theblockcrypto.com/post/111977/opensea-secures-100-million-in-series-b-round-at-1-5-billion-valuation>

The NFT marketplace on OpenSea is rather extensive, and one can get lost with all the NFTs floating around. That's where the Marketplace categorization tool comes in handy. One can sort NFTs in different categories, including New, Art, Music, Domain Names, Collectibles, and more.

Status Filter



The image shows a vertical filter menu on a light blue background. At the top, there is a header with a hamburger menu icon, the text "Filter", and a left-pointing arrow. Below this is a section titled "Status" with an upward-pointing arrow. This section contains four buttons: "Buy Now", "On Auction", "New", and "Has Offers". Below the "Status" section are five more filter categories, each with a downward-pointing arrow: "Price", "Collections", "Chains", "Categories", and "On Sale In".

Once you've selected a category, you can narrow it down even further via the filter. There are six filters available: Categories, Status, Price, Collections, Chains, and On Sale In. We will now go through each filter.

Status can be broken down into Buy Now, On Auction, New, and Has Offers. As the name suggests, the Buy Now filter allows you to view NFTs that you can purchase immediately for a fixed price.

Meanwhile, Auction NFTs go through a bidding process, and you're allowed to place a bid for an NFT you like. However, you'll need to compete with other bidders as well. As for New, these are NFTs that were recently added.

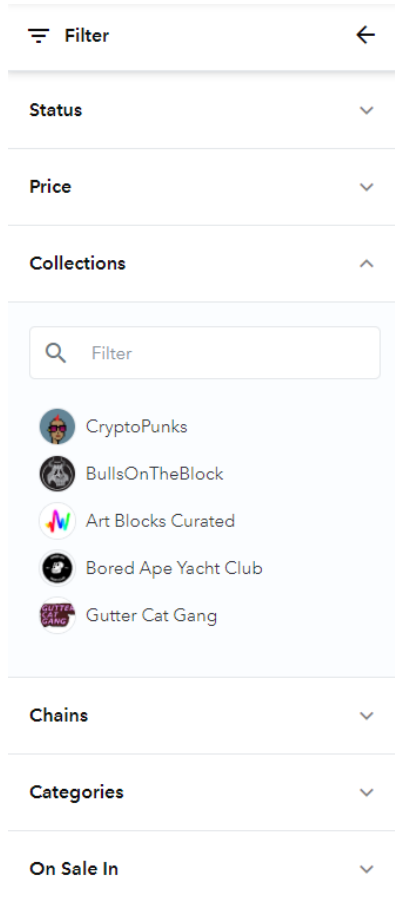
Finally, the Has Offers status will showcase NFTs which interested buyers have placed bids on.

Price Filter

The image shows a vertical filter menu. At the top is a header 'Filter' with a left-pointing arrow. Below are several filter categories, each with a downward arrow: 'Status', 'Price', 'Collections', 'Chains', 'Categories', and 'On Sale In'. The 'Price' filter is expanded, revealing a sub-menu. This sub-menu contains a currency selector dropdown currently set to '\$ United States Dollar (USD)'. Below the currency selector are two input boxes labeled 'Min' and 'Max', separated by the word 'to'. At the bottom of this sub-menu is a blue 'Apply' button.

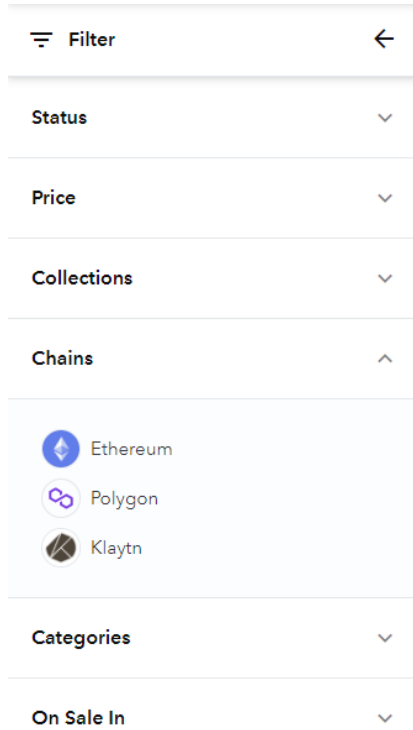
Price allows you to switch between USD and ETH. The price range can also be adjusted, allowing you to view NFTs within your price range.

Collections Filter



The Collections filter allows you to view NFT collections, including CryptoPunks, CryptoKitties and more. It is also possible to search for a specific collection via the embedded search bar.

Chains Filter



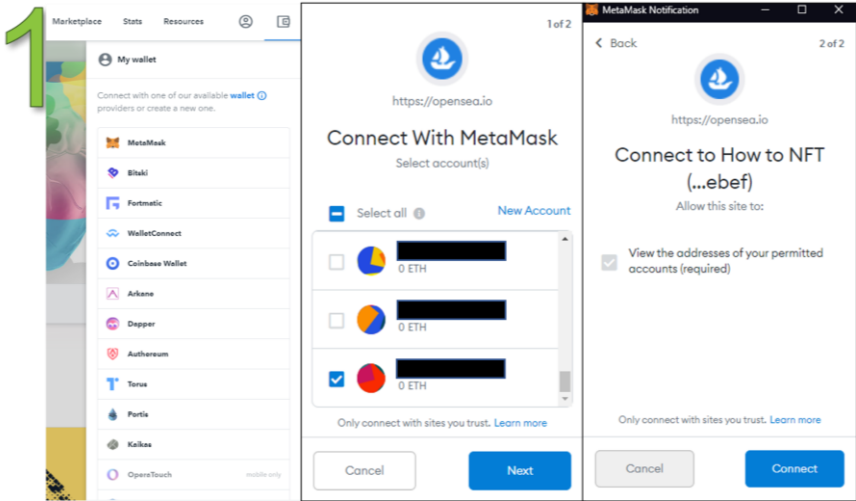
The Chains tab enables you to switch between different blockchains. At the time of writing, OpenSea only supports Ethereum, Polygon, and Klaytn.

On Sale In Filter

The image shows a mobile application interface for filtering NFTs. At the top, there is a 'Filter' button with a left-pointing arrow. Below this is a list of filter categories, each with a downward-pointing chevron: 'Status', 'Price', 'Collections', 'Chains', 'Categories', and 'On Sale In'. The 'On Sale In' filter is currently selected and expanded, showing a search bar with a magnifying glass icon and the text 'Filter'. Below the search bar is a list of five options, each with an unchecked checkbox: 'ETH', 'WETH', '0xBTC', '1337', and '1MT'.

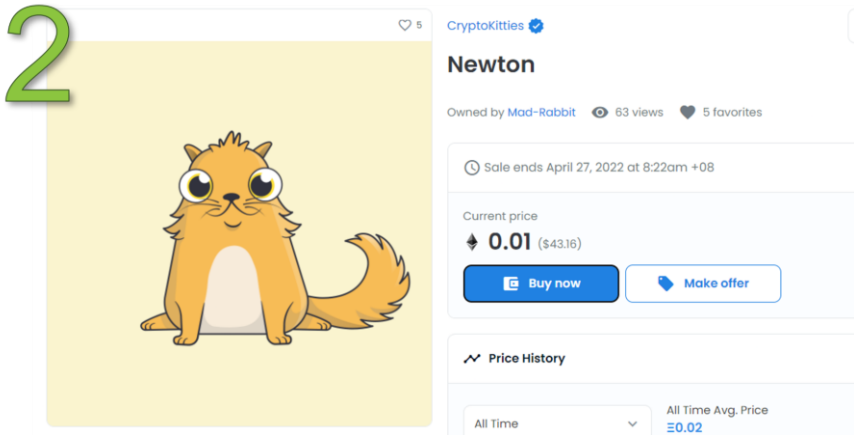
The On Sale In filter allows you to sort NFTs by the currency they're sold in. For example, you can select only NFTs that are sold in ETH, or select NFTs that are sold in WETH.

Purchasing Your First NFT



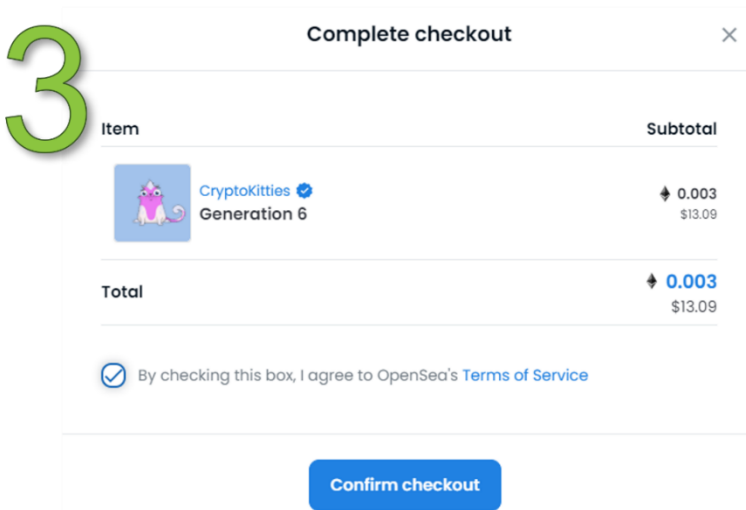
Step 1

- To connect your wallet, tap on the wallet icon in the top right corner. Some of the methods available include MetaMask, Bitski, Fortmatic, Coinbase Wallet, among others. In this tutorial, we will be using MetaMask.
- Select the MetaMask icon, and you will be prompted to connect your wallet to OpenSea. Simply select which MetaMask wallet you would like to connect, hit “Next”, and tap “Connect”. You have now successfully connected to OpenSea via MetaMask.



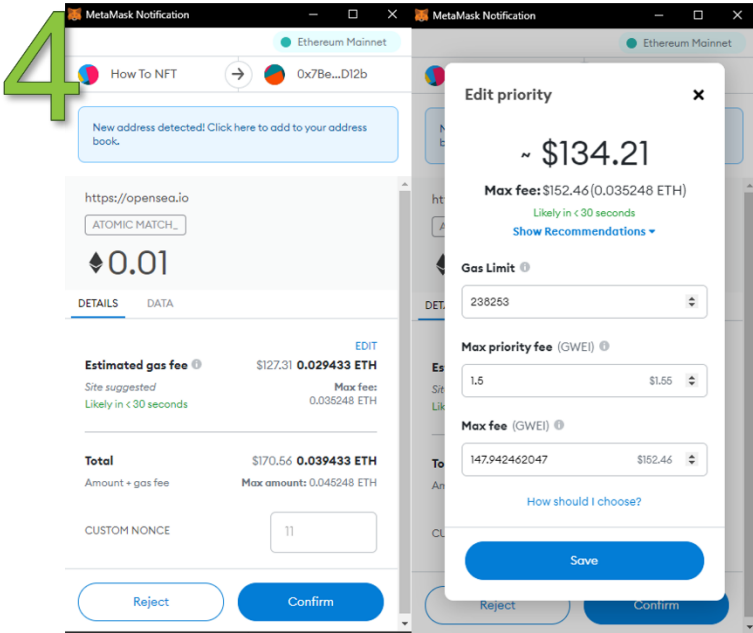
Step 2

- After finding an NFT that suits your liking, it's time to purchase it! Here, we will be purchasing an NFT from CryptoKitties. To get started, hit the “Buy now” button.



Step 3

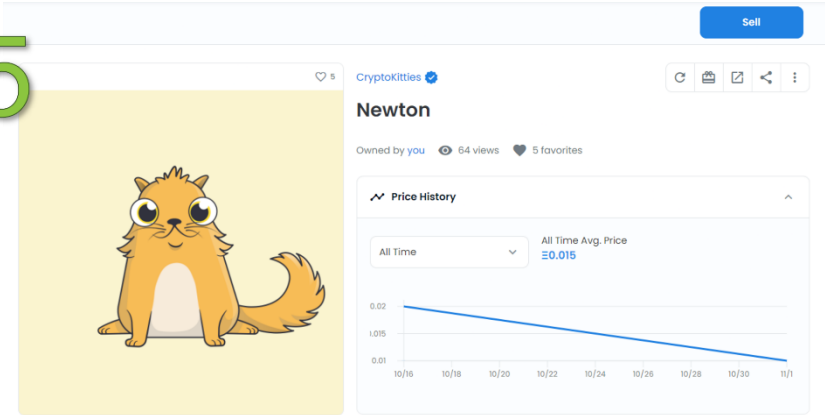
- You will now be asked to check a box to agree to OpenSea's terms. Once done, you will be allowed to hit the Checkout button.



Step 4

- Next, a MetaMask confirmation will pop up, and you will have to either confirm or reject the transaction.
- If you click on the “Edit” button, there will be the option to increase or decrease the Max fee. Increasing it will hasten the transaction, while decreasing it will cause the transaction to take longer to confirm. When you’re done, click on Save, and then Confirm.

5



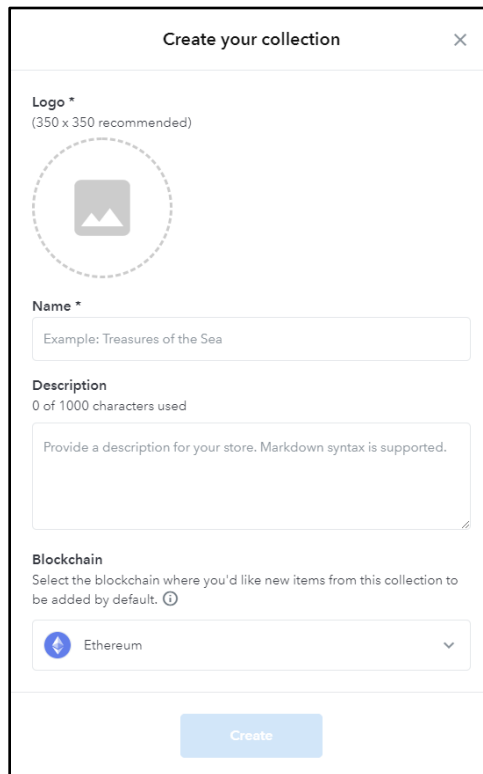
Step 5: Viewing the NFT

- There you have it—you have purchased an NFT from OpenSea. Now, it's time to view your new purchase. Simply head to your profile, and the NFT will be available for viewing.

Creating Your First NFT Collection

The process to upload an NFT on OpenSea is slightly different than other NFT platforms. First things first, you'll need to create a collection. To do this, go to your profile icon, and select My Collections. From here, tap on Create a Collection, allowing you to begin a new collection.

You will need to upload a logo for your collection, give it a name and a description, and choose the blockchain for the NFT to be minted on. Finally, click Create, and you can begin creating NFTs for your collection. Do note that it's possible to add further information to your collection. This consists of links to social media profiles, a category to make your item discoverable on OpenSea, and also the ability to upload a banner image.



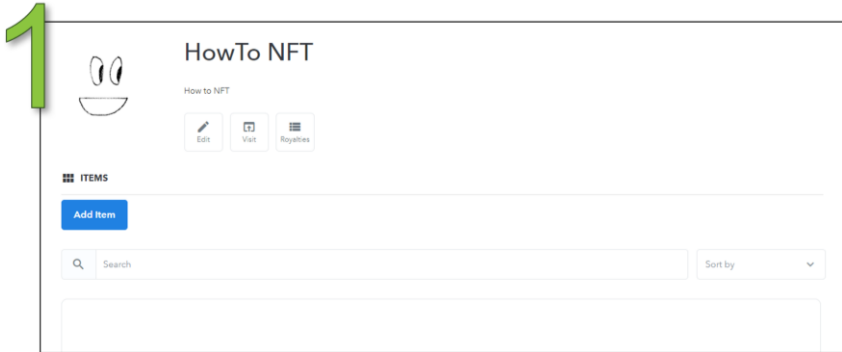
The screenshot shows a mobile interface for creating a new NFT collection. At the top, the title "Create your collection" is displayed with a close button (X). Below the title, there are four main sections:

- Logo ***: A circular placeholder for a logo, with the text "(350 x 350 recommended)" below it. The placeholder contains a small icon of a mountain range.
- Name ***: A text input field with the placeholder text "Example: Treasures of the Sea".
- Description**: A text area with the label "0 of 1000 characters used" and the instruction "Provide a description for your store. Markdown syntax is supported." The text area is currently empty.
- Blockchain**: A dropdown menu with the label "Select the blockchain where you'd like new items from this collection to be added by default." The selected option is "Ethereum", indicated by a blue lightning bolt icon and a downward arrow.

At the bottom of the form, there is a blue "Create" button.

Minting Your First NFT

After creating a collection, you can begin to upload NFTs into it.




Step 1

- Go to your collection, and select Add Items. This will bring you to the Create New Item page.

2 Create new item

Image, Video, Audio, or 3D Model

File types supported: JPG, PNG, GIF, SVG, MP4, WEBM, MP3, WAV, OGG, GLB, GLTF. Max size: 40 MB



Change

Name *

Quirky Smile

External Link

OpenSea will include a link to this URL on this item's detail page, so that users can click to learn more about it. You are welcome to link to your own webpage with more details.

<https://yoursite.io/item/123>

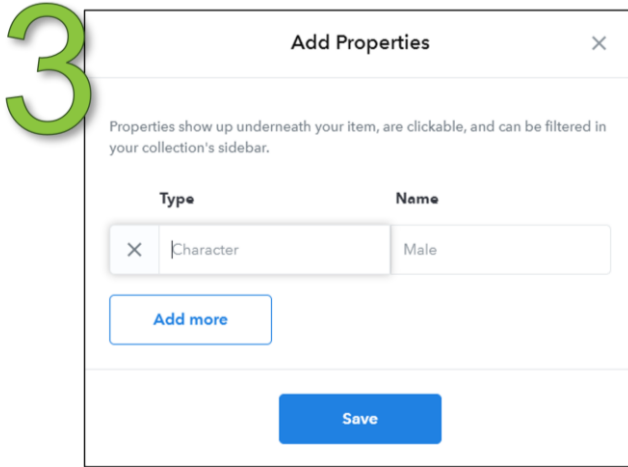
Description

The description will be included on the item's detail page underneath its image. [Markdown](#) syntax is supported.

A smile that's quirky.

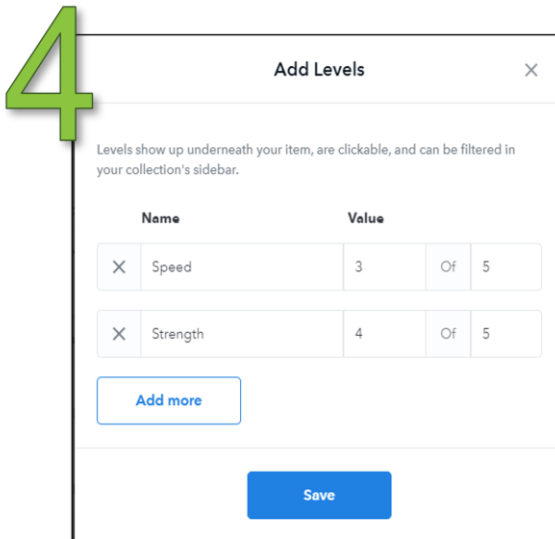
Step 2

- Add the NFT file; it may be an image or video. OpenSea supports a host of formats, including JPG, PNG, GIF, MP4, and more. Give it a name, and a description as well.
- There's also the option to add an external link to the NFT, for example a link to your personal website.



Step 3

- Time to give your NFT some properties. These are traits for your NFT, and it could be gender, color, or whatever characteristics you would like to add.



Step 4

- Next, give your NFT a level and it will show up as a progress bar. For our NFT, we are giving it a 3/5 for speed and a level of 4/5 for strength. It is also possible to provide it with levels for other traits. Adding levels for your NFT is optional.

5

Add Stats

Stats show up underneath your item, are clickable, and can be filtered in your collection's sidebar.

Name	Value
<input type="text" value="Speed"/>	<input type="text" value="3"/> Of <input type="text" value="5"/>

[Add more](#)

[Save](#)

Step 5

- It is also possible to add numerical stats to your NFT. This is similar to levels, but it won't show up as a progress bar, but instead will appear simply as numbers.

6

🔒 Unlockable Content

Include unlockable content that can only be revealed by the owner of the item.

Enter content (access key, code to redeem, link to a file, etc.)

Markdown syntax is supported.

Step 6

- If owning your NFT will give the owner access to perks, or tied to a redeemable item, then activate the Unlockable Content option. This will allow the buyer to receive the code, link, etc. once it's purchased.

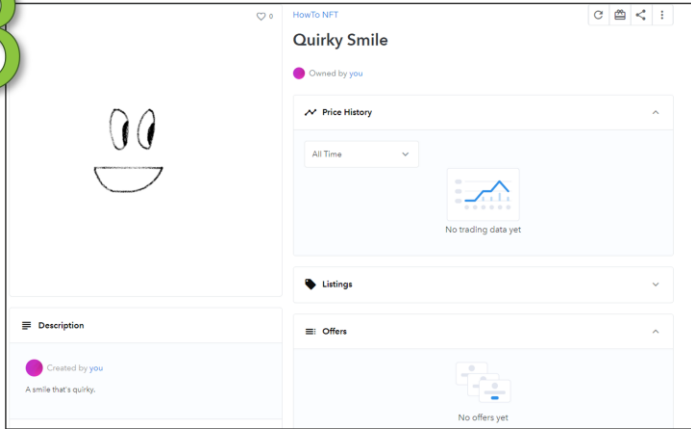
7



Step 7

- If the NFT contains explicit or sensitive content, you may categorize it as such.

8



Step 8

- Finally, it's time to mint the NFT. Tap on Create, and the next page will show your newly uploaded NFT. From here, you may visit or edit it.

NFT Scams to Look Out For

Now that you are familiar with the basics of minting and trading NFTs, you are ready to dip your toes into the waters and start acquiring your very first NFT! But before that, you need to be aware of the potential dangers.

Below are a few common NFT scams you should keep an eye out for.

Fake Websites

One of the most rampant scams out there is replicating NFT project websites or popular marketplaces like OpenSea. Often, unwary users will be prompted to connect their crypto wallets to the fake website to mint or transact with an NFT. In most cases, the action will drain the funds from the users' wallets, whereas the more "fortunate" ones will end up paying for a fake NFT.

So how can you avoid falling for this? Always double-check all the website links before you click on them. The official links are usually shared in each projects' locked Discord channels (e.g., Announcement or FAQ channels) or on their Twitter page.

Another good "mint habit" to foster is to glance through the comments on the project's social channels as you prepare for a mint. Often, internet sleuths will call out scams, and if you see any, it's best to take a step back and investigate deeper. In cases where you are unsure but still insist on buying or minting an NFT in the hopes of striking gold, connect using a new wallet with just the right amount of funds needed.

Remember, stay safe and always do your own research!

Fake Collections

If something seems too good to be true, it probably is. The same saying also applies to NFTs, so don't buy that 1 ETH CryptoPunk just yet! Be sure to check the NFT is indeed part of the authentic collection and not an imitation product.

Marketplaces such as OpenSea will mark most high-profile collections with a "Verified Collection" tag. Some creative scammers attempt to replicate this by including the verified tick in the fake collection's logo. One quick way to check is to hover over the blue tick on OpenSea, and the words "Verified Collection" should pop up like what you see below.



Authentic Lost Poets collection with "Verified" tag



Fake Lost Poets collection

In cases where the "Verified Collection" tag is not available, it's best to check the official websites and community channels of the NFT collection and see if the contract addresses match up with what you are buying.

Impersonation

Impersonation scams have been around for a long time and unfortunately, still very much prevalent in the world of crypto. Scammers often impersonate the projects' customer support team to prey on unsuspecting users in need of help. Usually, these are phishing attempts to get ahold of the targets' personal details and sensitive information such as their wallet seed phrases.

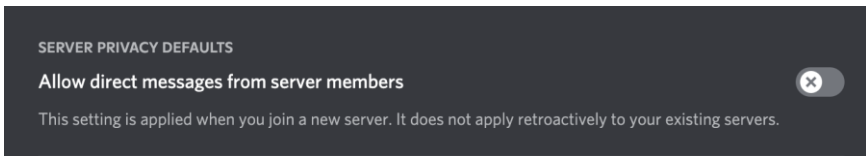
Another common scam is fake giveaways that trick and entice users into connecting their wallets with a fake website or surrendering their private keys. If done successfully, the users' funds will be at the mercy of the scammers, allowing them to drain all of the wallet's assets.

Sophisticated hackers may even bypass security and take control of the project's social media or Discord accounts. This essentially allows hackers to share fake "official links" in "official channels" that can dupe even the most careful users, as in the case of Bepple's Discord group, which led to a user losing ~38 ETH.⁸ While there's no sure-fire way to prevent such incidents, you can perform due diligence by cross-checking multiple sources (e.g., Twitter, Discord, Telegram, official website) before attempting to buy or mint any NFTs.

⁸ Parasol, M. (2021, November 11). *Bepple's Discord compromised, timed to coincide with Christie's auction*. Retrieved November 11, 2021, from <https://cointelegraph.com/news/bepple-s-discord-compromised-attack-timed-to-coincide-with-christie-s-auction>

As you participate in more and more projects' Discord groups, you will start to receive many unprompted direct messages (DMs) or spam from other users. Avoid clicking on links shared by other users, which is a method for scammers to share fake websites to phish for private keys. This was one of the methods that scammers used to trick users in Aurory's high-profile NFT drop.⁹

One way to prevent this is to tweak Discord's privacy settings to prevent direct messages from server members. By doing so, you will filter out all private messages from users who are not on your friend list.



Lowball Bids

While strictly not a scam, this is still a widespread phenomenon that both aspiring and veteran NFT collectors should note. It is common to receive multiple offers for your NFT, especially for popular collections or rare pieces. When you receive an offer for your NFT, pay close attention to the denomination of the cryptocurrency for the offer. Is the offer denominated in ETH, DAI, USDC, or some other tokens?

Take the below offer for Poet #3179, for instance. While 1.25 ETH might be a decent offer to consider for the NFT, 1.25 USDC is undoubtedly not. In this case, the bidder is hoping that the NFT owner mistakenly accepts the offer for a quick and easy profit, so watch out for these tactics!

⁹ Copeland, T. (2021, September 1). *How scammers are exploiting the NFT mania*. Retrieved November 1, 2021, from <https://www.theblockcrypto.com/post/116317/how-scammers-are-exploiting-the-nft-mania>

LOSTPOETS

Poet #3179

Owned by NFT_Shady 117 views 4 favorites

Sale ends November 17, 2021 at 1:21am +08

Top bid -- Reserve price not met.

0.3463 (\$1,650.34)

Place bid

Listings

Offers

Price	USD Price	Floor difference	Expiration	From
0.3463 WETH	\$1,650.34	11.1% below	in 4 hours	27D026
1.25 USDC	\$125	99.9% below	in a year	649B6D

As with many lucrative businesses out there, there will always be bad actors scheming to profit from our momentary lapse of judgment. In general, the same old cybersecurity practices should be applied with NFTs:

1. Never reveal your wallet seed phrases
2. Verify and check the links you click on
3. Cross-check and verify information across multiple sources
4. Use a fresh wallet when connecting to dubious sites
5. Always do your own research

Notable Mentions



SuperRare

SuperRare is a marketplace with highly curated NFTs and is a more community-centric platform. Being highly curated, you can expect the marketplace to work closely with artists and feature a smaller variety of art. SuperRare also has its fungible token named RARE.



Rarible

Rarible is an NFT marketplace that offers various NFTs (e.g., art, video, etc.) and is not content-restricted (i.e., curated), unlike some platforms. Like SuperRare, Rarible has its own NFT token, RARI, and is part of a larger initiative to decentralize the platform.



MakersPlace

Another lesser-known NFT exchange would be MakersPlace. The way they distinguish themselves from the competition is by offering “truly unique” NFTs. Most of these are one-off creations and are from exclusive collections. Artists such as Shakira and T-Pain have also held NFT drops on MakersPlace.



Nifty Gateway

Nifty Gateway is another NFT marketplace, owned by the crypto exchange Gemini. The platform is famously known for hosting Beeple’s \$6.6 million sale of CROSSROAD. Other famous collections include drops from musicians like Grimes, Eminem, and The Weeknd.



Solanart

Catering to your NFT trading needs on the Solana ecosystem is Solanart. Despite being in beta, the marketplace is already actively facilitating trades, including prominent collections such as Degen Ape Academy and Aurory.



Binance NFT

The popular crypto exchange, Binance, has also gotten into the NFT game by setting up its own marketplace. Aptly named Binance NFT, the marketplace allows users to buy and sell Binance Smart Chain and Ethereum NFTs.



Artion

Artion is a new Fantom-based NFT marketplace launched by Andre Cronje. Its source code is open-source, and unlike other marketplaces, Artion does not charge any platform fees for mints and purchases.

Conclusion

NFT artists and owners are spoiled for choice when it comes to choosing an NFT marketplace to use. While we have covered quite a few, new marketplaces are always popping up and vying to establish themselves.

You have also seen that setting up a profile on one of these NFT marketplaces is rather straightforward. By following the step-by-step guide we have included, you should be able to own an NFT or create your own NFT collection in no time.

However, you should still be wary of gas fees when it comes to purchasing or minting NFTs on Ethereum. Be sure to double-check the amount you are being charged for transaction fees, as there have been too many incidents where individuals have accidentally overpaid for gas.¹⁰

¹⁰ Copeland, T. (2021, October 13). *Ethereum user pays \$430,000 in transaction fees for a failed payment*. Retrieved November 1, 2021, from <https://www.theblockcrypto.com/post/120438/ethereum-user-pays-430000-in-transaction-fees-for-a-failed-payment>

Recommended Readings

1. NFT Token Discovery - Metadata
<https://dennisonbertram.medium.com/nft-token-discovery-metadata-3fcfc01c2450>
2. What is Freezing Metadata?
<https://support.opensea.io/hc/en-us/articles/1500012270982-What-is-Freezing-Metadata>
3. Getting started on OpenSea
<https://support.opensea.io/hc/en-us/sections/360011539774-Getting-Started>
4. Getting started on Rarible
<https://rariblecom.zendesk.com/hc/en-us/categories/360006282651-Getting-Started-on-Rarible>
5. 13 of the Biggest NFT Marketplaces
<https://decrypt.co/80595/best-nft-marketplaces>

PART TWO: DEEP DIVING INTO THE NFT ECOSYSTEM

CHAPTER 3: ART

The art NFT movement is a movement that was primarily driven by a small community of digital artists. As the scene garnered more attention and clout, other artists started coming on board. Budding digital artists saw it as the chance to showcase their work, while traditional and more renowned artists made the leap to begin experimenting digitally.

Artists and creators can now create their art directly as NFTs and directly generate revenue from their fans without any middlemen. Without dealing with fees from distributors and publishers, artists can now earn their fair share based on what users are willing to pay.

NFTs essentially opened up the digital art industry because of their ability to protect ownership rights. Before NFTs, the Internet was a sea of artwork that was difficult to trace because anyone could easily copy or reproduce these media assets without any ownership rights attributed. Now, NFTs allow artists to place their stamp of origin onto any digital media. While this still does not prevent people from “copy-pasting”, it does prove the origin of the artwork.

Collectors are willing to spend hefty amounts on art NFTs because these NFTs are limited and have proof of ownership on the blockchain. In other words, NFTs facilitate the value of origin and provenance—this is important because actors such as “prior owners” and the “painter’s identity” play a

significant role in driving art value.¹¹ There are many examples in the traditional art industry where paintings were sold cheaply but later revalued once the original artist and owner were identified.¹²

Moreover, NFTs also provide a unique connection to the creators that do not exist with any other art form. There are many advantages to using the digital medium such as portability and enabling more creativity. For example, artists can incorporate sound and movement in their work.

The variety of different artforms offers more appeal to a broader audience, thereby giving the opportunity for artists and creators to expand their fanbase. New collectors include investors from the crypto community and existing art collectors who may have heard of art NFTs from the wider media attention. The rise of art NFTs is also attracting institutional investors as they become accepted as investable asset classes.¹³

Defining Art

Art has been an essential part of human culture since the dawn of time. It has always been a medium of expression for humanity to portray creativity, dreams, visions, and more.

Art is also subjective. It has taken on many forms, from sculptures such as Auguste Rodin's *The Thinker*, to Michelangelo's famous fresco that adorns the Sistine Chapel's ceiling. With the advent of the Internet, art now exists in digital format and is created natively on digital platforms. In a sense, NFTs are the amalgamation of technology's advancement and art.

Now, instead of just being painted or printed on paper, art has evolved into GIFs, JPEGs, and more. NFTs brought a whole new revolution worldwide,

¹¹ Randall, K. (2021, March 15). *What makes art valuable?* Retrieved November 3, 2021, from <https://www.thecollector.com/what-makes-art-valuable/>

¹² Fawcett, K. (2017, September 8). *6 valuable works of art discovered in people's attics and garages.* Retrieved November 3, 2021, from <https://www.mentalfloss.com/article/504146/6-valuable-works-art-discovered-peoples-attics-and-garages>

¹³ Quarmby, B. (2021, August 31). *Three Arrows Capital executives launch NFT fund.* Retrieved November 1, 2021, from <https://cointelegraph.com/news/three-arrows-capital-execs-launch-nft-fund>

bringing immense opportunities into the art industry for paintings, photography, graphic design, or even short animation.

Within the NFT industry, artists utilize various art segments to create unique artworks. Much like how there are oil and watercolor paintings, the digital art space is a lot more nuanced than you think. Here are some of the segments that we will cover:

1. Static Art
2. GIFs/Videos
3. Photography
4. Generative Art

Static Art

As the name suggests, static art is digital art that does not move. Static art is usually the choice of graphic artists who specialize in ‘photoshopping’ and ‘painting’ but is also preferred by traditional artists who tokenize their physical copies. Here, we will look at two of the most prominent NFT ‘static’ artists in the scene: Beeple and Pak.

Beeple

Beeple is the pseudonym used by Mike Winkelmann, a South Carolina-based graphic designer with 1.8 million Instagram followers. His artworks have been shown in Louis Vuitton’s collection and at least one of Justin Bieber’s concerts, yet he has no gallery representation in the traditional art world.

Until October 2020, Mike Winkelmann was selling his digital prints for merely \$100. The first part in Beeple’s artwork, titled “Everyday’s - The First 5000 Days”, dates back to 1 May 2007. That was when Beeple set out to create and publish online a new artwork every day, which is a task he had been doing for the past 13 years. His artwork focuses on society’s obsession and fear of technology.

The “Everydays” series is a composite of every single individual image created in 5000 days into a single image. This art NFT was generated by

MakersPlace, a marketplace for digital creators, and is the first purely digital NFT artwork sold by Christie's, a major auction house. It sold for over \$69 million in March 2021.¹⁴ According to Christie's, the art sale puts Beeple "among the top three most valuable living artists." Beeple is now ranked as the most influential figure in Fortune's "NFTy 50" list.¹⁵

Mike Winkelman himself quotes, "I do view this as the next chapter of art history. Now there is a way to collect digital art."



Everydays: The First 5000 days by Beeple

Another piece of artwork from "The First Drop" collection by Beeple, named "Crossroads" had fetched \$6.6 million on the secondary market on Nifty Gateway.¹⁶ During the auction in October 2020, the original buyer did not know how the art piece would turn out as the final form depended on the outcome of the 2020 U.S. presidential election. Once the result was

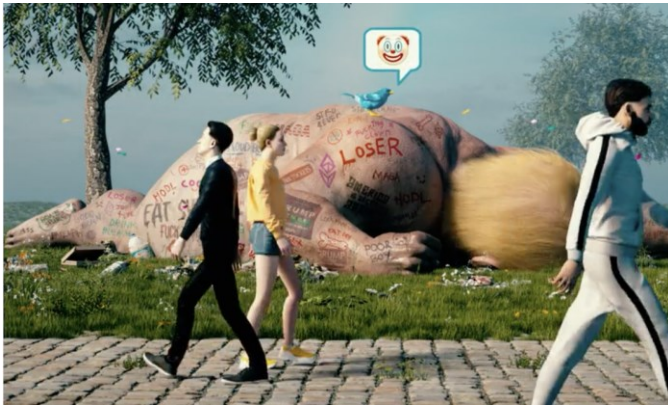
¹⁴ Christie's. (2021, March 11). *Beeple's Opus*. Retrieved November 2, 2021, from <https://cutt.ly/9EiDeyA>

¹⁵ Fortune (2021, July 29). *NFTy 50: The 50 most influential people In NFTs*. Retrieved November 2, 2021, from <https://fortune.com/nfty-50/>

¹⁶ Solomon, T. (2021, February 25). *Beeple NFT artwork sells for \$6.6 M. ahead of Viral Christie's auction*. Retrieved November 2, 2021, from <https://www.artnews.com/art-news/news/beeple-nft-artwork-nifty-gateway-sale-1234584701/>

finalized, the final art was presented—a picture of a defeated President Donald Trump lying in his birthday suit covered in graffiti on the roadside.

Pablo Rodriguez-Fraile, who initially bought this artwork for \$66,666, resold it for 100 times the original purchase price in just four months. He started his digital art collection a year ago and co-founded the Museum of Crypto Art to display his growing collection. He views Winklemann’s rising sale prices as an indication of the importance of technology to the public.¹⁷



Crossroads by Beeple

Pak

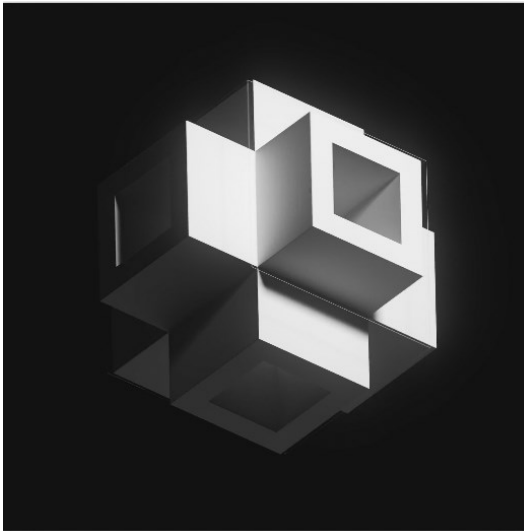
Pak is a mystery to date as nobody knows who Pak is. Due to Pak’s pseudonymous identity, the crypto community has even labeled Pak as the “Satoshi of crypto art”.

Pak is a designer widely known for creating the Archillect, an AI algorithm that offers unique images featuring floating, geometrical shapes and tens and thousands of matching cubes. With the launch of The Fungible Collection, Pak seeks to challenge the relationship between scarcity and value while pointing to the future of digital art.

¹⁷ Kastrenakas, J. (2021, March 11) *Beeple sold an NFT for \$69 million*. Retrieved November 2, 2021, from <https://www.theverge.com/2021/3/11/22325054/beeple-christies-nft-sale-cost-everydays-69-million>

In collaboration with Sotheby's and Nifty Gateway, Pak's 'The Fungible Collection' earned nearly \$10 million in the first 15 minutes of sales and \$16.8 million in 2 days. The highest valued artwork within this collection was The Switch, which sold for \$1.44 million.¹⁸

On Nifty Gateway, The Switch is described as a unique, "one of one" NFT that demonstrates the evolution of artwork in the digital realm. The Switch is developed to change form at a specific point in the future, known only to Pak. The transition is determined and rendered immutable by smart contracts or self-executing code on the Ethereum blockchain.



The Fungible Collection: The Switch by Pak

Another art piece from The Fungible Collection is The Pixel. The Pixel is a digitally native artwork represented by a single pixel. It is meant to symbolize the entry of NFTs into the traditional art world and was sold for \$1.36 million after a 90-minute bidding war on the Nifty Gateway.

¹⁸ Sotheby's. (n.d.). *The fungible collection*. Retrieved November 3, 2021, from <https://cutt.ly/CEjITxC>



The Fungible Collection: The Pixel by Pak

Unlike the Switch, which encompasses a collection of white and grey three-dimensional shapes on black background, The Pixel is just a grey square. It is meant to showcase the significance of digital art (NFTs) entering traditional auction houses. The Pixel was later sold on Sotheby's.

Other than The Fungible Collection, Pak has many other NFT collections like "The Title". Pak has already imprinted his name in crypto art history, and could very well become a household name in the future.

GIFs/Videos

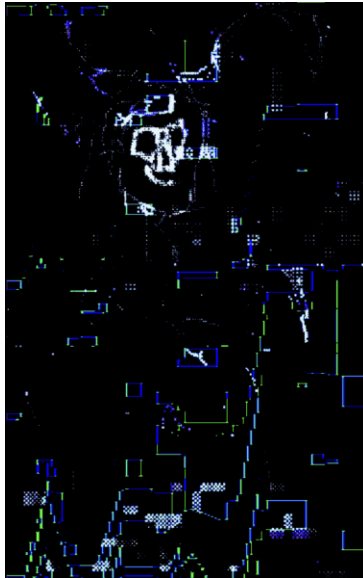
Take a look at any NFT marketplace, and you will find tons of GIFs and video NFTs available for sale. While it is unlikely for you to find a whole movie tokenized into an NFT, there are many animations that have been made into NFTs because it fully maximizes the digital medium. Unlike traditional paintings or static digital images, GIFs and videos can incorporate animation and sound, thus allowing artists to create pieces which integrate visual movement and auditory experiences.

XCOPY

XCOPY is a London-based crypto artist who explores death, dystopia, and apathy through distorted visual loops. XCOPY participated in the SuperRare launch in 2018, becoming the second-ever artist to mint on the now-iconic platform.

He has minted over 100 NFTs on SuperRare since the platform's earliest days in 2018. XCOPY not only has NFTs minted on SuperRare, but he also has his artworks on other platforms like Nifty Gateway.

His piece *Death Drip* was the 14th NFT ever minted on SuperRare, and it was sold for 1,000 ETH in a SuperRare secondary market transaction on 24 March 2021.¹⁹ This purchase marks the largest all-time sale made on SuperRare to date and notably saw a royalty payment of 100 ETH (10% of the resale price as per SuperRare contract) sent straight to XCOPY's Ethereum wallet.



Death Drip by XCOPY

¹⁹ SuperRare. (n.d.). *Authentic digital art market*. Retrieved November 3, 2021, from <https://superrare.com/artwork/death-dip-14>

Another GIF by XCOPY, NGMI, is a 1 of 1 NFT minted on a custom smart contract, which allows the owner's wallet address to determine the piece's color.²⁰ The artist asks the question, "How do we defuse the bomb if we are the bomb?" as his personalized animation sees vibrant color set against a dark illustrated background. It was sold for \$378k on Sotheby's Natively Digital: A Curated NFT Sale in June 2021.



NGMI by XCOPY

Mad Dog Jones

Mad Dog Jones, an Ontario artist also known as Michah Dowbak, has created art in line with the dynamic, adaptive, and surreal concept by combining music and art. His artwork starts as photographs or drawings of urban viscera such as buildings and street signs, which he then morphs through colors and illustrations into a cyberpunk scene. He has sold 1,567 NFT artworks averaging \$9,063.52 apiece.

His NFT artworks, such as "Crash + burn", which sold for \$3.9 million, have made NFT headlines. Like Beeple, Mad Dog Jones has created artworks for entertainers and musicians like Maroon 5.

²⁰ Sotheby's. (n.d.). *NGMI: Natively Digital: A curated NFT Sale 2021*. Retrieved November 3, 2021, from <https://www.sothebys.com/en/buy/auction/2021/natively-digital-a-curated-nft-sale-2/ngmi>.

Mad Dog Jones' REPLICATOR (2021) sold for \$4.1 million on 23 April 2021 at an auction organized by Phillips.²¹ The Replicator is unique as it will generate new NFTs every 28 days. The buyer could ultimately own between 180 and 220 unique NFTs, each with its own resale value.



REPLICATOR (2021) by Mad Dog Jones

Mad Dog Jones' passion for the cyberpunk art genre eventually led him to create an MP4 NFT, Visor.²² He rendered a light and color study of the face inside a motorcycle helmet within the present work, illustrating a vivid and captivating visualization of the metropolitan aesthetic. This 1 of 1 art edition was sold at \$201.6k on Sotheby's Natively Digital: A Curated NFT Sale in June 2021.

²¹ Kinsella, E. (2021, April 23). *Mad Dog Jones is The Most Expensive Canadian Artist After Phillips's \$4.1 Million Sale of His Self-replicating NFT*. Retrieved November 3, 2021, from <https://cutt.ly/cEjSoS3>

²² Sotheby's. (n.d.). *Visor: Natively digital: A curated NFT Sale 2021*. Retrieved November 3, 2021, from <https://www.sothebys.com/en/buy/auction/2021/natively-digital-a-curated-nft-sale-2/visor>



Visor by Mad Dog Jones

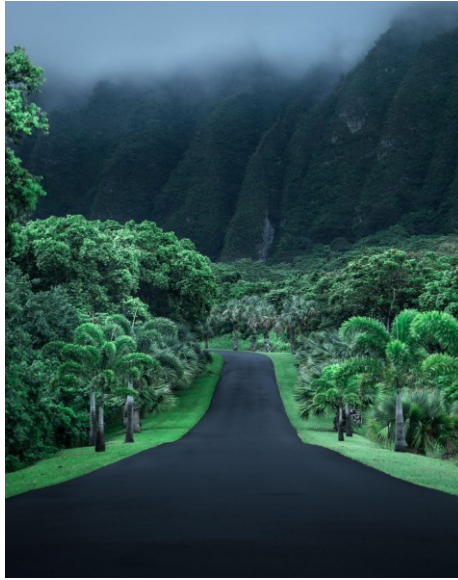
Photography

In digital photography, image ownership is traditionally disputable. Anyone on the internet can claim they own an image without proof.

Original creators receive little to no credit for the photographs they take. With photographs being made into NFTs, the authenticity and proof of ownership of these photos can now be verified on the blockchain.

Cath Simard

Back in 2017, landscape photographer Cath Simard captured an image of a lonely road in Hawaii. Posted on her Instagram account, it quickly became viral and was soon shared by thousands on various social media platforms. However, many failed to credit the original photographer in their postings, and Simard could not obtain any monetary compensation even after fighting multiple copyright infringement cases.



#FreeHawaii Photo by Cath Simard

In the end, Simard decided to mint the photo as an NFT on SuperRare and have its usage rights released to the public after its purchase. It was placed for auction with a reserve price of 100 ETH. A well-known NFT collector, Gmoney purchased this NFT. The photograph can now be used by Gmoney for any commercial purpose without the need to attribute it to the photographer.

#FreeHawaii Photo is now one of the most famous photographs turned into an NFT.

Alejandro Cartagena

The 50 Carpoolers is a collection of images captured by Alejandro Cartagena. The pictures depict laborers commuting between suburbs and urban centers in the city of Monterrey, Mexico. While the photographs were captured as part of a collection of 50 works in 2011, they were only turned into NFTs in July 2021.

The project came from Cartagena's desire to showcase the environmental, economic, and demographic changes playing out in his home city of Monterrey.

The minted NFTs were put up for auction on the Foundation marketplace, and interested buyers were allowed to bid for a period of time. NFTs from the collection were sold for between 0.75 ETH and 10 ETH via this bidding process.



Carpoolers #1 by Alejandro Cartagena

Generative Art

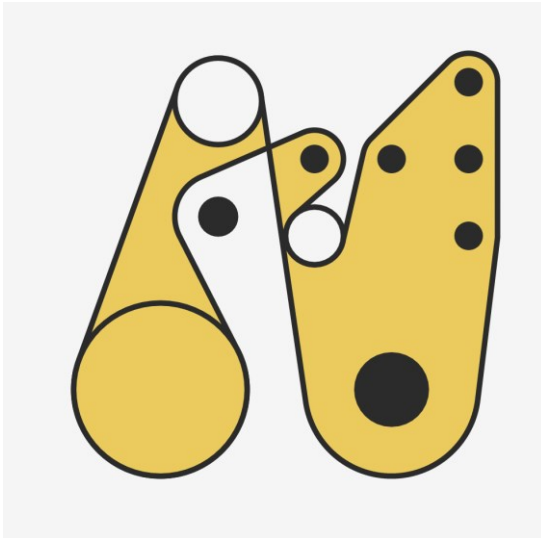
It is commonly assumed that a living being must create artwork, but that assumption is far from the truth. With generative art, artworks are created by an autonomous system, meaning that the artworks lack any human participation. Usually, such artworks are inspired by modern art, which heavily involves geometric shapes. This genre of art has seen quite the hype in the NFT space, and at the forefront of it all has been Art Blocks.

Art Blocks Curated

Art Blocks is the first platform that focuses on programmable on-demand generative content, also known as generative art. Its collection consists of a wide range of different drops by different artists. Some are static images or 3D models, but they are all united by a similar concept: every final, unique

image is generated by the Ethereum blockchain. The artist creates an algorithm or script and deploys it on the Ethereum blockchain, and the algorithm generates a unique, randomly generated piece of content.

Ringers #879, created by the artist **Dmitri Cherniak**, has been purchased through a secondary market transaction on OpenSea for 1,800 ETH, roughly \$5.8 million at the time of sale, making it the most expensive **Art Blocks** piece in the market.²³ The buyer was Three Arrows Capital, a Singapore-based cryptocurrency investment firm.



Ringers #879, Art Blocks Curated

Another Art Blocks collection, **Fidenza by Tyler Hobbs**, consists of 999 unique arts representing a series of colorful squares and rectangles generated through an algorithm.²⁴ Tyler Hobbs is one of many artists currently featured on the Art Blocks platform founded in November 2020 for Ethereum-based generative art drops. **Fidenza #313** sold for 1,000 ETH, which amounted to just over \$3.3 million at the time of sale.

²³ Weeks, R. (2021, August 27). *NFT Platform Art Blocks breaks record with \$5.8 million sale*. Retrieved November 6, 2021, from <https://cutt.ly/UEjAZNE>

²⁴ Ahonen, E. (2021, September 17). *Fidenza: Tyler Hobbs wrote software that generates art worth millions*. Retrieved November 6, 2021, from <https://cutt.ly/hEiKets>



Fidenza #313, Art Blocks Curated

Notable Mentions



The Everlasting Beautiful

FEWOCiOUS or Victor Langlois is an 18-year-old artist from Las Vegas. His artworks have fetched over \$18 million and are being auctioned on Christie's. In his last year of high school, he has over 27k Instagram followers and 58k Twitter followers.



Gunky's Uprising by SSX3LAU

SSX3LAU is a collaboration between electronic musician 3LAU, Justin David Blau, and visual artist Slime Sunday. It sold for \$1.33 million on Nifty Gateway. The Iridescent collection consists of four audio with visual pieces combining unreleased music from 3LAU and Slimesunday's mesmerizing animation.



Bitcoin Angel

Trevor Jones broke a new record for the most expensive open edition NFT artwork by selling 4,157 editions of his painting Bitcoin Angel for \$777 each in a mere seven minutes on 25 February 2021, bringing in a total amount of over \$3.2 million. Jones also collaborated with Pak in an NFT piece titled “The Collision” that brought in a total of \$1.3 million in December 2020.

Conclusion

NFTs are undoubtedly disrupting the entire art industry and hold the potential to transform the wider creative industry. Art NFTs give creators more options to expose their works on different platforms to a broader audience, thus having more opportunities to get noticed. Collectors can also showcase their collections without the need for physical spaces, while artists can experiment with different mediums. Perhaps NFTs represent the next step for artists to further unlock their artistic potential and produce even more exotic art forms, be it physical or digital.

Nevertheless, there are still a lot of unanswered questions that need to be addressed. For example, what happens if NFTs become the dominant medium for art? Will traditional art forms slowly fade out to be replaced by JPEGs and GIFs on the blockchain?

There are a lot of uncertainties, but one thing we can be sure about is that art is always evolving. Since time immemorial, art has always transcended mediums. Before 400 A.D., there were cave paintings, hieroglyphs, and Greek sculptures.²⁵ Thereafter, the Medieval Age and Renaissance ushered in the era of oil paintings and poetry. Today, we still retain a lot of traditional art forms like paintings.

²⁵ Invaluable. (2021, April 8). *Western Art Movements and their Impact*. Retrieved November 11, 2021, from <https://www.invaluable.com/blog/art-history-timeline/>

History tells us that some artforms die out, but many will remain relevant. It is, therefore, premature to assume that digital art will cannibalize existing art or even become the dominant art form. Rather, a more practical assumption would be that digital art, through NFTs, will supplement the art industry as a more modern interpretation of what constitutes art.

Recommended Readings

1. Crypto Artist
<https://www.delphidigital.io/reports/crypto-artists/>
2. How NFTs are revolutionizing the art and entertainment worlds
<https://www.forbes.com/sites/forbesbusinesscouncil/2021/09/07/rise-of-a-new-disruptor-how-nfts-are-revolutionizing-the-art-and-entertainment-worlds/?sh=25a4b8a31a90>
3. NFTs online exhibition crypto art
<https://www.artnews.com/art-in-america/features/nfts-curation-online-exhibitions-crypto-art-1234601534/>
4. NFT explained: Crypto art
<https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq>
5. Most expensive art NFT list
<https://www.businessinsider.com/most-expensive-nft-list-top-selling-nfts-crypto-art-sales-2021-3>

CHAPTER 4: MUSIC

Musicians worldwide have also started embracing this innovative medium to breathe new life into the music industry. From unreleased tracks to exclusive full albums, artists can now publish their songs directly as NFTs and generate revenue directly from their fans, without any middlemen.

Without dealing with intermediaries such as record labels, distributors, and publishers, musicians can now earn their fair share based on what users are willing to pay. For example, Mike Shinoda of Linkin Park received a \$10,000 bid on one of his NFTs, and reaffirmed the potential of NFTs by stating that he would “never get even close to \$10,000” from Digital Service Providers after deducting fees.²⁶

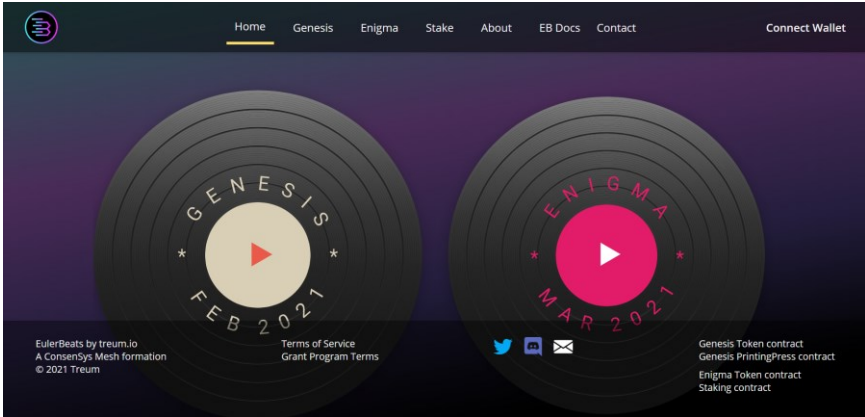
In this chapter, we will be looking at how decentralized music streaming platforms like Audius are empowering content creators and how Euler Beats and other audio-based NFTs are changing the music copyright landscape for the better.

Euler Beats

We are used to musicians making music through instruments, but what if the music was randomly generated using the power of math? Euler Beats brings

²⁶ Shinoda, M. (2021, February 20). *Someone bid \$10k USD on my piece (thanks!)*. Retrieved November 6, 2021, from <https://twitter.com/mikeshinoda/status/1358090976414236674>

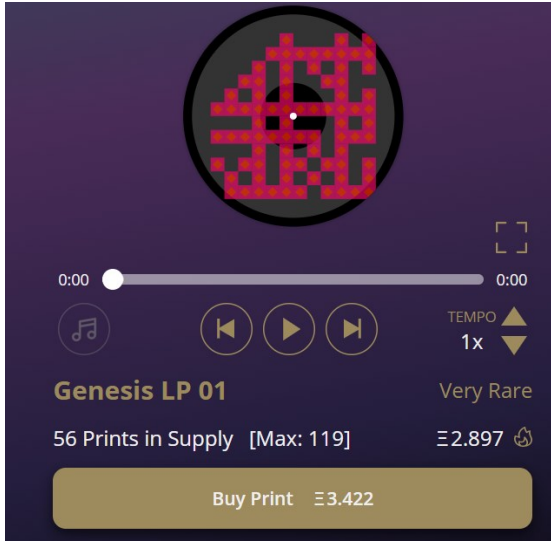
this to reality by allowing users to mint a limited series of unique NFTs based on Euler's Number, e , and the Euler's totient function. The art and music for each piece are algorithmically generated using data such as the creator's wallet address and the block hash at the time of minting.



The Euler Record consists of two limited series called Genesis and Enigma, each made up of 27 NFTs. Mirroring old master records, each NFT set has one unique, non-fungible original token and a series of fungible copies known as prints.

A total of 119 and 160 print tokens can be minted from each Genesis and Enigma original NFT. When sold, print token holders can opt to receive a refund of up to 90% of the current printing cost by burning their prints. 8% of the price of each print is sent to the original holder, while 2% goes towards the EulerBeats project.

NFTs from Genesis and Enigma are priced using the bonding curve mathematical formula. Therefore, as print token holders create new prints from the original token, the price of subsequent prints increases exponentially.



For example, the original NFT from the Genesis series was initially priced at 0.271 ETH each, but as of writing time, the minted print token would cost anywhere from 1 ETH to over 3 ETH, as shown above.

The Enigma series, on the other hand, was mostly sold via OpenSea auctions with a starting price of 2.71 ETH. 25 of the original Enigma tokens were sold this way, while the remaining two are reserved as a DAO donation and for the EulerBeats team, respectively.

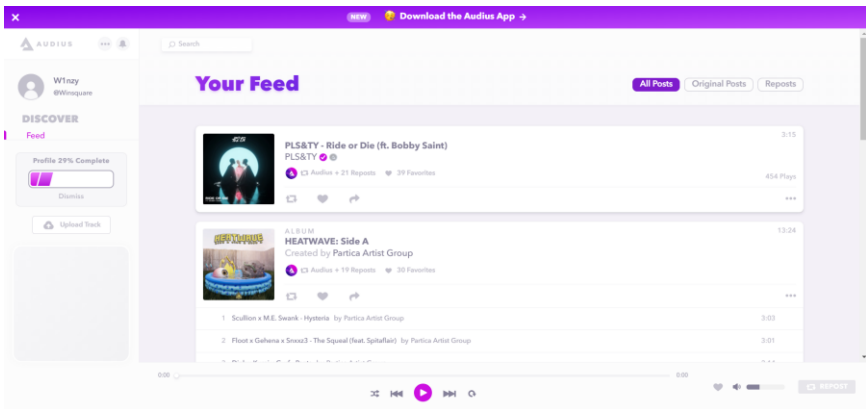
These NFTs are not just pleasing to the ears, but they can also be used in EulerBeat's print initiative staking program. To begin staking, you need a pair of the same LP editions from both Genesis and Enigma sets. For example, a Genesis LP 01 print has to be paired with an Enigma LP 01 print. Originals cannot be staked. Participants will receive 100% of the print royalties based on the number of LP pairs staked. Rewards are accrued in ETH and can be claimed at any time.

To summarize, EulerBeats combines many innovative techniques to produce truly one-of-a-kind NFTs that are not just beautiful but would fit well in any playlist. Even famous entrepreneur Mark Cuban has expressed his love for these masterpieces! Many later NFT projects have emulated mechanisms

such as the bonding curve and burning process, but EulerBeats remains one of the more enduring ones, with pleasant music to boot.

Audius

Audius is a music streaming and sharing platform where artists can upload their creations for others to enjoy. Although it may seem similar to Spotify or Soundcloud, it is a decentralized platform that stores the artists' content on a public blockchain, transparent for all to see. One advantage of using the platform is nobody can change the content unless the creator allows it, thus preserving creator rights. Furthermore, producers have the opportunity to produce the type of music they want.



Audius functions pretty much like any other music streaming service. Users can discover trending sounds from world-renowned artists or obscure creators based on their music preferences. Users will also have the option of listening to curated playlists or creating their own.

The main difference is that Audius is powered by its rewards and governance token, AUDIO, which empowers both the listeners and the musicians. Creators can earn AUDIO tokens by uploading their work, be it music or other applications, to improve the Audius experience and then use the AUDIO tokens to vote for new improvements to the platform.

Token holders can also get profile badges to show off to their friends. These badges are divided into four tiers based on the number of AUDIO tokens

held on Audius. Each tier comes with its special perks, such as Discord roles, NFT collectibles, and much more. To top it off, users can even vote on what benefits they receive for each tier through governance.

The platform has also introduced Audius collectibles, where artists can showcase their NFTs directly on their profiles. Audius collectively gathers all of the artists' NFTs in one place to showcase them to listeners. This feature functions as an alternative way for artists to personalize their profiles and monetize their work through exclusive drops.

Notable Music NFTs

The growing popularity and interest surrounding the NFT space have transcended into the realm of celebrities and artists. Famous bands and DJs have taken their first steps into the crypto scene by releasing their work songs or even entire albums as exclusive NFTs! Here are some of the more notable audio NFTs that have been released:

Death of the Old by Grimes



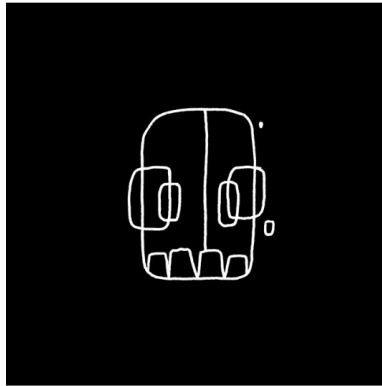
Death of the Old by Grimes

Grimes, a musician from Canada, released this music and art NFT as part of her debut WarNymph Collection Volume 1, together with her brother Mac Boucher. The collection featured ten digital art pieces, three of which were accompanied by her music. This unique piece, “Death of the Old”, also the

highest-selling music NFT at \$389,938, features numerous flying cherubs, eventually closing in on a glowing cross.

The remaining two music videos in the collection, “Earth” and “Mars”, were released under a different scheme, where up to 9,999 copies could be minted while the collection was open. “Earth” and “Mars” were sold for \$7,500, with over 300 pieces minted for each collection. In total, pieces from the collection cumulatively sold for nearly \$6 million, where a portion of the sales was donated to Carbon 180, a non-governmental organization working to lower carbon emissions.

One Hundredth Stream by Mike Shinoda



One Hundredth Stream by Mike Shinoda

This NFT is created by Mike Shinoda, a member of the American rock band Linkin Park. It features a minimalist representation of a skull with an accompanying track. At the time of writing, the NFT is still available for purchase on Zora, but be prepared to have a healthy stack of cash lying around as its current listing price is 200 WETH, or approximately \$400,000.

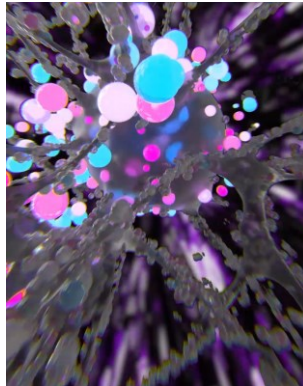
When You See Yourself by Kings of Leon



When You See Yourself by Kings of Leon

Rather than releasing just a single track, the iconic band released their entire album “When You See Yourself” as an NFT, becoming the first band to do so. Initially priced at \$50, the NFT includes an animated album cover and a limited edition vinyl. However, the token is merely a part of a series called “NFT Yourself”, each with its unique perks.²⁷ The first one is a special album package, while another offers front-row seats for life, while the third contains unique audiovisual art.

Jenny by Steve Aoki and 3LAU

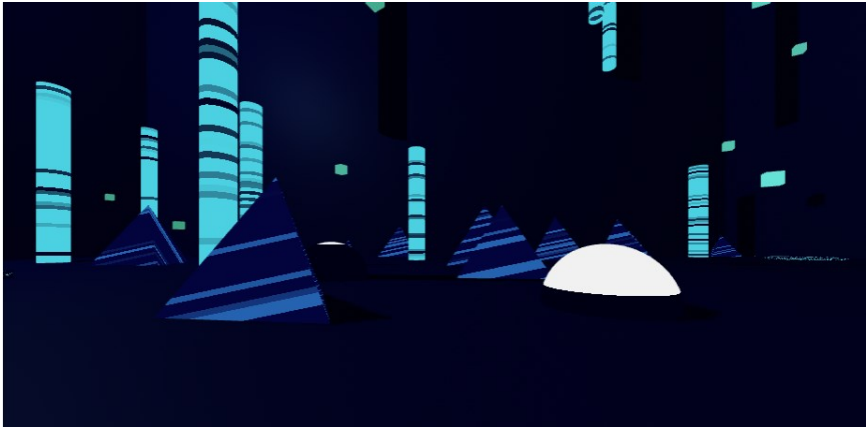


Jenny by Steve Aoki & 3LAU

²⁷ Hissong, S. (2021, March 3). *Kings of Leon Will Be the First Band to Release an Album as an NFT*. Retrieved July 14, 2021, from <https://www.rollingstone.com/pro/news/kings-of-leon-when-you-see-yourself-album-nft-crypto-1135192/>

Forged from a collaboration between Steve Aoki and 3LAU, two world-class DJs, Jenny is an unreleased song that features amazing visuals by Peiter Hergert and uses an AI voice sample. This piece was purpose-made to celebrate the launch of Jenny DAO, an organization where users can invest in NFTs via fractionalized ownership. Members can come together to decide which NFTs to invest in and propose how the treasury should be managed. Jenny DAO has already purchased the song for \$1 million as the first NFT in its collection.

BeatBoxes by Zeblocks



Beatboxes is an immersive audiovisual experience consisting of 841 unique, algorithmically-generated rooms. Owners can walk around and interact with the many different elements in virtual reality and enjoy generative art and sound within these rooms. If you do not have a VR device, you can still enjoy these pieces from your computer. The collection was launched under the Art Blocks Factory via a Dutch auction with a starting price of 14.2 ETH.

Notable Mentions



POW NFT

POW NFT is the first-ever mineable NFT that allows users to mint Atom NFTs with unique properties. Generated by the token's hash and the Atom's atomic number, each NFT features different elements such as various color palettes, electron positions, and its unique piece of music.



JingleBe NFT Collection

Created by two musicians, each musical NFT grants full ownership rights of the song and comes with a unique cover. The cover features unique artwork and a face completely generated by artificial intelligence. In other words, the 100 people that you see on the covers are not real.



Nifty Sax

The Genesis collection from Nifty Sax consists of 100 different auditory experiences and has unique saxophone solos created through a “human” generative process. Each piece has three distinct traits and comes with unlockable content, including the original work's audio file and the raw, unprocessed version.



DAOrecords

DAOrecords plans to build the future of the music industry through Audio NFTs and virtual events. They have released over 150 NFTs from over 100 artists and organized various virtual parties in the metaverse.

Conclusion

Music NFTs are giving more control to creators globally, allowing them to be more active in choosing what they want to produce and how they choose to distribute it to their fans. By removing intermediaries and censorship, artists and musicians worldwide may provide a more incomparable experience, not just in terms of music but also exclusive once-in-a-lifetime experiences, directly to their listeners. Through NFTs, not only fans can

directly support their favorite creators, but they may also receive additional content or perks.

Through the power of blockchain technology, creators can access a wider range of new tracks and sounds while still infusing their particular style. The combination of generative art with modern sound production techniques has paved the way for a diverse range of NFTs for fans to choose from, which can unlock even greater creativity and unexpected results than ever before.

NFTs have also become a new beacon of light for indie musicians who have previously relied on gigs, which are now more challenging to come by due to the COVID-19 pandemic. In May 2021, more than 57% of music-related NFT sales were made by independent artists. In other words, these artists are no longer bound to traditional record labels and are free to market their audio creations directly to their fans.

Recommended Readings

1. FAQ Vol. 1 With Audius Co-Founder Roneil Rumberg
https://www.reddit.com/r/audius/comments/lggl8n/faq_vol_1_w_audius_cofounder_roneil_rumberg/
2. NFTs: Are they the future of the music industry?
<https://www.bbc.com/news/entertainment-arts-57164487>
3. Here's what NFTs are - and what they could do for the music industry, artists and fans
<https://www.nbcnews.com/think/opinion/what-are-nfts-what-could-they-do-music-industry-artists-ncna1261205>
4. EulerBeats and The Future of NFTs
<https://www.one37pm.com/nft/music/eulerbeats-nfts-enigma>

CHAPTER 5: COLLECTIBLES

Collectibles have always been a unique asset class. People collect all sorts of stuff like seashells, stamps, cards, fridge magnets, and more as a hobby or even to show off.

Most of the time, the value of such collectibles is highly speculative. For example, Pokémon trading cards have risen in value since the craze in the late 90s. A sealed box of Pokémon cards skyrocketed from the original price of \$100 to \$50,000 in Q1 2021.²⁸

Collectibles are hard to define as a class on their own because technically, anything (including Art, Games, etc.) can fall under this category. However, within the NFT world, a growing list of crypto assets have proven themselves as highly collectible items. Here we will examine three different projects: Cryptopunks, Hashmasks, and Bored Ape Yacht Club (BAYC).

²⁸ Devlin, J. J. (2021, March 19). *The 'insane' money in trading collectible cards*. Retrieved September 22, 2021, from <https://www.bbc.com/news/business-56413186>

CryptoPunks



CryptoPunks have a long and illustrious history. In 2017, co-creators John Watkinson and Matt Hall (both would later go on to found Larva Labs) issued 10,000 CryptoPunks, all of which were procedurally generated and claimed for free (claimers merely had to pay a small Ethereum minting gas fee).²⁹

Attributes were randomized and funneled through a generator based on the creators' curated elements. Different traits sprung up, some rarer than others. For example, some were aliens (only nine such CryptoPunks) and apes (only 24 such CryptoPunks), while most were plain old humanoids.

Despite being one of the first NFT projects on Ethereum (even predating CryptoKitties by months), there was little activity on CryptoPunks in the early days. According to Hall, less than 30 CryptoPunks were claimed in the days following launch. Over time, as more people started to learn about the project, especially with Mashable's article, all CryptoPunks were eventually minted.³⁰

²⁹ Matney, L. (2021, April 8). *The Cult of Cryptopunks*. Retrieved September 22, 2021, from <https://techcrunch.com/2021/04/08/the-cult-of-cryptopunks/>

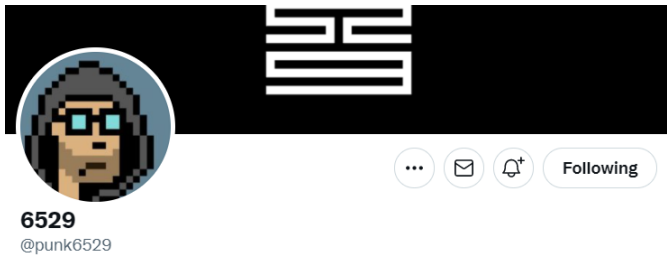
³⁰ Abbruzzese, J. (2021, June 10). *This Ethereum-based project could change how we think about digital art*. Retrieved September 22, 2021, from <https://mashable.com/article/cryptopunks-ethereum-art-collectibles>

The community was small but passionate. Slowly but surely, being a CryptoPunk owner became a sort of status symbol. Provenance has always carried value for any collectibles market, and blockchain technology is no different. Holding a CryptoPunk conveyed two things—you were either an NFT/Ethereum OG or derived value from being part of history.

However, real attention shifted towards CryptoPunks only when celebrities, venture capitalists, and business personalities started snapping them up as investments. The main allure of CryptoPunks was their historical relevance as one of the first-ever NFTs on Ethereum. Even Three Arrows Capital, one of the most successful crypto venture firms in the space, has acquired CryptoPunks.



Over time, many holders started to imbue their identity into CryptoPunks, so much so that people began to recognize and respect CryptoPunk holders within the crypto community. Owners recognized the social status it conferred and began changing their profile pictures on social media platforms (e.g., Twitter, Discord, etc.) to CryptoPunks.



CryptoPunks even managed to grab the attention of traditional auction houses. Sotheby's and Christie's, the two largest global auction houses, recently listed CryptoPunks and managed to sell rare CryptoPunks for millions of dollars.³¹

Beyond just existing as a 'JPEG', however, CryptoPunks later became a 'membership pass' to LarvaLabs latest project, Meebits. Meebits, launched in May 2021, are 3D voxel characters randomly created by a generative algorithm. Meebits aims to become the digital avatar of the virtual world by being interoperable between multiple virtual worlds.



In total, there are only 20,000 Meebits. Half of them were claimed by the owners of CryptoPunks and Autoglyph (another project by LarvaLabs), while the other half was auctioned off using Dutch Auction. They quickly sold out after the launch.

³¹ Locke, T. (2021, June 10). 'Covid Alien' Cryptopunk NFT sells for over \$11.7 million to billionaire buyer in Sotheby's auction. Retrieved September 22, 2021, from <https://www.cnn.com/2021/06/10/covid-alien-cryptopunk-nft-sells-for-11point7-million-in-sothebys-auction.html>

Hashmasks



Hashmasks is a collaborative art project created by over 70 global artists and was launched in January 2021. In total, there are only 16,384 unique Hashmasks.

Hashmasks introduces a combination of digital art and collectibles with a value hierarchy determined by both the creator and the consumer of the artwork. Unlike other collectibles, where the creators set out the rarity of all traits, Hashmasks includes two layers of scarcity:

1. Unique traits – Hashmasks are randomly assigned a Character, Mask, Eye colors, Skin colors, and Items during the initial distribution period.
2. The name – Hashmasks can be assigned names. The name is the rarest of all traits, and the user can change the name by burning Name Change Token (NCT). Each name is unique and can only belong to one Hashmask.

Hashmasks is one the first collectible where each piece's value and rarity are not predetermined but will change and adapt over many years before it takes its final form when the last NCT is burnt. Each Hashmask accumulates 10 Name Change Tokens (NCTs) each day. When users have 1,830 NCTs (about half a year's worth of NCTs), users can burn these tokens and change the name of the Hashmask. Each name must be unique, creating a second layer of scarcity within the artwork.

The last NCT will be emitted after ten years on 26 January 2031. Once this has taken place, the supply of NCT will only decrease as users burn NCT to

change the art's name. The art piece is complete when all NCTs have been burned.

To date, the biggest purchase has been by a pseudonymous individual known as Danny. Selling for 420 ETH (roughly \$650,000 at the time of purchase), the Hashmask was named 'sex'.³²

Bored Ape Yacht Club (BAYC)



YugaLabs released Bored Ape Yacht Club (BAYC) on 30th April 2021. Each of the 10,000 Apes is unique and programmatically generated using 170 possible traits, including background, clothes, earrings, eyes, fur, hat, mouth, and more. The traits and designs were heavily inspired by the '80s and '90s punk rock and hip hop genres.

In BAYC's world, which is set in the year 2031, these Apes hang out in a swamp club and 'get weird' because they are extremely rich and bored.

BAYC owners were granted these utilities at launch: full commercial rights on any BAYC owned and access to a private 'Bathroom' where holders can put graffiti on the wall.

³² Sinclair, S. (2021, February 4). *Rare Hashmasks Digital Artwork Sells for \$650k in Ether*. Retrieved September 22, 2021, from <https://www.coindesk.com/markets/2021/02/04/rare-hashmasks-digital-artwork-sells-for-650k-in-ether/>



Several creative owners have since created projects around BAYC, such as books, comics, coffee, and beer brands.³³



BORED APE WEAR

Officially Licensed BAYC Merch

BAYC was one of the few NFT projects that have garnered significant attention from the NFT community. Since its launch in April 2021, the project has achieved many milestones, including donating over \$850,000 to an orangutan charity.³⁴

One of the main reasons for its success is the transparency and constant communication delivered by the project team. Many creators of NFT projects stopped offering any further updates or development to their

³³ swensonk7. (2021, June 11). *Bored Apes Comic: Alt Ape Vacation Drops today. Find out how to get your ape in the next issue.* Retrieved September 22, 2021, from <https://www.theboredapegazette.com/post/the-first-bored-ape-comic-was-released-today-find-out-how-to-get-your-ape-in-the-next-issue>

³⁴ Copeland, T. (2021, August 10). *NFT project Bored Ape Yacht club has donated \$850,000 to an orangutan charity.* Retrieved September 22, 2021, from <https://www.theblockcrypto.com/post/114030/nft-project-bored-ape-yacht-club-has-donated-850000-to-an-orangutan-charity>

projects after the initial sale, but BAYC has created a future roadmap and is constantly seeking ways to surprise holders.



For example, there was a surprise gift (airdrop) in the form of the Bored Ape Kennel Club (BAKC). Similar to Meebits, BAYC holders were able to adopt a free dog NFT on 25th June 2021. The adoption period was set for only one week. In the first six weeks since launch, secondary sales of BAKC incurred a 2.5% royalty fee. All the proceeds were donated to animal shelters.

BAYC's strong culture, which developed organically due to its interactive community, good chemistry, and openness has attracted many others to be a part of the brand. As the community grew, BAYC eventually became regarded as the second CryptoPunks.

Measuring Rarity

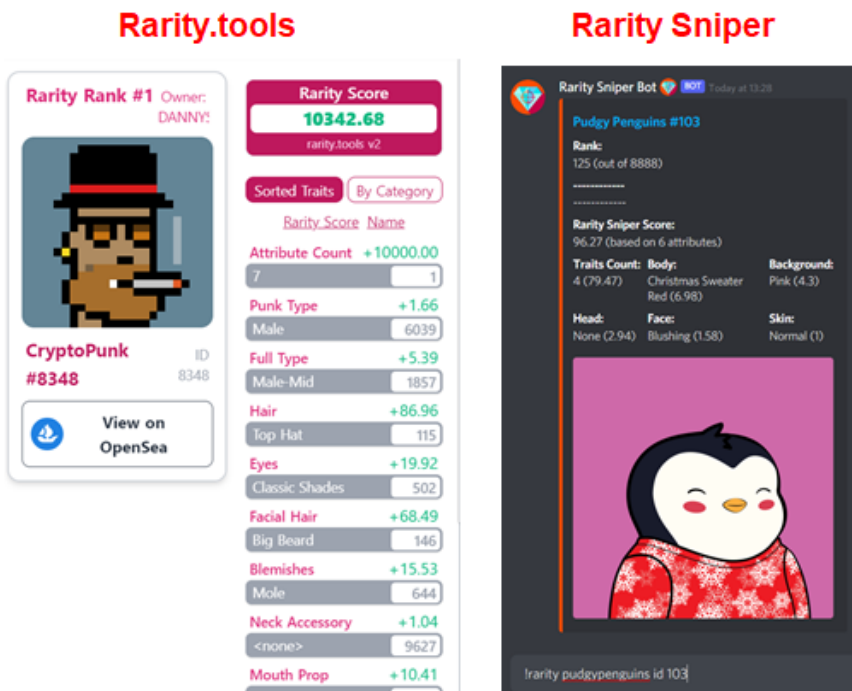
If you have been in the NFT space for a while, you will notice that people often compliment each other's JPEGs with different iterations on the word 'rare'. Phrases such as 'looks rare' are a cultural callback towards the popularity of measuring the value of NFTs through rarity.

As discussed earlier in [Chapter 2](#), creators can artificially create scarcity by fiddling with the metadata. For example, an art NFT collection may have 10 pieces, 9 of which are designed using blue colors, while only 1 was designed using red. Regardless of whether you prefer red or blue, there is no denying that a red piece is rarer by virtue of lower supply. Consequently, collectors naturally price these 'rare' pieces higher because of their provable scarcity.

While the value of NFTs is highly speculative and subjective, this is one of the only ways where value has a quantitative element. And because humans

are highly social creatures, there is often an instinctual drive to get the ‘most rare’ piece and be able to show off one’s collection. This is no different from players trying to get ‘rare skins’ on Fortnite or Pokémon players trying to get the rare Holo Charizard from a booster pack.

As the NFT industry explodes, more tools are being built to improve a collector’s experience. Two examples of this are rarity.tools and Rarity Sniper, both of which assign rarity scores based on the collection’s metadata. Users may key in an NFT’s token ID and check the scores (provided it is being tracked).



In the example above, we can see that for Rarity.tools (pictured on the left), the ‘rarest’ CryptoPunk is ranked No.1 because it has the highest rarity score (10342.68). A big contributor to its high score is its high attribute count at 7 attributes—this is a result of tracking the commonality of all traits within the CryptoPunk collection.

While rarity.tools is a website, Rarity Sniper operates as a discord bot where users key in the NFT's token ID on their discord channel. In the example above (pictured on the right), we can see that Pudgy Penguin #103 has a base score of 96.27 and is ranked 125 out of the entire Pudgy Penguins collection.

There are various tools, each with their own scoring methods. Some may have differing results as they possess different weightages but the core data source will always remain the same i.e. the collection's metadata from their smart contract.

Nevertheless, we cannot emphasize enough that these tools are not the only way to determine value. NFTs derive their value from all sorts of factors such as the strength of the community, cultural significance and so on. More often than not, people buy one just because they like them. That being said, if you are an avid JPEG collector, these kinds of tools may be useful for the hunt.

Notable Mentions



CryptoKitties

Created by Dapper Labs, the company behind Flow blockchain and NBA Top Shot, CryptoKitties ignited a frenzy back in 2017. The influx of activities caused by CryptoKitties was so strong that it caused heavy congestion on the Ethereum mainnet.



Wicked Craniums

There are in total only 10,762 Craniums with over 180 features. Cranium holders have access to The Cradle, a members' only social platform.



Pudgy Penguins

8,888 Pudgy Penguins were launched with a mint price of 0.03 ETH in July 2021. Since then, Penguins have developed a cult-like following among its community³⁵, which even caught the attention of The New York Times³⁶.



Cool Cats

Cool Cats is a collection of 10,000 programmatically and randomly generated NFTs. More than just a profile picture, Cool Cats holders are also entitled to participate in exclusive events such as raffles, giveaways and more. The NFT collection skyrocketed in popularity where even the legendary boxer Mike Tyson was seen sporting a Cool Cats NFT as his Twitter profile picture³⁷.

Conclusion

Humans have a desire to collect rare and premium items. Collectibles can be viewed as crypto versions of luxury digital items. This phenomenon is more pronounced in Crypto Twitter, where many anonymous or pseudonymous characters prefer to use these collectibles as their profile picture. This is especially prominent amongst CryptoPunks and BAYC holders.

In an increasingly digitized world, our digital identities are becoming even more important, and one day, it may even surpass our physical identity. As we spend more time in the virtual world, it is not difficult to imagine that our digital identities may become the primary mode of self-introduction and identification. The great thing about digital identity is that you can craft whatever image you want, arguably more “free” than the physical identity, which faces biases like race, skin color, religion and more.

³⁵ Hor, B. (2021, August 19). *Punks, Apes, and Penguins: A New Cultural Paradigm*. Retrieved November 1, 2021, from <https://www.coingecko.com/buzz/punks-apes-and-penguins-a-new-cultural-paradigm>

³⁶ Powers, B. (2021, August 12). *I Joined a Penguin NFT Club Because Apparently That's What We Do Now*. <https://www.nytimes.com/2021/08/12/technology/penguin-nft-club.html>.

³⁷ Princess. (2021, August 11). *The Cool Cats NFTs Makes a Splash with 45x Gains*. <https://nftevening.com/the-cool-cats-nfts-makes-a-splash-with-45x-gains/>

Like the luxury items or the art world, the value of each collectible is subjective and usually only recognizable within a closed group of people. Collectibles are one of the tools to find like-minded people. There is a huge potential in creating a widely sought-after identity that can resonate with most people across the world. This is the potential of the metaverse - creating a parallel world that provides purpose to our lives.

Recommended Readings

1. Ten things to know about CryptoPunks
<https://www.christies.com/features/10-things-to-know-about-CryptoPunks-11569-1.aspx>
2. What is Bored Ape Yacht Club (BAYC)?
<https://momentranks.com/blog/what-is-bored-ape-yacht-club-the-ape-nft-transforming-nfts>
3. The story behind Hashmasks
<https://decrypt.co/58109/the-story-behind-hashmasks-ethereums-greatest-art-sale>

CHAPTER 6: GAMING

Games have always been built in isolated bubbles controlled by centralized entities. Developers or publishers dictate the rules of the system and usually have strict conditions regarding in-game currencies.

Players are generally restricted from selling their game items or assets for fiat currency. Often, they would have to resort to the illegal use of third-party platforms and rely on unsafe Peer-to-Peer (P2P) transactions. Above all, the digital assets are ultimately owned and controlled by the developers.

While most gamers may be content with the status quo, there is no denying that limitations are in place. Many players value their virtual possessions, but can you truly say that you own the assets if the game developers have the right to take them away from you? From a technical standpoint, games are also limited from virtually interacting with one another, and valuable items are locked into a particular game, except perhaps for larger long-running series that boasts a strong development team (e.g., Pokémon).

Now imagine a digital world where games are interconnected, and players can move avatars, assets, and currencies between one another. If you have watched the movie *Ready Player One* (or even read the book), you might be able to resonate with this idea of a gaming paradise. In ‘traditional gaming’, one example we can think of would be Pokémon HOME, a mobile application that facilitates the transfer of Pokémon from different Pokémon series and Nintendo consoles through the cloud.

However, the problem with Pokémon HOME (and generally all games) is that:

1. Game interactivity is only limited to the Pokémon series and not other games
2. Creating ‘Hacked Pokémon’ is a very common phenomenon
3. Player autonomy is still limited by the developers
4. There is no (legal) way to sell assets for cash or other virtual assets

Recognizing the limitations of ‘traditional gaming’, developers are capitalizing on blockchain technology to build games that allow players greater freedom and autonomy with their in-game items and currencies. A big part of that process involves creating NFTs and tokens to represent digital assets and in-game currencies. This may seem inconsequential, but the implications are more significant than you think.

Once in-game currencies and items are deployed as tokens and NFTs, they will become accessible on decentralized exchanges (DEXs) and NFT marketplaces. In other words, players can freely trade and exchange these items for other cryptocurrencies such as Dai, USD Coin, Ethereum, and even other gaming assets. This is a result of greater player autonomy as NFTs offer real ownership and allow players to do whatever they want with the assets.

At the same time, it also limits asset hacking, i.e., creating new assets out of thin air because of the security that blockchain provides. Nevertheless, it should be noted that other forms of hacking may still take place if there is a flaw in the smart contract (e.g., unlimited minting) or the game itself (e.g., maphacks, unlimited energy generation, etc.).

In this chapter, we will cover three examples of NFT games and dive into the burgeoning Play-to-Earn (P2E) economy.

Axie Infinity



Axie Infinity was first developed by Sky Mavis, a gaming studio, back in 2018. Within the Axie Infinity game, both Axies (virtual pets) and Lunacia Land (virtual land) are represented as NFTs. These NFTs are primarily traded on Sky Mavis's own Ethereum sidechain, Ronin.

Axie Infinity has become extremely popular for its Play-to-Earn (P2E) element in many developing countries. Play-to-Earn (P2E) refers to the gaming concept whereby players are awarded in-game currency for completing certain tasks or achievements. These in-game tokens can also be transferred out of the game, and into wallets or exchanges, where they can be traded for various other currencies to be used in the real world.

In May 2021, Axie Infinity released a mini-documentary on its growing adoption rate in the Philippines.³⁸ This Play-to-Earn element in Axie Infinity has provided a supplementary income source for many players of all ages, including those who were financially impacted by the Covid pandemic.

Axie Infinity borrows many elements from Pokémon, including a breeding system for skill cards and stats (analogous to Pokémon's moves and IV stats). The gameplay can roughly be divided into two core features, Player-versus-

³⁸ cnunley7. (2021, June 28). *People in the Philippines are earning cryptocurrency during the pandemic by playing a video game*. Retrieved September 21, 2021, from <https://www.cnn.com/2021/05/14/people-in-philippines-earn-cryptocurrency-playing-nft-video-game-axie-infinity.html>

Environment (PVE) and Player-versus-Player (PVP). In PVE, players play against bots but in PVP, players play against each other.

Whether it is PVP or PVE, players must bring three Axies. Each Axie has four skills, represented by cards randomly drawn every round. There are over 100 different skills and nine species of Axies. Axie Infinity also has positioning and energy consumption mechanics.

Unlike most blockchain-based games, Axie Infinity works on both Android and Apple devices. This is on top of their desktop apps which are all operating under the same servers. Users are thus free to play under one account on all devices. Users must have a Ronin Wallet to acquire and breed Axies.

Axie Infinity has two fungible tokens—Axie Infinity Shard (AXS) and Smooth Love Potion (SLP). Both tokens are required to breed an Axie. A single Axie can breed a maximum of seven times. The cost of breeding is 1 AXS + a certain amount of SLP (depending on how many times both parents have bred). For example, if one parent has bred 0 times and the other has bred 2 times, the total SLP cost will be 2100 SLP.

One thing to note is that Axie parents and siblings cannot mate with each other. This breeding system forms the backbone of the Axie economy.

Cometh



Players in Cometh (also called astrominers) control spaceships, which are NFTs issued on the Polygon blockchain. They orbit in a circular trajectory around giant stars and their primary goal is to mine tokens from smart asteroids.

The initial parameters of a spaceship trajectory are drawn randomly from the block hash in which it was created. A spaceship can be pulled in space towards another spaceship to get closer to another smart asteroid.

Spaceships can be upgraded with other NFTs such as better drilling tools, engines, or crew members that can improve the spaceship's mining capabilities, allowing you to get more yield.

Pulling is a core mechanism of Cometh. Other players can pay a spaceship for pulling service and pay a fee to the spaceship's owner, who are free to set and change the fee they charge at will. Ultimately, the goal is to pull your ship close enough to reach an asteroid's trajectory and farm the reward.

Smart asteroids are smart contracts representing asteroids in the game. Mirroring Kepler's First law in the real world, smart asteroids have an elliptical trajectory around the star they orbit. The trajectory parameters of a smart asteroid are drawn at random from the block hash in which the asteroid appears.

The creation of new smart asteroids is a process left to the Cometh Generator. It is a smart contract that accumulates yield in the form of Ethereum-based assets (e.g., liquidity pool tokens). Miners may then mine the asteroid and receive the "stored yield" in return.

Under Cometh V1, these assets were accumulated as a portion of earning fees from ComethSwap, Cometh's own DEX built on top of the game. However, with Cometh v2 (Cometh: Beyond), the developers plan to introduce a new Fee-Earning system which will only be revealed in their upcoming Whitepaper v2.³⁹

³⁹ Cometh. (2021, September 6). *Per Aspera Ad Astra: Cometh 2022 teaser*. Retrieved November 11, 2021, from <https://medium.com/cometh/per-aspera-ad-astra-%EF%B8%8Fcometh-2022-teaser-490962246862>

Gods Unchained



Gods Unchained is a free-to-play tactical card game that launched in 2019. Its gameplay is very similar to Hearthstone. Led by the former game director of Magic: The Gathering Arena, the game focuses on competitive play, which means players must strategically outsmart their opponents by building decks that can combat a wide variety of tactics.

In Gods Unchained, players completely own their digital items, mainly trading cards, in the form of NFTs, giving them the freedom to trade, sell and use their cards any way they like—just like owning real, tangible cards.

There are a few game modes to choose from. Solo Mode sets you against a computer opponent, designed for players to train and test out new decks. Constructed mode lets you face opponents online, allowing players to gain experience points, level up, and unlock new cards.

If you are a real competitor who wants to climb the ranks, you will have to enter Ranked Constructed. In addition to earning experience points, you will also be able to unlock prizes and earn Flux (native token) which offers crafting capabilities in the Gauntlet of Gods.

New players are given 2 copies of 70 different cards, a total of 140 cards as part of the Welcome Set. These premade decks are meant to ease new players

into the game by sharing the different traits and strategies that each of the six gods (type) offers. Additionally, basic cards (known as Core cards) are also provided.

Although most cards are minted as NFTs, some cards, particularly the free core cards, are not minted on the blockchain. Core cards earned in-game are not blockchain-native but can be fused together to increase their quality. Through fusing, the cards are minted on the blockchain as actual NFTs. You can trade them for cryptocurrencies to gain the cards you seek to complete your deck.

Play-to-Earn (P2E)

As its name suggests, Play-to-Earn (P2E) involves players playing games to earn an income. Depending on the game, there are different economies, strategies, and methods to build a reliable revenue stream.

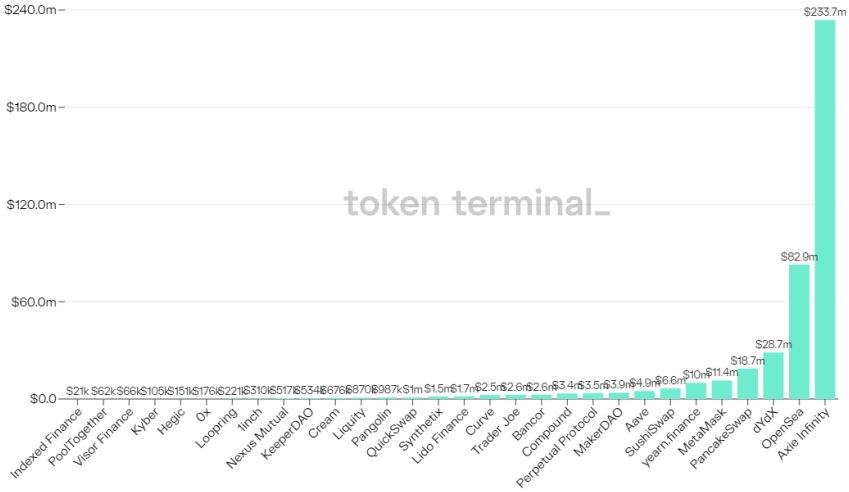
A typical example would be selling resources in-game that require a significant investment of time to obtain. Other players who seek convenience and faster game progression but are unwilling to put in the hours are usually more than happy to pay for it.

P2E is not a new phenomenon. Entrepreneurial players have been around way before the advent of blockchain-based NFT games. Runescape, a highly popular Mass-Multiplayer Online Role-Playing Game (MMORPG) released back in 2001 by Jagex, has been the primary source of income for many Venezuelans over the past few years.⁴⁰ Selling Gold from World of Warcraft or Meso from Maplestory are also immensely popular till today.

However, P2E players rely on third-party platforms to transact and sell their in-game currencies. These platforms are often illegal because they do not have permission from the game developers and go against the games' terms and conditions.

⁴⁰ Ombler, M. (2020, May 27). *How RuneScape is Helping Venezuelans Survive*. Retrieved September 28, 2021, from <https://www.polygon.com/features/2020/5/27/21265613/runescape-is-helping-venezuelans-survive>

In 2021, we started seeing massive growth in gaming NFTs. A large part of this can be attributed to Axie Infinity’s parabolic run, both in terms of the price of AXS, its native token, and the number of daily active users it has gained (1.8 million as of August 2021). Such impressive growth metrics have also put Axie Infinity at the top in terms of crypto protocol revenue.



Source: Token Terminal - 30-day protocol revenue as of 28 September 2021

Case Study: Axie Infinity

Axie Infinity’s success is largely due to its strong P2E elements. There are currently four primary methods in which Axie Players can play-to-earn.

1

Sell SLP/AXS acquired from in-game on exchanges like Uniswap and Binance.
Currently, Axie Infinity operates on its Ronin sidechain where assets would need to be bridged using the Ronin Wallet. However, the team is building a Ronin-based DEX which would remove the need to bridge out SLP/AXS and sell it on the main Ethereum network.

2

A decent team is needed to progress through higher levels of Adventure Mode and higher ranks in the Arena. Many breeders look for specific skills, traits, and parental genetics to ensure they have the best chances of obtaining offspring that fit the current meta. **Breeders will then sell their Axies on the Axie Marketplace or use the offspring to breed new Axies.**

3

AXS also doubles up as a governance token and would eventually be able to be **staked (sometime in 2021) to earn protocol revenue.** Delphi Digital, an Axie Infinity Partner who helped design the tokenomics structure, has forecasted an annual percentage yield of **40% for the next 5 years.**

4

Collect and speculate on rare Axies, Axie Land Plots and other land-related assets. Rare Axies are issued by the gaming developers at special events and have different cosmetics. Land also has a limited supply, and different rarities that would influence spawn rates of resources, chimeras etc. However, **land gameplay has not yet been implemented** although users can still buy land.

Source: CoinGecko Q2 2021 Report

To truly understand how lucrative it is to play Axie Infinity, here is a typical daily routine of an Axie Player who farms SLP using Method 1, the most popular option. We tested the game ourselves and have come up with a base case approximation.

Game Considerations

- Players earn SLP from matches, which require 1 Energy per entry. A team of 3 Axies (minimum requirement to play) gives 20 Energy per day.
- Energy is not required to earn SLP in Adventure Mode. However Energy is required for Axies to earn experience points, which boosts their stats. We will assume an average of 10 Energy is spent per day to level up.
- This leaves 10 Energy remaining to be spent in the Arena. Depending on your Matchmaking Rank (MMR), you will earn different amounts of SLP. Moreover, you will only earn SLP if you win your match. We will assume each match awards 15 SLP (average SLP earned from the 1550-1650 MMR bracket) and 5 matches won per day.
- Winning 10 matches in Adventure Mode and 5 matches in Arena Mode will give 25 SLP as part of the Daily Quest Reward.

Estimated SLP Rewards Earned Per Day

Adventure Mode = 50 SLP

Arena Mode = 75 SLP

Daily Quest = 25 SLP

Total SLP earned = 150 SLP

Estimated Amount of Time Contributed

From our own experience, one Axie match lasts approximately 5 minutes. This translates into 100 minutes of pure playtime. To be more conservative, if we include rest periods, loading times, and games played in Adventure Mode (before reaching the 75 SLP cap), we can approximate the total time spent per day at 4 hours.

Wage Comparisons

Following these assumptions, here are the following earnings calculations for an Axie player compared to minimum wage jobs in select countries (before tax) if the SLP price is at \$0.1:

	Hourly Earnings Rate*	Monthly Earnings Rate**
Axie Infinity	\$3.75	\$450
UK (23 and over)	\$12.30	\$2,952
US (Federal)	\$7.25	\$1,740
Malaysia	\$1.19	\$285
Philippines	\$1.06	\$254

* *Daily Earnings Rate for each country based on their respective minimum wages, which was sourced from, gov.uk, US Department of Labour, and ASEAN Briefing.*

** *Monthly Earnings Rate based on 8-hour shifts except for Axie Infinity which is capped at 20 energy per day*

Take note that this is just the base case earnings rate. Players with 20 Axies or more will be able to use 60 energy per day. Although Adventure mode is capped at 75 SLP, the player would be able to capitalize on more opportunities to earn SLP in the Arena. Not to mention tournaments and seasons where AXS and SLP rewards are also distributed to top-ranking players.

Regardless, earning \$450 per month is already very respectable by South-East Asian standards, considering it only requires roughly 4 hours per day. And remember, Axie Infinity is not a job but a game. People are being rewarded just by playing a game whose ultimate purpose is entertainment!

However, not everyone can afford an Axie team. As of November 2021, a single Axie boasts an average floor price of \$115. A person would need to invest roughly \$345 upfront to meet the minimum requirement of 3 Axies to play. This is quite a significant amount, especially for players in developing countries who lack basic income.

To address this, Axie Infinity allows Axies to be loaned through their system. Sponsors can loan Axies out by sharing their Mavis Hub password with Scholars. Scholars have no control over the assets as they are tied to the owner’s Ronin Wallets, but the scholar can still play the game.⁴¹

In return, Scholars enter into a profit-sharing agreement where the SLP earned while playing in-game is split between both parties. This has spawned a whole new class of ‘employment’ known as Axie Scholarships. Some scholars even have CVs!

Axie Scholarship List & Tracker

In an Axie Scholarship, there are managers (those who provide the Axie), and scholars (those who play the game). Typically, the managers take a percentage of the scholar’s earnings (eg. 30%, depending on the setup/agreed upon). Scholarships are an ideal way for newer players to start out, as they allow them to dip their toes into the Axie ecosystem and experience the gameplay prior to investing in owning their own Axies.

As of July 2021, a basic Axie can cost up to 0.15 ETH each (\$305.67) and 3 Axies are required to play a game, bringing the total cost to around 0.5 ETH (\$1,016.90) which can be a substantial sum. As a result, scholarship programs are an attractive means for new players who wish to start exploring the game, or simply to earn some money while having fun. Below we have compiled a list of Axie Scholarship providers, along with their profit sharing mode, estimated earning and relevant links.

[August 2021 update] Note that Axie Infinity has made adjustment to the economics of Axie Infinity and as such, it may be slightly more difficult to reach 150 SLP per day (as we estimate below). As a result, there may also be changes to scholarship reward structure which we are working to compile. Hang tight!

#	Scholarship Provider	Country Of Origin	Profit Sharing Model	Amount To Player	Estimated Earnings (\$ and SLP)	Links
1	Axie Ocean	BR	Percentage	65%	\$ (48.75 SLP)	👍 👎
2	Axie Hash		Percentage	65%	\$ (48.75 SLP)	👍 👎
3	Yield Guild Games	PH	Percentage	70%	\$ (52.5 SLP)	👍 👎
4	Axie Revolution Guild	PH	Percentage	65%	\$ (48.75 SLP)	👍 👎
5	CoinBarn		Percentage	65%	\$ (48.75 SLP)	👍 👎
6	Axie Space Guild	CA	Percentage	60%	\$ (45 SLP)	👍 👎

Source: CoinGecko

To provide some context, here is an example of the expected returns for Axie Sponsors and Scholars. Our assumptions are as follows:

1. SLP price is maintained at \$0.1 throughout a 1-year period
2. The upfront cost per team is \$345
3. Price of assets (Axies) remains the same throughout a 1-year period

⁴¹ Nevertheless, it should be noted that while the assets are secure, there is still an element of trust between a Sponsor and Scholar as the Sponsor has ultimate control over the SLP earnings in the Ronin Wallet: the Scholar has to trust that the Sponsor will distribute the SLP in accordance with their agreed upon terms.

Axie Scholarship Terms (Scholar:Sponsor)	Monthly Earnings Rate (30 days)		Expected Return on Investment (ROI) for a Sponsor over a 1-year period
	Scholar	Sponsor	
70:30	\$315	\$135	370%
60:40	\$270	\$180	526%
50:50	\$225	\$225	683%

Axie Scholarships are immensely popular because they lower the barrier of entry to play the game. At the same time, investors are also starting to notice the Axie economy; there are already dedicated hedge funds (e.g., Blackpool⁴²) and decentralized gaming guilds (e.g., Yield Guide Games⁴³) actively investing in the game through the Scholarship system. It is only a matter of time before more institutions and private investors start to realize the potential of P2E.

Axie Infinity may be the King of P2E for now, but other games are starting to capitalize on the P2E trend. Technically any crypto game with a tradable asset can be considered a P2E game. Moreover, more developers are beginning to actively market their products as P2E, specifically because of their low barriers of entry designed to attract free-to-play (F2P) players.

As more players enter the system, each game becomes its own virtual economy, which is then driven by the current game state and market demand; a derivation of the real influence developers have by controlling the game's laws. This is very similar to how governments act and react, but instead of policy and regulation, patch updates serve as the method of economic preservation.

⁴² BlackPool Finance. (n.d.). *BlackPool Finance - Axie Infinity*. Retrieved September 22, 2021, from <https://blackpool.finance/metrics/axie>

⁴³ YGG. (n.d.). *Yield Guild Games*. Retrieved September 22, 2021, from <https://yieldguild.io/>

Many of the games we have discussed in this chapter are very new, while others have not even been launched (discussed below under notable mentions). Even Axie Infinity, which launched in 2018 and is one of the oldest blockchain games, is still at the Alpha stage.

The P2E phenomenon has undoubtedly redefined gaming and proven itself as a surefire way to attract new players but whether or not the in-game economy is sustainable is an entirely different matter. Developers are still trying to come up with the right formula. Each game has to be judged on its own merits.

However, once a solid business model and tokenomics structure have been developed, disrupting the entire gaming industry is inevitable.

Notable Mentions



Star Atlas

Star Atlas is an upcoming space-themed, grand strategy game set in a metaverse in the year 2620. Like EVE Online, players will have to manage politics, trade routes, and economically productive territories. Each in-game asset is represented as NFT, which can be found or created by players.



Illuvium

Illuvium is an upcoming open-world RPG adventure game. Like Pokémon, players can explore the world and capture deity-like creatures called Illuvials, which are also NFTs. A key differentiating factor is the battle system. Similar to AutoChess, automated battles take place on a board. Players can earn Illuvium (ILV) through play while climbing the ranked ladder.



Plants vs Undead

Plants vs Undead (PVU) is a P2E tower defense game on the Binance Smart Chain. Similar to the popular Plants vs Zombies franchise, players will need to use their plant NFTs to fight off hordes of undead minions.



R-Planet

R-Planet is all about crafting and collecting NFTs. Players are incentivized to mine and synthesize new elements and expand their collection through a story rooted in space exploration. Native NFTs can also be staked to earn the in-game currency, Aether.



Alien Worlds

Alien Worlds is a resource-based game that focuses on governance and mining. Six different factions govern six planets. Each faction operates as a DAO and competes with one another to grow their planet's economy using the in-game currency, Trilium.



MyNeighbourAlice

MyNeighbourAlice is a narrative-driven RPG story strongly inspired by Animal Crossings. Players build on top of plots of land and socially interact with their friends and other players. Almost all in-game items are represented as NFTs.

Conclusion

The gaming industry blossomed in the age of the Internet. However, basic limitations such as developer overreach and IP rights restricted the growth of true gaming economies. The integration of NFTs may not be a novel concept, but it may become the medium to support the next generation of gaming.

Non-blockchain based-games like Fortnite, Dota 2, and Counter-Strike are examples of free-to-play (F2P) games that thrive on revenue generated from “skins” (virtual fashion wear) and other cosmetic-related effects. The key difference, however, is that players do not technically own these skins. With NFTs, players are free to do what they want with the items.

Moreover, developers can build and integrate existing games with other dApps on the decentralized network that offers all sorts of exciting

opportunities. For example, two games can cross-collaborate in-game or even integrate with existing financial dApps to offer financial services to their players.

With this newfound freedom, more and more games are starting to introduce P2E mechanics. Gaming developers can capitalize on attractive financial incentives to attract players. However, a robust P2E economy game that is entertaining in its own right is not easy to achieve.

While gaming offers both entertainment and economic freedom to players, establishing a balanced flywheel effect is challenging. The industry is still in its infancy; however, the potential upside and opportunities are endless.

As more games start to refine the formulas for success, we expect more traditional gaming giants to enter the crypto scene. We are already beginning to see this take place. Companies like Electronic Arts (EA) are currently looking for new staff who have experience with NFTs and blockchain gaming,⁴⁴ not to mention that the CEO of EA has publicly stated that “NFTs are an important part of the future of our industry”.⁴⁵ It is only a matter of time before blockchains become the primary web infrastructure for game-building.

⁴⁴ Insights, L. (2021, August 27). *Electronic Arts recruits for Blockchain, NFTs. Why it matters.* Retrieved September 28, 2021, from <https://www.ledgerinsights.com/electronic-arts-recruits-for-blockchain-nfts-why-it-matters/>

⁴⁵ BBC. (2021, November 4). *EA says NFTs are part of the future of games industry.* Retrieved November 11, 2021, from <https://www.bbc.com/news/technology-59167668>

Recommended Readings

1. How Gamers are Making a Living: A Case Study on Axie Infinity
<https://www.coingecko.com/buzz/how-gamers-are-making-a-living-a-case-study-on-axie-infinity>
2. Play-to-Earn: A Study on Scholarship Viability
<https://www.coingecko.com/buzz/play-to-earn-a-study-on-scholarship-viability>
3. What is Gods Unchained?
<https://decrypt.co/48379/gods-unchained-review-and-beginners-guide>
4. Cometh Whitepaper
<https://www.cometh.io/cometh-white-paper.pdf>

CHAPTER 7: SPORTS

With millions of fans worldwide, sports unite people from different countries and backgrounds. It has become a form of camaraderie when supporters from all walks of life come together to watch their favorite teams and players duke it out.

NFTs have introduced a new way for sports teams and athletes to engage with their fans, and give ordinary fans another way to show support to their favorite sports teams and players. This development has ushered in a new era of sports collectibles and, in some cases, allows the fans to have a decision-making role in their favorite club.

Most sports NFTs function as trading cards or game pieces, where users can participate in exciting events and compete against each other in fantasy games. Some sports teams also offer additional perks that are unlocked upon an NFT purchase, such as the opportunity to meet your sports hero personally and influence team decisions.

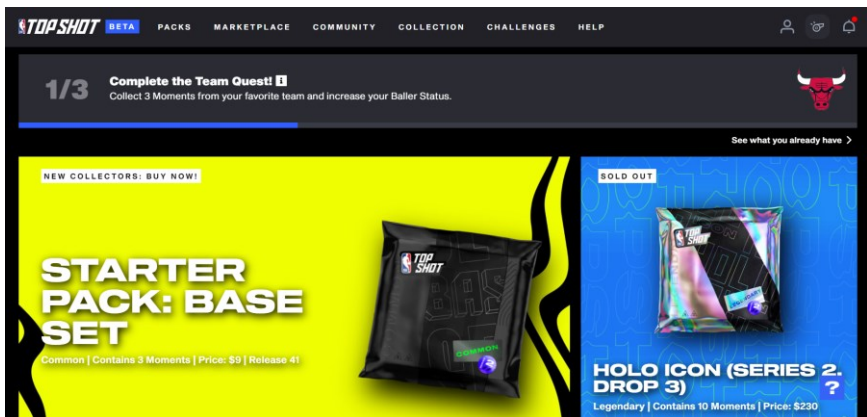
Several NFT projects including NBA Top Shot and Sorare have licensed the rights to work together with major sports franchises. On the other hand, Chiliz has focused more on improving engagement with fans via their Fan Tokens, which will unlock exclusive benefits, including limited edition NFTs. In this chapter, we will look at some of these sports NFT projects and how they are changing the game of sports.

NBA Top Shot

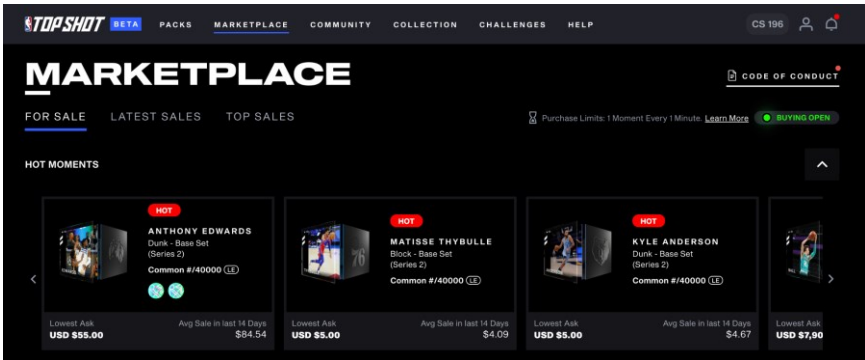
For basketball fans out there, NBA Top Shot is the perfect platform for you. Here, you can buy and sell Moments, which are NFTs featuring officially licensed video clips of your favorite players in action. You can think of Moments as traditional basketball trading cards with a modern digital twist.

There is a whole range of clips to choose from for each player, from different seasons, and with different versions. Each Moment, which comes in multiple copies, is labeled with either the Circulating Count (CC) tag or the Limited Edition (LE) tag. CC tags mean that the supply of this Moment may increase further from new issuance, whereas LE tags mean that no new copies of this Moment will be released in the future.

To start your collection, simply create a Dapper account on NBA Top Shot and load up your wallet with some funds. You can top up your Dapper wallet balance using your credit card or cryptocurrency. Currently, only five cryptocurrencies are supported - Bitcoin, Ethereum, Bitcoin Cash, Litecoin, and USD Coin.



You can purchase Moments by buying and opening new packs from NBA Top Shot. Such purchases are known as drops (primary market sales), and you will not know which Moments you will get in each pack. Drops take place at pre-selected times, and you have to be lucky to be able to pick one up as they get sold out very quickly.

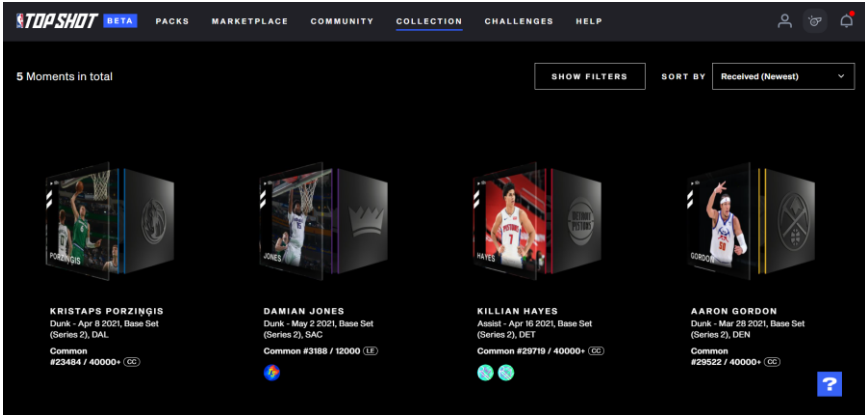


If you missed the chance to buy a drop, you could purchase Moments from other users on the NBA Top Shot Marketplace (secondary market sales). Prices of Moments can range anywhere from \$4 to over \$200,000 depending on the rarity and tier of the Moment.

HOLO ICON (DROP 3)

To be eligible for this drop you need to have a Collector Score of 7,500 or more as of the June 17, 2021 - 9:36AM PDT snapshot. If you didn't meet the requirements at the time of the snapshot you won't be able to join the drop! You need to maintain your score even after the snapshot.

Do note that not all packs available are for everyone. While some packs are specially made available for first-time collectors, packs with higher-rarity Moments may require collectors to attain a specific Collector score before it is available for purchase. Collector scores are calculated based on the rarity and tiers of the Moments you have collected.



NBA Top Shot Moments are issued as NFTs on the Flow blockchain. This means that after you buy a Moment, you have the right to resell the Moment to another user. You can sort through the listings in the marketplace to find the lowest-priced Moments or Moments with unique attributes such as serial numbers corresponding to the players' jersey numbers. Do note there is a 5% marketplace fee for sales conducted on the NBA Top Shot marketplace.

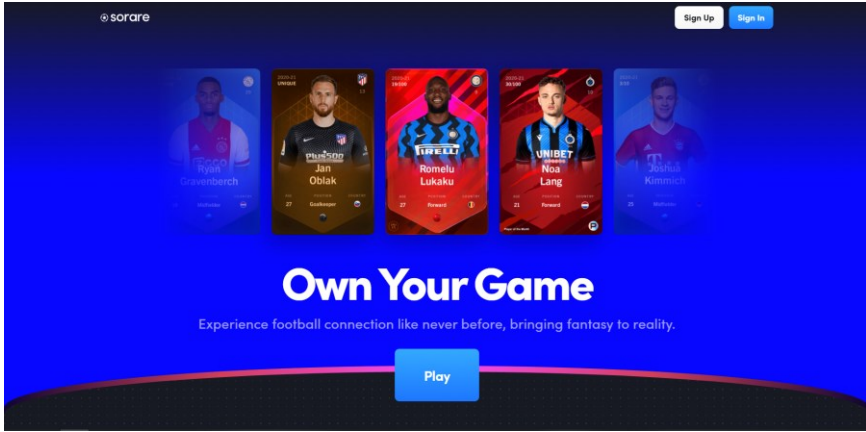
For more information on past transactions and historical prices, collectors can head to Own The Moment (<https://otmnft.com/>) or Evaluate.Market (<https://evaluate.market/>). Here, you can discover the biggest movers for individual Moments as well as the circulating distribution. You can even appraise the value of your collection just through your username.

Another interesting aspect of NBA Top Shot is the inclusion of Challenges, which requires collectors to acquire and hold specific Moments to receive an exclusive Moment as a reward. The rewards are only available through these challenges and can never be acquired through drops. To complete the Challenges and claim the rewards, users need to hold the required Moments until the timer expires.

NBA Top Shot is not just a collectible but also a community where NBA fans come together to celebrate the best dunks and three-pointers by collecting these special Moments. NBA's involvement in NFTs has enabled them to engage with their legion of sports fans in a new, innovative way relevant to our digitized world today.

Sorare

If basketball is not your cup of tea, maybe soccer would pique your interest instead. Similar to Top Shot, you can purchase NFTs in the form of player cards. You can then use the player cards to form your fantasy soccer teams, where the real-life performance of your selected players will dictate the number of points scored by your team.



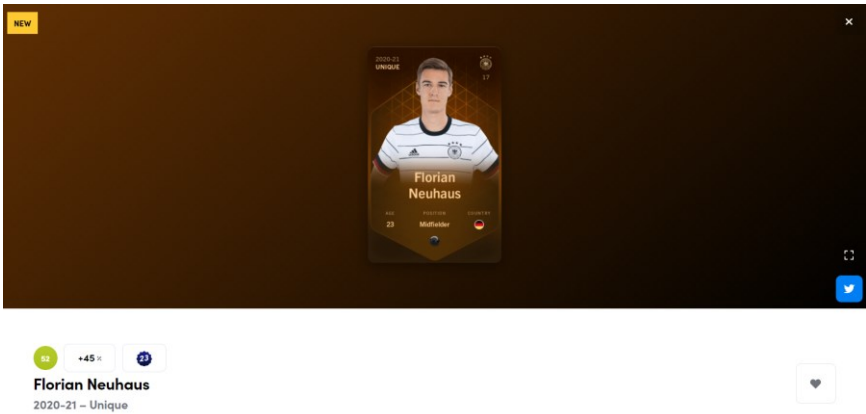
It is very much like traditional fantasy football, where you, as a manager, can select your team for the week, and points will be calculated based on their performance. In Sorare, you can only choose five players and appoint a captain. However, the main difference here is that rarity matters.

For the 2020–2021 season, rarity is divided into three tiers. Each tier has a limited number of copies—Rare, which only has 100 copies, Super Rare, with ten copies, and Unique, with only a single copy available in the game. Naturally, these Unique cards are worth a lot of money, even more so if they feature world-class talents such as Kylian Mbappe or Cristiano Ronaldo. In March 2021, the Unique version of Christian Ronaldo’s player card was sold for a mind-boggling \$290,000.⁴⁶

⁴⁶ Williams, C. (2021, March 15). *Unique Cristiano Ronaldo NFT Sells for \$290,000*. Retrieved July 26, 2021, from <https://cryptobriefing.com/unique-cristiano-ronaldo-nft-sells-290000-sorare/>

If you're looking for new players to add to your roster, you can scour the marketplace to purchase the strongest footballers and your favorite players. You may deposit funds into your Sorare wallet using your credit card, bank transfers, or ether from your external crypto wallet. Cards are not priced in US dollars but rather in Euros, so check that you have the right amount of funds.

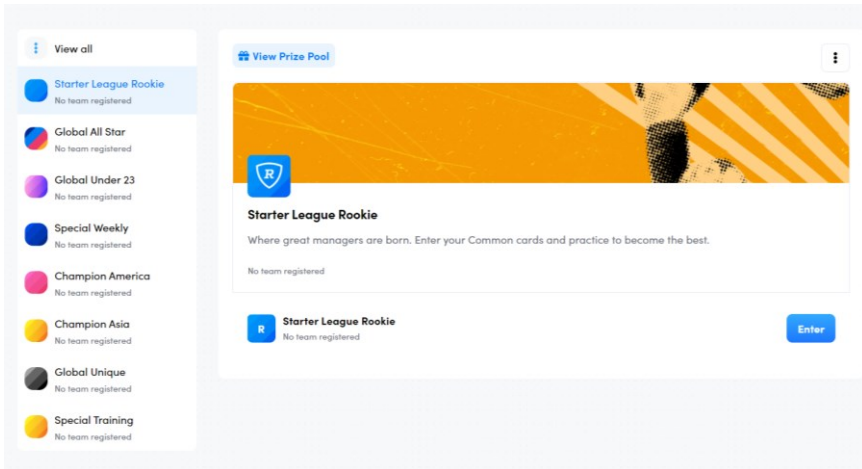
You can purchase existing player cards from other managers in the marketplace, or purchase new player cards by participating in the marketplace auction. If you get outbid by another user, you will be instantly refunded.



The Player Score shows how well your players perform on the pitch, while the Card Score is derived from the Player plus an additional bonus based on the card's own unique traits. For example, let's say that you have a Rare card with a player score of 80 and a 10% bonus. Therefore, the Card Score for the week will be 88% (80×1.1).

Although higher rarities inherently start with a higher bonus, experience points can help to boost your players to the next level. Each time a card is played for the week, it gains experience points which progressively increase the card's level, granting it an additional 0.5% bonus for each level attained. Note that a card can be leveled up to 20 times, but it will take approximately three years to do so.

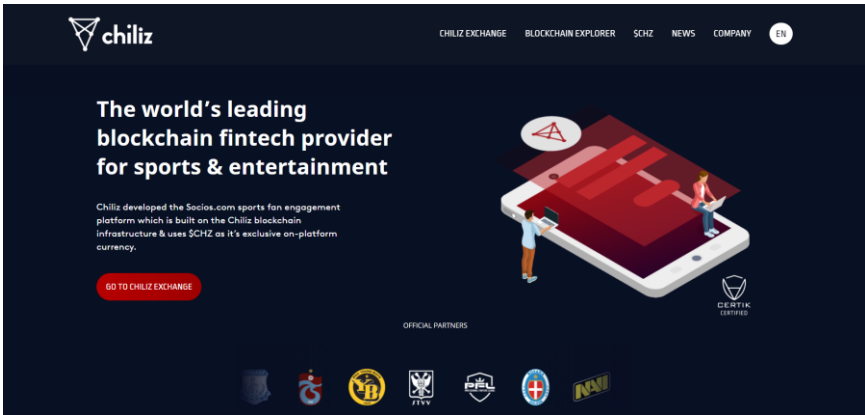
As a fantasy soccer game, leagues are one of Sorare's key features. Leagues are divided into four different divisions, each with its card requirements to ensure a more competitive playing field. For example, Division 4 requires at least four Rare player cards, while Division 1 requires at least three Unique player cards to participate. By entering a weekly league, you stand a chance to win more cards and even some ether!



Sorare combines the traditional fantasy football experience with digital collectibles that appeal to both crypto enthusiasts and soccer fans. Although it may seem like a pay-to-win experience, where all the rarest cards will have the strongest bonuses, you can always build your squad using the free cards provided and climb to the top from there.

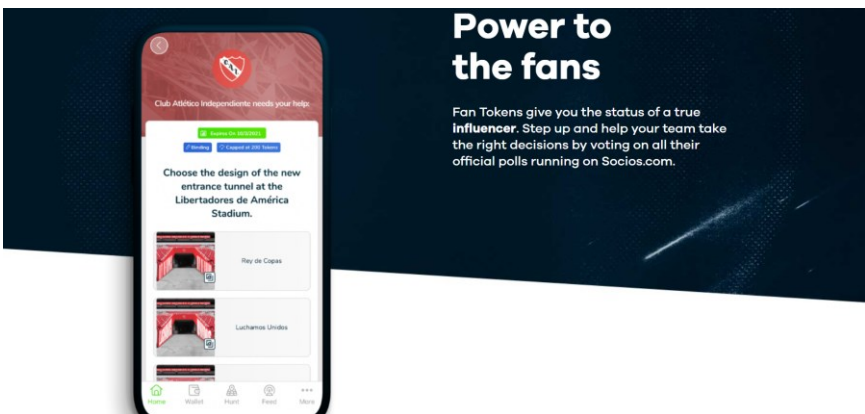
Chiliz

Although fans are an important part of any sports team, they are rarely involved in decision-making in driving their teams' growth and future development. Chiliz is offering to change that by offering Fan Tokens on their platform, giving hardcore fans the power to vote in fan-led decisions, access to a group of like-minded supporters, and the chance to participate in exclusive events that reward fans with NFTs.



By partnering with large football clubs like Juventus FC and even esports organizations, such as Natus Vincere, Chiliz has been able to offer the respective teams' Fan Tokens via their own Chiliz exchange. Their native Chiliz token, CHZ, is used as the currency for their exchange and on their fan rewards app, Socios.

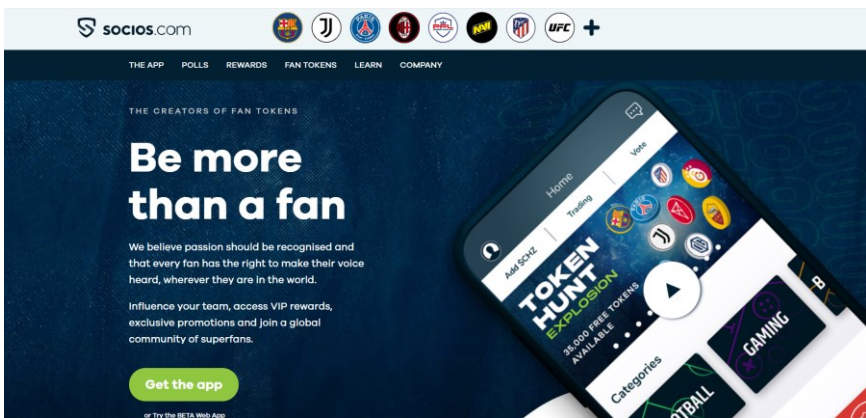
Since all Fan Tokens are paired to CHZ on the Chiliz exchange, you would need to acquire some before you can start influencing decisions and showing support for your favorite team. Alternatively, you can also acquire Fan Tokens using the usual cryptocurrencies from other exchanges, for example Binance.



As mentioned previously, these Fan Tokens can be used to influence the choices made by the team, such as choosing a message for the captain's

armband or even as far as designing a new team bus design! The best part is, you only need one token to receive the right to vote, but having more tokens will give you more power to influence the outcome.

The Socios app provides an all-in-one experience for sports fans. You can place match predictions and compete against others to win great prizes, such as signed jerseys or even VIP matchday experiences. Additionally, in a similar concept to Pokémon Go, you can earn free Fan Tokens by engaging in the daily Token Hunt. Socios also has its own “Fan Token” called SSU, which can be used to vote on changes and additional features for the app.



Besides Fan Tokens, Chiliz has already made major plans to include NFTs on their fan engagement platforms. By integrating Chainlink, partner clubs can mint NFTs in real-time, be it for live sporting events or commemorate particular moments in the club’s history. Additionally, Socios users may stand a chance to receive them as prizes for accurate match predictions. These NFTs will initially be based on Ethereum but will eventually be supported on other blockchains in the future.

Notable Mentions



Revv Motorsport

Revv Motorsport is an Ethereum-based blockchain gaming platform that supports the highly-popular F1 Delta Time game. Players can collect virtual cars, drivers, and even circuits in the form of NFTs. Additional car components can also be purchased to boost performance in the racing game.



Zed Run

Users can participate in digital horse races and stand to win attractive prize pools from each race. Every racehorse NFT comes from different bloodlines and has unique traits. Users can breed horses from different families to create a winning horse.



Lympo

Branding itself as a sports NFT ecosystem, Lympo offers a variety of collectible cards featuring prominent athletes from a variety of sports such as MMA, tennis, and figure skating. The NFTs can be obtained by staking the platform's Lympo Market Token to earn credits which can then be used to redeem the NFTs. These NFTs come in different rarities, with varying amounts of credits needed to mint them.

Conclusion

Sports NFTs cater to sports fans among existing crypto users and attract sports enthusiasts into the crypto space. Sports teams and clubs have equally much to gain as the gamification of experiences using NFTs become a new medium for fan engagement. By making the applications simple and accessible to every sports fan worldwide, Sports NFTs is an excellent way for official clubs to generate additional revenue.

As for Fan Tokens, although they are not exactly NFTs, they play an important role to bridge the gap between sports and crypto. Much like how users showcase these NFTs as part of their identity, fans can show off their

level of support through Fan Tokens. Instead of becoming a form of competition to sports NFTs, they both have a synergistic relationship. Their main goals are clear—to give fans a better experience and draw even more attention to the digital collectibles space.

Recommended Readings

1. What is NBA Top Shot? Explaining the Blockchain NBA highlight collectibles
<https://ca.nba.com/news/what-is-nba-top-shot-explaining-the-blockchain-nba-highlight-collectibles/18nram5ye1ub01hres3lkk3xvd>
2. What is Sorare? The Ultimate 2021 Guide to Sorare Fantasy Football
<https://sorarescout.com/the-ultimate-2021-guide-to-sorare-fantasy-football/>
3. What Are Fan Tokens?
https://www.socios.com/help_center/what-are-fan-tokens/

CHAPTER 8: METAVERSES

Metaverse is the convergence of virtually enhanced physical reality and physically persistent virtual space, allowing users to experience it as either.⁴⁷ The term was first coined in 1992 in the science fiction novel *Snow Crash*, consisting of the prefix “meta” (meaning beyond) and the root word “verse” (meaning universe).

Simply put, a metaverse can be understood as a shared virtual space that resembles our experience of the physical world. For instance, players can buy virtual assets such as land and vehicles, hang out with friends, attend events, and more in the digital world.

Given the current limitations of technology, the full potential of a metaverse is still unknown. Still, non-blockchain metaverses have existed for many years.

Some examples include open-world/sandbox games such as *The Elder Scrolls Online* and *Minecraft*. These video games integrate with virtual space that resembles reality to give players experiences that are somewhat indistinguishable from reality. More recently, some would argue that a primitive metaverse would include social media platforms like Twitter and Facebook.

⁴⁷ Metaverse Roadmap. (n.d.). *Metaverse Roadmap Foresight Framework*. Retrieved September 15, 2021, from <https://metaverseroadmap.org/inputs4.html#glossary>

Regardless, there is one pervading difference between old and new metaverses—the level of decentralization. If the developer of a centralized digital world decides to cease operations, then all the players will lose their accounts, along with any precious in-game progress and assets. Also, a centralized non-blockchain platform generally gives moderators limitless authority to alter data, making them a “god” in the digital world.

This type of virtual reality can only provide non-persistent instances, which defies the metaverse’s requirement of being able to provide persistence in objects. To tackle this issue, developers have started integrating VR games with blockchain to give players access to persistent assets immutably recorded on the blockchain, providing them with “true ownership” of the digital objects they own in the virtually enhanced reality.

Furthermore, by utilizing blockchain technology, virtual assets such as lands and digital currencies can be rendered scarce since everything is recorded in the ledger. For example, even the project originators cannot create more lands in any particular digital area. A decentralized platform may also distribute the game’s stake to the community, providing community members the right to vote on any decisions that would change the metaverse.

Below, we will learn more about the pioneers of blockchain metaverse, namely Decentraland, The Sandbox, Cryptovoxels, and Somnium Space.

Decentraland

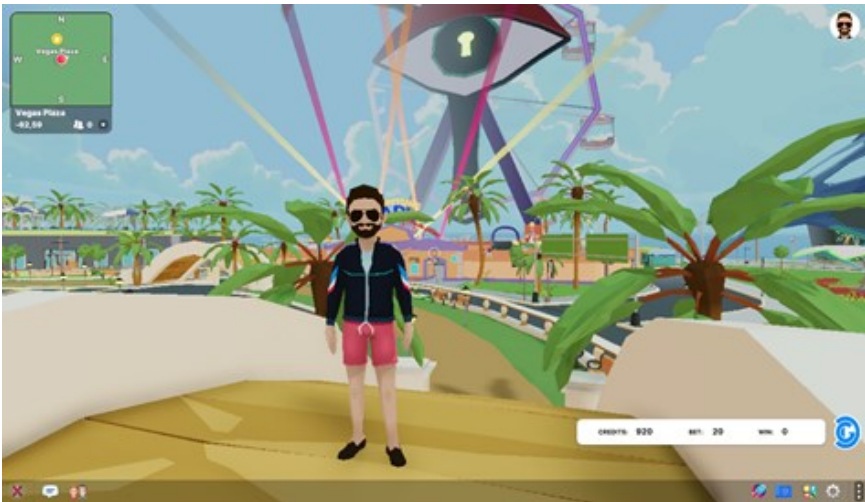
Decentraland is a decentralized 3D virtual reality world powered by the Ethereum blockchain. It is overseen by the non-profit Decentraland Foundation and was first launched to the public in February 2020.

Decentraland was initially created in 2015 by like-minded friends to “fight back” against centralized VR games.⁴⁸ During its early stage, in what was

⁴⁸ Zeoli, F. (2017, June 18). *Introducing the Decentraland Team*. Retrieved September 15, 2021, from <https://medium.com/decentraland/introducing-the-decentraland-team-3071f7c947a>

known as the “Stone Age,” Decentraland was simply modeled in the form of a simple grid allocated to users through a proof-of-work algorithm.

In early 2017, Decentraland evolved into a 3D metaverse on the same blockchain.⁴⁹ Over time, the 3D virtual space has grown to be integrated with the Ethereum ecosystem to utilize Ethereum smart contracts, which has enabled interactive apps, in-world payments, and peer-to-peer communication in the metaverse. Today, players may trade digital assets, socialize with friends, and even hold VR conferences, all while exploring this ever-expanding digital world.



As the name implies, Decentraland (decentralized land) provides the community with complete control over their creation on the platform by representing these digital lands as NFTs. For instance, landowners will have full authority over the content built within their portion of land, which is specified by a set of Cartesian coordinates (x,y).

Landowners can build a range of items on their land, from static 3D objects to interactive systems like games and music players. Above all, Decentraland is free to play, and it does not require any blockchain knowledge to start.

⁴⁹ Ordano, E. (2017, June 23). *The Decentraland Development Roadmap*. Retrieved September 17, 2021, from <https://medium.com/decentraland/the-decentraland-development-roadmap-51bf7903ff16>

However, it is recommended to get yourself a digital wallet to enjoy the whole experience. A digital wallet like MetaMask will safeguard all your game assets and in-world progress as long as you keep your private keys secured.

To start playing Decentraland, go to play.decentraland.org, click Play to connect your digital wallet. Afterward, follow the prompts in your digital wallet, then you may begin to personalize your avatar.

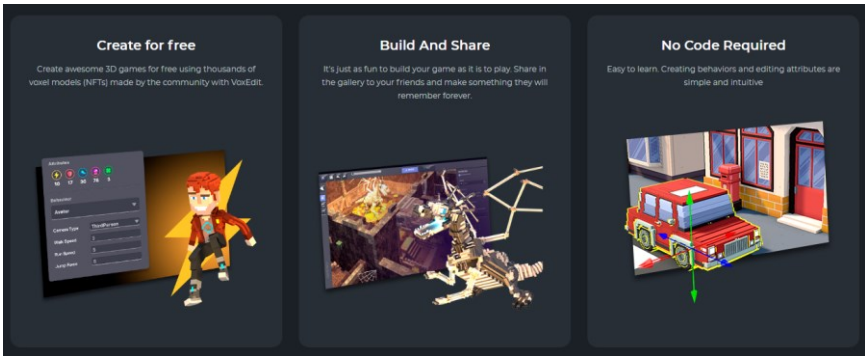
Make your avatar unique by customizing it in many ways, including Body, Head, Top, Bottom, Shoes, Accessories, and Collectibles. Once done, enter a new username, and you are ready to experience the world!

The Sandbox

The Sandbox is a decentralized virtual world where you can create 3D objects, own digital assets in the form of NFT, build and play in an expansive metaverse, and monetize in-game creations. The project aims to provide artists, makers, and players the tools they need to express themselves through voxel art, a sort of art form in which 3D models are created entirely out of tiny 3D cubes called voxels.

Interestingly, The Sandbox began as two centralized mobile games produced by Pixowl, The Sandbox (2012) and The Sandbox Evolution (2016). Both games are 2D sandbox games seemingly inspired by Terraria, but The Sandbox focuses more on user-generated content.

In early 2018, the team announced its acquisition by Animoca Brands and revealed its plans to create a new blockchain-based, multiplayer, cross-platform 3D sandbox game. They aimed to redefine the sandbox gaming industry and disrupt major game developers such as Roblox and Minecraft with their NFT and Play-to-Earn model.



The Sandbox is not just a regular sandbox game. It consists of three integrated products which provide players with a comprehensive sandbox-gaming experience: Voxedit, Marketplace, and Game Maker. Voxedit is a free 3D voxel modeling software that allows users to construct and animate 3D objects out of voxels. The artwork can be uploaded into an IPFS network (decentralized storage system), registered onto the blockchain as an NFT, and published on The Sandbox’s Marketplace to be sold as NFTs to potential buyers.

Lastly, the Sandbox Game Maker allows players to build their 3D games for free, with no coding experience required, as the program is designed to provide easily understandable visual scripting tools. Similarly, art and script can be bundled together to be uploaded and listed for sale as an NFT. Finally, all the assets can serve as creative elements that would contribute to a vast metaverse, which consists of a capped total of 166,464 LANDS or digital real estate in The Sandbox.

Cryptovoxels

Cryptovoxels is an Ethereum-powered metaverse that utilizes voxel-asset architecture similar to The Sandbox, and it allows players to buy land to build stores, museums, art galleries, and more. Ben Nolan, the founder of Cryptovoxels, envisioned a user-editable metaverse that does not require users to have programming knowledge to realize the full potential of a blockchain-based virtual world. Ben released Cryptovoxels to the public in mid-2018.



Cryptovoxels started as a black and white metaverse. When the developer began to add color to the metaverse, the COLR token was required to add color blocks. The sale of COLR token was discontinued in June 2020 and replaced with color blocks, provided for free. The world of Cryptovoxels has brightened up significantly since then.

The metaverse land, or parcel, is bought and sold on the OpenSea NFT marketplace using Ethereum. Same as The Sandbox, landowners can place voxel-built objects on the land they own to decorate their land and turn it into stores and art galleries. Likewise, players who do not own any land can also enjoy the building experience by using the Free Space or building on one of the available sandbox parcels. However, do note that what's built on public land is not permanent as anyone is allowed to modify it.

Cryptovoxels focuses heavily on adding interactive multimedia into the building blocks of digital infrastructure, including text, images, GIFs, audio files, .vox files, scripting, and video streaming. The interactive environment that Cryptovoxels employed greatly enhances users' multisensory experiences in the metaverse. As such, the metaverse is an excellent fit to organize digital events, such as virtual music festivals and virtual art exhibitions.

Another exciting aspect of Cryptovoxels is its wearables. Wearables are virtual NFT clothing that users can use to customize their avatars. Cryptovoxels wearables come in all shapes and sizes, and they function

similarly to digital apparel from the other games. Furthermore, it is possible to design your unique wearables with voxel blocks and turn them into NFT assets. You can also choose to sell your works on NFT platforms to earn cryptocurrency.

Somnium Space

Somnium Space is a VR-centric blockchain-based metaverse founded by Artur Sychov in 2017 with a bold vision of establishing a permanent economy and virtual currency for the world. Today, Somnium Space is an open-source, decentralized VR metaverse that is entirely shaped by its users. The digital world technically works the same as the metaverses we introduced to you earlier, allowing activities such as owning digital lands, building houses, buying in-game NFT assets like avatar equipment, and more.



The metaverse is integrated with Ethereum blockchain to power its in-app digital currency, Somnium Cubes (CUBE). The CUBEs are an essential component of the blockchain-based economy, allowing players to transact with each other and provide users with permanent ownership of NFT assets, from virtual lands to avatars, goods, buildings, and more.

The difference between Somnium Space from other blockchain metaverses is that it aims to incorporate cutting-edge VR technology to provide users

with a fully immersive VR experience. It has already enabled full-body tracking technology, which tracks and detects body and fingers movement. In October 2021, Somnium Space made strategic investments in VRgineers and Teslasuit. VRgineers is a leading manufacturer of XTAL, a new generation, high-resolution VR headsets, while Teslasuit is a firm that produces full-body haptic suits for physical VR experiences. Somnium Space has also announced the research and development of its own standalone Somnium Space VR headset.

What's more, Somnium Space announced in October 2021 that it is integrating the Solana network as part of its ultimate plan to create a multichain metaverse with highly-efficient interoperability capability. From December 2021 onwards, Solana ecosystem users will be allowed to utilize their Solana-based NFTs inside Somnium Space clients to build NFT galleries and more.

According to the Somnium Space Economy Paper, CUBE tokens can be used to enter arcades and amusement parks in the metaverse. You may even visit user-generated museums or watch performances, some of which require you to purchase tickets from the artist.

The Somnium Space client is available for download on Steam and accessible from any VR device.

Investing in Virtual Land and Real Estate

Much like the real world, there are a lot of aspects to consider when purchasing virtual real estate. Buyers must consider various factors such as its proximity to amenities, location, price per area of land, and more.

As of November 2021, the floor price for a parcel of land in Decentraland is roughly 1.2 ETH, or about \$5,200. The MANA token, meanwhile, has a market capitalization of approximately \$3.54 billion. In addition, the most expensive land sale in Decentraland history featured 259 plots of land sold for about \$913,228 in MANA tokens. But why all the hype?



It is generally believed that the metaverse will significantly impact our daily lives in the future. The metaverse could potentially serve as a digital country or civilization, linking the real and virtual worlds.

Metaverses have already enabled users to purchase land, construct properties, and organize virtual parties and concerts. Investing in a decentralized metaverse may appear to be a niche market, but retail investors are not the only ones pouring money into these virtual realities.

For example, prominent auction house Sotheby's has established an art gallery in Decentraland, virtually recreating its London headquarters on New Bond Street. The Sotheby's gallery is in a prime location in Decentraland's Voltaire Art District, with all five ground floor exhibition spaces dedicated to displaying its art collections.



Some celebrities have expressed their interest in taking part in metaverses. Snoop Dogg, for example, has replicated his mansion within The Sandbox metaverse and is offering fans VIP seats to his virtual parties. In addition, Paris Hilton, Deadmau5, Alabaster dePlume, and 3LAU have participated at Decentraland's music festival in October 2021.

Metaverses may even be utilized for remote work, home learning, and tourism. Nestled in the Vegas City district of Decentraland is the Tominoya Casino, where players can test their luck in various casino games. To smoothen the onboarding experience for newcomers, the casino even hires real people as casino greeters, giving a dose of human touch to the virtual space to foster a deeper sense of familiarity.⁵⁰

This is just one of the many examples of real-life employment opportunities within the metaverse. Soon, even the concept of working-in-the-office-from-home will become a reality as companies explore setting up virtual offices in the metaverse, similar to what KuCoin has done.⁵¹

⁵⁰ Nelson. D. (2021, March 19). *This Casino in Decentraland Is Hiring (for Real)*. Retrieved September 17, 2021, from <https://www.coindesk.com/tech/2021/03/18/this-casino-in-decentraland-is-hiring-for-real>

⁵¹ Wright. T. (2021, November 3). *KuCoin launches virtual office in the Bloktopia metaverse*. Retrieved September 17, 2021, from <https://cointelegraph.com/news/kucoin-launches-virtual-office-in-the-bloktopia-metaverse>

Like it or not, humans are spending more and more time online. Metaverses fill that gap where our social needs are becoming increasingly easier to meet.

Notable Mentions



Cyber

Cyber is an immersive 3D metaverse where artists and collectors can display their NFTs. Aside from the realistic graphic settings of the metaverse, collectors can easily connect their Ethereum wallet with the platform to import their NFT assets to be displayed in their personalized space. Cyber has also collaborated with some remarkable artists in the industry to build creative spaces.



Isotile

Isotile is a decentralized metaverse built on the Ethereum blockchain, where you may set up a gallery to display your NFTs and hang out with friends. Isotile is primarily influenced by Habbo Hotel, allowing users to control their 3D characters from a fixed third-person perspective.



Lunacia (Axie Infinity)

Lunacia is an open world inhabited by creatures called Axies and Chimeras. The universe is divided into tokenized parcels of land called Terra, which players can buy, rent, and develop. Players can choose to fight off monstrous creatures to rebuild and strengthen the Kingdom. The Axie Infinity is currently a turn-based Play-to-Earn game, but it is expected to develop into a vast metaverse.

Conclusion

The metaverse is one of the hottest topics in the tech sector, prompting companies to invest billions of dollars in the near future. Many large tech companies such as Facebook, Microsoft, and Tencent, are betting big on the potential of the metaverse as well.

In late-2021, Facebook teased a plan to hire 10,000 individuals in the European Union in the next five years to help develop its metaverse, Meta. Shortly after the announcement, the company renamed its parent company Facebook Inc. to Meta Platforms Inc. to focus fully on developing the metaverse. According to a Forbes report, Meta's metaverse project will cost at least \$10 billion in 2021 alone.⁵²

Similar to how we are attached to our social media accounts, in the future it is projected that many people will choose at least one metaverse as their second life and form connections within the platform.

A centralized metaverse may have its own perks, but in a decentralized blockchain infrastructure, individual networks can govern themselves under a decentralized protocol. This stops one organization wielding monopolistic power over the sphere of online interactions.

The upcoming key development for the overall metaverse industry is to incorporate cutting-edge augmented reality and virtual reality technology to enhance virtual environment settings. For example, Decentraland's roadmap includes plans to integrate VR technology to complete the virtual reality experience.

Although the future of the metaverse is still somewhat obscure, we can certainly picture it evolving into an immersive digital world like the Oasis in Ernest Cline's novel "Ready Player One", a place where the limits of reality are your own imagination.

⁵² Brown, A. (2021, October 25). *Facebook Expects Metaverse Project Will Cost At Least \$10 Billion—In 2021 Alone*. Retrieved October 28, 2021, from <https://www.forbes.com/sites/abrambrown/2021/10/25/facebook-expects-metaverse-project-will-cost-at-least-10-billion-in-2021-alone/>

Recommended Readings

1. The Metaverse Primer
<https://www.matthewball.vc/the-metaverse-primer>
2. Are We in the Metaverse Yet?
<https://www.nytimes.com/2021/07/10/style/metaverse-virtual-worlds.html>
3. For the love of the loot: Blockchain, the metaverse and gaming's blind spot
<https://techcrunch.com/2021/09/16/for-the-love-of-the-loot-blockchain-the-metaverse-and-gamings-blind-spot/>

CHAPTER 9: UTILITY-BASED NFTS

Many people assume that NFTs are only for vanity reasons, used as profile pictures or displayed in virtual art galleries. However, certain NFTs can also carry some form of utility and grant special rights to the owners. From decentralized naming systems to attendance verification systems, NFTs can help smoothen the user experience and help creators ensure that the right participants are duly rewarded.

Imagine having a decentralized name that improves the readability of blockchain addresses instead of random strings of characters, making it easier for users to share their blockchain addresses. Or creators issuing limited edition NFTs that unlock special perks such as exclusive access to private groups or events. The possibilities are endless with these utility-based NFTs.

We will be looking at some of these NFT projects that aim to add compelling use cases that bestow NFTs with useful functions, such as the Ethereum Name Service (ENS) and the Proof of Attendance Protocol (POAP).

Ethereum Name Service (ENS)



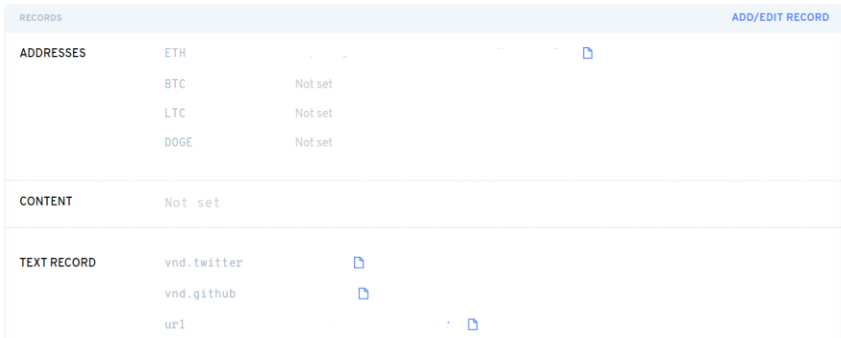
As its name implies, the Ethereum Name Service (ENS) is an open, decentralized naming system built on the Ethereum blockchain. The main goal of the ENS is to map machine-readable identifiers, such as Ethereum addresses and InterPlanetary File System (IPFS) content hashes, to human-readable names.

For instance, we have associated our Ethereum address, `0x4Cdc86fa95Ec2704f0849825f1F8b077deeD8d39` to an ENS, `coingecko.eth`. This makes it much easier for other users to remember and reference a particular address by using human-readable words rather than a long string of random characters.

It is similar to how Internet domain names work. For example, `https://www.coingecko.com/` is mapped to our server's IP address where CoinGecko is hosted while `coingecko.eth` is mapped to our Ethereum address.

ENS functions similarly to a conventional Domain Name System (DNS) used by websites around the world, and owners of ENS `.eth` domains have total control over their subdomains. Since we have control of `coingecko.eth`, we can create new subdomains like `buzz.coingecko.eth` and configure them to our liking.

All ENS registrations are ERC-721 compliant, meaning that they are NFTs that are transferable. While they are under your control, you can configure them to have additional records such as addresses and social media links. As shown below, ENS holders can receive currencies from other blockchains by including the wallet addresses for Bitcoin, Litecoin, or Dogecoin.



The screenshot shows a table with three sections: ADDRESSES, CONTENT, and TEXT RECORD. The ADDRESSES section lists ETH, BTC, LTC, and DOGE, all with 'Not set' values. The CONTENT section shows 'Not set'. The TEXT RECORD section lists vnd.twitter, vnd.github, and url, all with empty values.

RECORDS		ADD/EDIT RECORD
ADDRESSES	ETH	Not set
	BTC	Not set
	LTC	Not set
	DOGE	Not set
CONTENT	Not set	
TEXT RECORD	vnd.twitter	
	vnd.github	
	url	

ENS ownership is not permanent as they need to be renewed upon expiry. You can view the expiration date on your ENS account dashboard and even set a reminder. The cost to register a .eth domain varies based on the number of characters in the name. Due to the smaller pool of available names, shorter names cost much more than lengthier names.

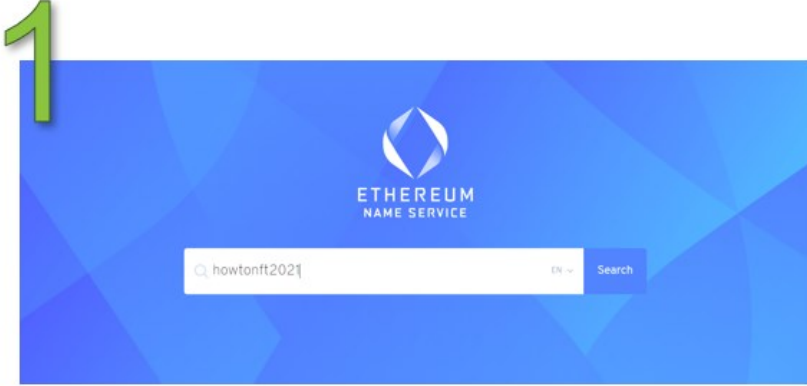
Currently, registration costs are set at the following prices:

- 5+ character .eth names: \$5 in ETH per year.
- 4 character .eth names: \$160 in ETH per year.
- 3 character .eth names \$640 in ETH per year.

Source: <https://docs.ens.domains/frequently-asked-questions>

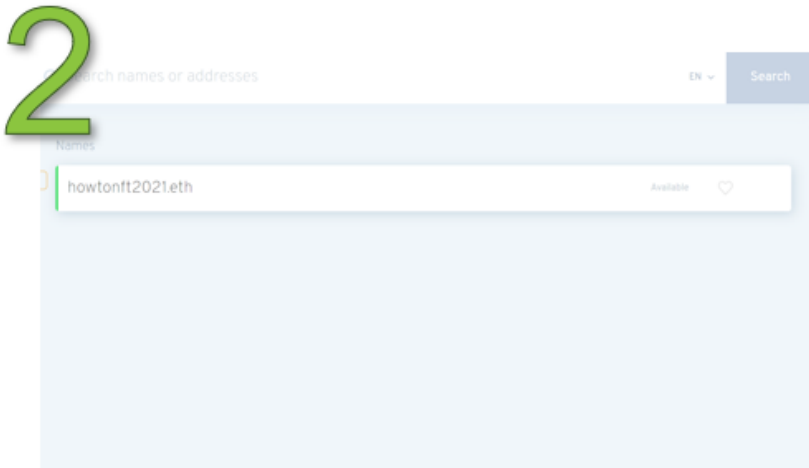
That covers the basics of ENS! There are more technical use cases for developers to use and integrate ENS with their applications. However, for regular users and newcomers, ENS is a great way to adopt an on-chain alter ego, and you can use them to send and receive funds in a simpler manner. Before we head to the next section, here's a step-by-step guide on how to register your very own ENS!

How to Register an ENS



Step 1

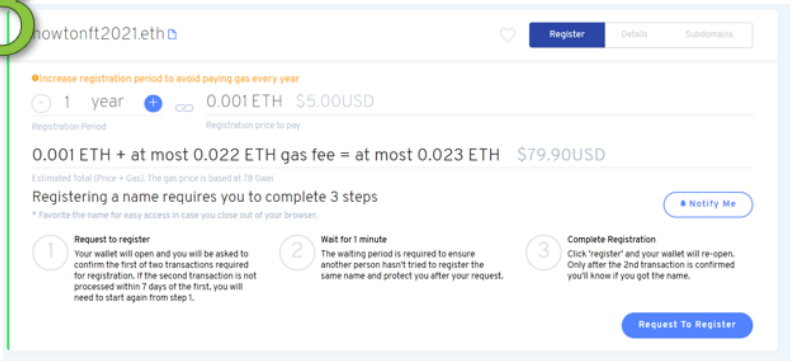
- Head to <https://app.ens.domains/>. Make sure to connect your wallet to the Ethereum mainnet before doing so.
- Then, search for a name that you would like to register. In this example, we will look for “howtonft2021”.



Step 2

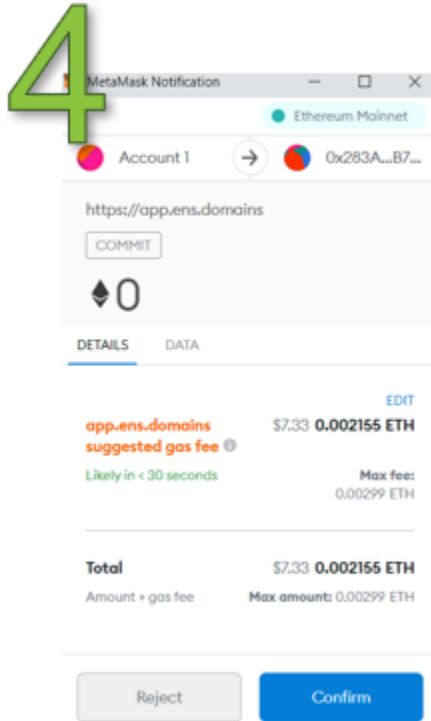
- If the name is unavailable, the expiry date will be shown. If it is available, it will be highlighted in green.
- Click on the available name.

3



Step 3

- Select the number of years to register the ENS domain.
- You will be shown the amount you have to pay in ETH (including transaction fees).



Step 4

- Once you have selected the registration period, click on 'Request to Register'.
- You will need to confirm the first of two transactions to complete the registration.
- Confirm the first transaction.

5 You will be able to manage your name soon.

Write the name for easy access in case you close out of your browser.

1 Request to register
Your wallet will open and you will be asked to confirm the first of two transactions required for registration. If the second transaction is not processed within 7 days of the first, you will need to start again from step 1.

2 Wait for 1 minute
The waiting period is required to ensure another person hasn't tried to register the same name and protect you after your request.

3 Complete Registration
Click 'register' and your wallet will re-open. Only after the 2nd transaction is confirmed you'll know if you got the name.

Step 1 ● Step 2 ● Step 3 ○

Click register to move to the 3rd step **Register**

Step 5

- After the first transaction is complete, you need to wait for 1 minute to make sure that no one else is trying to register the exact same name.
- Once the waiting period is over, click on 'Register' to confirm the second transaction.

6

Account

Favourites

FAQ

About

Learn how to manage your name...

PARENT	eth	
REGISTRANT		Transfer
CONTROLLER		Set
EXPIRATION DATE	2026.09.1 at 17:10 (UTC+08:00) Remind Me	Renew
RESOLVER	0x4976fb03c32e588cfe2b6cc831c098a78E8a8a41	Set

RECORDS **ADD/EDIT RECORD**

Step 6

- You're all done!
- You can manage your ENS domains by accessing your account and selecting the relevant name.
- Here, you can transfer ownership, add records and renew your name before it expires.

Proof of Attendance Protocol (POAP)

Proof of Attendance Protocol (POAP) is an app that makes it possible to record the events you have attended. For instance, if you have participated in a concert, the physical ticket could serve as your proof of attendance. However, the physical ticket might get misplaced, and its proof lost forever.

With POAPs, an attendee receives a digital badge represented as an NFT when attending a particular event. Event organizers can give attendees POAP as mementos for attending an event, further engaging their attendees and serving as a bridge to lengthen the relationship between event organizers and attendees.

Each POAP has a unique design that represents the event. Organizers can also add features, such as private chat rooms, raffles, and even send token airdrops to POAP holders to create a richer experience for their attendees. Additionally, event organizers can ask attendees to decide future events via polls.



The Graph NFT Badges by POAP

For the collector, this offers a way to bookmark their life experiences. Each POAP collection will look very different and unique. POAPs are not just a collection of badges. It provides a story that can be shared with others.

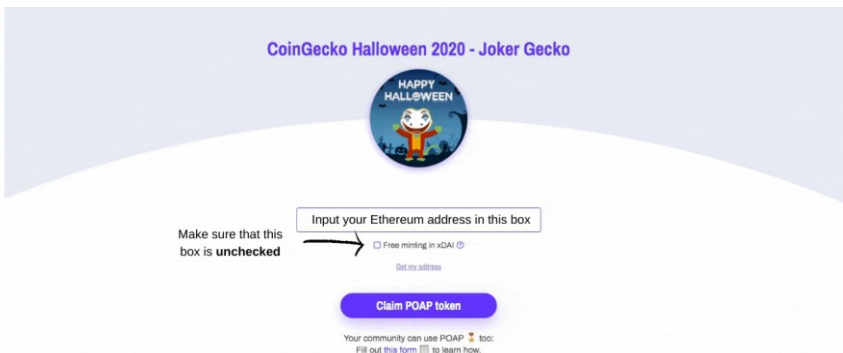
Collectors can meaningfully engage with other people with similar interests from POAPs they own by using the badges as verification to access private chat channels.

The cost of minting POAPs is low because POAP NFTs are issued on the xDai blockchain, an Ethereum sidechain with fast and inexpensive transactions. Event organizers can decide the timeframe when the POAPs can be claimed and distribute the POAPs through a link or QR code to anyone who has attended the events.

The only requirement to claim a POAP is participating in the event and claiming the POAP using an Ethereum address. POAPs then show up in the address's collection and can be viewed on <https://app.poap.xyz/>. Below is a guide on claiming your POAP NFT for each event.

Step 1

- Click the link provided by the event.



Step 2

- Input your Ethereum address into the box.
- Click on the "Claim POAP token" button

Notable Mentions



Collab.Land

Collab.Land has a similar use case to POAPs to create more engaged communities. Owning an NFT from a collection can serve as a verification process to gain entry into gated Telegram or Discord communities.



Handshake

Handshake is a decentralized naming protocol where top-level domain names are sold through auctions every two weeks. Users can participate in these auctions using their native currency, HNS. Auctions are conducted on Namebase, a Handshake registrar and exchange.



Unstoppable Domains

Unstoppable Domains allows users to create blockchain-based domain names that can be used to retrieve and send over 275 different tokens. Although it is similar to ENS, Unstoppable Domains enable users to own the domains for life with no renewal fees.

Conclusion

As seen from ENS and POAP, NFTs are definitely more useful than most people may think. Functioning more than just naming conventions or as a fancy souvenir, some projects such as APY Vision, which provides yield farming tools and analytics, have even used NFTs as a form of subscription for more premium services. Instead of holding fungible tokens, as long as you own the NFT, you gain access to professional features for a fixed period.⁵³

We at CoinGecko also use NFTs as a form of access into our CoinGecko Premium+ Telegram and Discord groups! Using the tool provided by

⁵³ APY Vision. (2020, November 26). *Introducing NFT Subscriptions*. Retrieved September 20, 2021, from <https://medium.com/apy-vision/introducing-nft-subscriptions-for-apy-vision-78b6d9a02a39>

Collab.Land, users holding these special NFTs can connect their wallets to verify ownership of their NFTs to gain access to our exclusive groups.

Outside of the cryptoverse, NFTs have many other real-world applications, such as movies and events tickets.

Entrepreneur Mark Cuban is trying to use NFTs to represent Dallas Mavericks' sports tickets, allowing fans to buy and resell them. With possibly commemorative designs for each occasion, a secondary market of these NFT tickets can exist, allowing the tickets to retain some form of value well into the future. This is just one example of how NFTs will continue to pave the way to a smoother and more transparent way of exchanging ownership in the future.

Recommended Readings

1. Step-by-Step Guide to Registering a .ETH Name
<https://medium.com/the-ethereum-name-service/step-by-step-guide-to-registering-a-eth-name-on-the-new-ens-registrar-c07d3ab9d6a6>
2. How and Why to Replace Your Ethereum Address with a User-Friendly Name
<https://blog.makerdao.com/how-and-why-to-replace-your-ethereum-address-with-a-user-friendly-name/>
3. POAPs: What are they and how to collect NFT attendance badges
<https://nftevening.com/poaps-all-you-need-to-know-about-nft-badges/>
4. NFTs will change everything we know about subscriptions, membership, licensing
<https://mattgalligan.com/membership-nfts/>

PART THREE: NFT TRENDS

CHAPTER 10: FRACTIONALIZED NFTS

On 11 June 2021, PleasrDAO grabbed headlines by purchasing the internet's most iconic meme, 'The Doge NFT', at a whopping price of 1,629 ETH, worth roughly \$4 million at the time of transaction.⁵⁴ Short of amassing generational wealth, the general public has virtually no opportunity to gain ownership of this particular Doge NFT due to its astronomical price.



The Doge NFT by Atsuko Sato

54 Manoylov, MK. (2021, August 31). *Fractions of the original 'Doge' NFT will soon be sold.* Retrieved September 29, 2021, from <https://www.theblockcrypto.com/linked/116180/fractional-doge-nft-auction>

Much like traditional art pieces or even real estate properties, prices of unique NFTs can be prohibitive, preventing many from gaining exposure to the most sought-after pieces. If holders want to sell their NFTs immediately, they will have to look for buyers with enough capital or reduce the price significantly to lower the barrier of entry. This makes NFTs illiquid since you cannot easily exchange them for money or other assets.

Unless you are a professional NFT appraiser, it's also challenging to gauge the intrinsic value of NFTs. Sure, there are cases where rarity can be established, but there are also many other non-quantifiable factors such as aesthetics, social prestige, and cultural significance - who's to say that one NFT is more valuable than the other?

Without a reliable price reference, it can be difficult for NFTs to be used as collateral for more complex financial products. For instance, one could easily use ETH as the collateral for borrowing other assets like USDC since ETH is traded 24/7 on markets globally. However, because NFTs trade at a much lower frequency, their prices cannot be readily established at any given moment in time.

For example, if you would like to collateralize your NFT to draw out a USDC loan, how much USDC would someone be willing to lend to you? For NFTs to become a viable form of collateral, highly accurate real-time pricing is required. In short, NFTs have a few hurdles to overcome before becoming an attractive asset class,

Here are some of its challenges:

- **Illiquid** – resulting in high slippage during buying and selling
- **Lack of market prices** – consequently hard to value
- **Not a good collateral** – therefore, low capital efficiency
- **Significant capital outlay** – required to obtain exposure to the highly-prized NFTs

The challenges highlighted above led the NFT community to ask this question - what if there's a way to buy just a slice of the NFT rather than the entire piece?

Why Do We Need Fractionalized NFTs?

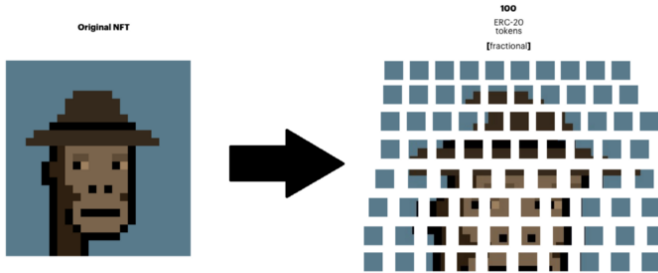


Illustration of NFT fractionalization by Fractional⁵⁵

Enter NFT fractionalization. NFT fractionalization aims to solve the problems mentioned above by making NFT divisible, thus more tradable. This allows investors with less capital to own a slice of unique, high-value NFTs previously outside their reach.

In September 2021, many Doge lovers gained the opportunity to partially own The Doge NFT mentioned above as PleasrDAO decided to fractionalize the NFT and auctioned off DOG tokens representing fractional ownership of The Doge NFT. The batch auction raised 11,942 WETH in total, propelling the NFT to a record-breaking valuation of \$225 million!⁵⁶

The fractionalized pieces of the NFT are considered fungible with one another. As they are fungible, users can trade these fractional NFT tokens through decentralized exchanges, similar to how fungible tokens are traded. Users can provide liquidity to decentralized exchanges, thus lowering slippage for others.

Just like how Real Estate Investment Trusts (REITs) have allowed retail investors to own a part of real estate, fractionalized NFTs have also allowed investors to own a piece of a valuable NFT. Below we will look at three projects tackling the problem of fractionalizing NFTs—Niftex, Unicly, and NFTX.

⁵⁵ (n.d.). Fractional.art. Retrieved November 1, 2021, from <https://fractional.art/>

⁵⁶ Shen. M. (2021, September 3rd). *Record Doge NFT Sale Highlights Growing Demand for Fractionalization*. <https://www.coindesk.com/markets/2021/09/02/record-doge-nft-sale-highlights-growing-demand-for-fractionalization/>

Niftex



Niftex, one of the first fractionalized NFT projects, was launched back in May 2020, way before the NFT hype of 2021. It allows users to mint fractionalized NFTs that are called shards. Niftex initially focused on individual NFTs such as highly-priced Axies and CryptoPunks.

Although the first iteration of Niftex only allowed for the fractionalization of single items, Niftex V2 enables users to mint shards for a bundle of NFTs. Shard holders will also have governance rights towards the underlying NFTs.

For example, if the underlying NFT is a piece of land from Decentraland, any underlying utility, such as rent, can be distributed to the shard holders. Niftex supports different types of NFTs that can be included inside a bundle.






Even though Niftex started out by leveraging Uniswap v1, with the launch of Niftex v2, Niftex has decided to utilize its own exchange to incorporate features like royalty distribution.

Royalty distribution is a feature that allows royalties to be distributed to the NFT issuer each time the NFT is sold. NFT royalty may significantly improve the artists' earnings where traditionally, artists have only benefited from the primary sales of their creations.

With fractionalized NFTs, the NFT is locked inside a smart contract. This means that any sales of the NFT shards will not trigger the royalty payout as the underlying NFT itself does not have a change of owners. With the launch of its exchange, Niftex pioneered a new feature called artist trade fee royalties, where part of the trading fees will be accrued to the artist.

Niftex introduced the buyout clause for individual NFT and bundles so that purchasers have a way to buy the underlying assets even without collecting all the shards. Let's take a look at an example to see how the buyout works in practice, and how it is designed to prevent spamming.

Assume there are 100 shards available for an NFT with a 10% minimum amount of shards required to trigger a buyout. A buyer would like to buy the whole NFT for 100 ETH. The buyer will have to stake 10 shards and 90 ETH to trigger the buyout. To cancel the buyout, fraction holders will have to buy the staked 10 shards at the quoted price, totaling 10 ETH.

#	Name	Market Cap	Liquidity	Price	ROI	Total Supply
1	 APE Punk NIFTEX Uniswap	\$975,762	\$162,536	\$97.58	182.54%	10,000 APES
2	 R64X.com NIFTEX Uniswap	\$557,069	\$154,115	\$87.04	341.06%	6,400 R64X
3	 Antique Zombie Shards NIFTEX Uniswap	\$551,650	\$136,945	\$551.65	399.17%	1,000 ZOMB
4	 Baddest Alpha Ape Bundle NIFTEX Uniswap	\$352,707	\$47,028	\$0.35	27.66%	1,000,000 APED
5	 Almace Shards NIFTEX Uniswap	\$341,925	\$23,209	\$34.19	333.15%	10,000 ALMX

Unicly



Unicly is a relative newcomer in the NFT space.

Users can lock a collection of NFTs through Unicly to issue fungible share tokens called uTokens, which represent ownership of the NFT collection. uTokens have governance rights over the collection, such as deciding which NFTs can be included in the collection. The structure is similar to an NFT fund since Unicly supports different types of NFTs inside a collection.
















Fractionalized NFTs

To redeem the underlying NFTs, sufficient uToken holders need to vote to unlock the collection. Interestingly, there is no way to bid for the entire collection; buyers have to bid on the underlying NFTs individually.

Each collection has its own voting threshold set by the collection's creator, which can be unlocked when the voting threshold is achieved. After the voting is over, the respective highest bidders can claim the NFTs while uToken holders can claim the ETH paid by the bidders.

Unicly has a governance token named UNIC. UNIC holders can lock UNIC to receive xUNIC, which is eligible for 0.05% of the protocol's volume taken in fees.

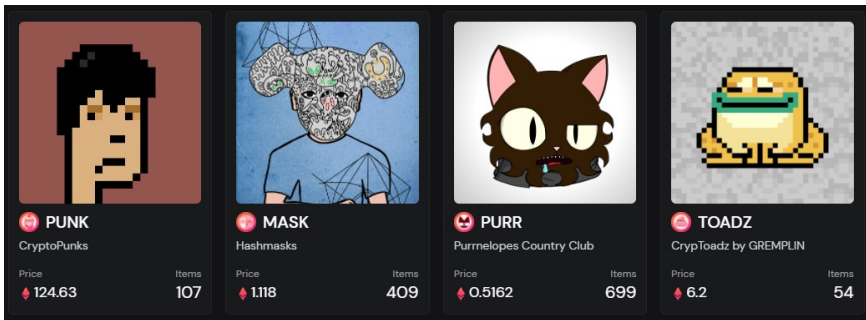
Unicly's Automated Market Maker (AMM) exchange is called UnicSwap, a fork of Uniswap V2. Users trading uTokens in Unicswap are charged 0.3% as swap fee, of which 0.25% goes to uTokens's Liquidity Providers. The remaining fees are used to buy back UNIC tokens and subsequently distributed to xUNIC holders.

Name	Symbol	Price (USD)	Market Cap	Liquidity	Actions
1.  Jenny Met... 	uJENNY	\$1.745135	\$17,451,345	\$8,357,067	Bid Trade
2.  CryptoPun... 	uPUNK	\$0.07529	\$18,822,520	\$3,235,968	Bid Trade
3.  Hashmask 	uMASK	\$0.029456	\$2,945,610	\$1,299,806	Bid Trade
4.  Aavegotch... 	uGOTCHI	\$1.19744	\$1,197,440	\$1,162,576	Bid Trade
5.  Mystic Axies 	uAXIE	\$0.336487	\$3,364,872	\$1,033,407	Bid Trade
6.  Autoglyph 	uGLYPH	\$0.042333	\$4,233,295	\$923,125	Bid Trade
7.  Bored Ape... 	uAPE	\$0.002322	\$2,321,700	\$791,317	Bid Trade
8.  ArtBlocks 	uARTBLOCKS	\$0.016264	\$1,626,380	\$516,983	Bid Trade
9.  MoonCats 	uMOON	\$0.151044	\$1,510,443	\$440,162	Bid Trade
10.  The Beppl... 	uBEEPLE	\$0.037273	\$372,733	\$363,741	Bid Trade

NFTX



Although Niftex and NFTX sound very similar, they are anything but. Unlike Niftex, NFTX does not support the sharding of individual NFTs. NFTX focuses on creating funds for NFTs with similar attributes, thus helping to create a floor price for particular NFT types.



NFTX funds are constructed using NFTs that users deposit into the vault. This process is called minting. For example, users can deposit CryptoPunks into the CryptoPunks vault and receive PUNK tokens in return. Some vaults, however, might only allow certain subtypes such as the CryptoKiittes (Gen 0) vault. As its name suggests, only Gen 0 CryptoKitties are eligible to be deposited into the vault.

The funds' token follows the ERC-20 standard and is fungible. Users can choose to provide liquidity in decentralized exchanges like Sushiswap, and the default token pair is with ETH.

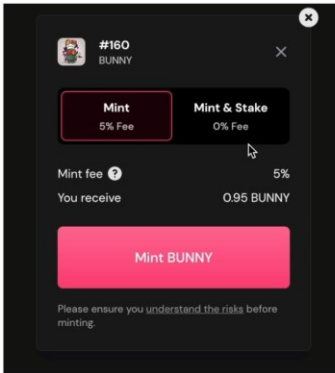
With a sufficiently large enough liquidity, NFTX funds help to improve price discovery for particular NFT types. For example, if a PUNK token is trading at \$40,000, this suggests that the price floor of every CryptoPunk is \$40,000.

In the latest version of NFTX V2, fees are charged when users mint or redeem NFTs. The default fees are the following:

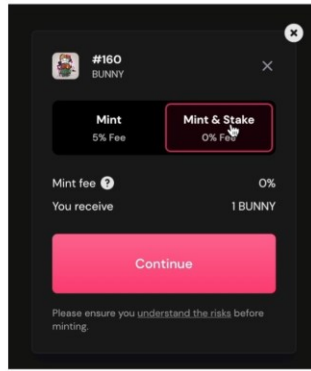
1. 5% minting fees
2. 0% random redemption fees
3. 5% targeted redemption fees

Fees can be changed anytime through a governance vote by the vault owners.

In the case of minting, a user who deposits one CryptoPunk into the vault, for instance, would receive 0.95 PUNK tokens in return. 0.05 PUNK token will be paid to the liquidity providers of the vault. You can avoid paying the mint fee if you stake the tokens for a minimum of 48 hours.



Mint with fee



Mint & Stake with no fee

Users can redeem their NFTs anytime and bypass any redemption fees if they choose to redeem a randomized NFT from the vault. Alternatively, the user can pay a premium (5% targeted redemption fees by default) to select specific NFTs. As such, you should not deposit any NFTs that have high or sentimental value if you do not want to lose them to other collectors.

Notable Mentions



DAOFi

DaoFi released Fraction.art, a primary art marketplace that launches fractionalized NFTs. Fraction community members can enter lotteries to receive allocations for the fractionalized NFTs. After the primary sale, the fractions are traded on a bonding curve on the secondary marketplace facilitated by DaoFi.



Fractional

Fractional allows users to mint fractionalized NFTs. Users can own a share of their favorite NFTs by purchasing fractionalized ownership tokens of a particular NFT. The Doge NFT was fractionalized through this protocol.



NFT20

NFT20 is another NFT index fund provider with a governance token named MUSE. Similar to NFTX, NFT20 funds support similarly priced NFTs that come from the same project and also offer NFT flash loans. For rarer pieces, a Dutch auction can be initiated where the owner gets to set the price.

Conclusion

NFTs received unprecedented attention in 2021, with eye-popping sales such as Beeple's \$69 million art sale.⁵⁷ Before NFT fractionalization, it was hard to own highly-priced NFTs. Fractionalized NFTs aim to democratize the NFT market and allow retail traders to have exposure to this asset class.

The adoption of fractionalized NFTs is still fairly early, and they hold immense potential to upend the market for illiquid asset classes. As of September 2021, the combined total value locked for Niftex, Unicly, and NFTX still sits around \$120 million. To put this number into perspective,

⁵⁷ (2021, March 11). *Beeple sold an NFT for \$69 million*. The Verge. Retrieved September 23, 2021, from <https://www.theverge.com/2021/3/11/22325054/beeple-christies-nft-sale-cost-everydays-69-million>

that's only 0.1% of the \$120 billion locked in Ethereum DeFi protocols in the same period.

NFT as an asset class still has a long way to go to prove its profitability and sustainability. With the rise of digital natives and the growing demand for alternative investments, fractionalized NFT may emerge as the investment dark horse in the next decade.

Recommended Readings

1. Comparing different NFT Fractionalization Protocols
<https://www.coingecko.com/buzz/fractionalized-nft>
2. Lessons along the wei
<https://gaus.substack.com/p/lessons-along-the-wei>
3. NFTX: NFT-backed index vaults on Ethereum
<https://blog.nftx.org/>
4. Road to Financialization of NFTs
<https://medium.com/iosg-ventures/road-to-financialization-of-nfts-145f3829dfdf>

CHAPTER 11: NFTS & DEFI

The financialization of NFTs through fractionalization has enabled improved accessibility, liquidity, and ironically, fungibility of NFTs. It shows how the utility of NFT can go beyond the stereotypical association of just arts or collectibles. NFTs do in fact have a role to play in the world of Decentralized Finance (DeFi).

Decentralized Finance or DeFi is the movement that allows users to utilize financial services such as borrowing, lending, and trading without relying on centralized entities. These financial services are provided via Decentralized Applications (Dapps), most of which are deployed on the Ethereum platform.

NFT fractionalization showcases the integration of DeFi mechanics in the world of NFTs, but the influence isn't merely a one-way street.

As the development of DeFi matures, several projects have started exploring the combination of NFTs with DeFi products, giving birth to a new class of assets called “Financial NFTs”. Simply put, financial NFTs are any NFTs applied as financial instruments—but *why*?

Why go through the hassle of integrating NFTs into DeFi? What is the point when ERC-20 tokens are already working so well? We will explore in this chapter how financial NFTs can bring about improved capabilities and efficiency for DeFi products. The examples that we will cover are Uniswap, Solv Protocol, and Charged Particles.

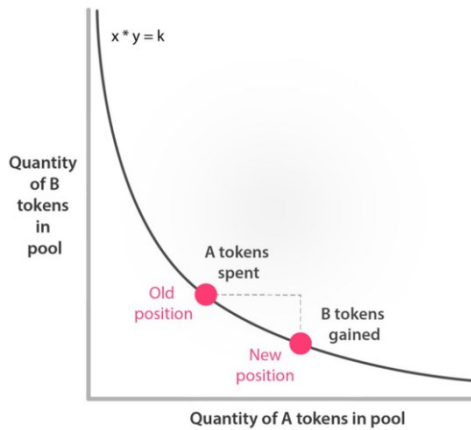
Uniswap

To fully understand Uniswap, we must first comprehend the core concepts of both Uniswap V2 and Uniswap V3.

Uniswap V2



Uniswap V2 is an Automatic Market Maker (AMM) that allows the setup of any ERC20-ERC20 liquidity pools, which are completely fungible in nature. For instance, in a DAI/USDC pool, both DAI and USDC are equally and indiscriminately distributed along an $x*y=k$ price curve to cover *all* prices, from \$0 to infinity.



Source: <https://www.coindesk.com/business/2021/02/04/what-is-uniswap-a-complete-beginners-guide/>

What this means is that most assets within most liquidity pools are never utilized unless their respective prices swing to the extreme ends. According to Uniswap, the V2 trading pairs of DAI/USDC only reserves about 0.50%

of capital for swaps between \$0.99 and \$1.01, which is the price range where most trades are typically concentrated around in a stable pool.

While Uniswap V2 is revolutionary, we can observe a number of issues:

- **Capital inefficiency** – most of the liquidity (or about 99.5% in the above DAI/USDC example) supplied by LPs sits unutilized.
- **High slippage** – as funds are spread thin across all prices, users may have to pay higher prices when buying tokens due to the lack of liquidity at a specific price.
- **Lower fee earnings** – Liquidity Providers (LPs) only earn fees on a small portion of the capital they provide, which can be insufficient to offset the risk of Impermanent Loss (IL) they take on.

Uniswap V3



Uniswap V3 launched in May 2021 with new features and improvements. In this chapter, we will focus on the key implications of Uniswap V3 introducing non-fungible liquidity pools. This fundamental change is instrumental in addressing the flaws of Uniswap V2 and serves as an interesting example of the role that NFTs can play in the core design of DeFi products.

Unlike Uniswap V2, LPs in Uniswap V3 can concentrate their liquidity within custom price ranges. As shown in the graph below, instead of liquidity being spread across all prices in an ETH/USDC pool, an LP, for instance, can choose to allocate his capital specifically in the price range of \$250–\$12,000.



Source: <https://uniswap.org/blog/uniswap-v3/>

What the LP has essentially done is that he has created his own personalized liquidity pool covering only the range of \$250–\$12,000. The collective liquidity positions of all LPs will then make up the ETH/USDC pool. Interestingly, this also means that it is theoretically possible to have price ranges in Uniswap V3 pools where no liquidity is available at all.

If the above LP provided liquidity for Uniswap V2, his share of the ETH/USDC pool would have been represented by fungible Uniswap-ETH-USDC-LP tokens, but this is not the case in Uniswap V3.

On top of “quantity”, Uniswap V3 positions need to account for an extra dimension of “liquidity concentration”. For example, two LPs may have added \$100 to the ETH/USDC pool, but their choice of liquidity allocation in terms of price range might be very different.

In this sense, their liquidity positions are not interchangeable and hence, non-fungible. This is where NFTs come into play since non-fungible ERC-721 tokens are a more suitable fit to represent the unique positions of both LPs.

As such, Uniswap V3 has managed to leverage NFTs effectively in the DeFi space, leading to:

- **Improved capital efficiency** – Uniswap V3 requires less capital to generate the same amount of expected fees compared to Uniswap V2.
- **Lower fee slippage** – as a result of higher liquidity depth in high-volume price ranges.
- **Higher fee earnings** – a higher percentage of the deployed funds can be used to generate swap fees.

The flip side of this user empowerment is that it also demands proficiency in market knowledge to identify optimal liquidity positions, which may be limited to only a handful of financially-savvy DeFi users. Becoming an LP for Uniswap V3 has a much steeper learning curve compared to becoming an LP for Uniswap V2 since your choice of fund allocation has major implications on the trading fees that you may earn, as well as the level of risk you are exposed to.

Nevertheless, this reward mechanism for capital efficiency bodes well for the long run. It offers a glimpse into how NFTs can play a pivotal role in cultivating an increasingly sophisticated DeFi space, which is essential for sustainable growth.

Solv Protocol



Solv Protocol is a DeFi platform that enables the minting and trading of financial NFTs called Solv Vouchers.

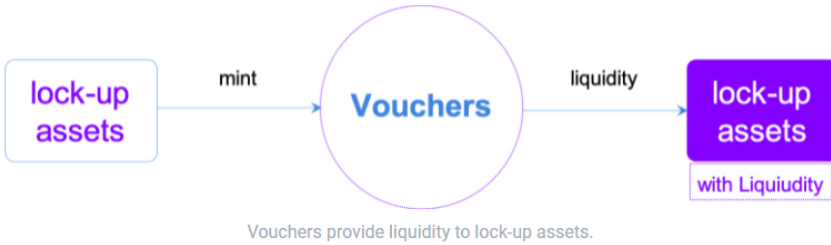


An example of a Solv Voucher - 2 years linear vesting of 20,520 DODO

Solv Vouchers are a form of derivatives product that represents vesting assets. Vesting is the process of locking up and releasing the tokens after a set period of time. This helps to ensure long-term commitment from early investors and team members, which will help to align their financial interests in furthering the project's growth and success.

Through Solv, projects are able to mint and distribute locked investment allocations in the form of Solv Vouchers to their investors, who are then entitled to any future token flows of the underlying assets.

Take the voucher above as an example. The allocation of 20,520 DODO is vested linearly for two years, which means that the voucher will be unlocked for redemption at a fixed interval. For Solv Vouchers, linear vesting releases the tokens every Ethereum block, which works out to roughly 0.00488 DODO every 15 seconds. Other methods of release include one-time release and staged release.



Source: <https://docs.solv.finance/solv-documentation/>

Usually, locked assets are absolutely illiquid, and the only action available is to passively wait out the vesting period to claim the assets. With Solv Vouchers, owners of locked assets can now exercise active control, including:

1. Buying and selling the vouchers on Solv’s marketplace, which is akin to transferring the ownership of the vested tokens⁵⁸
2. Splitting the vouchers into multiple, smaller portions
3. Merging the vouchers into a bigger portion

This opens up fascinating market strategies for vesting assets where buyers can enter long-term positions at a discount, while early investors can opt to sell a portion or all of their Vouchers for liquidity.

It is interesting to note how Solv Protocol has managed to flip the narrative that “NFTs are illiquid” by enabling liquidity and trading for the otherwise illiquid, locked fungible assets through the innovative use of financial NFTs.

But again, why NFTs?

By nature, ERC-20 tokens lack the sophistication to be encoded with complex information needed in certain financial instruments. ERC-721 tokens, on the other hand, while suitable in carrying the metadata of a Pudgy Penguin, for instance, lack flexibility as they cannot be divided or combined.

In order to circumvent these limitations, Solv Finance had to develop a novel token standard called “vNFT”, which stands for versatile non-fungible token. vNFTs is a culmination of the best of both worlds from ERC-20 and

⁵⁸ (n.d.). *Solv Protocol - The Pioneer of Financial NFTs*. Retrieved November 1, 2021, from <https://solv.finance/>

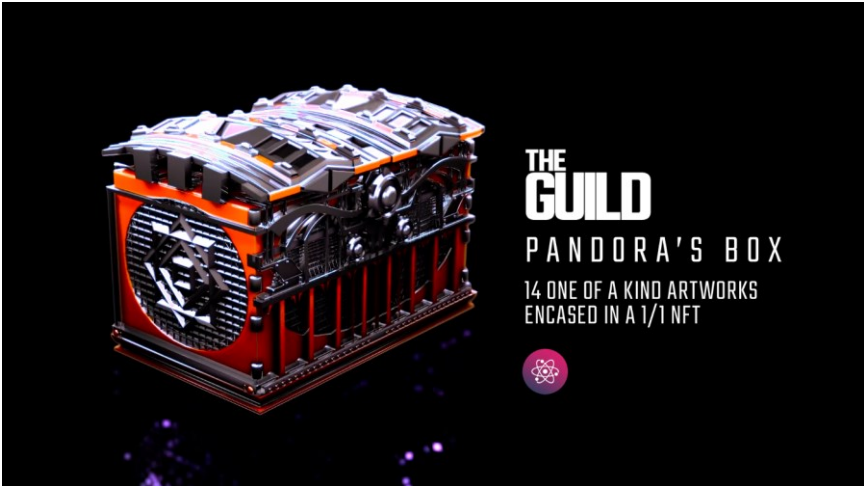
ERC-721, enabling Solv Vouchers to be encoded with the intricacies of vesting contracts, as well as the composability of ERC-20 that allows them to be split or combined.

Charged Particles



One can think of Charged Particles as the Matryoshka dolls of NFTs, except, in this case, the dolls do not have to be identical at all. This protocol allows any tokens (e.g., ERC-20, ERC-721, ERC-1155) to be deposited into any NFTs. With this, your apes and penguins transform beyond being just expensive JPEGs into utility NFTs or virtual baskets capable of carrying various digital assets.

Here's where things get even more interesting. You can also “charge” your NFT by depositing an Aave-supported ERC-20 token, such as DAI, into it. In doing so, the DAI will automatically be swapped into its interest-bearing counterpart, aDAI, allowing your NFT to evolve into yield-generating financial NFTs. The accrued interest can then be programmed to “discharge” to any other wallets—your favorite aunt, a charity, CoinGecko—it's up to you!



This innovative approach in the treatment of NFTs paves the way for many new, exciting possibilities. Picture a loot box (which is an NFT by itself) that contains a plethora of items ranging from aTokens to LP Tokens to other valuable NFTs, which is what Charged Particles have done in partnership with The Guild. This loot box can then be embedded within a blockchain game as a treasure chest containing other in-game items or even reimaged as a music album filled with individual music NFTs.

This is just one of the many ways that Charged Particles could be used, and it will certainly be fascinating to observe how many more use cases can be drummed up in the coming months.

As of now, Charged Particles can only support NFTs minted on their platform, but in the near future users will be able to “charge” or deposit digital assets into any NFTs as stated.⁵⁹

⁵⁹ *Charged Particles Documentation*. (n.d.). Retrieved November 1, 2021, from <https://docs.charged.fi/>

Notable Mentions



Aavegotchi

The Gotchiverse is an upcoming open-ended social space where players can engage in many activities, such as farming, crafting, trading, and battles. Each ghost NFT called Aavegotchi requires collateral in the form of Aave’s interest-bearing aTokens to summon. This means on top of being an in-game avatar, these pixelated ghosts are also financial NFTs that can accrue value over time.



Unvest

Similar to Solv Protocol, Unvest also facilitates the on-chain trading of locked tokens. This is achieved through the minting of ERC-20 Liquid Vesting Tokens (LVTs) that represent the vesting assets or their version of financial NFTs—Unvest NFTs.



Revest

Revest enables the locking of ERC-20 tokens in ERC-1155 NFTs. The user can configure the locking mechanism to one of the following: Time Lock, Value Lock, and Address Lock.



NFTfi

NFTfi is the “Aave of NFTs”. Instead of fungible tokens, NFTfi facilitates peer-to-peer lending and borrowing by using NFTs as collaterals.

Conclusion

While the application of NFTs in Uniswap V3 centers around financial practicality, financial NFTs like Solv Vouchers, Charged Particles, or even Aavegotchis also possess the artistic elements typical of NFTs. As such, the value of financial NFTs becomes multi-dimensional and can be summed by the collective aspects of:

1. The perceived value of their utility (if any)
2. The speculative value of their artwork, design, and rarity
3. The intrinsic value of their underlying assets

As demonstrated, the use-cases of NFTs transcend beyond that of just tokenizing art and collectibles. The fundamental technology sets the stage for financial NFTs to have widespread utility in DeFi too.

The relationship between NFTs and DeFi is not mutually exclusive. Rather, they work symbiotically and strengthen each other. As the crypto ecosystem grows and flourishes, we will likely observe the emergence of more novel combinations and use cases between DeFi and NFTs. The ecosystem as a whole is still in an experimental stage, and it will be interesting to see what new, exciting directions financial NFTs will bring about.

Recommended Readings

1. The boom of financial NFTs
<https://hackernoon.com/financial-nfts-will-be-the-real-nft-boom-jz1a32wl>
2. Uniswap V3 explained
<https://defiprime.com/uniswap-v3-explained>
3. How can NFTs be used in DeFi
<https://101blockchains.com/nft-and-defi/>
4. When DeFi meets NFTs
<https://cointelegraph.com/news/this-time-it-s-different-when-defi-meets-nfts>

CHAPTER 12: BRAND MARKETING USING NFTS

On 23 August 2021, Visa, the global payments processing company, announced that it acquired CryptoPunk #7610 for \$150,000. The purchase marked the first foray of a large company into NFTs. According to Cuy Sheffield, Head of Crypto at Visa, there were three main reasons for the purchase.⁶⁰

“We think NFTs will play an important role in the future of retail, social media, entertainment, and commerce. To help our clients and partners participate, we need a firsthand understanding of the infrastructure requirements for a global brand to purchase, store, and leverage an NFT.

We also wanted to signal our support for the creators, collectors, and artists driving the future of NFT-commerce. Enabling buyers and sellers is what we do —whether it’s helping small and micro business owners get online, or making it easier for companies to pay their partners across borders. We’re excited to work with this growing community to make NFTs usable and accessible in a variety of contexts.

Lastly, we wanted to collect an NFT that symbolizes the excitement and opportunity of this particular cultural moment. We’re a company steeped in the

⁶⁰ Sheffield, C. (n.d.). *NFTs mark a new chapter for digital commerce*. Retrieved September 22, 2021, from <https://usa.visa.com/visa-everywhere/blog/bdp/2021/08/18/nfts-mark-a-1629328216374.html>

history of commerce and payments—but with our eyes on the future. With our CryptoPunk purchase, we’re jumping in feet first. This is just the beginning of our work in this space.”

Although the official reasons have been spelled out, there is a fourth underlying reason that has not been expressly stated—marketing. A quick scroll through VisaNews’s Twitter page and you would notice that the CryptoPunk post has received far more attention than any other post.



Immediately after the announcement, news of the purchase also spread like wildfire across both crypto and business news websites.⁶¹ A \$150,000 purchase effectively became an extensive marketing campaign that generated far more public relations value than the cost of acquiring the asset itself.

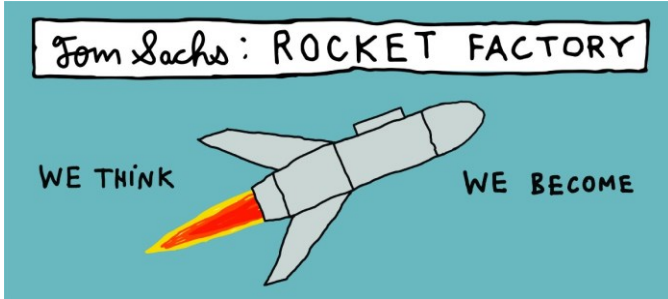
Additionally, with this NFT purchase, Visa still holds the asset on its balance sheet, which has roughly doubled in value since the purchase was made. The point is that acquiring an NFT can not only be used by individuals to flex but can also be used by companies and other institutions to build their brand and market themselves.

Based on our observations so far, there are two approaches that companies have adopted - one is by buying an existing NFT, and the other is by growing their brand through their own NFTs.

⁶¹ Browne, R. (2021, August 24). *Visa jumps into THE NFT craze, buying a 'CryptoPunk' for \$150,000*. Retrieved September 22, 2021, from <https://www.cnbc.com/2021/08/23/visa-buys-cryptopunk-nft-for-150000.html>

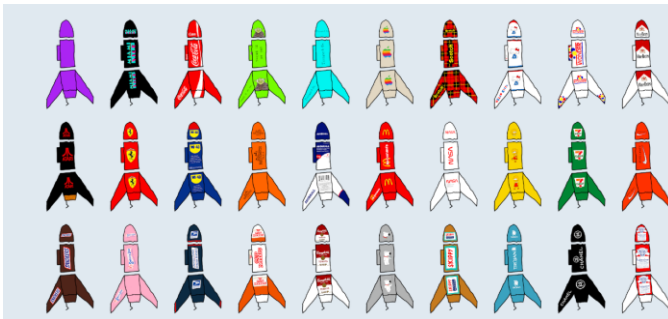
The Buyer's Approach

Visa's CryptoPunk purchase was clearly the buyer's approach. However, Visa was not the only one to adopt this method. Another example is Budweiser purchasing an NFT from Tom Sachs's: Rocket Factory (TSRF) collection.



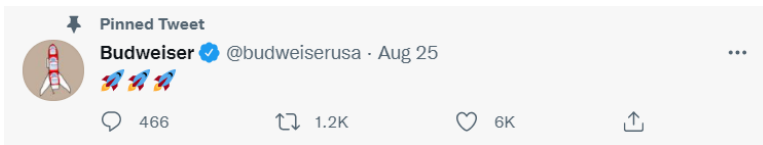
As its name suggests, TSRF is by Tom Sachs, a renowned contemporary artist in New York. TSRF was a unique project as it involved collecting Rocket parts to form a complete Rocket. A Rocket comprises three Component NFTs: a Nose Cone, a Body, and a Tail Assembly. These three components may be combined to form a Completed Rocket NFT. Once the Component NFTs are combined and burned, a Completed Rocket NFT is minted. Up to 1,000 Completed Rockets may be minted.

Over the years, Sachs has worked closely together with many established brands like Chanel and Nike. Along with the use of Copyright Laws that allow parody works (fair use doctrine), most of the Rocket parts have a pre-existing company logo on them.



Once a Completed Rocket has been minted, owners have the option to launch their rocket. If approved, the project will create a physical sculpture of the rocket, launch it and make every attempt at recovery. The Physical Rocket is then shipped to its owner in a custom display box, while the Completed Rocket NFT will be updated with metadata gathered from the launch. A video documenting the launch will be linked to the Completed Rocket NFT as well.

Now here's the kicker. Shortly after Visa's CryptoPunk purchase, Budweiser bought a Budweiser Rocket on 24 August 2021 for \$25,000. Notably, Budweiser also bought the ENS domain beer.eth previously for \$95,000. There was no notice, nor was there any big announcement. Budweiser only did two things; changed their Twitter profile picture to the NFT and posted three rocket emojis.



A spokesperson later confirmed the purchase and stated:⁶²

“Budweiser is taking its first steps into the NFT universe. We’re excited to support Tom Sachs and his Rocket Factory project and join this incredible community.”

Like Visa, Budweiser's NFT purchase galvanized the crypto community and drew widespread attention across social media and other news platforms. Budweiser has effectively reaffirmed Visa's approach towards a new form of marketing.

Even smaller brands have taken the leap. For instance, AriZona Iced Tea is actively collaborating with Bored Ape Yacht Club (BAYC) on new products after purchasing an Ape.

⁶² Kiderlin, S. (2021, 25 August). *Budweiser gets INTO NFTS by launching A Bud-themed space rocket on Twitter*. Retrieved September 22, 2021, from <https://markets.businessinsider.com/news/currencies/budweiser-nft-spacerocket-rocket-factory-project-nonfungible-token-crypto-asset-2021-8>



The iced tea company has even bought other growing NFTs such as Pudgy Penguins and Cool Cats.⁶³

Buying an NFT automatically enrolls a brand into an exclusive club. Notably, members of the club will naturally become de facto brand ambassadors because it is in everyone's mutual interest to grow the community. Rather than paying millions of dollars to sign a contract with Stephen Curry, it might be worth considering buying a BAYC instead since Curry owns one.⁶⁴ The best part is that the NFT remains an asset with (albeit speculative) value on the balance sheet instead of a marketing campaign that gets spent immediately.

⁶³ OpenSea. (n.d.). *AriZonaNFTTea - Profile*. Retrieved September 22, 2021, from <https://opensea.io/AriZonaNFTTea?identifier=AriZonaNFTTea>

⁶⁴ Lee, I. (2021, August 30). *Steph Curry jumps into NFTs with \$180,000 purchase of Bored Ape Digital Artwork*. Retrieved September 22, 2021, from <https://markets.businessinsider.com/news/currencies/steph-curry-nft-bored-ape-yacht-club-180000-ethereum-nba-2021-8>

The Creator's Approach

Unlike the Buyer's Approach, the Creator's Approach involves companies creating their own NFTs. However, because NFTs can be encoded and utilized in various ways, the possibilities for building a brand are endless.

Luxury giants like Burberry and Louis Vuitton have already implemented this method.⁶⁵ In Burberry's case, they have collaborated with Mythical Games' multiplayer online game Blankos Block Party to create an official NFT game character called Sharky B that can be purchased in-game.



Burberry's reasoning is that the company has always been experimenting with creative marketing strategies and has identified gaming and the digital sphere as a strong area of interest among its consumers.⁶⁶

Louis Vuitton has gone one step further by creating their own mobile-app game, *Louis: The Game*. The game follows the journey of the fashion brand's mascot Vivienne to Paris and features 30 NFTs to be collected by players along the way, 10 of which were designed by digital artist Beeple. The NFTs are collectible but not for sale.

⁶⁵ Shumba, C. (2021, August 9). *Luxury fashion houses Louis Vuitton and Burberry dive into the world of NFTs and online gaming*. Retrieved September 22, 2021, from <https://www.scmp.com/magazines/style/luxury/article/3144333/louis-vuitton-and-burberry-are-diving-nfts-and-online-gaming>

⁶⁶ Theodosi, N. (2021, August 4). *Burberry drops first digital products*. Retrieved September 22, 2021, from <https://wwd.com/fashion-news/fashion-features/burberry-drops-first-digital-products-1234892893/>



Although this is Louis Vuitton’s first direct involvement with NFTs, it should be noted that its parent company, LVMH is the founder of the Aura Blockchain Consortium, which aims to combat counterfeiting in the luxury industry through blockchain technology.

Old school brand Adam Bomb Squad is also experimenting with NFTs.⁶⁷ Known for its streetwear style and multiple collaborations with big players like Disney and Pepsi, Adam Bomb Squad launched an NFT line of 25,000 art designs centered around their company’s mascot.



Each NFT has historical significance and is based on real prints manufactured over the firm’s 18-year history (founded in 2003), or even designs that did not make the cut.

⁶⁷ Princess. (2021, September 21). *Adam Bomb Squad: Overlap between streetwear and NFTs*. Retrieved September 22, 2021, from <https://nftevening.com/https-nftevening-com-adam-bomb-squad-overlap-between-streetwear-and-nfts/>

Unlike other conventional NFT projects, Adam Bomb Squad is also looking to incorporate revenue-sharing mechanics through its NFTs. The idea is that the holders of NFT designs that go to print (e.g., NFT #1 gets printed on a T-Shirt for the Summer of 2022) will receive a portion of the sales as royalties.

Case Study: Revitalizing the magazine industry

The rise of the digital era has made many industries obsolete. The print media industry, though a formidable and still-relevant giant, will never recapture the same market share it once held with the advent of the Internet.

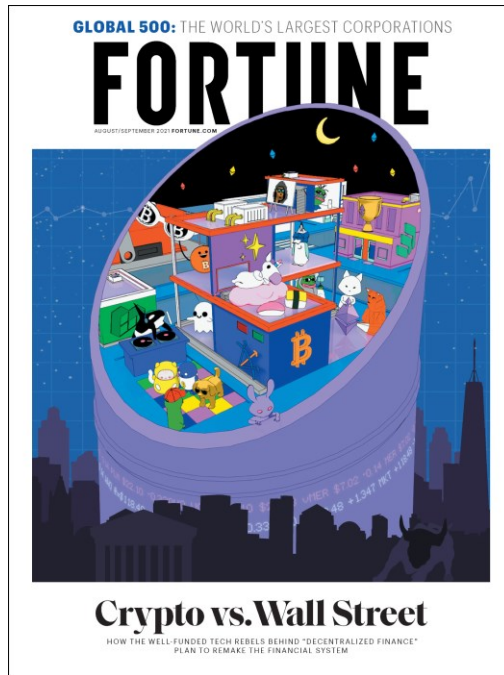
Recognizing the need to adapt, a flurry of magazines entered the NFT foray in 2021 after seeing both the financial and marketing opportunities the space offered.⁶⁸ Iconic magazines such as Time and Fortune auctioned off NFTs based on their magazine covers and were widely successful.



Time designed its first NFT cover, “Is Fiat Dead?” for its March 2021 issue, which formed a 3-part series of its well-known cover design, “Is God Dead?” from April 1966 and “Is Truth Dead?” from April 2017. In

⁶⁸ McDowell, M. (2021, August 25). *Exclusive: Fashion magazines are minting NFTs*. Retrieved November 1, 2021, from <https://www.voguebusiness.com/technology/exclusive-fashion-magazines-are-minting-nft>

total, the 3-part collection managed to raise \$435,000 through the NFT marketplace SuperRare.⁶⁹



Fortune was a little more adventurous with their NFT direction and hired pplpleasr, which in their opinion, “is the graphic artist whose work has defined the look of the ‘decentralized finance’ movement.”⁷⁰ The August/September 2021 cover included many famous yet anonymous individuals on “Crypto Twitter” depicted by their avatars.

As part of the release, 259 NFTs were created, 3 of which were special. These special NFTs provided individuals depicted on the cover with the opportunity to acquire specially-generated artwork designed for them (determined based on their listed addresses). The catch was that these

⁶⁹ Southern, L. (2021, March 25). *Time's NFT Covers Sold at Auction for \$435,000*. Retrieved November 1, 2021, from <https://www.adweek.com/media/times-nft-covers-sold-at-auction-for-435000/>

⁷⁰ Hackett, R., & Harty, D. (2021, August 8). *Fortune is dropping its latest cover as NFTs*. Retrieved November 1, 2021, from <https://fortune.com/2021/08/05/nft-drop-pplpleasr-cover-art-opensea-auction-ethereum/>

special NFTs are only attainable if the individuals depicted win the bid. If the winning bid is from a non-listed address, the NFT reverts to its original form. In totality, the entire collection managed to raise 429 ETH (roughly \$1.3 million), half of which were donated to charity.

Notable Mentions



Project Galaxy

Marketing in a different vein, Project Galaxy offers NFT-as-a-service to help projects drive user engagement and retention.⁷¹ For instance, Protocol usage can be gamified, thus allowing users to earn NFTs by completing specific tasks.

Conclusion

NFTs are status symbols that generate social clout. Savvy brands and marketers will recognize the power of NFTs and how they can speak to a broader audience, especially when identities and expressions of oneself are only becoming more prevalent in the digital space.

NFTs are allowing companies to reshape marketing strategies. Companies that traditionally seek out celebrities and athletes for sponsorships are now considering NFTs as a viable alternative. Each NFT also has a narrative and message which can be used for broader market appeal (e.g., charitable donations from sales). Public relations value comes from the initial news hype and the community engagement that follows.

At the same time, NFTs grant access to new markets in the digital space. We have already seen how Burberry collaborated with a game developer—what is stopping Burberry from collaborating with other game developers to increase its brand awareness further?

⁷¹ (n.d.). *Project Galaxy: Powering On-chain Credentials*. Retrieved November 1, 2021, from <https://galaxy.eco/>

But more than just that, NFTs offer new opportunities for brands to build closer relationships with their community. Brands can offer benefits and perks to their NFT holders, much like buying a membership pass. By sharing similar values and offering social utility to customers, brands can grow a more loyal consumer base.

Recommended Readings

1. Other Brands experimenting with NFTs
<https://www.thedrum.com/news/2021/08/04/5-brands-are-experimenting-with-nfts>
2. How Brands can benefit from NFTs
<https://bettermarketing.pub/how-brands-can-benefit-from-non-fungible-tokens-nfts-dc38500a1c26>
3. Reshaping the Creator Economy
<https://www.forbes.com/sites/avidan/2021/09/13/nfts-reshape-brand-marketing-in-the-creator-economy/?sh=34e3a508da2d>

CHAPTER 13: NFT LEGOS

Most NFT projects have a similar approach to how their NFTs will be used in the future. Be it as a profile picture or an in-game item, NFTs are usually considered as “finished products” and accrue more value as the project expands and continues to provide more benefits to the holders.

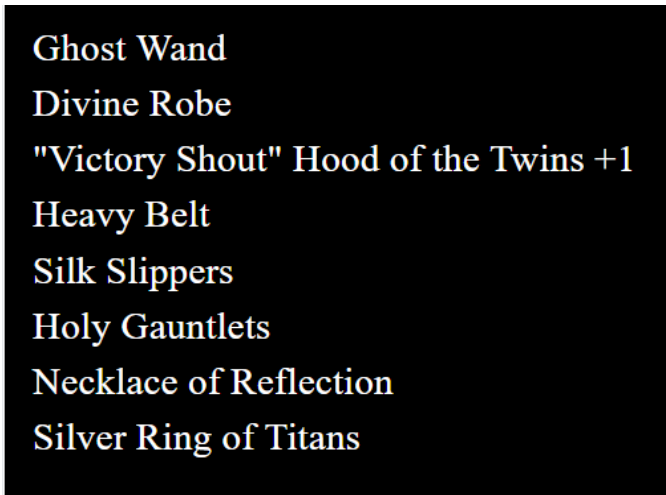
But what if there is no finished product? In other words, NFTs can also serve as fundamental building blocks for a larger ecosystem, where a passionate community comes together to build new items, narratives, and experiences around the NFTs. Instead of the creators having complete control over the direction of their work and how they may be used, these “NFT Legos” provide a foundation and enable the broader community to participate in innovation, creativity and value creation.

By allowing holders to come together to build an entirely new ecosystem for the NFTs, no single holder can dictate the NFT value. Instead, value is generated by all the projects that come about from the community. This is an unprecedented way forward for the future of NFTs, where the community participates and contributes to how valuable their pieces will be.

And it all started with eight lines of text on a black background.

The Birth of Loot

The brainchild of Dominik Hoffman, one of the co-founders of Vine, “Loot” is a limited series NFT consisting of randomly generated sentences, with each sentence representing a particular form of gear that one would usually find in a fantasy role-playing game. Each set of “Loot” consists of different items from weapons to armor, with varying rarities for each item, ranging from Common to Mythic.



Loot Bag #3637

The project was launched on the Ethereum blockchain. The NFTs were free of charge, and all participants had to do was pay the Ethereum transaction fee to mint a Loot bag. However, minting the Loot NFT was not the most straightforward task—there was no website or user interface for users to easily mint the NFT, and users had to interact with the Loot smart contract directly.

After Dominik’s announcement on Twitter, savvy crypto users quickly rushed to mint the Loot NFTs directly from the smart contract while newbies struggled.⁷² The opportunity to mint an NFT created by one of the

⁷² dhof. (2021, August 27). “LOOT - randomized adventurer gear - no fee, just gas...”. Retrieved September 13, 2021, from <https://twitter.com/dhof/status/1431316631934967815>

co-founders of Vine motivated many to teach themselves how to interact directly with Ethereum's smart contracts.

The “minting” period concluded quickly, and the community soon got their hands busy trying to identify the rarest bags. Within a few hours, the community compiled a rarity list for items in each Loot bag.

People collectively gathered that Divine Robes were the most coveted item. Although Divine Robes were not special on their own, the memetics was such that they catapulted their way into popularity, thereby granting special status and fetching higher prices. The community started organizing itself into various guilds for different items such as Katanas and Crowns, each with its dedicated chat room for community members to interact with each other.

Loot Derivatives

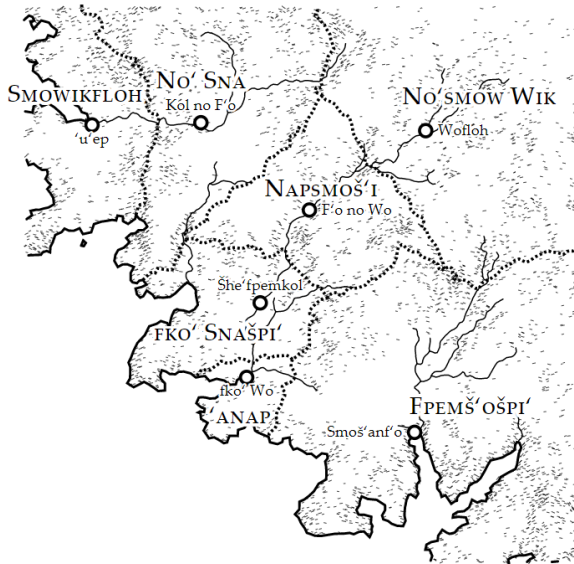
Although the Loot project started slowly, the community started envisioning a future where these NFTs could be used as the building blocks for a completely new and vast fantasy role-playing game akin to the traditional Dungeons and Dragons game. However, several missing pieces are needed to complete this vision, such as locations, quests, and enemies to battle. As a result, this set off a chain reaction for the community to launch Loot spin-offs, known as Loot Derivatives.

Loot Derivatives are projects built on top of Loot NFTs and are meant to complement and fill the missing pieces of the Loot universe. One of them is Adventure Gold (AGLD), the currency for adventurers.⁷³ AGLD are fungible tokens that players can use in a future fantasy world to transact with one another.

Each Loot NFT entitled its owner to claim 10,000 AGLD. On the day of the announcement, the amount of claimable AGLD per bag was about \$50,000. Imagine receiving that amount just for minting a free NFT!

⁷³ Will Papper (2021, September 1). “*Adventure Gold is now available for...*”. Retrieved September 13, 2021, from <https://twitter.com/willpapper/status/1433243941449568259>

As of September 2021, there are well over 40 Loot derivative projects.⁷⁴ Three major projects that have emerged are Realms, Abstract Loots, and mLoot. Realms is a series of generated maps with unique regions for the Loot world while Abstract Loot are animated artworks based on the Loot metadata. The third major project is mLoot, an extension of Loot that allows for more participation from those who missed the original Loot drop. Other Loot derivatives include Loot extensions such as pets, songs, guilds, mounts, and many more.



Realm #3862 (Lisnoli)

Although the price of Loot derivatives have not performed as well as the original, there is still a relatively decent amount of support for these derivatives. It will be interesting to see whether they can come together to build out the greater Loot universe. Some on-chain data analysts have even taken a step further by creating detailed dashboards that offer a more in-depth view of price and number of holders via detailed dashboards.⁷⁵

⁷⁴ (n.d.). *Loot Derivatives*. Retrieved September 22, 2021, from <https://www.lootproject.com/resources>

⁷⁵ (n.d.). *Loot Derivatives Overview*. Retrieved September 22, 2021, from <https://dune.xyz/dqnellew/Loot-Derivatives-Overview>

Besides these spin-offs, Loot's simplistic design has inspired many other projects to launch forks. The main difference is that these forks are not built on top of Loot and thus are not part of the larger Loot universe. Some of these projects include The Settlements,⁷⁶ an on-chain turn-based strategy game reminiscent of the Settlers of Catan board game, competing factions such as Bloot,⁷⁷ and Rarity,⁷⁸ a game developed by Andre Cronje and inspired by Loot on the Fantom blockchain.

The Future of NFT Legos

Loot and its successors have invariably challenged the conventional view of NFTs, where there is already a fixed world in place. Rather, these NFTs can be viewed as composable parts that can be used as a part of something much larger, like Lego pieces for creators and innovators to build on.

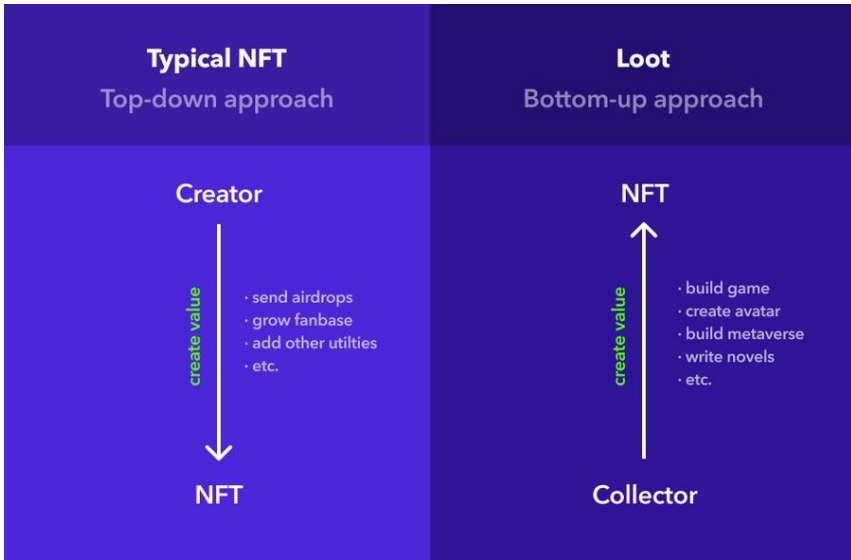
Historically, creators would use a top-down approach to set the project's direction from the art style, roadmap, and execution. With NFT Legos, the top-down approach is flipped on its head. Instead, the community is provided with a blank canvas to imagine and build the project together.

This bottom-up approach represents the unbundling of an NFT into individual parts that can be repurposed for other use-cases, one that is not constrained to a set plan. The vastness of what could be built on top of a fantasy theme NFT is immense.

⁷⁶ The Settlements. (n.d.). (@the_settlements). Retrieved September 27, 2021, from https://twitter.com/the_settlements

⁷⁷ Bloot. (n.d.). (@TeamBloot). Retrieved September 27, 2021, from <https://twitter.com/teambloot>

⁷⁸ Rarity Game. (n.d.). (@RarityGame). Retrieved September 27, 2021, from <https://twitter.com/raritygame>



Source: <https://twitter.com/tandavas/status/1432802983528448000>

Is it possible that this could be the “metaverse” that people have been talking about for many years now? Will NFT Legos fade into obscurity months from now, or will it pave the way forward with more innovation? We will have to wait and see where the future takes us.

Notable Mentions



The Settlements

Inspired by strategy video games like *Civilizations* and *Age of Empires*, users collect various resources from their Settlements to expand their territories to grow their influence. Each Settlement comes with six traits, such as Government and Resources, which can be randomized up to 5 times by re-rolling your traits.



Rarity

Created by Andre Cronje, the founder of Yearn Finance, Rarity is a role-playing game that was inspired by Loot and traditional fantasy adventure games like *Dungeons and Dragons*. Players select characters from various

classes to go on adventures and complete quests in return for experience points, gold, and crafting items. Characters can upgrade their skills as they progress and forge new equipment along the way.



The Colors

The Colors is a collection of over 4,000 images, each filled with their distinctive shade of color. These NFTs can be used to create various derivative projects, which will use the metadata of your colors to define them. The Spirals is the first derivative project of The Colors. It uses the HEX and RGB properties to generate unique animated spirals.

Conclusion

NFT Legos are still very much an exploration into uncharted territory, and we don't know exactly where all this is headed. What is certain is that we are seeing the coordination of passionate builders and community members working together to realize this vision. NFTs can be a blank slate, and as long as the community rallies to build something greater together, then the sky's the limit.

Will the bottom-up approach to NFT development pave the way forward with more innovation, or will such NFT Legos fade into obscurity months from now? Nobody knows, and we will have to wait and see. Currently, it is getting increasingly difficult to track the development of every NFT project, and the best part is that such development is only just the beginning.

Recommended Readings

1. Loot And Bloot: What To Know About Text-Based NFTs Seeing Strong Interest
<https://www.benzinga.com/markets/cryptocurrency/21/09/22837032/loot-and-bloot-what-to-know-about-text-based-nfts-seeing-strong-interest>
2. The Ultimate Guide to Loot NFTs
<https://dappradar.com/blog/the-ultimate-guide-to-loot-nfts>
3. Loot & Rarity
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CHAPTER 14: NFTS ARE THE FUTURE

For the longest time, the perception behind blockchain technology has always been that of a payment network and closely related to finance use cases. However, NFTs have changed this; we can safely say that the blockchain is now akin to one big decentralized development platform, containing a swath of different assets and dApps, filled with identities, cultures, and communities that provide both financial and intangible social value.

NFTs also represent a new paradigm in the way we digitize physical assets and how we treat natively digital assets. As the world heads down the path of digitalization, the need for technologies that can securely authenticate digital assets will only continue to grow. NFTs fill this gap and have so much potential to change the way we function as a society.

There are many NFT use cases, from art to games. Validating provenance is a common use case, yet we are still only scratching the surface.

Any product or service that is or relies on an intermediary can be tokenized through an NFT. Clear cases ripe for “NFTing” are important documents like legal contracts, house deeds, insurance, and licenses. Just like how property rights enabled traditional economies to grow, NFTs will do the same for the digital economy.

Even if companies and governments do not participate in the decentralized network, the technology behind NFTs is too large to ignore. At the very least,

they would have to consider the implications of how NFTs can vastly reduce bureaucratic processes.

But beyond the more obvious use cases, through the act of tokenization, NFTs allow us to break down abstract social constructs into dollars and cents. Humans have long ascribed value to all sorts of things, but with NFTs, we can even tokenize memes. This offers all sorts of exciting opportunities to develop decentralized brands and communities.

NFTs are not just redefining the way we perceive value but also how humans traditionally interact. Take a look at how the Loot NFT project developed, and you will see how NFTs and decentralization have affected the producer and creator economy. What we are witnessing is, in fact, the percolation of tokenization into communities, culture, and even ourselves.

Whether we like it or not, the digital world is imminent, and NFTs are the gateway to digital ownership. Some might argue that we are approaching a digital dystopia, but we at CoinGecko have long believed that almost everything will eventually be tokenized - the genie is already out of the bottle, and there is nothing we can do to stop it. We can only prepare for what's coming.

Are you Ready, Player One?

CLOSING REMARKS

Congratulations on making it this far! From the inception of NFTs to the various applications in music, sports, and games, our journey through the NFT landscape in this book has come to an end. However, this is just the beginning, as the future looks bright for our NFTs, with even more real-world applications in the making.

By now, dear reader, you should have a deeper understanding of what NFTs are and how they can be used in many different ways. As the crypto and NFT space continues to evolve and move at the speed of light, it is inevitable that we may not be able to capture all the latest NFT developments. By the time we publish this book, some of the information may already be outdated!

Nevertheless, we sincerely hope that this *How to NFT* book will be the perfect starting point on your adventure through the vast contours in the world of NFTs. May it guide you on your continuous quest to explore the multi-faceted world of NFTs.

APPENDIX

CoinGecko's Recommended NFT Resources

Analytics

Dune Analytics - <https://dune.xyz/home>

Nansen - <https://www.nansen.ai/>

NFTBank - <https://nftbank.ai/>

NFTCrunch - <http://nftcrunch.com/>

NonFungible - <https://nonfungible.com/>

The Block Dashboard - <https://www.theblockcrypto.com/data>

News Sites

CoinDesk - <https://www.coindesk.com/>

CoinTelegraph - <https://cointelegraph.com/>

Decrypt - <https://decrypt.co/>

The Block - <https://www.theblockcrypto.com/>

Crypto Briefing - <https://cryptobriefing.com/>

Newsletters

CoinGecko - <https://landing.coingecko.com/newsletter/>
Bankless - <https://bankless.substack.com/>
Delphi Digital - <https://www.delphidigital.io/research/>
Ethhub - <https://ethhub.substack.com/>
My Two Gwei - <https://mytwogwei.substack.com/>
Messari - <https://messari.io/>
The Defiant - <https://thedefiant.substack.com/>
Week in Ethereum News - <https://www.weekinethereumnews.com/>
Zima Red - <https://andrewsteinwold.substack.com/>

Podcast

CoinGecko - <https://podcast.coingecko.com/>
Bankless - <http://podcast.banklesshq.com/>
BlockCrunch - <https://castbox.fm/channel/Blockcrunch%3A-Crypto-Deep-Dives-id1182347>
Chain Reaction - <https://fiftyonepercent.podbean.com/>
Into the Ether - Ethhub - <https://podcast.ethhub.io/>
PoV Crypto - <https://povcryptopod.libsyn.com/>
Unchained Podcast - <https://unchainedpodcast.com/>
Zima Red Podcast - <https://podcasts.apple.com/au/podcast/zima-red/id1494165748>
The Metaverse Podcast - <https://podcasts.apple.com/us/podcast/the-metaverse-podcast/id1511782129>
Welcome to the Metaverse - <https://podcasts.apple.com/us/podcast/welcome-to-the-metaverse/id1565851466>

Youtube

CoinGecko - <https://www.youtube.com/c/CoinGeckoTV>
Bankless - <https://www.youtube.com/channel/UCAl9Ld79qaZxp9JzEOwd3aA>
Art Blocks Official - <https://www.youtube.com/channel/UCJ3do9nWP6qaJkcbxZaJZ4w>
CAGYJAN - <https://www.youtube.com/c/CAGYJAN>

NFT TIMES -

<https://www.youtube.com/channel/UCMTMppmOoXmMw-hdbFIVHyA>

NFT Verse -

<https://www.youtube.com/channel/UCf9cq3uePT1qmE5RNxiCqLg>

NBA Top Shot Talk -

<https://www.youtube.com/channel/UCby4rW001pEz0AEEfPiZNO>

Brycent - <https://www.youtube.com/c/brycent>

Bankless Level-Up Guide

<https://bankless.substack.com/p/bankless-level-up-guide>

Projects We Like Too

Dashboard Interfaces

Apeboard - <https://apeboard.finance/dashboard>

NFTBank - <https://nftbank.ai/>

Zapper - <https://zapper.fi/dashboard>

Zerion - <https://zerion.io/>

Debank - <https://debank.com/>

NFT Marketplaces

OpenSea - <https://opensea.io/>

Rarible - <https://rarible.com/>

SuperRare - <https://superrare.com/>

MakersPlace - <https://makersplace.com/>

Foundation - <https://foundation.app/>

Nifty Gateway - <https://niftygateway.com/>

Async Art - <https://async.art/>

Zora - <https://zora.co/>

Art

Art Blocks - <https://artblocks.io/>

Pak - <https://twitter.com/muratpak>

Beeple - <https://www.beeple-crap.com/>

FVCKRENDER - <https://twitter.com/fvckrender>

XCOPY - <https://twitter.com/XCOPYART>

Tom Sachs - <https://www.tomsachs.com/>

Damien Hirst - <https://www.damienhirst.com/>

Music

Audius - <https://audius.co/feed>

EulerBeats - <https://eulerbeats.com/>

POW NFT - <https://www.pownft.com/>

JingleBe - <https://www.jinglebe.com/>

Nifty Sax - <https://www.niftysax.com/>

Sports

Chiliz - <https://www.chiliz.com/>

Sorare - <https://sorare.com/>

NBA Top Shot - <https://nbatopshot.com/>

REVV Motorsport - <https://revvmotorsport.com/>

Lympo - <https://nft.lympo.io/>

Zed Run - <https://zed.run/>

Collectibles

CryptoPunks - <https://www.larvalabs.com/cryptopunks>

CryptoKitties - <https://www.cryptokitties.co/>

Meebits - <https://meebits.larvalabs.com/>

Hashmasks - <https://www.thehashmasks.com/>

Bored Ape Yacht Club - <https://boredapeyachtclub.com/#/>

Pudgy Penguins - <https://www.pudgypenguins.io/>

Loot (for Adventurers) - <https://www.lootproject.com/>

The Settlements - <https://thesettlements.world/>

Metaverses

Decentraland - <https://www.larvalabs.com/cryptopunks>

Cryptovoxels - <https://www.cryptovoxels.com/>

The Sandbox - <https://www.sandbox.game/en/>

Somnium Space - <https://www.somniumspace.com/>

Gaming

Axie Infinity - <https://axieinfinity.com/>

Cometh - <https://www.cometh.io/>

Gods Unchained - <https://godsunchained.com/>

CryptoBlades - <https://www.cryptoblades.io/>

Skyweaver - <https://www.skyweaver.net/>

Aavegotchi - <https://aavegotchi.com/>

Illuvium - <https://www.illuvium.io/>

My Neighbor Alice - <https://www.myneighboralice.com/>

Ember Sword - <https://embersword.com/>

Utilities

ENS - <https://ens.domains/>

POAP - <https://poap.xyz/>

Fractional NFTs

Unicly - <https://www.unic.ly/>

Niftex - <https://landing.niftex.com/>

NFTX - <https://nftx.io/>

NFT20 - <https://nft20.io/>

Fraction - <https://fraction.art/>

Fractional - <https://fractional.art/>

Taxes

ZenLedger - <https://www.zenledger.io/>

TokenTax - <https://tokentax.co/>

Wallet

Metamask - <https://metamask.io/>

Argent - <https://argent.link/coingecko>

Dharma - <https://www.dharma.io/>

GnosisSafe - <https://safe.gnosis.io/>

Monolith - <https://monolith.xyz/>

Coin98 - <https://coin98.com/>

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GLOSSARY

Index	Term	Description
A	Airdrop	Airdrop refers to the distribution of a reserve of tokens, usually to users who have completed certain actions or fulfill certain criterias.
	Annual Percentage Yield (APY)	It is an annualized return on saving or investment and the interest is compounded based on the period.
	Automated Market Maker (AMM)	Automated Market Maker removes the need for a human to manually quote bids and ask prices in an order book and replaces it with an algorithm.
	Audit	Auditing is a systematic process of examining an organization's records to ensure fair and accurate information the organization claims to represent. Smart contract audit refers to the practice of reviewing the smart contract code to find vulnerabilities so that they can be fixed before it is exploited by hackers.

Index	Term	Description
	An Application Programming Interface (API)	An interface that acts as a bridge that allows two applications to interact with each other. For example, you can use CoinGecko's API to fetch the current market price of cryptocurrencies on your website.
B	Buy and Hold	This refers to a TokenSets trading strategy which realigns to its target allocation to prevent overexposure to one coin and spreads risk over multiple tokens.
	Bridge	A protocol that connects two blockchains together, allowing users to transfer assets between them.
	Bonding Curve	A bonding curve is a mathematical curve that defines a dynamic relationship between price and token supply. Bonding curves act as an automated market maker where as the number of supply of a token decreases, the price of the token increases. It is useful as it helps buyers and sellers to access an instant market without the need of intermediaries.
C	Cryptocurrency Exchange (Cryptoexchange)	It is a digital exchange that helps users exchange cryptocurrencies. For some exchanges, they also facilitate users to trade fiat currencies to cryptocurrencies.
	Custodian	Custodian refers to the third party to have control over your assets.
	Centralized Exchange (CEX)	Centralized Exchange (CEX) is an exchange that operates in a centralized manner and requires full custody of users' funds.

Index	Term	Description
	Collateral	Collateral is an asset you will have to lock in with the lender in order to borrow another asset. It acts as a guarantor that you will repay your loan.
	Collectibles	Items that are either standalone or part of a series, often sought after by collectors.
	Cryptoasset	Cryptoasset refers to digital assets on blockchain. Cryptoassets and cryptocurrencies generally refer to the same thing.
	Composability	Composability is a system design principle that enables applications to be created from component parts.
	Cross-chain	Transactions that occur between different blockchains.
D	Decentralized Finance (DeFi)	DeFi is an ecosystem that allows for the utilization of financial services such as borrowing, lending, trading, getting access to insurance, and more without the need to rely on a centralized entity.
	Decentralized Applications (dApps)	Applications that run on decentralized peer-to-peer networks such as Ethereum.
	Decentralized Autonomous Organization (DAO)	Decentralized Autonomous Organizations are rules encoded by smart contracts on the blockchain. The rules and dealings of the DAO are transparent and the DAO is controlled by token holders.

Index	Term	Description
	Decentralized Exchange (DEX)	Decentralized Exchange (DEX) allows for trading and direct swapping of tokens without the need to use a centralized exchange.
	Derivatives	Derivative comes from the word derive because it is a contract that derives its value from an underlying entity/product In the context of NFTs, derivatives are projects that are built on top of other NFT projects.
	Dashboard	A dashboard is a simple platform that aggregates all your NFT activities in one place. It is a useful tool to visualize and track where your NFT portfolio is.
	Data Aggregator	Service providers that index and aggregate data so that it be queried by other decentralized applications
	Dutch Auction	A Dutch Auction, also known as an “inverted” auction, starts with a high asking price and decays over time until a predetermined floor price.
E	Ethereum	Ethereum is an open-source, programmable, decentralized platform built on blockchain technology. Compared to Bitcoin, Ethereum allows for scripting languages which has allowed for application development.
	Ether	Ether is the cryptocurrency that powers the Ethereum blockchain. It is the fuel for the apps on the decentralized Ethereum network

Index	Term	Description
	ERC-20	ERC is an abbreviation for Ethereum Request for Comment and 20 is the proposal identifier. It is an official protocol for proposing improvements to the Ethereum network. ERC-20 refers to the commonly adopted standard used to create tokens on Ethereum.
	ERC-721	Compared to the well-known ERC-20, which is fungible, ERC-721 are non-fungible tokens. That means each and every ERC-721 is unique and is not equal to one another.
	ERC-1155	ERC-1155 token standard allows each token ID to represent both non-fungible (NFT's) and fungible tokens which may have their metadata, token supply, and other attributes.
	Ethereum Naming Service (ENS)	Ethereum Name Service (ENS) is a look-up service that allows Ethereum users to find websites or send and receive funds via simple names.
	Exposure	Exposure refers to how much you are 'exposed' to the potential risk of losing your investment. For example, price exposure refers to the potential risk you will face in losing your investment when the price moves.
F	Factory Contract	It is a smart contract that is able to produce other new smart contracts.

Index	Term	Description
	Fan Tokens	A type of cryptocurrency that allows fans to vote on decisions and enjoy benefits that are related to a specific sports club or organization.
	Floor Price	The lowest price for an item in a particular series or collection.
	Fractionalization	The act of dividing ownership of an NFT between many smaller participants. This method is commonly used for highly valuable NFTs such as CryptoPunks.
	Front-Running	In a DEX, all orders made are broadcasted to the blockchain for all to see. Frontrunning is an attempt to execute buy orders on the market at a favorable price, in which the frontrunner picks up suitable orders by placing enough fees to have their transaction mined faster than the target's orders.
G	Gas	Gas refers to the unit of measure on the amount of computational effort required to execute a smart contract operation on Ethereum.
	Generative Art	Art that has been completely or partially created automatically using an algorithm.
	GIF	Graphics Interchange Format, or GIF, is a file format that usually depicts a short animation.

Index	Term	Description
	Governance	To steer the direction of the DeFi protocol, governance is introduced whereby the project community can decide collectively. To make this possible, governance tokens are pioneered by Compound, allowing token holders to vote on protocol proposals that any community member can submit.
H	Hard Fork	Forced bifurcation of a blockchain, which is usually given when a fairly significant change is implemented in the software code of a network. It results in a permanent divergence of a blockchain into two blockchains. The original blockchain does not recognize the new version.
I	IDO	IDO stands for Initial Decentralized Exchange Offering or Initial DEX offering. This is where tokens are first offered for sale to the public using a DEXs liquidity pool.
	Impermanent Loss	Temporary loss of funds due to volatility leading to divergence in price between token pairs provided by liquidity providers.
	Index	An index measures the performance of a basket of underlying assets. An index moves when the overall performance of the underlying assets in the basket moves.
	Insurance	An agreement to provide compensation for losses incurred in exchange for upfront payment.

Index	Term	Description
	InterPlanetary File System (IPFS)	The InterPlanetary File System (IPFS) is a peer-to-peer network and distributed file system protocol for storing and transferring data including images and videos.
J	JPEG	Joint Photographic Experts Group, or JPEG, is a format for compressing image files and also refers to files of that format. Is it often used as internet slang to describe NFTs.
K	Know-Your-Customer (KYC)	Know-Your-Customer (KYC) is a compliance process for business entities to verify and assess their clients.
L	Layer-1 Chains	Blockchains where every transaction is settled and verified on the network itself.
	Layer-2 Chains	Layer 2 is a chain that is built on top of the base chain to improve scalability without compromising the security and the decentralization.
	Liquidity Pools	Liquidity pools are token reserves that sit on smart contracts and are available for users to exchange tokens. Currently the pools are mainly used for swapping, borrowing, lending, and insurance.
	Liquidity Mining	The reward program of giving out the protocol's native tokens in exchange for capital. It is a novel way to attract the right kind of community participation for DeFi protocols.

Index	Term	Description
	Liquidity Providers	Liquidity providers are people who loan their assets into the liquidity pool. The liquidity pool will increase as there are more tokens.
	Liquidity Pool Aggregator	It is a system which aggregates liquidity pools from different exchanges and is able to see all available exchange rates in one place. It allows you to compare for the best possible rate.
	Leverage	It is an investment strategy to gain higher potential return of the investment by using borrowed money.
M	Marketplace	A platform or protocol where users can buy and sell various assets such as NFTs.
	Metadata	The metadata is used to define the properties and attributes of an NFT.
	Metaverse	A virtual reality environment where users can interact with one another.
	Mint	It refers to the process of issuing new coins/tokens.
	Mint Pass	Usually in the form of an NFT, a mint pass allows the holder to mint certain NFTs or access special sales before the public.
	Multichain	Usually refers to products or tokens that exist on one or more blockchains.

Index	Term	Description
N	Node	Within the blockchain network, nodes are computers that connect to the network and have an updated copy of the blockchain. Together with the miners, they are the guarantors that the network works properly. The nodes in Bitcoin are very important because they help the mission of keeping the network decentralized.
	Non-fungible Token (NFT)	NFTs are digital assets or collectibles on a blockchain, where each token has a unique identifier and attributes.
O	Order book	It refers to the list of buying and selling orders for a specific asset at various price levels.
	Over-collateralization	Over-collateralization refers to the value of a collateral asset that must be higher than the value of the borrowed asset.
	Oracle	Service providers which collect and verify off-chain data to be provided to smart contracts on the blockchain.
P	Play-To-Earn	A growing trend where users can earn money just from playing games or participating in the game's ecosystem.
	Prediction Markets	Prediction markets are markets created for participants to bet on the outcomes of future events.
	Pre-sale	An exclusive token sale event for select participants, usually held before it is open to the public.

Index	Term	Description
	Price discovery	Price discovery refers to the act of determining the proper price of an asset through several factors such as market demand and supply.
	Protocol	A protocol is a base layer of codes that defines its functions. For example, Bitcoin and Ethereum blockchains have different protocols.
	Provenance	The origin or historical record of ownership for an object. It is commonly used to determine value for artworks, antiques and artifacts.
	Peer-to-Peer	In blockchain, ‘peer’ refers to a computer system or nodes on a decentralized network. Peer-to-Peer (P2P) is a network where each node has an equal permission to validate data, and it allows two individuals to interact directly with each other.
	Perpetuals	It refers to perpetual futures, which is an agreement to purchase or sell an asset in the future without a specified date.
Q		-
R	Rebalance	It is a process of maintaining a desired asset allocation of a portfolio by buying and selling assets in the portfolio.
	Royalties	A percentage of profits from each sale given to the original creator when their work is sold.

Index	Term	Description
	Rug-Pull	In the context of crypto and Decentralized Finance (DeFi), having been rug pulled means to have buy support or Decentralized Exchange (DEX) liquidity pool taken away from a market. This results in a sell death spiral as other liquidity providers, holders and traders sell to salvage their holdings. This is a new form of exit scam as token holders are no longer able to trade in the DEX after the pool has been drained.
S	Smart Contracts	A smart contract is a programmable contract that allows two counterparties to set conditions of a transaction without needing to trust another third party for the execution.
	Stablecoins	A stablecoin is a cryptocurrency that is pegged to another stableasset such as the US Dollar.
	Staking	Staking can mean various things in crypto space. Generally, staking refers to locking up your cryptoassets in a dApp. Otherwise, it could also refer to participation in a Proof-of-Stake (PoS) system to put your tokens in to serve as a validator to the blockchain and receive rewards.
	Spot market	Spot market is the buying and selling of assets with immediate delivery.
	Speculative activity	It is an act of buying and selling, while expecting to gain profit.

Index	Term	Description
	Spread Surplus	The net positive difference between swap transactions when the executed price is slightly better than the price quoted
	Slippage	Slippage is the difference between the expected price and the actual price where an order was filled. It is generally caused by low liquidity.
T	Testnet	Shorthand for “Test Network”, testnets are staging areas for experimenting new blockchain features.
	Total Value Locked	Total Value Locked refers to the cumulative collateral of all DeFi products.
	Tokens	It is a unit of a digital asset. Token often refers to coins that are issued on existing blockchain.
	Tokenize	It refers to the process of converting things into digital tradable assets.
	Technical Risk	It refers to the bugs on smart contracts which can be exploited by hackers and cause unintended consequences.
U	-	-
V	Value Staked	It refers to how much value the insurer will put up against the target risk. If the value that the insurer staked is lower than the target risk, then it is not coverable.
	Vesting	The act of locking up assets that are then slowly unlocked after a set period of time.

Index	Term	Description
	Validators	In contrast to mining on a Proof of Work blockchain network, Proof of Stake blockchain networks are secured by a distributed consensus of dedicated validators who have staked (locked into the network) a significant amount of token as long as the validator nodes are running. Validators are queued for block-signing based on a combination of random selection, amount (weight) staked and length of time staked (age), and others depending on the design of the consensus algorithm.
W	Wallet	A wallet is a user-friendly interface to the blockchain network that can be used as a storage, transaction, and interaction bridge between the user and the blockchain.
	Wrapped NFTs	Represent assets that existed before the ERC-721 standard was created. For example, Acclimated MoonCats are the official wrapped versions of the original MoonCats.
X	-	-
Y	Yield Farming	It refers to the act of staking or lending digital assets in order to generate a return, usually in the form of other tokens.
Z	-	-