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Travelling the Metaverse Through NFTs and Digital Assets

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Executive Summary

We start by examining the concept of the Metaverse, followed by a recap of the Metaverse to the present day – covering some of the associated technologies with the Metaverse beyond blockchain and digital assets.

To define the Metaverse, we highlight [seven](#) key characteristics:

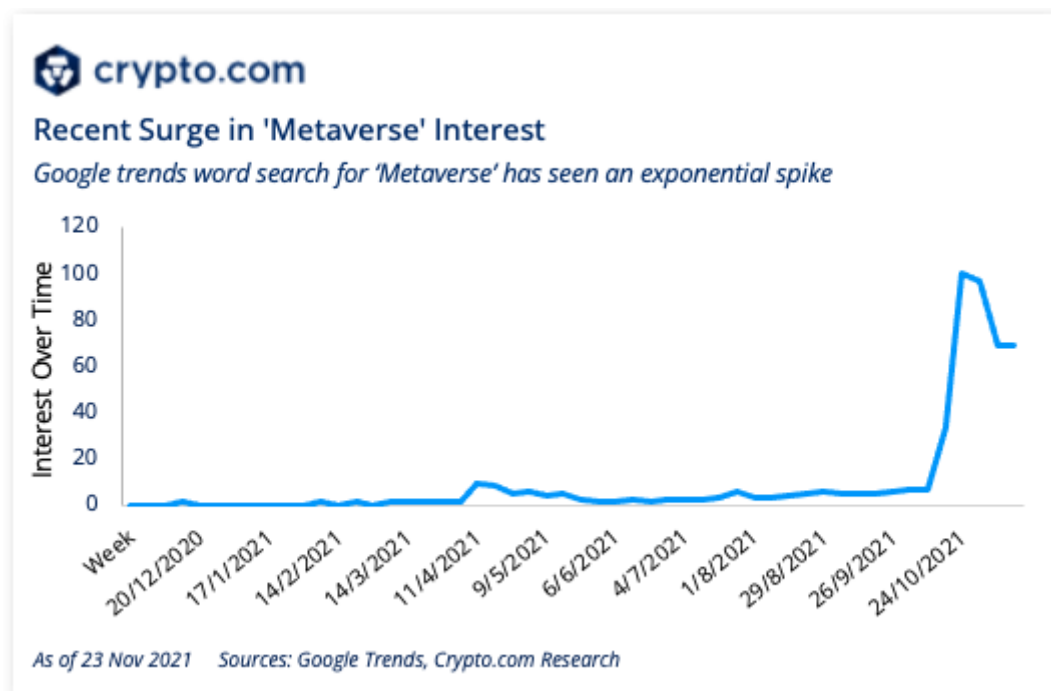
1. **Persistent experience:** it never 'resets', pauses', or 'ends', it continues indefinitely
2. **Be synchronous and live:** events happen live in real time, like streaming
3. **Without cap to concurrent users:** everyone can participate in events with equal agency and no maximum limit
4. **Functioning economy:** The Metaverse will allow have a range of valuable 'work' which can be contributed by all players equally
5. **Spans both digital and physical, open and closed platforms:** people can enter, exit, and combine both virtual and physical realms seamlessly
6. **Interoperable data, contents, and assets:** users can transfer their assets between platforms
7. **Open:** Allow content and experiences to be operated by a range of contributors

Next, we look at the development of the Metaverse through the lens of digital assets. We separate this into three buckets:

1. **'Pure' digital:** Assets that are valued as **digital non-fungible collectibles**, or represent persistent spaces in the Metaverse. We find this to be the most basic of all Metaverse digital assets that are interoperable and open.
2. **Programmable digital:** Assets that are digital collectible but programmed with **additional capabilities** such as rarity scaling, meta-data breeding, and on-off connection with off-chain 'real' world events. This marks persistence, functioning economy, synchronicity, and open and closed loop properties
3. **Social and cultural assets:** Assets that are digital collectibles but have also **social and cultural effects in realizing the Metaverse** – used for identity marking, social signalling, and governance in the Metaverse.

1. Defining the Metaverse

The term 'metaverse' has seen a recent resurgence in the public consciousness, no doubt boosted by recent news that Facebook would be rebranding to 'Meta', to better fit their vision for the future of social connection.



Yet, 'metaverse' is a term that has been around for a long time – arguably coined in 1992 novel *Snow Crash* by Neal Stephenson – a blending of digital and physical worlds. While there is no single agreed definition of the metaverse, there are several widely agreed characteristics which define it in a descriptive sense. Using Matthew Ball's widely recognised [article](#), there are seven properties that define the Metaverse:

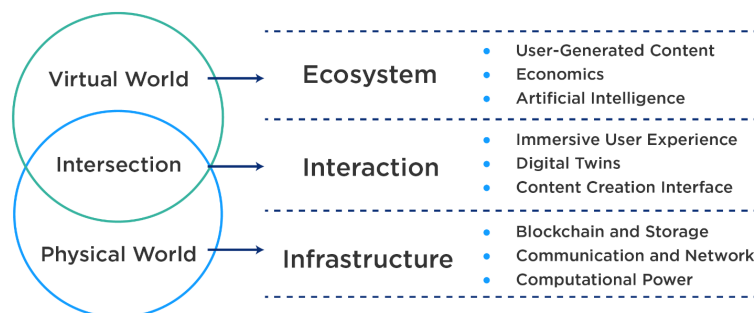
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Three Layer Architecture of the Metaverse

A mental model to understand the components for the Metaverse



As of 18 Nov 2021 Source: Duan et al, Crypto.com Research

Alternatively, Meta's (previously Facebook) 2021 [keynote](#) outlines eight things that are needed to bring the Metaverse to life: presence, avatars, home space, teleporting, interoperability, privacy and safety, virtual goods and natural interfaces.

Combining Ball's and Meta's ideas, a rough idea of what the 'Metaverse', enabled by the internet might look like this: You log onto a digital world, go to an 'real time' online marketplace and buy a pair of shoes created by another user. Your avatar wears these shoes throughout the virtual spaces they go to, whether it is an online art gallery or an MMO game. Alternatively, you decide to rent the shoes out to others, take the proceeds and buy a new (virtual) jacket to wear to live fashion events or concerts you attend with your other friends in the Metaverse.

Of course, this version of the Metaverse is far from the required scalability wide adopted for it to be realised. But notions and manifestations of the Metaverse have been around even before the current resurgence of the word in popular consciousness - and it is a concept and reality developed on top of technological advancement and continuous development.

2. The Metaverse: A Quick Recap

Development of the 'Metaverse' is an ongoing part of the history of technology, internet, and human connection.

For example, the notion of a metaverse has historically been strong for the gaming industry, with proto-type versions of the Metaverse in virtual worlds such as **Imvu**, **Second Life**, **The Sims**, **Grand Theft Auto Online**, and **Animal Crossing**. Virtual persistent spaces can be seen in [The Uncensored Library](#), a project that where censored reporting from journalists in Mexico, Russia, and Saudi Arabia can be accessed by users in Minecraft.

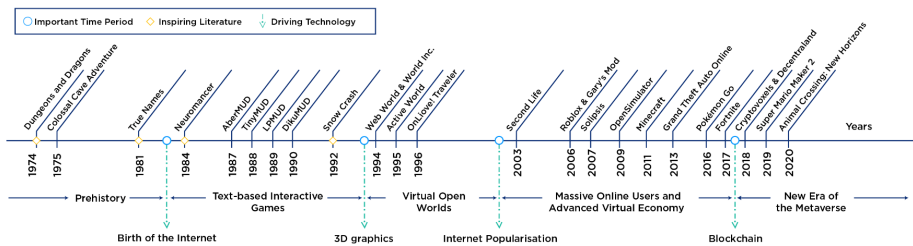
Marketplaces and economies based on virtual assets are already common in the gaming industry – underground economies where skins (virtual items with cosmetic changes) are traded and gambled for both native game currency and fiat currency is not new either (so much so it arguably is a pointed problem especially when this sort of gambling involves minors who play these games). The development of advanced economies with user generated content (UGC) are seen in creator games such as [Roblox](#) and [Minecraft](#). For example, in Roblox users can code their own games using Lua, Roblox's proprietary game engine with royalties split between creator and game studio. Purchases using in game currency can be cashed out for fiat.

Further social integration was developed with Fortnite's streaming effort, united by Epic's push to take the game to new heights with live-concerts from icons Travis Scott and Ariana Grande. Similarly, there were concerts in Minecraft and Roblox. Other blockchain based virtual spaces / 'Metaverse' focused games such as [The Sandbox](#) and [Decentraland](#) around 2020, offering a universe where UGC could be truly owned by users: trading, renting and creating. (Although, prior to its blockchain pivot, The Sandbox had already been a game studio). More recently, there have been forays into the avatar space for users to express their metaverse identity with the hyped [Yat](#) project and recently, [Genies](#).



Brief Timeline of Metaverse Development

Development of Metaverse is an ongoing project spanning decades



As of 18 Nov 2021 Sources: Duan et al, Crypto.com Research

But the Metaverse isn't just for gaming: it has been hyped in the consumer focused industries from art, to fashion to cars with the integration of AR / VR art and non-fungible digital assets such as sneakers and clothes. With blockchain technology, NFTs enable true digital ownership, trustless provenance verification, and transfer of digital assets. As early as 2010s, social platforms like Youtube recognised the power of UGC. This is continued with new upstarts like TikTok splurging USD1B in 2020 for its [Creator Fund](#) over three years to fund video and content creation.

The race to realise the Metaverse is heating up, especially in the blockchain space as all sectors seemingly find synergies with the Metaverse narrative from gaming, fashion and art to decentralised finance.

3. Metaverse from Digital Assets

In logical and chronological order, the following will track the development of the Metaverse through 3 buckets of NFT digital assets.

1. **Pure digital assets** (and persistent virtual spaces to hang out)
2. **Programmable digital assets**
3. **Social and cultural assets**

3.1 Bucket 1: Pure Digital Assets

Pure digital assets are NFTs that are simply collected as digital collectibles.

Digital Collectibles

One of the early adopters of digital assets as non-fungible, digital collectibles is arguably [Cryptopunks](#) – which some credit as inspiring the 721 standard. Cryptopunks were released in 2017 by Larva Labs as 10,000 algorithmically generated pictures, before the ERC-721 standard even existed. **There are five different punk types** (i.e. zombie, alien, apes, men, and women). There are more than **70 different attributes** (e.g. white hair, beanie, eye mask, do-rag, etc.), and each punk will have a varying number of attributes. The resulting punks therefore have varying levels of rarity – influencing their final resale value on the secondary market.

Since Cryptopunks, 2021 has seen a resurgence of these algorithmically generated PFP projects – but its evolution has spun out from mere digital collectibles (mentioned further in bucket 3). At this stage of the NFT journey, these **assets were merely just valued as collectibles** that users truly owned in their wallets. At first, the actual image storage of these punks was not on chain but only on server – presenting a counterparty risk and layer of trust. However, as of [August 2021](#), punk data files now live on-chain [here](#).

The development of digital collectibles were further taken to the next level with the shocking rise of [NBA TopShot](#), **which proved as a use case (and the lucrative nature)** of the NFT secondary market. For each sale made on their internal marketplace, TopShot would take a 5% trading fee.

While TopShot does not embody all the core aspects of the Metaverse in a truly open economy, TopShot demonstrates **digital non-fungible assets in the Metaverse enabling core characteristics of ownership and nascent features of an open economy**.

Virtual Spaces

We have the development of blockchain based virtual spaces, taking virtual space experiences in games such as the Sims, or Second Life to the next level towards an open interoperable Metaverse. [Cryptovoxels](#) is one such example.

Cryptovoxels at a glance

# of Sales	10,191
Sales (USD)	254,073,045.87
Average Sales (USD)	2,362.19
Active Wallets	2337
Primary Sales	3130
Secondary Sales	7061

As of 17 Nov 2021 Sources: Cryptovoxels, Crypto.com Research

Cryptovoxels is an **'Ethereum virtual world'**, which arguably fulfils all of Ball's seven Metaverse criteria. Users can explore the map, buy land ('parcels'), create assets for their land, or open their land up to other users to build on ('Sandbox' mode). Due to the interoperability and standardisation of the ERC 721 standard, land can be further sold on OpenSea. Art galleries such as B20's [Monument Gallery](#), the [Palette Gallery](#) and [imnotArt Gallery](#) can be visited. These spaces are cultivating the development of vertical industries similar to the off-chain real estate industry. For example there are virtual metaverse architects such as [Voxel Architects](#) or [Decentraland Architects](#). Cryptovoxels is also compatible with VR - Oculus Rift / Quest and HTC Vive.



Inside imnotArt gallery in Cryptovoxels

The gallery is situated in the trendy neighborhood of Berlin



As of 23 Nov 2021 Sources: Cryptovoxels, Crypto.com Research



Cryptovoxels Universe Map

Land in Cryptovoxels consists of 'streets' owned by The Corporation, and 'parcels' which are owned by individuals



As of 23 Nov 2021 Sources: Cryptovoxels, Crypto.com Research

Crypto Voxel Top 5 Parcel Sales of All Time

Highest sales reach heights of 100 ETH

	Parcel	Transaction Date(s)	Price (ETH)	Price (USD)
1	CVPA #102	22/10/2021 21/08/2018	65 0.17	271,077.95
2	CVPA #851	14/02/2021	100	183,591.00
3	CVPA #3	18/02/2021	100	183,464.00
4	CVPA #4	17/02/2021	100	177,046.00
5	CVPA #10	24/02/2021 19/06/2018	90 0.132	131,486.40

(Note that \$USD Price is as of ETH/USD conversion rate at date of sale).

As of 17 Nov 2021 Sources: NonFungible.com, Crypto.com Research.

3.2 Bucket 2: Programmable Digital Assets

Developing from just digital collectibles, NFTs are also programmable, enabling a new generation of use cases in the metaverse as dynamic assets.

[CryptoKitties](#)

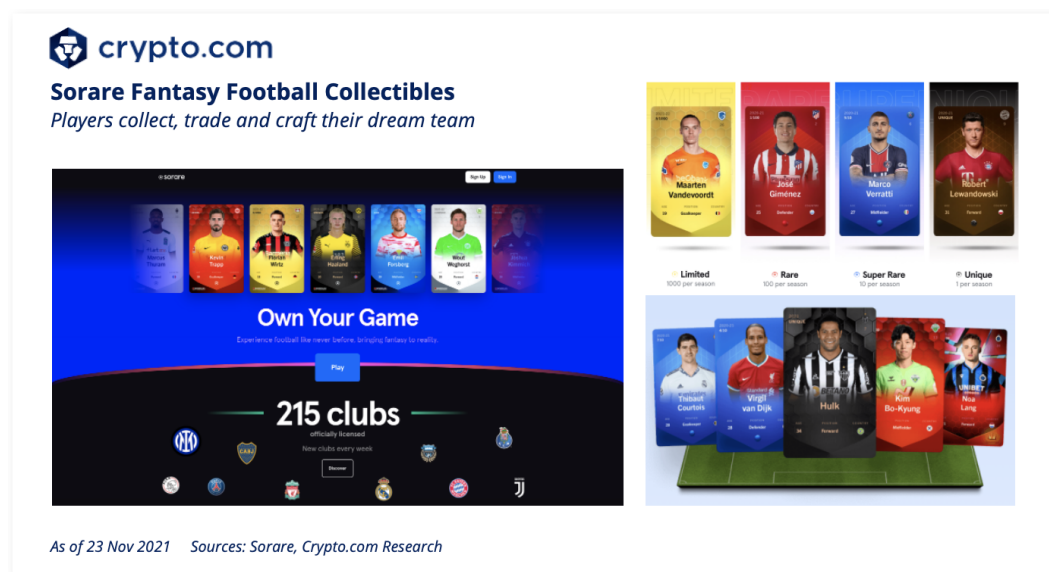
CryptoKitties is a 2017 game on the Ethereum chain which allows users to collect, breed and sell their 'cryptokitties'. Subsequent offspring [characteristics](#) are determined by their parents' **metadata within the NFT**. Offspring have pre-determined rarities of dominant and recessive genes and a chance of in-game determined genetic mutations.



Sorare

Further development of programmable NFTs beyond collectibles was made with Sorare in the sports and gaming industry. Founded in 2018, it is a fantasy football card game which uses NFTs that represent their fantasy football team on the Ethereum blockchain. It's USD680M Series B funding marks the less than five year old company as a quadruple unicorn – a valuation of USD4.3B. In the game, the **rankings of players' fantasy football team will be updated in real time as the players play real matches, with real life performance tied to the performance of their fantasy team.** Player cards can be bought and sold on the Sorare marketplace.

The game appeals to both digital collectors with provably scarce football cards and rarity rankings across 4 levels: 'limited', 'rare', 'super rare', and 'unique'. Meanwhile, Sorare develops on Cryptokitties by linking the gamification of NFTs to 'real world' by partnering with over **200 football clubs for official endorsement and partnerships** across various leagues such as La Liga, Premier League, and the Bundesliga.

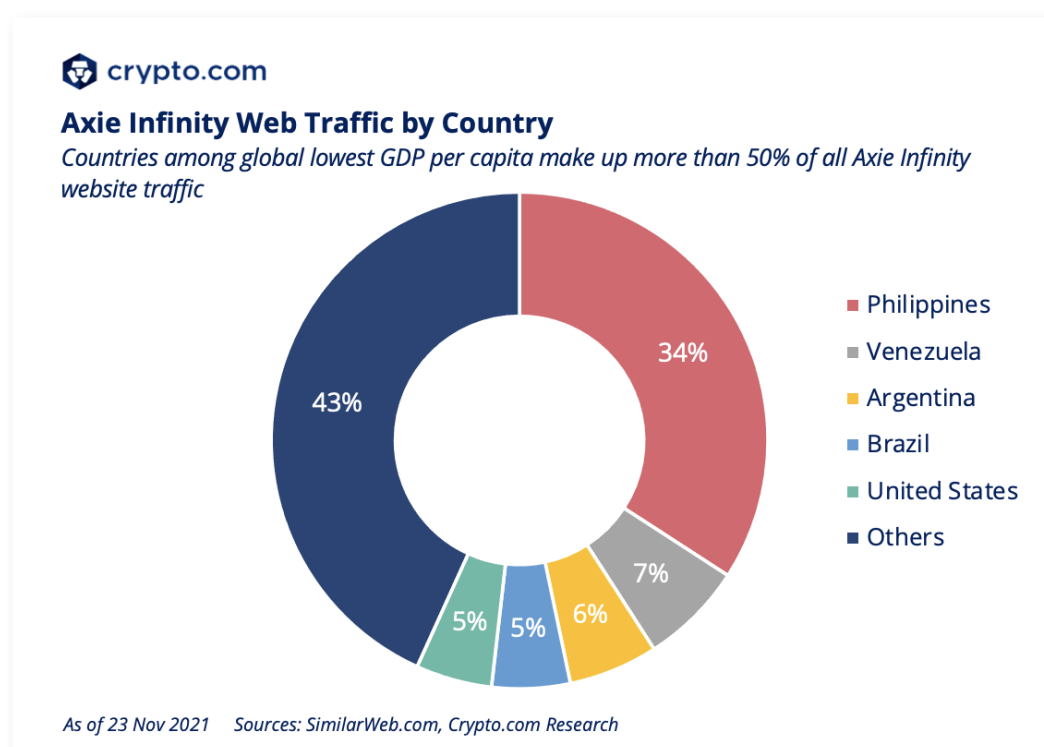
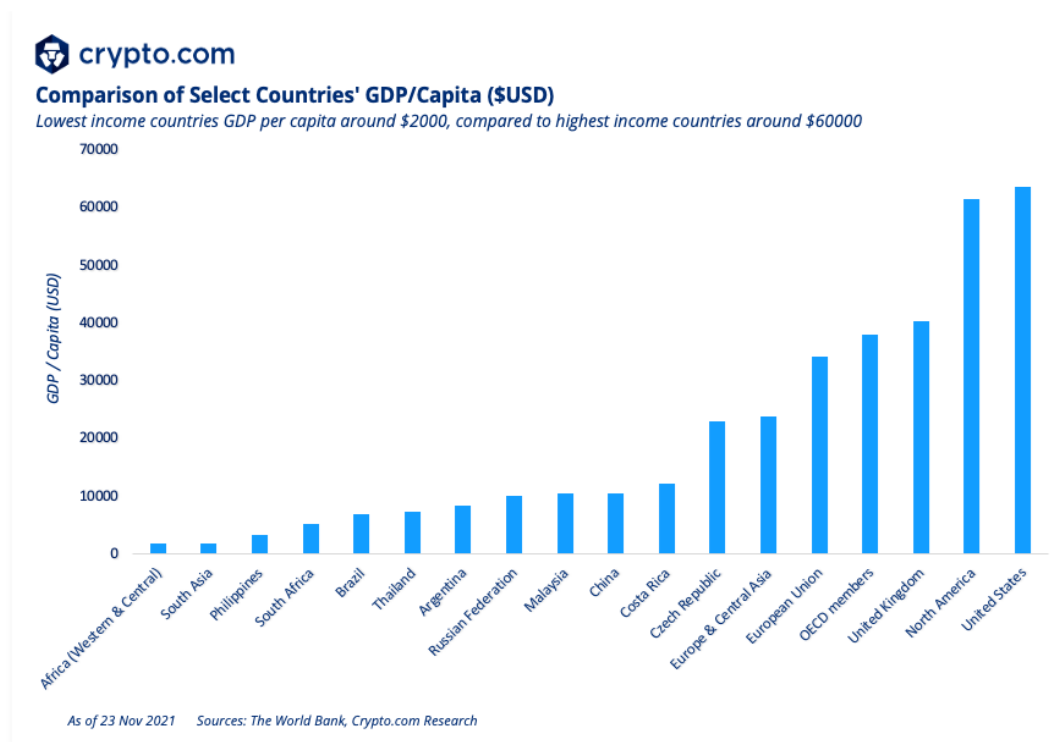


The connection between virtual and physical worlds enabled by Sorare marks the development of the Metaverse where users not only own with provable authenticity, but with interactive programmability, persistence (as fantasy football teams continue every season for users), and a synchronous connection between physical and virtual updating in real time which was little seen in its predecessors such as CryptoPunks, Crypto Kitties, and TopShot.

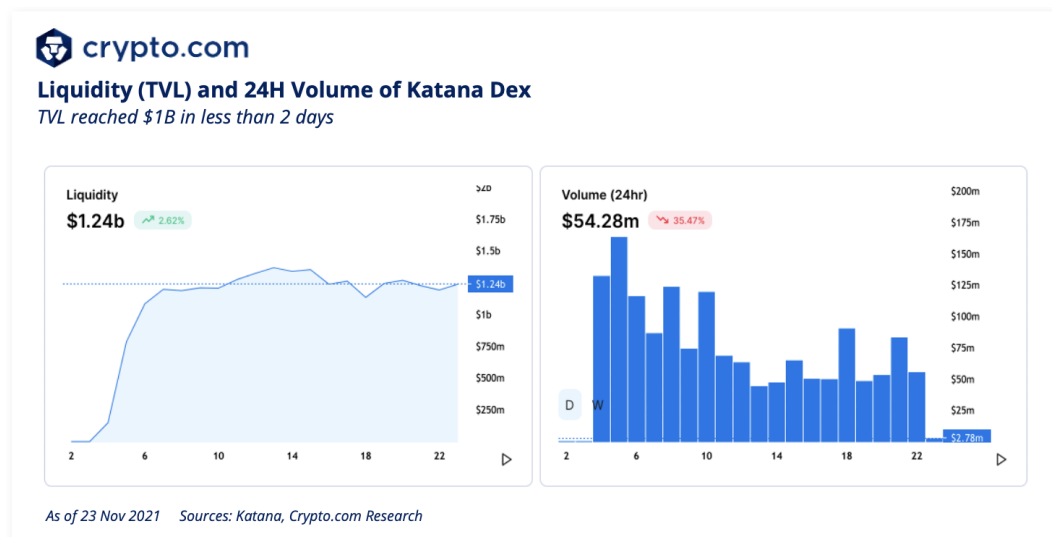
In sum, programmability, combined with financialisation in the DeFi space further fleshes out a persistent experience, synchronicity, and functioning economy with real ownership rights – in the projects of [ZedRun](#) (NFT based horse racing game), [Aavegotchi](#) (NFT and DeFi pet-raising game) and [Axie Infinity](#) (NFT pet-raising game).

[Axie Infinity](#)

Arguably, the most advanced example of a play-to-earn Metaverse economy with persistent experience would be the dual **token economy of Axie Infinity**. Users are able to breed their NFTs ('Axies'), train, battle, and complete quests. The in-game currency runs on Smooth Love Potion ([SLP](#)) and experience points, while rewards are distributed in the native protocol governance token, [AXS](#). The marketing campaign for Axie Infinity centered around how earning in the game would pay for 'real' life improvements. In developing countries, the value equivalent of AXS earned could be more than the countries' minimum wage. Therefore, some players truly 'play-to-earn' through the game.



The recent deployment of [Katana](#), **Axie's own DEX to trade specific Axie assets** (AXS, WRON, wETH, SLP), shows rapid maturity of the ecosystem.



Meanwhile, from a **socio-economic view**, there are '[Axie Scholarships](#)' where players ('managers') can rent their Axies out to other players ('scholars') to battle, taking a cut of any winnings earned (usually 30%). This fills a market gap between players who cannot afford to buy an Axie (starting the game requires ownership of three Axies minimum – whose price has rapidly increased due to rising value of AXS) and those who have Axies but no time to level them up or battle them. This is a hallmark of a truly **functional economy** as owners of assets in the Metaverse are able to make them productive, while still controlling the rewards from such endeavours, rather than the platform (Axie Infinity).



3.3 Bucket 3: Social and Cultural Assets

Beyond programmable and financialised digital assets, more recently we have seen NFTs being increasingly understood as cultural and social assets. Seemingly taking the evolution from CryptoPunks to the next iteration are profile picture (PFP) projects which are typically a collection of algorithmically generated profile pictures with various characteristics all varying in rarity. Often, these NFT images are uploaded as people's Twitter profile pictures.

PFPs

PFP projects have gained even more prominence as celebrities beyond the crypto-sphere have been purchasing these - from **Synthetix's** [Kain](#), [Stani](#) from **Aave**, to mainstream business and entertainment moguls such as [Jay Z](#), [Steve Aoki](#), and [Steph Curry](#) to name a few.

Top NFT Projects by Sales Volume (All Time)

PFP related projects are bolded

Collection	Sales Volume (USD)	Chain
Axie Infinity	3,347,800,568	Ronin
CryptoPunks	1,668,053,481	Ethereum
Art Blocks	1,077,026,106	Ethereum
Bored Ape Yacht Club	786,871,513	Ethereum
NBA TopShot	783,172,224	Flow
Mutant Ape Yacht Club	424,276,552	Ethereum
Loot	264,711,345	Ethereum
Meebits	237,855,210	Ethereum
Cool Cats	187,257,895	Ethereum
CrypToadz	170,678,139	Ethereum
Parallel Alpha	164,019,136	Ethereum
MekaVerse	157,639,920	Ethereum

0N1 Force	147,331,112	Ethereum
Farmers World	144,457,290	Wax
Pudgy Penguins	136,435,967	Ethereum
Sorare	130,754,597	Ethereum
PUNKS Comic	129,767,597	Ethereum
Zed Run	120,323,928	Polygon
CyberKongz	119,974,451	Ethereum
Solana Monkey Business	111,714,259	Solana

As of 23 Nov 2021 Sources: CryptoSlam.io, Crypto.com Research

Out of the top 20 NFT projects sorted by trading volume, PFP projects account for 11 out of the top 20. (For this article, Loot will not be counted as a PFP project). The emergence of NFT projects profile picture projects attests to the characteristic of **persistent identity** in the Metaverse, which is key to meaningful presence.

In the narrative of NFTs, PFPs illuminates the deeply social nature of the Metaverse – acting as a social signal to others about which ‘tribe’ / community people belong to. In other words, being part of the [Bored Ape Yacht Club](#) is not just about a new PFP for social clout. It is about social signalling to other members that you are one out of 10,000 special members in the BAYC. The extent of social signalling in the Twitter sphere is sophisticated. In September 2021 it was announced that Twitter would be rolling out a new tool to enable verified NFT profile pictures.

From a grassroots perspective the **community around PFPs is dynamic, constantly evolving**. For example, in anticipation for Christie’s sale of a Bored Ape, many saw a ‘Suits on for Christie’s’ campaign on Twitter from [Cool Cats](#), [Gutter Gang](#), [Wicked Cranium](#) and Bored Apes – all wearing suits.



Membership in the Cool Cats or the Sneaky Vampire Syndicate is not limited just to virtual presence: **truly successful PFP projects are aware of the linchpin role of community as a value proposition and positive feedback loop to PFP projects.** For example, there are often physical off-chain meetups in locations such as LA and New York. Community members organically contribute to a community of co-creators and owners with active discord groups and community Town Halls. In other words, **PFPs are not just about digital assets and the image itself, but rather the associated socio-cultural value holding a PFP,** contributing to the sense of persistent identity in the Metaverse.

DAOs

Finally, Web3.0 and the token economy is advancing towards the Metaverse through the creation of decentralised autonomous organisations (DAOs) that aggregate individuals into something bigger **with real social, economic, and political power to achieve coordination in transparent, democratised ways previously not possible.**

PleasrDAO

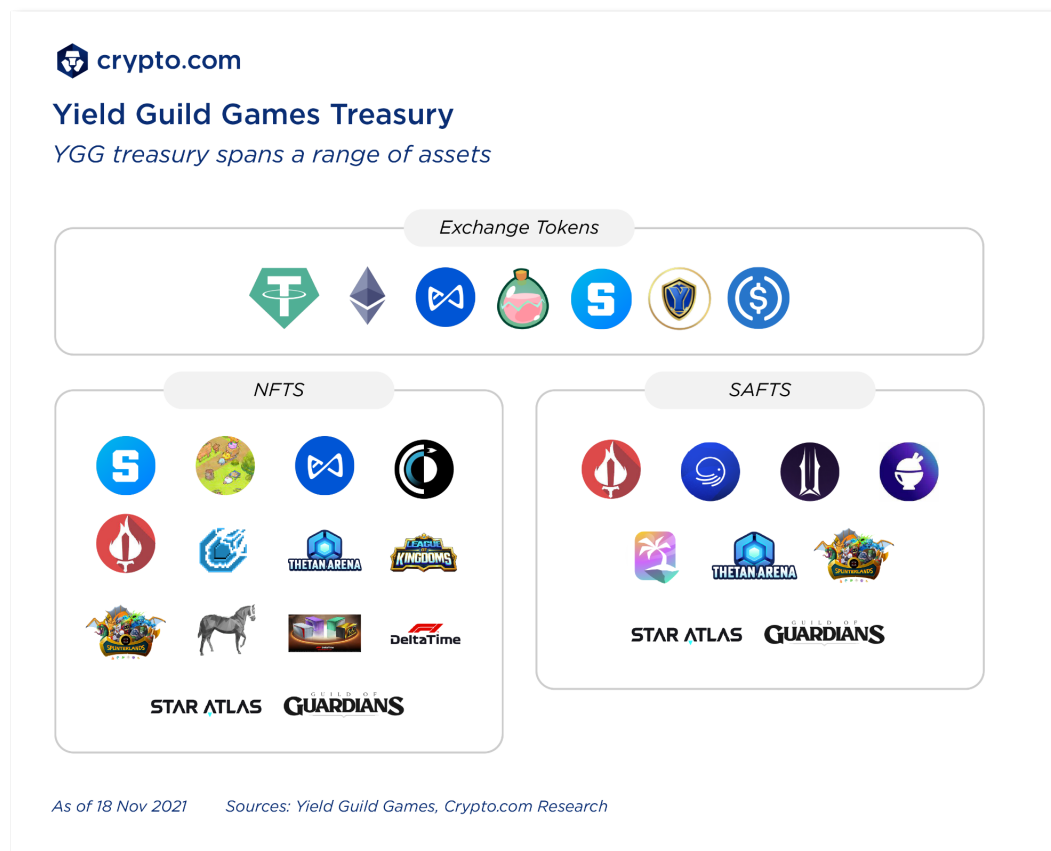
This is a DAO that collectively decides to purchase and showcase various 'culturally significant' pieces of art. Made out of DeFi and NFT enthusiasts, it has collectively acquired pieces such as Wu Tang Clan's album '[Once Upon a Time in Shaolin](#)', the original [Dodge](#) meme, Edward Snowden's '[Stay Free](#)', pplplr's Genesis Uniswap V3 '[x * y = K](#)', and PussyRiot's '[Virgin Mary. Please Become a Feminist](#)', among others.



[Yield Guild Games](#) (YGG)

YGG is a DAO that allows people to earn income on play-to-earn games – which can look like spending time to upgrade Axies / earn XP to level up in-game asset stats or buying land. YGG is another **social coordination layer** much like Axie Infinity Scholarships. They have [secured](#) funding from a16z, Animoca games and Atelier Ventures. The YGG IDO [raised](#) \$12.5M and sold out in 31 seconds.

Through the Guild, players come together much like the PleasrDAO collective by coordinating through Discord and a network of community managers. But instead of collecting art, they come together to maximise their gains in blockchain based games such as Axie Infinity, The Sandbox, and Decentraland, to name a few. As of September 2021, **YGG treasury stands at [\\$845M](#)**.



Global Coin Research (GCR)

Global Coin Research is a social token community where ‘the best writers, researchers and crypto community members can come together’. Using their token, GCR they use it to align all writers and members with the success of the platform. Members can access community investment deals, community created content (research, insights) and a community of crypto enthusiasts spanning well known developers, VCs, and angel investors.

There is a discord community which is token-locked – to join, one must hold 100 GCR tokens. The GCR token is used for community governance and writers will earn it as they write and contribute to the community (directly with content or indirectly through attending meetings and being active on the Discord server). While the required holding of 100 GCR tokens may be seen as a barrier to entry, GSR makes it clear **that anyone can write and be part of the community** and may earn the required holdings in other ways. As of writing, the GCR token is [\\$3.77](#), making the ‘buy in’ of 100 tokens worth \$377. If one characteristic of the Metaverse is defined as persistent presence, GSR represents the **equivalent of a self-sustaining corporation that goes**

beyond national and physical limitations – providing an insight as to what the social future of the Metaverse might look like.

Guilds like PleasrDAO, YGG and GCR mark another move towards a functioning economy and openness where new ownership-sharing and decentralised governance is being experimented with. Both examples are fairly nascent experiments, and are far from truly ‘decentralised’ and ‘open’ guilds. However, they are certainly a nod to the possibilities that lay ahead for complex societies in the Metaverse where people’s presence and identities are not defined by national borders or physical limitations, but rather by these **guilds with real social, political, and economic power.**

Top 'Social Money' Coins by Market Capitalisation

GSR ranks 4th globally

	Coin	Market Cap (\$M)
1	Rally (RLY)	1184.69
2	Whale (WHALE)	138.02
3	Friends with Benefits (FWB)	64.03
4	Global Coin Research (GCR)	37.71
5	Mork (MORK)	34.79
6	Onoks (OOKS)	9.40
7	Julien (JULIEN)	7.26
8	1337 (1337)	7.36
9	Yup (YUP)	5.36
10	Vid (VI)	2.84

As of 15 Nov 2021 Source: CoinGecko

4. Where Next for the Metaverse?

Notions of the Metaverse have been around for a while – with more recent proponents such as Epic’s CEO, **Tim Sweeney** [stating](#) it is ‘going to be far more pervasive and powerful than anything else’ in 2016.

Recently, Facebook, the 6th [largest company](#) in the world by market cap, has rebranded itself as Meta. The move was motivated by the belief this more accurately represents the future of Facebook – the very nature of social interaction and networking – beyond just virtual space expressed in the web2.0 paradigm, but encapsulating the characteristics that ‘real’ physical presence entail: persistence, identity, socio-economic rights (ownership, labour), and genuine connection.

From a digital asset angle, we can see how the way in which our **understanding of digital assets has similarly evolved to not just facilitate the possibility of a metaverse with verifiable, trustless and productive non-fungible assets, but also as socio-cultural legos that allow us to express our identity and act as a social signal to others** – be it membership of Cool Cats or CyberKongz clan.

Combined with the interoperability of asset standards, open source virtual and social tooling (e.g. open source and decentralised protocols, DAOs) **new possibilities in understanding the fluid concept of the Metaverse are possible**. It’s exciting that Facebook (Meta) is betting big to develop the verticals that will further bolster the Metaverse.

Yet, there is something fundamentally at odds when a platform (i.e. Meta) whose primary business model is an intermediated multi-sided marketplace founded on proprietary information pivots to build something aiming to be open, interoperable, and owned by users. This is not to say that Meta (or big game studios) cannot build a truly open internet, or that a *Ready Player One*-esque dystopia is inevitable. Simply that for now, how Web2.0 companies like Meta practically build their version of the Metaverse will be keenly watched.

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