



The Metaverse, Blockchain Gaming, and NFTs: Navigating the Internet's Uncharted Waters

Newzoo Trend Report 2022





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The Metaverse in 2022 and Beyond

Foreword

We launched the first edition of our metaverse report in July 2021. Then, the metaverse, NFTs, and blockchain gaming transitioned from being largely unknown concepts to ubiquitous terms on the lips of every major brand or investor. Despite the hype somewhat cooling down in recent months—partly as a result of the global macroeconomic situation—interest in the metaverse as a natural and immersive successor to the 2D internet is still at an all-time high.



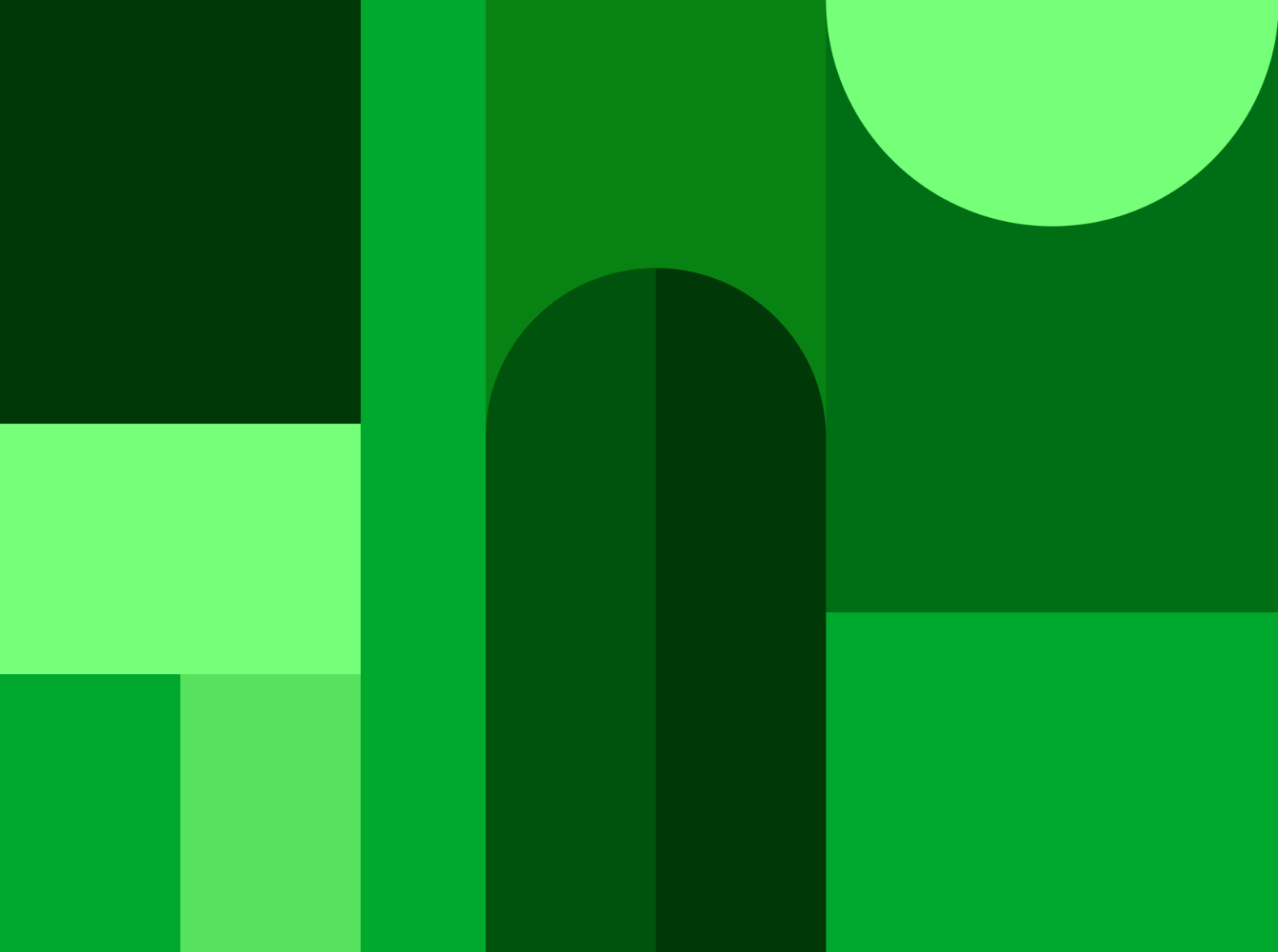
Mihai Vicol
Metaverse Lead

The transition from Web 2.0 to Web 3.0 will not only impact the modus operandi of (major) brands, but also the way in which consumers live, work, and experience entertainment.

The evolution of simulated, 3D worlds presents a particularly massive opportunity for brands. The transition from diffused physical spaces and into virtual worlds provides them with a new opportunity to reach a highly condensed mass of users that is more difficult to both approach and monetize through other forms of advertising. This transition into virtual worlds can only accelerate as the current generations of digital natives age and as virtual experiences become more authentic. Fast-moving brands like Nike, Louis Vuitton, Balenciaga, or technology brands like Meta—to name just a few—recognized this shifting of the tide and have already developed metaverse strategies.

Moreover, while NFTs and blockchain games have experienced a spectacular 2021, a severe drawback in the crypto market along with fears of a global recession have both led to public interest and coin valuations substantially waning in recent months. As a result, this correction will likely end most of the (low effort) endeavors in these areas. Nevertheless, we remain optimistic about the future and remain confident that the top projects will succeed.

Given how fast-moving this space still is, an elemental understanding of the building blocks and trends that surround it is essential. Therefore, in this report, we identify and discuss the top 10 prevailing trends in the metaverse, blockchain gaming, and NFT space. Understanding these trends (and what drives them) will help companies endemic to gaming, consumer brands, and consumers alike to navigate the murky waters of the metaverse, along with its connection to NFTs and blockchain games. We hope you find this report insightful and useful for shaping your strategy in 2022 and beyond.



The Metaverse Foundation

Definition, ecosystem, and recent events

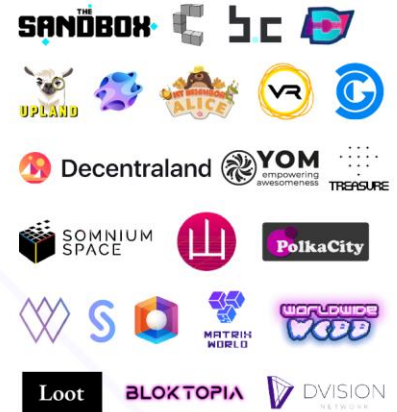
Metaverse Ecosystem Diagram (1/2)

Metaverse Gateways

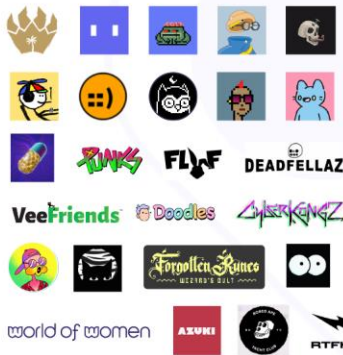
Centralized



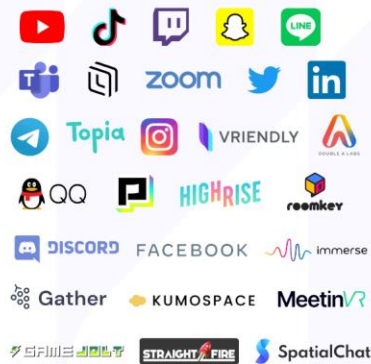
Decentralized



NFT PFP Collections



Social & Meeting Hubs



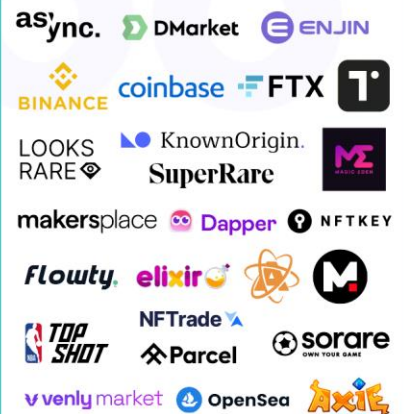
Economy



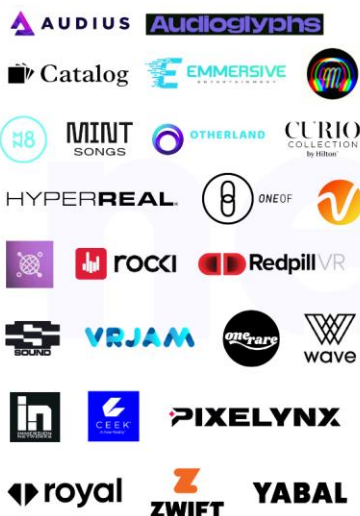
Crypto Wallets & Access



Marketplaces



Music & Entertainment



Avatar & Interoperability



Digital Fashion & Identity



Metaverse Ecosystem Diagram (2/2)

User Interface & Immersion



Visualization & Digital Twin



Development & Infrastructure Tools



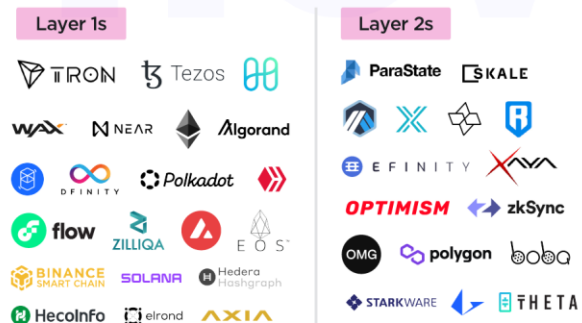
Cloud, Scalability & Storage



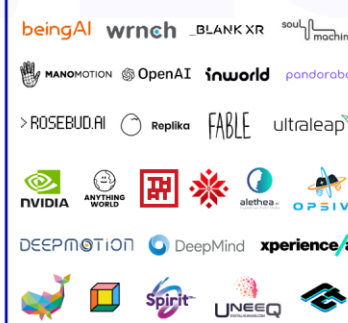
Connectivity



Decentralized Infrastructure



Artificial Intelligence



Adtech & Marketing

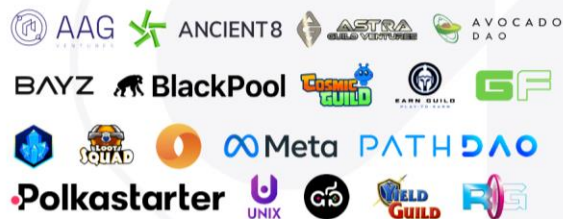


Blockchain Gaming Ecosystem Diagram

Blockchain Games & Virtual Worlds



Crypto Gaming Guilds



Marketplaces



Development & Infrastructure Tools



Crypto Wallets



Blockchain Infrastructure

Layer 1s



Layer 2s



What Is the Metaverse?

The metaverse has no authoritative definition; however, several thought leaders have offered a framework



Though often used interchangeably, the metaverse and virtual worlds are different concepts. While the metaverse will be comprised of many individual, interconnected virtual worlds, no one virtual world can be the metaverse.



Selected Definitions from Thought Leaders



Jonathan Lai
Partner

A persistent, infinitely-scaling virtual space with its own economy and identity system.



Persistent, shared, 3D virtual spaces in a virtual universe.



Tim Sweeney
CEO/Co-Founder

Realtime 3D social medium where people can create and engage in shared experiences as equal participants in an economy with societal impact.



An interconnected and interoperable network of persistent, virtual worlds that are populated by large numbers of players who interact with each other via 3D digital avatars, which offer users a heightened sense of immersion and presence.



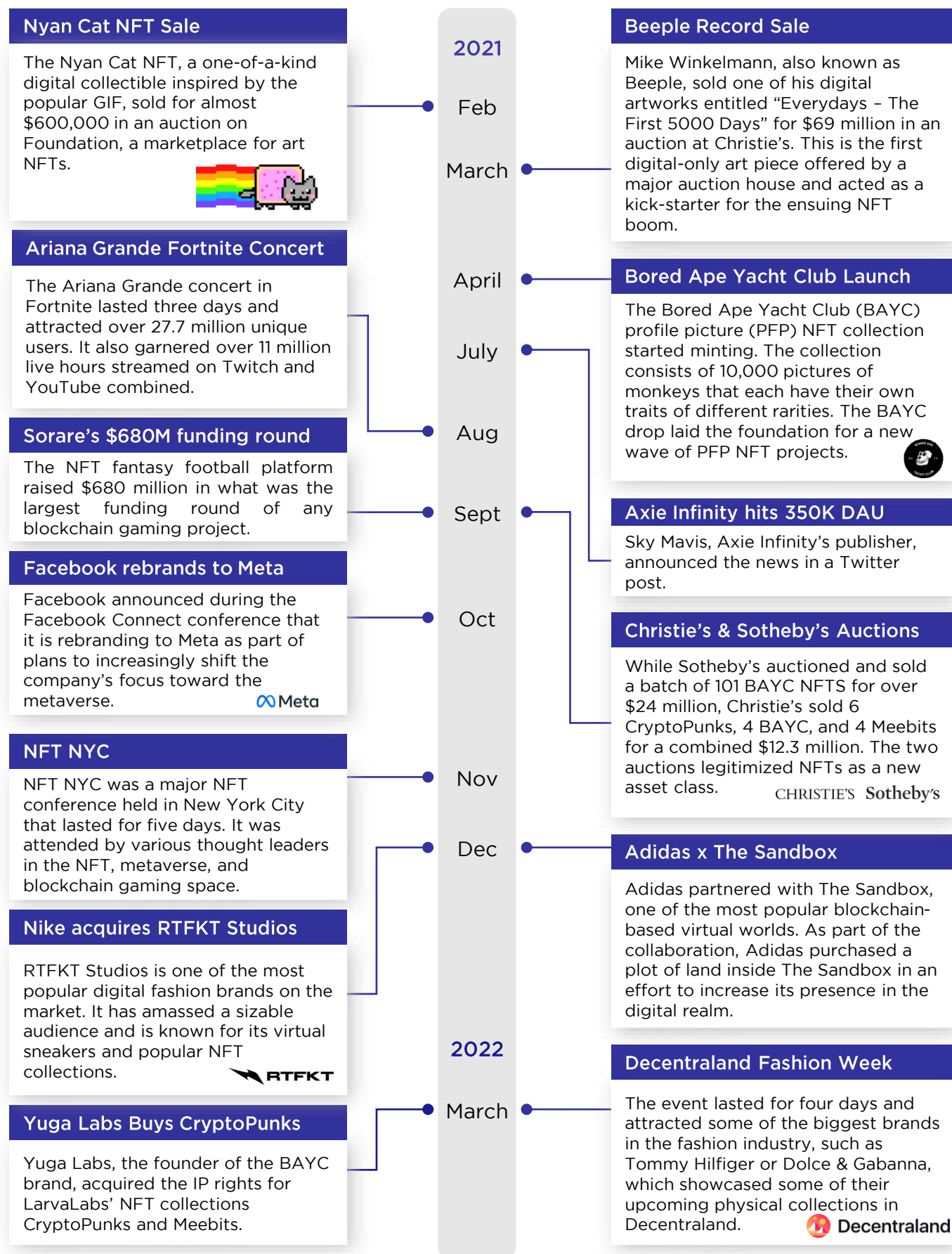
Key Attributes from Matthew Ball, Media & Gaming Investor

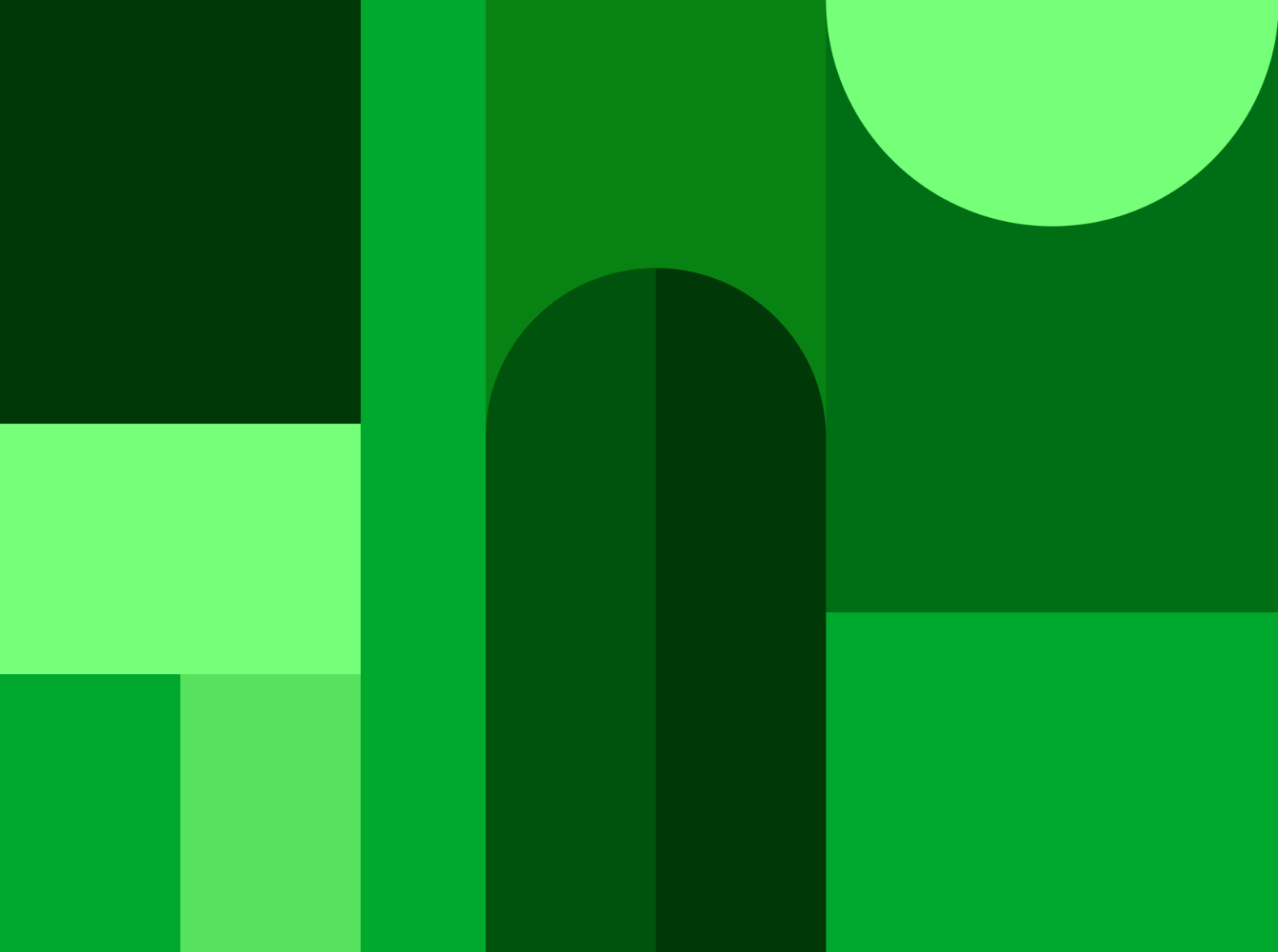
- **Scaling:** increasing the current cap of c. 100 per zone to potentially infinite.
- **Persistence:** technical limitations unlocked, actual digital persistence can improve immersion and create new experiences.
- **Interoperability:** merging of different games and new systems of interaction between them; value in one game can compound in others.
- **Economy:** trading across different games, more depth, currencies.
- **Identity:** evolution of current online identities for avatars that can represent a player in more imaginative or realistic ways.
- **Digital & physical:** spans across many aspects of life with open and closed platforms.
- **Populated by multiple contributors:** content from individuals, informal groups, organizations, and commercial enterprises.

<https://www.matthewball.vc>

NFTs and the Metaverse: A Year in Retrospect

Recent key events in the Metaverse and NFT space





Executive Summary

Executive Summary (1/3)

The key global trends that are currently shaping the metaverse, blockchain gaming, and NFT space

1. Big Tech and Brand Involvement

- Consumers spend increasingly more time in virtual worlds, and successful brands follow them. As a result, consumer-facing companies will be forced to develop a metaverse strategy to stay connected with their (future) customers and remain relevant.
- Since there is no single “right” approach to tackling the metaverse, different brands have approached it in distinct ways. Now, these can range from IP activations inside virtual worlds and acquiring virtual land NFTs to outright M&As.

2. Roblox: A Peek into the Future of Virtual Worlds

- As gaming has increasingly transitioned towards a multi-layered experience that encompasses viewing, playing, and socializing, Roblox has become one of the most popular games on the planet and has managed to attract large numbers of creators, players, events, and brands to its ecosystem. By analyzing its success, we can draw important lessons and better understand the direction that the virtual worlds of the future should (not) take.
- For all the praise it received, Roblox only allows developers building on its platform to retain just above 25% of the revenue they generate. The evolution of pay structures will be interesting to monitor, particularly considering the bad publicity that Meta received for announcing an almost 50% take rate for developers building on its proprietary virtual world, Horizon Worlds.

3. The Future of Music and Entertainment

- The inability for artists to go on tour during the COVID-19 pandemic has forced them to seek alternative revenue streams. Consequently, the last year has seen several high-profile musical events in virtual worlds like Fortnite or Roblox, which managed to pique the interest of millions of fans around the world.
- Music NFTs are an alternative way for artists—most of whom depend on extractive record labels and centralized platforms to earn a living—to increase their earning potential. This allows them to sell their singles, EPs, or albums as NFTs to their most loyal fans.

4. The Future of Fashion and Luxury Brands

- As time spent in virtual worlds increases, our digital identity and representation will grow in importance. This opens a wide array of opportunities for traditional and digital fashion brands alike to dress our digital selves with in-game skins and virtual garments, thus giving rise to the direct-to-avatar business model. This also has important implications for the future of e-commerce.

Executive Summary (2/3)

The key global trends that are currently shaping the metaverse, blockchain gaming, and NFT space

- As the transition to digital accelerates, consumers will want the choice of shopping in immersive online environments that feature photo-realistic representations of a brand's physical garments, again increasing the incentives for fashion brands to invest in their digital presence.

5. Play to Earn and Blockchain Gaming

- The early market for blockchain games is overrun by titles that feature rudimentary gameplay without sustainable economies. This is natural, as complex gaming experiences take time to develop. As time passes, we are likely to see more blockchain games challenge traditional AAA titles in terms of technical complexity and—at some point—size of the player base.
- Though blockchain gaming faces some notable challenges—particularly sustainability and regulatory concerns—these are likely to be mitigated as the space matures.

6. P2E Guilds and the Future of Work

- Play to earn guilds have exploded in popularity in the last year. Their activities revolve around acquiring and then loaning in-game assets to players who cannot otherwise afford the high entry barriers of some blockchain-based titles. Their services are generally popular in growth markets and usually depend on blockchain games offering players enough (financial) incentives to engage with them.
- The future of work in the virtual realm extends beyond just gaming. As synthetic environments and digital twin technologies—among others—become more advanced, a wide range of “metaverse” native jobs will emerge to sustain our alternate digital lives.

7. The Rush for Digital Real Estate

- The last 12 months have seen major brands like Samsung, Adidas, and Gucci jumping on the bandwagon of digital-land NFTs. Acquiring digital real estate is essentially a bet on the blockchain-based virtual worlds gaining in popularity but is also a low-risk way for major companies to ensure they will be where their clientele is, should this become a wide-ranging phenomenon in the future.

8. An Introduction to NFT Collections

- 2021 has undeniably been the year of NFTs, with several high-profile collections being sought after for the boost in social status and financial incentives they offered. Despite the current market pullback, profile picture (PFP) NFTs are likely to be key elements when it comes to digital identity in the metaverse.

Executive Summary (3/3)

The key global trends that are currently shaping the metaverse, blockchain gaming, and NFT space

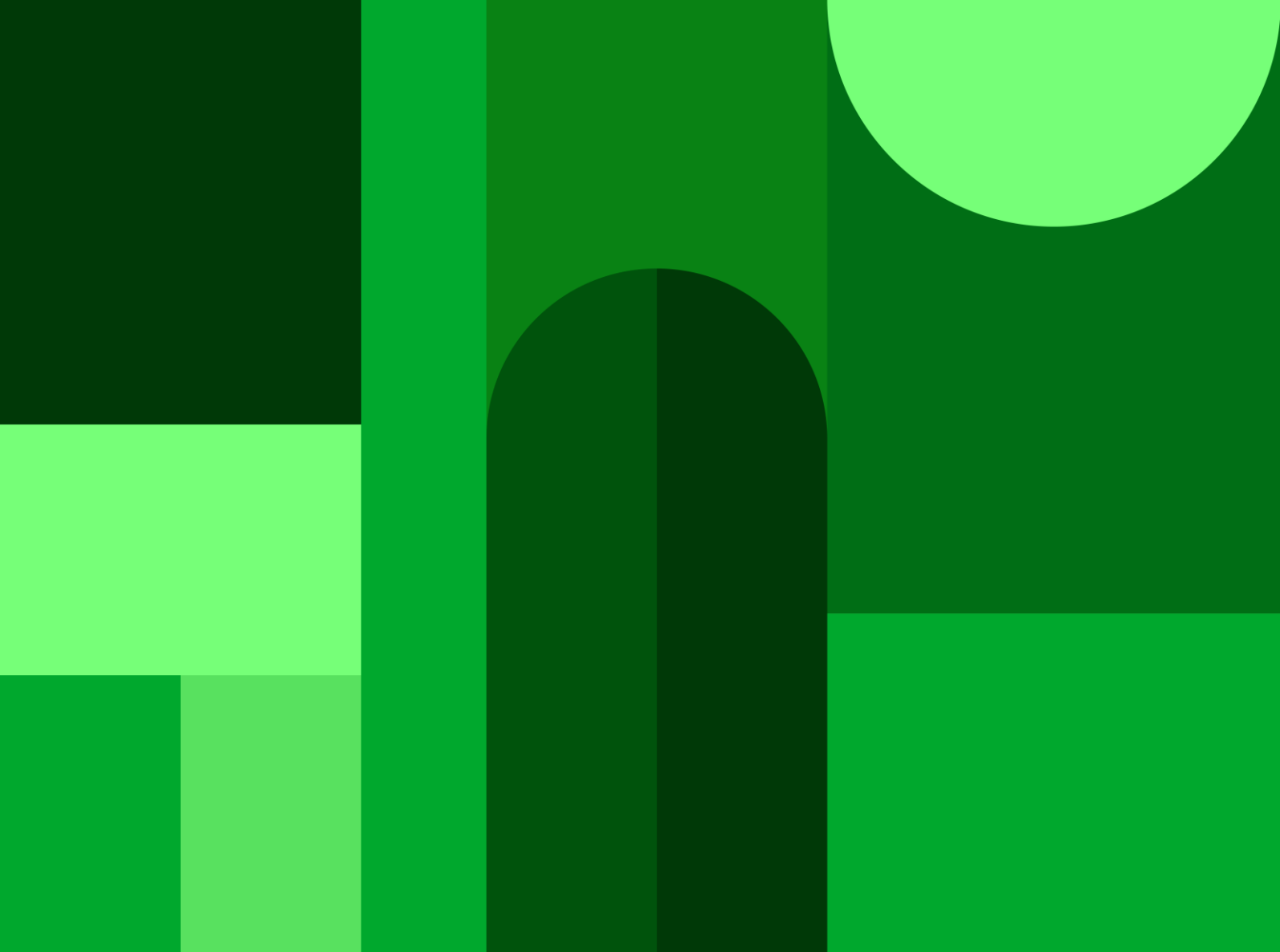
- PFP NFTs are only a subset of the whole digital asset offering; virtual land, in-game items, art, or utility NFTs are also popular among market participants.

9. The Transition from NFT Collections to Global IP

- The Bored Ape Yacht Club (BAYC) is an NFT collection made up of 10,000 cartoon apes. Since its launch, it generated significant interest from celebrities and high-profile individuals (though several celebrities were gifted their BAYC NFTs), being one of the first NFT brands that managed to permeate into mainstream culture through music, events, partnerships, and its dedicated network of individuals. This has prompted an increasing number of NFT projects to extend their scope and become transmedia IPs that span across multiple verticals.
- Loot is an exercise in decentralized IP building. Its evolution is fully controlled by its community at large; everyone can build applications that enrich the Loot ecosystem and bring it one step closer to becoming a major IP. Loot began a movement that was then quickly adopted by other notable projects—like Treasure—and that will likely reshape the way in which some brands of the future are born and evolve.

10. Crypto and the Promise of Interoperability

- Despite its limitations, Ethereum—together with its sidechains and layer 2s - is currently the backbone of a sizable portion of the NFT & blockchain gaming space. With the Ethereum merge - which will transition the blockchain from the unsustainable proof of work towards proof of stake - on the horizon, it is poised to continue its rule as the dominant smart contract platform.
- While interoperability at scale across games continues to be a hot topic among metaverse enthusiasts, the path to adoption is currently filled with notable technical and political roadblocks. Nevertheless, interoperability can potentially become a reality as shared standards are being built and as player interest grows.



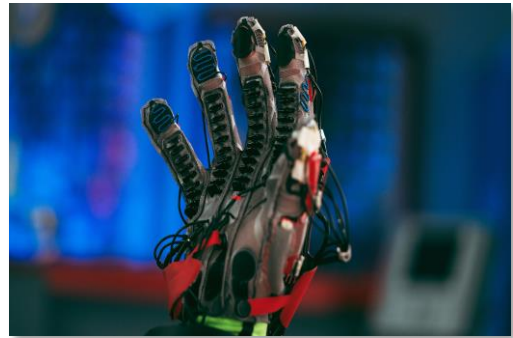
10 Trends Shaping the Metaverse

1.1 Big Tech and Brand Involvement

All roads lead to the metaverse



After several temporary activations inside Roblox, Gucci established a permanent presence in the virtual world with its new Gucci Town.



Meta's metaverse strategy primarily revolves around haptics and VR technology

In this early stage of the metaverse, it is brands that stand to gain the most by establishing a 3D, digital presence inside virtual worlds. The rush to be present in the metaverse is a bet on future generations spending more time online in increasingly gamified and digital settings.

We already see this today in the gaming market, where titles like Roblox, Minecraft, and Fortnite attract hundreds of millions of users every month and are the most popular games on the planet. While in part accelerated by the onset of COVID-19, the transition from physical and into virtual worlds is a larger cultural shift that has accelerated in recent years.

As a result, it has become more challenging for brands to reach Gen Z and Gen Alpha through traditional media channels like television—which have been the norm in the last decades. Moreover, social media and entertainment platforms like TikTok, Twitch, and Twitter—among others—lack the gamified elements that virtual worlds provide. Besides the fact that advertising on these platforms can be intrusive and irritating, it is also unidirectional. Individuals are unable to interact with the brand that is being advertised in a meaningful manner—they can merely watch. This keeps conversion rates at a minimum and makes it difficult for the two

sides to form a substantial connection.

Enter virtual worlds, where brands can establish a digital presence and build interactive experiences for anyone to engage with in a 3D environment. While it requires more effort—these experiences need to be constantly managed and refreshed with new content—they are much more likely to create a positive and long-lasting impression of a brand if done right.

Most traditional companies enter the Web3 space to advertise to the younger generations in a way that these digital-native consumers perceive as more organic, generally through IP activations inside virtual worlds or by launching NFT collections. However, this need not always be the case. The metaverse hype jumped into mainstream attention when Facebook renamed the company to Meta. Facebook faces an aging userbase and a drop in popularity compared to platforms such as Discord or Twitter, which currently accommodate most of the metaverse discourse. While Meta is developing its proprietary virtual world, called Horizon Worlds, and owns Reality Labs, the business wing that focuses on VR, AR, and haptic technologies, its focus is on building the platform of choice—through its Meta Quest offering—for users seeking to join the metaverse.

1.2 Big Tech and Brand Involvement

There is no one-size-fits-all solution for brands in the metaverse

HSBC Buys Digital Land in The Sandbox



- HSBC's first foray into the metaverse comes in the form of a partnership with The Sandbox, one of the most popular blockchain-based virtual worlds. The banking giant intends to use the platform as a vehicle for fan engagement by building educational finance games for its potential future customers.
- While Nike's acquisition of digital fashion company RTFKT Studios adds a digital dimension to Nike's already popular physical offering, it is also a powerful PR and revenue-generating tool. RTFKT is one of the most well-known brands in the NFT space and is the creator of several high-profile NFT collections such as CloneX or The Meta-Pigeon.

Nike Acquires RTFKT Studios



Dapper Labs Partners with La Liga



- NBA Top Shot Creator Dapper Labs plans to release officially licensed NFTs in the form of short videos that contain iconic plays from La Liga's history.
- The partnership between NFL and Epic Games' Fortnite resulted in over 3.3 million NFL branded skins bought by players in-game over a two-month period. The collaboration netted a combined \$50 million and illustrated the potential for brand activations inside virtual worlds.
- Chipotle opened a digital store inside Roblox and offered its first 30,000 visitors a free burrito code redeemable for online orders or inside physical Chipotle stores.

The NFL Releases Branded Fortnite Skins



Chipotle Offers Discount Codes in Roblox



2.1 Roblox: A Peek Into the Future of Virtual Worlds

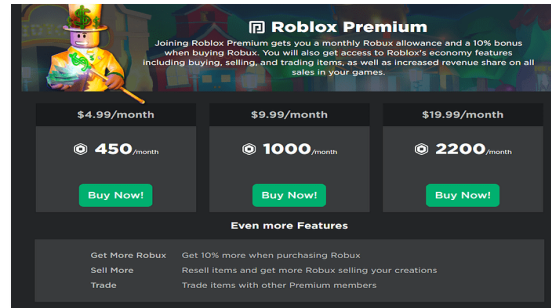
Roblox is currently one of the most popular games on the planet



Adopt Me! Is a Roblox game developed by Uplift Games that has been played over 28 billion times and which currently features 64 million MAUs.¹



Ghostopia – a Roblox game developed by professional game studio Supersocial – partnered with MGM and brought the characters from the Adams Family to the game during Halloween.



Roblox Premium is a monthly subscription that provides players with Robux each month. It also offers perks like in-game discounts on skins and other accessories.



Jailbreak - one of the most popular games on Roblox - was created by two amateur developers. On Roblox's platform, the game creation process is not only limited to professional studios.

Roblox is currently the most popular iteration of a game as a platform, having reached over 53.1 million DAUs on average in 2021.² However, Roblox does more than simply providing a platform for players. According to Yonatan Raz-Friedman, CEO of Supersocial, Roblox sits at the intersection of four major verticals:

- It's a game engine, allowing developers and individuals to build their own games on top of Roblox.
- It's a virtual social hub and meeting place for many of its users.
- It's a platform that allows for the publishing and distribution of content. The developers of Roblox games can promote and advertise their experiences on the Roblox marketplace in exchange for a fee.
- It's a cloud service provider. Roblox has made the transition from AWS toward building its proprietary cloud infrastructure.

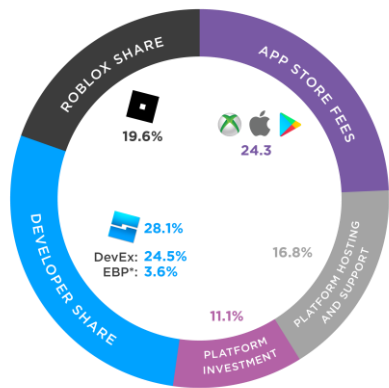
Gaming has evolved over the last decade to become a multi-layered experience encompassing playing, viewing, socializing, and engaging. All these elements come together in the wildly-popular Roblox. More than a game, Roblox is a **platform** where players can create and capture value - a feature which many games from previous generations did not have.

The transition to games as a platform provides publishers and content creators with a blank canvas that invites a wide range of non-gaming experiences such as music concerts, fashion shows, IP activations, and media partnerships, among others. The appeal of such opportunities is powerful, for they also attract members of the non-native gaming audience. Importantly, players of all kinds see these metaverse-like experiences as places where they can express their identity, host social events, or free themselves of traditional societal standards.

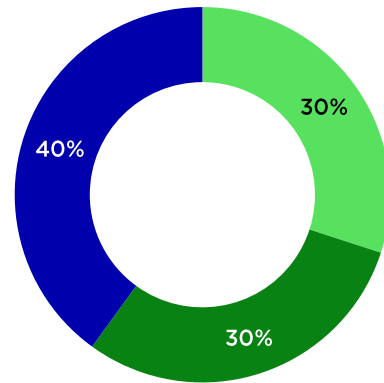
2.2 Roblox: A Peek Into the Future of Virtual Worlds

Developers building on Roblox only retain a small percentage of the revenue they generate

The Cash Payout Structure of Roblox¹



Roblox game developers can retain up to 28.1% of the total earnings generated by their experiences.



● Creator of the item ● Platform
● Seller of the item

As opposed to traditional distribution platforms like Steam and Google Play, which feature a standard 30% cut on all game or in-app purchases for most developers, Roblox takes a much higher fee—close to 75%—from game developers building on its platform.² This is substantial, even when compared to Meta announcing a 47.5% take rate for Horizon Worlds, a move that generated ample community backlash.

However, part of the difference between Roblox and traditional digital storefronts can be explained by the various advantages associated with building games on Roblox, such as the large user base (53.1M DAU³) and the already existing game engine—Roblox Studio—that game developers can tap into. Compared to traditional games, creating Roblox experiences is much more accessible in terms of both manpower and development time. Individuals can also earn money from creating and selling in-game items, skins, and accessories. These can be sold inside experiences—which resemble in-game purchases in traditional games—or on the Roblox marketplace. In the latter case, Roblox's cut increases to 70%. The high take rates are especially dangerous when considering the following:

- Roblox is not a profitable company, having registered a net loss of over \$162 million in Q1 2022 alone.⁴ Therefore, lowering its take rate to match that of its competitors (The Sandbox has a take rate of 5% on digital asset sales, though only 300K MAU) can prove challenging and can lead to further growth slowdowns. Ultimately, Roblox only needs to be concerned about its payout structure if one of its competitors reaches a similar scale, which is currently far from the case.
- Roblox is facing recent declines in user growth and increased competition from a growing number of popular game creation platforms (GCPs).

Despite its recurring net losses—which are primarily reinvested back into the platform to expand its already dominant position—Roblox is still currently the undisputed market leader. However, with Epic Games doubling down on its vision for the future—including Fortnite and other metaverse-adjacent investments such as Manticore Games—and with many other (blockchain-based) GCPs like Crayta, Zepeto, and Kogama seeking a larger piece of the pie, the race for the metaverse is on.

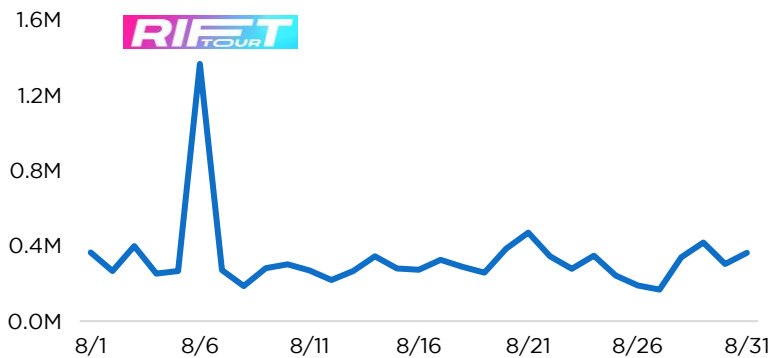
3.1 The Future of Music and Entertainment

Virtual concerts and influencers become commonplace as the transition to digital accelerates

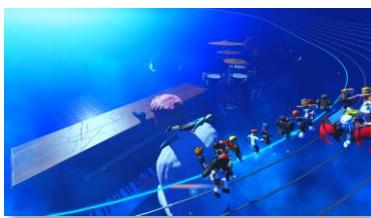
The Impact of Ariana Grande's Rift Tour

Peak Concurrent Fortnite Viewers in August 2021; YouTube & Twitch Combined

FORTNITE



The **Rift Tour** amassed 1.3 million concurrent viewers at its peak, with more than 75% watching on Twitch. Moreover, the concert generated 11.03 million live hours streamed on Twitch and YouTube combined.



Twenty One Pilots Concert in Roblox



Coldplay Concert in Joytopia



FN Meka, virtual influencer with >10.1 million TikTok followers.

With physical concerts and tours grinding to a halt during the COVID-19 pandemic, artists sought alternative ways to perform and connect with their fans. Many artists found an opportunity to perform in virtual worlds like Roblox or Fortnite as alternative concert venues.

The popularization of virtual artists emphasizes that a physical existence is no longer a prerequisite for success and that (young) consumers are open to the idea of fully digital artists and influencers. However, virtual beings need not be limited to the music realm—other entertainment sectors like TV or film, among others, are likely to follow suit.

Justin Bieber performed his latest album, Justice, in front of a fully digital crowd on Wave, an increasingly popular virtual platform. What distinguishes this virtual concert from others is that the artist performed live in a studio while wearing a motion-capture suit.

His voice and body movements were then transmitted in real-time to the audience inside the virtual world. During the show, audience members could interact with each other and the artist, allowing fans to connect with Justin Bieber more closely.



Equip motion capture suits



Perform live in virtual worlds

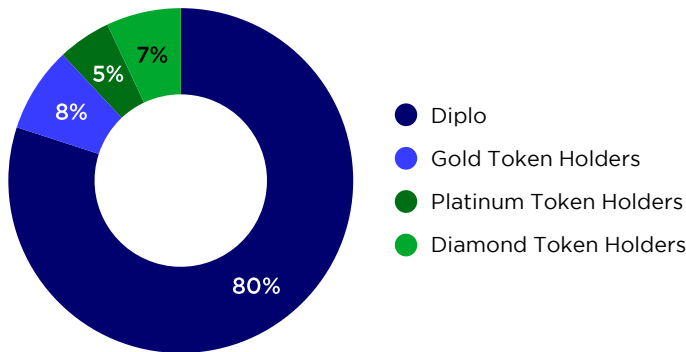


Interact with millions of fans in a digital setting

3.2 The Future of Music and Entertainment

Music NFTs pave the way for increased revenues and fan engagement

Royalty distribution of Diplo's *Don't Forget My Love* NFT Single



Diplo offered a combined 20% of the streaming royalties from his latest single, *Don't Forget My Love*, to people who acquired the NFT version of the song on music platform Royal. The music NFTs were sold in three different editions with varying rarities and prices and will allow NFT holders to share in part of the revenue generated by the song on traditional streaming platforms.

Can NFTs Reshape the Music Industry?

- Earning a living wage as an artist can be challenging. Record labels retain anywhere between 50% to 90% of an artist's revenue,¹ and streaming platforms like Spotify pay out anywhere between \$0.003 and \$0.005 per stream.²
- **Touring and selling merchandise are usually great ways for artists to supplement these wages**, but the COVID-19 pandemic effectively removed this income, with physical concerts and touring not being an option anymore.
- Even for high-profile bands and artists, touring can be notoriously expensive, as well as time- and energy-consuming. Relying on touring as a sizable revenue-generating activity can take a toll on the (future) creative abilities of many artists.
- NFTs can offer artists the ability to sell their singles, EPs, or albums as NFTs, as well as streaming royalties or other perks—such as concert tickets or exclusive VIP access—to NFT owners. This creates a more intimate fan-artist relationship while still allowing fans to directly support their favorite artists and allowing artists to retain most revenues for themselves. Unlike the traditional modus operandi, music NFTs have the potential to make both fans and artists better off while leaving the extractive intermediaries, i.e., record labels, out of the loop.

Coachella, one of the most popular music festivals in the world, allowed all 2022 attendees to claim an In Bloom seed NFT. **The token provided immediate benefits to all holders**, such as vouchers for food and beverages during the festival, faster entry lines, and access to limited-edition merch. More importantly, the token evolved throughout the festival, having the chance to bloom into one of six rare flowers, which provided a select few with VIP upgrades, 2023 passes, and other premium festival upgrades.





Spotlight on: Improbable

Herman Narula, CEO



Improbable is a metaverse technology company pioneering new ways to connect, play, create, and build value across interconnected virtual worlds.

Improbable

Herman Narula, CEO

Q1: Though interoperability across games and experiences has been a hot topic in the last year, there are some notable roadblocks that currently prevent it from becoming an industry standard. How are you thinking about interoperability happening at scale in the gaming industry?

Interoperability may sound like a Holy Grail right now, and it's true that it does embody the true promise of the metaverse, the seamlessness and spontaneity you would expect. But interoperability also means different things to different people. At Improbable, we break interoperability down into people, places, and things. What might surprise people is you can find current examples of all of these across the games industry.

"Interoperability of people" is having a common identity you can take from place to place with you, including things like your profile, friends list, and achievements. You can see this in action on Xbox Live, Steam, or Roblox, although we need to work on further decentralization to detach these profiles from platform owners.

"Interoperability of place" is your ability to move from experience to experience in a frictionless manner. If you've played SteamVR or Oculus Quest and moved between two experiences, or even navigated between two pages on a web browser, you've experienced some of this already.

Finally, "interoperability of things" refers to digital objects you can take from experience to experience that don't just look the same, but that also have consistent meaning and behaviour. It's the foundation of true cross-metaversal economies, and what most

people think of when they hear "interoperability". There was a glimpse of interoperability of things in Second Life, which launched way back in 2003. It featured objects authored by totally different creators that were able to coexist in the same experience and interact with one another. Making this work in a more general context is the one big challenge.

It goes without saying that the current level of interoperability is limited, but at Improbable we're working on enabling this in the worlds we're currently developing and strongly believe it needs to be designed into content from the very beginning.

Q2: What is the benefit of supporting interoperability for traditional game developers and publishers?

Interoperability opens the door to more valuable experiences involving large groups of people which simply won't work out in a "walled garden". Developers and publishers already clearly see the value of interoperability of people, with Xbox Live and Steam allowing you to share your profile across games, and interoperability of places when you can circulate in between separate game experiences in the same world.

The big challenge is around interoperability of things, which is as much about incentives as about technical obstacles. Balance in competitive games is a delicate thing, thus bringing weapons from Call of Duty into League of Legends doesn't particularly make sense. In more social experiences, the value is clearer; studios and game developers should see how some of their users would appreciate taking the collectibles gathered in a given game with them to another title, such that they are able to keep the skins they've acquired.



Spotlight on: Improbable

Herman Narula, CEO



This would also allow companies to preserve and guarantee the value of rare items, including moving them into future iterations of the game itself.

Q3: You've recently partnered with Yuga Labs to help them develop Otherside. What do you think will attract large numbers of players to the game, especially considering that similar "metaversal" experiences include some of the most popular games on the planet?

We are obviously a huge fan of what Yuga Labs is developing with Otherside and believe this world will blow people's minds while upending decades-long ideas of what gaming is and what's possible with open platforms. Yuga Labs is, to date, the largest and most successful creator of NFTs. Its culture and intimate understanding of the web3 community's expectations put it at the forefront of what can be fun for its community.

For Otherside, we are working on making it fully interoperable with all other metaverses built on the M² network and other IPs. And with the power of our Morpheus technology, over 15,000 players will be able to interact simultaneously in a single place, connect with natural voice chat (even in crowds of thousands), and experience rich, immersive gameplay supported by AI and physics. This is not currently something you can find easily in other metaversal projects.

Q4: What are the key elements that currently prevent shared virtual spaces from being inhabited by large numbers of players?

The central challenge is a technical one stemming from how networking architecture currently works. Popular games on the market typically feature around 60-100 players per server because networking requirements scale quadratically. Simply put: a 200-player game has four times the networking requirements of a 100-player game. If we're going to bring tens of thousands of players together in shared virtual spaces, we need a fundamental change in technology.

Q4.1: How is Improbable tackling this issue, and how do you see it evolving in the medium-to-long term?

Our Morpheus technology tackles this scaling issue, overcoming the barriers of density and presence traditionally met within games and real-time experiences. It enables enhanced social interaction and a sense of presence inside virtual spaces, with over 15,000 real users interacting in the same place, at the same time, in a high fidelity, lag-free experience. Every player's avatar is fully customizable and can see the entirety of the crowd he or she is in.

We've already been running public tests to prove the technology, bouncing over 4000 live players around like tennis balls inside Scavengers spin-off ScavLab. And in a pioneering live event with K-Pop star AleXa, over 1000 fans freely roamed the arena, danced, and interacted with the singer. Our current focus for evolution is continuing to increase the scale and fidelity of what's possible until we're able to create worlds that support virtually unlimited players.

Q4.2: When do you think we'll reach one million players in the same virtual world?

The metaverse is still in its infancy, but we are obviously very optimistic about how fast we'll hit this milestone. All it takes is a few solid experiences and worlds to be successful for the appeal to grow. We're pushing the boundaries of technology every day, so we see a million players in the same virtual world happening sooner rather than later.

Q5: How do you see the evolution of synthetic environments and virtual simulation? What are its implications for the future of work and human society in general?

We're continually seeing models and simulations become more powerful, more accurate, and, most importantly, more useful. The latest synthetic environments bring these together, and as a result they're rapidly evolving beyond helping us address



Spotlight on: Improbable

Herman Narula, CEO



isolated issues and towards being able to address wider, more complex, interrelated challenges. And at this stage, we are only just scratching the surface of what's possible.

By using synthetic environments to bring together different models that govern different systems, our clients are able to understand how they operate and react to different situations. Ultimately these simulations allow them to extract the full value of their data, to analyze challenges more rigorously for faster, more effective, and better-informed decisions, be it about how to run critical infrastructure, combat climate change, or respond to pandemics.

Q6: Fast forward to 2035. What do you think virtual worlds will look like, and what will the key differences be between the current and future iterations of immersive gaming experiences?

You could compare the current metaverse to the early stages of the internet. In the early days of the internet, buying books online was an awful experience. But the reason you tolerated it was because you could purchase books you couldn't otherwise easily find. And I think we're at that phase with the metaverse. We need to find those experiences that, despite the jankiness, are worth doing—those that will change the way we experience things and that we could only find in the metaverse. It is that same leapfrog that we should see in the coming years and iterations of the metaverse.

We should also come to terms with the accessibility issue: do we need AR or VR to be immersed? We personally don't see it that way, but hardware improvements should also come into play in the coming years. Finally, the relationship between physical and virtual spaces should also mature, and be enriching, and this is something that will make a huge difference in how we embrace virtual worlds.

Q7: What is your boldest prediction when it comes to the evolution of the metaverse in the next five years?

The arrival of the metaverse marks the beginning of a new age of exploration and opens the door to a new understanding of how we function and form society.

How we can work towards positive frontiers in psychological fulfilment and mental health; recenter our economy and modes of learning and education around individual needs; forge remarkable new communities built on shared interests and experiences; and bring about a world as interesting and fulfilling than the one we are afraid to leave behind. This is the promise and the hope.

4.1 The Future of Fashion and Luxury Brands

Virtual runway shows offer a peek into the future of digital fashion



Dolce & Gabbana used virtual cat avatars to exhibit their fashion line during the Metaverse Fashion Week.



Tommy Hilfiger showcased its Spring 2022 collection and allowed users to purchase NFTs for their avatars or physical garments from within the virtual world.



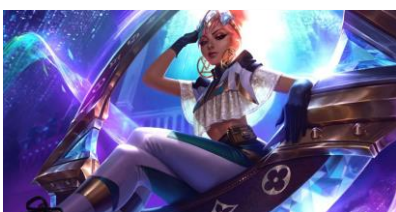
The daily runway shows took place in an arena built inside the newly opened luxury district in Decentraland.



Estée Lauder offered 10,000 free NFT wearables to Decentraland users.



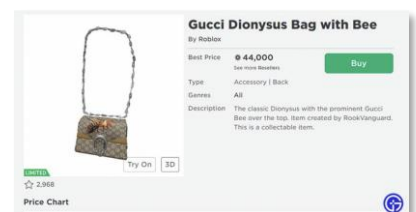
Meta has partnered with Balenciaga, Prada, and Thom Browne, and plans to create a digital fashion marketplace where users will be able to purchase in-game skins for their digital avatars



Louis Vuitton designed a set of League of Legends skins.



Balenciaga released a set of branded Fortnite skins.



A Gucci bag in Roblox sold for more than its physical counterpart.

4.2 The Future of Fashion and Luxury Brands

A paradigm shift is brewing in the fashion & e-commerce industry

Digital is the new black

As the gap between physical and virtual continues to blur, digital identity is poised to challenge the importance of physical appearance. Higher-fidelity experiences and better hardware will encourage many consumers to spend more time in immersive virtual worlds where 3D avatars will be the primary medium of interaction with other people. Therefore, it is vital that avatars and digital garments can reflect a user's personal tastes. To this end, a number of digital-only fashion houses have taken the market by storm.



Digital fashion house Auroboros debuted its first digital, ready-to-wear fashion collection at London Fashion Week 2021.



The Fabricant sold the world's first digital dress on the blockchain—called Iridescence—for \$9,500.



RTFKT Studios—now owned by Nike—has become one of the most popular digital fashion firms by selling digital sneakers.

Ready Player Fashion

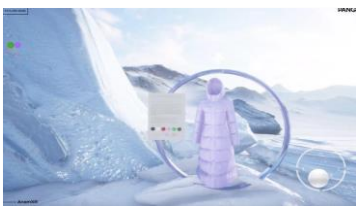
The transition to 3D immersive environments is poised to substantially transform the traditional shopping experience. Digital in-store shopping sessions will likely become more realistic and commonplace as XR and VR technologies evolve. Consumers will be able to stroll through digital storefronts and make well-informed buying decisions as more photo-realistic solutions are brought to market. AR filters will also play an important role, as they allow consumers to try on digital garments seamlessly without requiring them to be physically present in stores.



M-XR aims to produce hyper-realistic models of objects in the real world.



Matterverse enables brands to create hyper-realistic virtual stores.



AnamXR plans to create high-fidelity virtual worlds and shopping experiences for brands.



Perfity allows consumers to create realistic avatars and to try on garments digitally before purchasing them.



Photo-realistic models of real-life garments and immersive shopping experiences are essential, as high-end fashion is as much about brand building as it is about the product itself. Moreover, physical elements that are, for now, absent from digital stores—like the ability to touch or smell garments—are key to creating a deep connection between consumers and brands that does not currently exist in the online realm. Solving these issues will lead to longer digital shopping sessions, increased conversion rates, and lower overhead and returns, all the while allowing consumers to enjoy the comfort of their homes.



Auroboros is the luxury fashion house of the Metaverse. Creating culture and identity across physical and digital worlds since 2021.

Auroboros

Alissa Aulbekova & Paula Sello, Co-Founders

Q1: Tell us about Auroboros. What makes it unique when compared to other digital fashion houses?

Auroboros is the leading luxury fashion house of the metaverse, created by and for the next generation. Merging science and technology in the 21st century, we craft identity and style with physical couture and digital-only clothing. A revolutionary dual model utilising Web 3 technologies combined with futuristic creative vision, beautifully crafted products and carefully curated experiences, we are bridging the gap between reality and the metaverse using fashion as a vehicle.

Coming soon, our female founders, Alissa Aulbekova and Paula Sello will be represented by their own digital Auroboros Avatars—as the main heroines—breaking the fourth wall and showcasing a unique and innovative way for founders to engage with their community, thus providing a deeper dimension for all Auroboros NFT holders to have direct accountability and representation of female lead empowerment in Web 3.0 and digital fashion.

Q2: How do you see digital fashion evolving over the next decade, and what are the key pain points that still need to be addressed?

At Auroboros, we see digital fashion evolving to become intertwined with our physical landscape. We understand there is a desire to experience digital clothing on the body, so we believe in combining both the physical and digital realms to create a mixed reality. Hence, during London Fashion Week (LFW) last year, we released our iconic Venustrap Digital Dress as an augmented reality Snapchat filter so users could wear

Auroboros digital garments in the real-world. The filter reached more than 2.5 million users over the course of our LFW launch.

Another consumer desire is the need to transport your digital wardrobe of wearable assets from world to world, providing interoperability across different virtual worlds. This is an area which we at Auroboros have already begun and continue to explore, having made our digital collections available within gaming, social media and now digital venues, as emphasized by our recent venture into Decentraland.

The key pain point is that the current technology doesn't always allow the digital to seamlessly blend with reality, so user experience is an area that still needs to be addressed.

Q3: From your conversations with other traditional brands, what are the opportunities they are most interested in and excited about when it comes to the future of digital fashion?

Traditional brands are excited about the value and utility we can provide through fashion NFTs. Through NFT ownership, you can offer devotees of your brand exclusive activations and releases, such as access to IRL and virtual events and limited-edition assets. Therefore, NFTs have the power to strengthen a community, which is why we at Auroboros are thrilled to be releasing our first NFT collection later this year. With this release, we will be offering our community a new and more meaningful way to connect with the Auroboros brand, alongside the chance to co-create a new world.



Q4.1: Digital identity has grown in importance in the last years as consumers—particularly Gen Z and Gen Alpha—are spending increasingly more time in virtual worlds such as Roblox or Fortnite. What are your plans for tapping into this expanding demographic?

Built by and for the next generation, at Auroboros we have already engaged with the Gen Z and Gen Alpha demographics and will continue to do so in the future. The digital-focused vision of our brand comes naturally, as we grew up surrounded by the evolution of the internet and the online world. Most recently, we participated in the first-ever Metaverse Fashion Week in Decentraland, showcasing our Biomimicry Digital Collection with a performance from our muse, the acclaimed singer and artist Grimes.

With this immersive showcase, we presented an Auroboros Digital Bodysuit Wearable as worn by Grimes' avatar, which visitors could purchase as a skin to wear within Decentraland.

Q4.2: What are the key elements that differentiate your garments from other digital fashion items or traditional in-game skins?

The release of Auroboros branded skins across platforms are instantly recognisable, due to the visionary, nature-tech aesthetic and digital identity that Auroboros has distinctly created.

Q5: Traditional luxury brands like Dolce & Gabbana, Louis Vuitton, and Gucci have already released their own digital collections or branded skins inside games, and they are likely to be followed by a plethora of other (fashion) brands in the future. Do you see Auroboros as being in direct competition with (some of) these companies? If yes, how do you plan on tackling that competition?

As a female-led, community-driven metaverse native luxury fashion house, Auroboros is in a league of its own. We are building the first digitally native luxury fashion brand with a community of like-minded creators, collectors and fashion enthusiasts, using Web

3.0 technologies combined with a futuristic creative vision, and carefully curated experiences. We encourage historic brands to engage with the metaverse. However, as natives in the space, we better understand the value and utility that is sought after by the next generation.

Q6: How do you view the relationship between physical and digital fashion? Do you consider them to be two sides of the same coin or different concepts targeted toward distinct demographics?

At Auroboros, whilst our digital ready-to-wear and physical couture exist in separate realms, both collections are bound together thematically. Our first collection, Biomimicry, explores a vision of nature-tech across the two landscapes. The Auroboros physical couture collection consists of made-to-order wearable pieces of art that utilise a crystallising chemical reaction to metamorphose the entire or part of the couture.

These pieces are intended as exhibition pieces or for special events and therefore draw a different demographic to our digital collection. Our digital collection targets Web 3.0 natives, including Millennials and Gen-Z's that have a strong affinity for artistry, technology and gaming.

Q7: What is your boldest prediction when it comes to the evolution of digital fashion in the next decade?

Whilst the medium of digital fashion has been around for a long time in the form of character and avatar wearables within gaming and VFX costumes in Hollywood films, we are still early on in its evolution into the Web 3.0 space, so the trajectory is difficult to accurately predict.

Our boldest prediction would be that the fashion industry will become predominantly digital-first, producing garments digitally before committing to material manufacture. The advantages of this approach would include less material waste, allowing brands to see how well pieces perform before selecting which items to bring into the real world.

5.1 Play to Earn and Blockchain Gaming

The early iteration of blockchain games lacks the “fun” element



The Sandbox Season 2 Alpha attracted lasted for a month and attracted over 300K unique active users to the virtual world.

49%

of unique wallets interacting with decentralized applications were active in blockchain games as of December 2021.¹

The number of unique active wallets (UAW) does not automatically translate into daily or monthly active users. Players generally have more than one wallet, especially in games that run on blockchains with low fees such as WAX or Harmony.

- Play-to-earn (P2E) is a novel business model in which gamers are rewarded with cryptocurrencies for playing a specific title, generally as a function of their performance. Most P2E native titles have a blockchain element and generally require players to set up a crypto wallet in order to play them.
- P2E games have seen explosive growth in the last year, fuelled in part by the uneven impact of COVID-19 across the globe. They have primarily benefited individuals in growth markets who were left jobless by the pandemic and turned to titles like Axie Infinity to supplement their incomes.
- As the space is still young, the market is currently dominated by financially-oriented P2E titles whose core focus is on the economic aspect rather than the gameplay itself. This is partly because developing complex gaming experiences is a time-consuming and delicate process. Consequently, most of the current blockchain games are plagued with sustainability issues. Players are not incentivized to play most titles for reasons other than financial gain, which leads to a system that can only sustain itself if there is a continuous influx of players to the game.
- The core audience for the current iteration of blockchain games comes from growth markets such as the Philippines, Vietnam, and Brazil. Most players in these countries are not primarily interested in the richness of the gaming experience, but rather the ease with which they can use these games as income-generating activities. This may explain why games with rudimentary gameplay have picked up in popularity—they provide an easy on-ramp for earning-oriented players.

The Pros and Cons of Blockchain Gaming

Pros

- Player ownership of in-game assets
- The ability to earn while playing the game
- The ability to freely trade in-game assets
- Decentralized decision-making through DAOs
- Composability—the ability to build on top of already existing applications without the need to start from scratch

Cons

- Some games have high entry barriers
- Gameplay is still rudimentary and highly focused on economic gain rather than a fun player experience
- Most P2E games are currently not sustainable
- Regulation concerns
- Player onboarding is difficult given the need for crypto wallets
- Most native gamers' **distaste** for NFTs and blockchain

Current Verdict

Though there are many obstacles for the mainstream adoption of blockchain gaming—most notably the **gameplay experience**—they are likely to be mitigated as more resources and expertise are devoted to the space.

However, it remains to be seen whether and in which form will P2E take off as a business model. While early success in growth markets is a promising sign, it need not be indicative of future prosperity.

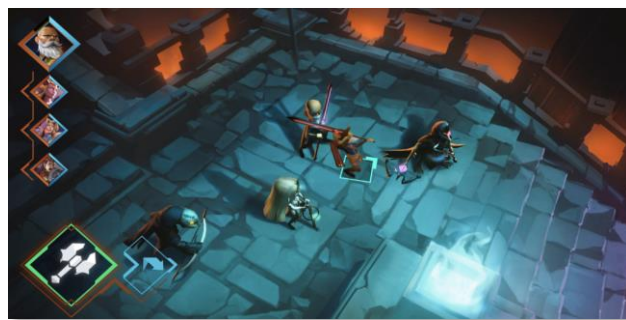
5.2 Play to Earn and Blockchain Gaming

Hype aside, blockchain gaming has yet to reach a mainstream audience



Axie Infinity is a card collectible title that has been the poster child of the blockchain gaming movement. While it broke all the records in the P2E space and pioneered some important concepts, it also poses several challenges.

Most importantly, **its in-game economy was not sustainable**—its success depended on continuous user growth. Once growth stalled, the price of the in-game token started to decrease, making the game less attractive to other users. At its peak, Axie Infinity has seen over 2.7 million unique wallets connecting to the game daily.



Guild of Guardians is a top-down action RPG on mobile with over 150,000 players on the waitlist. Though it has not yet been released, the title generated substantial interest, managing to sell several waves of in-game NFTs.

While most P2E titles focus on creating experiences for PC, **mobile may be where blockchain games achieve mainstream success**, given the platform's nearly three billion gamers who are more likely to be interested in bite-sized, time-filling, or less complex gaming experiences.



Illuvium is among the first AAA blockchain games and one of the most anticipated titles on the market. It is an open-world RPG where players need to find and catch creatures called Illuvials, which can then be bred, traded, evolved, and used to engage in battles with others.

Illuvium has recently raised over \$72 million after selling its first 20,000 plots (out of 100,000) of land. Land comes in different tiers and grants players different earning, building, and resource gathering opportunities. Employing such a strategy is common for most blockchain titles – raising large amounts of funds by selling NFTs, which are then used to fund the development of the game.



Splinterlands is a card collectible game (CCG) that featured over 580,000 active users in March 2022, making it one of the most played blockchain games currently. Uniquely, users are required to purchase a \$10 in-game asset to unlock the P2E component of the game.

Since the blockchain element is particularly well suited for CCGs—allowing players to easily trade their cards—it is also a crowded genre, with several titles like Gods Unchained and Skyweaver, among others, competing for the users' attention. Notably, the battles in Splinterlands are automated, meaning that the players' only input is building a card deck and choosing a strategy.



Spotlight on: Zilliqa

Tom Fleetham, Head of Business Development – Sports & Gaming



Zilliqa is a highly-performant, secure and affordable layer-1 blockchain designed to power the creator economy and a growing ecosystem of web3 apps across gaming, NFTs, and DeFi.

Zilliqa

Tom Fleetham, Head of Business Development – Sports & Gaming

Q1: Tell us about Zilliqa. What makes it unique when compared to other smart contract platforms?

Zilliqa is the first layer-1 (L1) blockchain to launch sharding, something that is in the long-term roadmap for many other chains including Ethereum. Our elegant design is well suited to the demands of gaming: we're fast, low cost, and scalable. In addition, we developed a security-focused smart contract programming language called Scilla that minimizes "smart contract risk"—the typical security flaws and errors behind many of the well-publicized hacks and thefts on Ethereum Virtual Machine (EVM) compatible smart contract platforms that use the Solidity programming language.

We are also the first L1 chain to build a metaverse as a service platform, called Metapolis, and our own first-person shooter. Developing a metaverse and game in-house is significant because, as the owners of these products, we can incentivise deeper and repeat engagement across the full Zilliqa gaming ecosystem.

Q2: Most smart contract platforms thrive from network effects. While Ethereum currently boasts the largest ecosystem of decentralized applications, other platforms like Solana and Avalanche already attract tangible developer interest. How does Zilliqa's ecosystem of dapps look like, and what are the incentives for developers to build on top of it considering the competition?

Our ambition is to become the leading blockchain for

competitive gaming. To support this goal, we've partnered with some of the world's leading esports teams and are investing in games that will appeal to esports fans. We believe that ultimately gamers won't and shouldn't have to care about which chain they're using when playing games. Additionally, our esports partners give us access to millions of traditional gamers—no other chain offers that.

From a developer perspective, we are actively looking for high quality projects to invest in and partner with. We are building out dev tools to make it easier to build games on Zilliqa, with our Unity SDK already available on Github and an Unreal Engine SDK slated for development.

Q3: What is Metapolis and where do you see it going in the future? How do you see its competition going forward, particularly considering that the market for virtual worlds has a handful of highly popular platforms (both traditional and blockchain-based) that attract most of the players?

Metapolis is the first "Metaverse as a Service Platform" (MaaS) powered by an L1 blockchain. Metapolis offers a data-centric and fully customizable XR experience accessible through web/AR & VR. Essentially, brands and communities interested in launching a web-based metaverse experience can plug into Metapolis and build a custom virtual city inhabited by 3D avatars. A brand's city will suit their unique identity and offer their audience a new web3 layer of engagement.



Spotlight on: Zilliqa

Tom Fleetham, Head of Business Development – Sports & Gaming



Metapolis simplifies the most popular web3 activations for brands and communities—these include NFT drops, custom token creation, and virtual community events. Traditional social gaming platforms monopolize content and economy through their “walled garden” ecosystems. By contrast, Metapolis offers a simultaneously open and secure platform for developing interconnected ecosystems that empower users to freely engage with brands, games, communities, and an open economy all in one place.

Q4: You mentioned you seek to attract blockchain games to Zilliqa. How do you plan on doing that in the short-to-medium term?

Our esports partners and the potential for integration with Metapolis is already attracting many high-profile projects to Zilliqa. We plan on further developing our gaming ecosystem in three ways:

1. By investing in high-quality gaming projects that are yet to integrate with a blockchain and/or have a multi-chain strategy.
2. By partnering with popular blockchain games looking to reach a traditional gaming audience.
3. Through gaming hackathons with investment prize pools for the winning projects.

Q5: Platforms like Polygon or Immutable X are currently the go-to destinations for most blockchain gaming projects. Considering their popularity and already established ecosystems, why would blockchain gaming developers choose to build games on Zilliqa instead of on the above-mentioned platforms?

A combination of investment, technical support (we build games too!) and access to our community and esports partners. The Zilliqa community has been crying out for more high quality dapps, and the early games that launch are likely to have a large impact and onboard an immediate user base of crypto native players. This will then allow us to take the titles to millions of traditional gamers through our esports partners and their social & streaming channels.

Furthermore, gamers don’t necessarily care what chain they’re using—they just want to play great games and go through the onboarding process with as little friction as possible.

Q6: What is your boldest prediction when it comes to the evolution of the Zilliqa gaming ecosystem in the next few years?

Zilliqa will become the Valve of competitive blockchain gaming—contributing to the development of both games and underlying platforms that raise the quality bar and unlock blockchain gaming for millions of non-crypto native gamers and traditional game studios.

6.1 P2E Guilds and The Future of Work

The market for P2E guilds is crowded and dominated by a few players

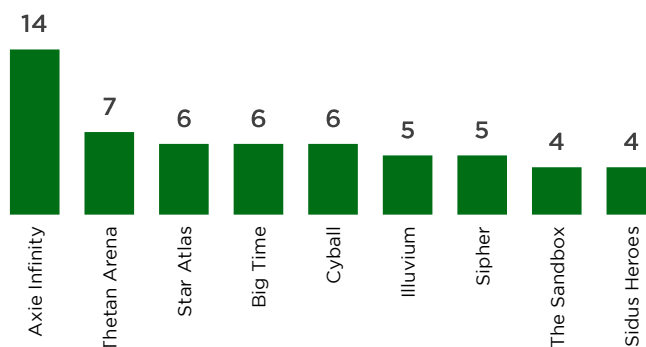
P2E Guilds - A Glimpse into the Future of Work

- P2E guilds are organizations whose primary activities revolve around acquiring stakes in select blockchain games in the form of crypto tokens or in-game assets. They then proceed to lend these assets to other players—also called scholars—who would like to play a certain game but cannot otherwise afford its high entry barriers. Players who use these assets can usually retain between 50% and 70% of the resulting revenue, with the rest going to the managers and the guild itself. Therefore, guilds primarily accrue revenue in two ways: they earn a percentage of the revenue generated by their scholars, and they benefit if the price of the native tokens or in-game assets increases.
- Many guilds attempt to educate their scholars in different crypto and blockchain-related matters to improve their financial literacy while also organizing social events meant to strengthen the ties between members. These events also serve as recruitment grounds for new, interested players. Though the economic incentives are the glue tying these communities together, the more established guilds are actively trying to create “digital nations”—anonymous people of different nationalities united via the internet by a common culture, shared beliefs, and a decentralized financial framework.
- P2E guilds are most popular in growth markets like The Philippines, Vietnam, and Brazil, primarily because some blockchain games offer(ed) higher—albeit often temporary—earning opportunities compared to other IRL jobs in these countries. Part of the recruiting is still done via word-of-mouth or even physically—guild delegates are physically traveling to several regions in these countries to try and onboard users. Moreover, guilds generally focus on specific geographical regions since onboarding scholars from around the world poses several challenges like language barriers or high searching costs.
- Most guilds invest in P2E titles before the game is released. This is beneficial for the game developer and the guilds if the game gets popular. However, it is uncertain whether guilds owning a big part of a title’s NFTs before the game’s release is advantageous for the players themselves, for they are now fully dependent on the services of a profit-seeking third party to play the game. While guilds thrive in a bull market when prices continuously increase, the opposite is true for market downturns. Crypto prices decrease, making blockchain games less attractive from a P2E perspective and thus leading to a decrease in active users, which puts downward pressure on the price of in-game assets. Such periods restrict the revenue-generating activities of guilds and will likely lead to the disappearance of many such entities.

Guild	# of scholars ¹
Yield Guild Games	20,700+
AvocadoDAO	11,000+
Unix Gaming	5,000+
Earn Guild	5,000+
PathDAO	4,000+
Merit Circle	2,750+
Astra Guild Ventures	2,032+
AAG Ventures	2,000+
Rainmaker Games	2000+

Portfolio Breakdown by Game²

Based on available data from 19 P2E guilds



6.2 P2E Guilds and The Future of Work

Earning money in the metaverse is likely to extend beyond gaming as technology evolves and mindsets shift



VoxEdit is an engine that allows for the design and creation of voxel-based NFT assets.



A hyper-realistic Matrix Awakens experience was fully created in Unreal Engine 5.



A digital twin of one of BMW's physical factories was built using Nvidia's Omniverse.



- Play to earn is not a new phenomenon. Earning money by playing video games has long existed and has been tacitly accepted by major publishers over the years as an industry standard. The most popular example is gold farming in MMORPGs like World of Warcraft or RuneScape—professional farmers gather and sell the in-game gold for real money to interested players.
- This process usually takes place on specialized third-party websites such as PlayerAuctions or G2G. It is, in theory, prohibited by game publishers—players who are trading outside of the game ecosystem risk getting banned. It is also a cumbersome and risky process that many players are not familiar with or willing to go through.
- To this end, a key contribution of P2E is facilitating this process and enabling consumers to share in the value they create by playing these games in a substantially more frictionless manner.
- Nevertheless, work in the metaverse can take many forms. Though the creation of custom in-game assets has traditionally been designated to professional designers, the increased demand for personalized clothing and equipment in virtual worlds has led to the explosion in popularity of user-generated content (UGC) in recent years.
- Games like Roblox, Horizon Worlds, or The Sandbox have UGC at their core and encourage users to create and sell assets on their platforms in exchange for virtual currency, which can then be converted to real money. For these platforms to thrive, they need to attract large numbers of players and builders alike, such that they can become vibrant social and economic hubs and increase their network effects—much like Roblox has done in recent years.
- The shift to digital will also enable the creation of virtual economies and worlds that will complement our physical existence. Much like the advent of the internet has led to the creation of new professions, so will the metaverse bring about a wide array of new work opportunities. If humans at large are to adopt virtual worlds as their digital homes, professions like virtual fashion designers, digital architects, metaverse guides, as well as other metaverse-native jobs are likely to become vital elements of a well-functioning digital society.
- This phenomenon is not only limited to gaming. It also includes other industries such as manufacturing, automotive, fashion, and city planning. As technology progresses, high-fidelity digital replicas of factories, buildings, and cities will serve as models that can inform real-life decisions, increase profitability, and improve safety standards for workers across the globe.



Spotlight on: Yield Guild Games

Gabby Dizon, Co-Founder



Yield Guild Games is a play-to-earn gaming guild, bringing players together to earn via blockchain-based economies.

Yield Guild Games

Gabby Dizon, Co-Founder

Q1: What is YGG's focus in the short-to-medium term?

YGG will continue to grow its reach and expand its scholarship program in 2022. To support that growth and to ensure we democratize access to play-to-earn games globally, we are tailoring our onboarding services and capacity to build local partnerships through YGG's regional subDAOs, including YGG SEA (Southeast Asia), IndiGG (India), OlaGG (Hispanic communities worldwide), YGG Japan, and BAYZ (Brazil). These subDAOs will allow communities across the world to have a YGG-styled, player-first experience that is hyper-localized to address onboarding challenges in their market and to ensure that language-specific content, education and support are made available.

In 2021, YGG partnered with a total of 48 games, guilds and play-to-earn infrastructure companies to help our community. In 2022, we are ramping up our support for these games to assist their successful launch and sustainable growth, while we also continue to fuel the development of the play-to-earn ecosystem worldwide.

Q1.1: What do you find most exciting about the current blockchain gaming space?

To date, YGG has over 40 game partners. Many of them will be launching in 2022, so we are excited to see these games finally being played by our community. YGG has worked with these partners to share guidance on developing their in-game economies and also provided user feedback on early-stage pre-launch games from our game testers.

YGG already offers scholarships in Axie Infinity and CyBall. Soon, we will launch additional scholarship offerings in games such as Fancy Birds, Crypto Raiders, and others. We have also enabled early access to the game Big Time for some members of our community.

Q1.2: What are the best opportunities in the blockchain gaming space now and in the immediate future?

Currently, the X-to-earn movement is a big focus for YGG, as we seek other gamified ways for our community to use their time, leverage their skills, and earn crypto rewards beyond play-to-earn.

Two examples, which are both partners to YGG are: Genopets, which is a move-to-earn NFT game, and Metacrafters, which is a learn-to-earn protocol helping Web2 developers make the shift into Web3. I think that as increasingly more people get onboarded into Web3, builders and innovators will continue to create experiences that will move this space forward.

Q2: How do you see P2E guilds evolving over the next years and what are the key pain points that still need to be addressed?

The purpose of YGG's subDAOs is to tailor its activities to the needs and interest of a smaller, more specialized group, and ultimately onboard more players with greater efficiency and effectiveness. YGG's subDAO model demonstrates the need to provide country and region-specific onboarding and game selection for its community members, whose local preferences, needs and challenges vary greatly depending on where they live in the world.



Spotlight on: Yield Guild Games

Gabby Dizon, Co-Founder



Additionally, YGG has established game-focused subDAOs in YGG-Splinterlands (YGG SPL) and YGG-League of Kingdoms (YGG LOK) for our most dedicated player communities to be able to govern their own activities, decision-making, earnings and assets. As more games launch, we would like to see more communities take ownership and run their own subDAOs using YGG infrastructure.

We also expect to see more X-to-earn subDAOs launching so that our community can move-to-earn, learn-to-earn, create-to-earn, sing-to-earn, dance-to-earn, and so on.

Q3: How does the current bear market shift (or affect) your investment strategy?

We're being a lot more careful about how we deploy our cash. Moreover, we want to make sure that we maximize our current (liquid) assets because we don't know how long this period is going to last.

Having said that, anyone who has been in crypto for some years will know and expect that the market is cyclical. As such, the current downturn has not changed our long-term vision at all. YGG is still securing new partnerships, collaborating closely with our existing partners, continuing to acquire assets in high-quality games that are in-demand by our community, onboarding scholars, and working on launching new subDAOs to grow the X-to-earn ecosystem.

Q4: How do you decide which games to invest in? What are some key elements these games should have?

YGG has an asset acquisition team that does due diligence on the games we partner with, for the YGG community. And as a guild, we have specific criteria. We scrutinize each game to weigh a range of factors such as tokenomics, utility of NFTs in the game, team deliverables, our own portfolio diversification amongst different genres, and of course, we also take the general gameplay and the fun factor into consideration. We also want to see that games have sustainable virtual economies. With more games being developed, we expect to see even higher quality output, which will

result in YGG ramping up its purchasing of the gaming assets needed to ensure our guild members get access to the best games. YGG's community of players or "game testers" also helps to provide early feedback on games in development to suggest improvements to the games before they launch.

Those who are interested can read more about our latest partnerships in the [YGG Q1 2022 Community Update](#).

Q4.1: What are the biggest red flags in a P2E game?

The sheer number of projects released in this space is staggering, so there are a few things that we watch out for when purchasing assets in games:

- Unsustainable economic models and Ponzi-like tokenomics: implementing strong tokenomics is crucial, especially as a game begins to scale - we want our partnered games to be prepared for large player bases entering the game economy.
- A team that isn't doxed - we look for trusted teams that have a great track record in their previous endeavors and are capable of producing games that our community can play-to-earn for a very long time.
- No play-to-earn element: we don't acquire idle assets that can't generate yield for the community to benefit from.
- Not community-first: we like our partnered games to be community-first, meaning that they are receptive to the demands of the players, while also thinking about the development of the game from the players' perspective.

Q5: Do you think P2E guilds will expand beyond gaming in the future? If yes, which industries are next?

Blockchain games have brought about many people who are interested in the play-to-earn aspect. Playing is great because there are more than two billion gamers around the world who already understand the benefit of being able to own their digital assets. When onboarded to NFT games, players learn Web3 skills in the process, and these are the skills needed to participate in the decentralized economy.



Spotlight on: Yield Guild Games

Gabby Dizon, Co-Founder



But it's not just games on offer in Web3—or the metaverse more broadly. There are people who want to contribute by using different forms of creativity. For example, it could be a community moderator who is applying their skills to a Discord or Telegram forum, or it could be an artist creating NFTs, or it could be someone who's into lore building, and the list goes on.

This is “X-to-earn,” or contribution in exchange for rewards and ownership, which is the central idea we expect to see gain further importance in the future.

Q5.1: How do you see the future of work in the metaverse?

I think most people in the future will work, exist and spend a vast majority of their time in the metaverse. As automation takes over, a lot of the jobs in the physical world will be lost. Though many people have been worried about this, such a future will ultimately free them from having to do things that they don't really enjoy. Freed from the need to work in menial jobs, many of them will go online to find other ways to use their time and their skills to earn money.

These forms of work might not necessarily resemble the traditional 9-5 jobs. I think that people are going to find themselves in different crypto communities, different virtual worlds, maybe part of a DAO, or in a small group where they will be able to earn and be incentivized by tokens, or by a community that grants NFTs.

We are already starting to see this shift happening, along with a group of people who see more value in digital assets as opposed to physical ones. Rather than buying watches or cars, some have now resorted to buying blue-chip NFTs instead, like CryptoPunks or Mystic Axies.

Q6: What is your boldest prediction when it comes to the evolution of blockchain gaming in general—and P2E guilds in particular—over the next decade?

We will see 10 million wallets interacting with blockchain games later this year. We also see some of the most successful P2E games or NFT projects become platforms for people to build applications and experiences on top of.

7.1 The Rush for Digital Real Estate

Virtual land—essentially 3D ad space—has taken the NFT space by storm



What is the appeal of virtual land to the average buyer?

It's largely a combination of a long-term speculative investment and the utility that digital land provides, with the former **currently** dwarfing the latter. The average consumer acquires virtual land with the hope that it will appreciate in the future once blockchain-based virtual worlds gain in popularity. For this to happen, such platforms need to provide compelling reasons for a critical mass of non-crypto-native users to join their ecosystems, which will, in turn, increase the network effects and make these virtual worlds more attractive. This isn't an unreasonable expectation, as some of the most popular games on the planet are Roblox (49.5M DAU¹) and Minecraft (141M MAU²), which share some features with titles like The Sandbox. However, it is ultimately the as-of-yet unrealized expectation of future success and mass adoption of blockchain-based virtual worlds that currently drives purchases of virtual land NFTs.



Speculation aside, what is the point of owning virtual land?

While it can be valuable for consumers of all trades—artists, celebrities, or entrepreneurs—to own (or rent) digital real estate for advertisement or creative purposes, brands stand to gain the most by establishing a presence in the metaverse. As traditional advertising channels and social media platforms grow less popular with the current young generations, creating high-fidelity, interactive experiences in virtual worlds will be a key avenue of user acquisition for brands in the future. Naturally, brands expect to convert part of the users of these virtual worlds into future clients. However, owning virtual land is a prerequisite for building such gamified experiences that consumers can enjoy. Consequently, brands will need to make use of their virtual land in the most creative of ways in order to gain a foothold in the metaverse and be embraced by the inhabitants of these digital spaces. On the other hand, failing to account for the increase in popularity of gaming and social activities inside virtual worlds will likely lead to a loss of both reputation and revenue for brands in the long term.

For example, HSBC—one of the largest investment banks in the world—bought land in The Sandbox and plans to use it to offer users educational finance games. Similarly, Boson Protocol's large land purchase inside Decentraland—which will be used to build a virtual shopping mall—hints at the future of immersive e-commerce experiences. However, the use cases for virtual land don't stop here—they can be used for anything from virtual concert halls to social gathering spaces and advertising hubs.



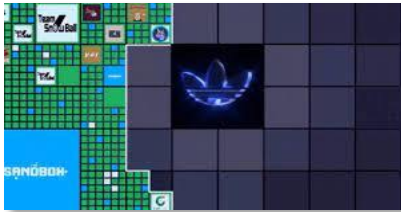
What does the future hold?

The rush for digital real estate has been initiated by Facebook's rebranding into Meta. As a result of the rebranding, prices for virtual land have exploded across prominent virtual worlds such as The Sandbox, Decentraland, or Somnium Space. Meta's name change essentially confirmed to market participants that the metaverse—like the internet in the 90s—is the next technological paradigm shift that is likely to change the future of work, play, and human interaction. As a result, buying virtual land was perceived as the best way to ensure that one is part of the future that Meta presented in the keynote speech. Though individual interest in virtual land has substantially waned in recent months, a growing number of popular brands like Adidas, Samsung, and Gucci are still eager to double down on their digital presence, given the low-risk, high-reward nature of acquiring it for brands of their size.

Digital real estate is likely to play an important role in the future of the metaverse. The network effects will grow as players are attracted by the expanding number of experiences that are being built in these digital spaces. Considering that most brands are currently only drawn to the two largest blockchain-based virtual worlds—The Sandbox and Decentraland—and given the limited supply and the need for owning several plots of land to build experiences, combined with the abundance of brands looking for a seat at the table, the competition is only likely to exacerbate in the years to come. To this end, the next page highlights some of the largest brands that have already jumped on the bandwagon of virtual land.

7.2 The Rush for Digital Real Estate

The Sandbox and Decentraland are the most attractive metaverse venues for brands



Adidas | The Sandbox



Gucci | The Sandbox



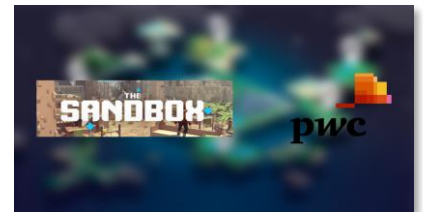
Samsung | Decentraland



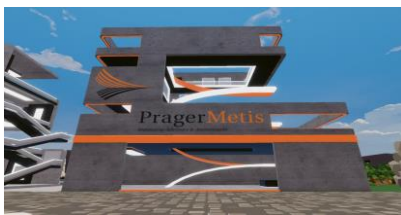
JP Morgan | Decentraland



HSBC | The Sandbox



PwC | The Sandbox & Decentraland



Prager Matis | Decentraland



Sotheby's | Decentraland



Standard Chartered | The Sandbox



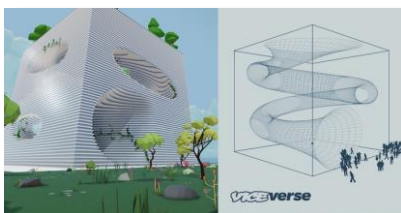
Slipknot | The Sandbox



Warner Music Group | The Sandbox



Snoop Dog | The Sandbox



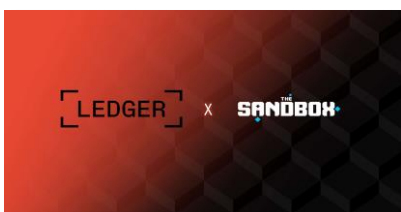
VICE | Decentraland



South China Morning Post | The Sandbox



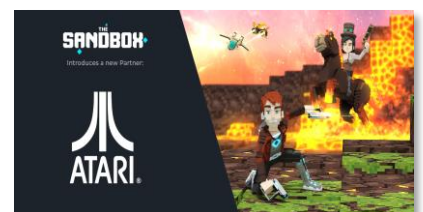
Zepeto | The Sandbox



Ledger | The Sandbox



Binance | The Sandbox



Atari | The Sandbox

8.1 An Introduction to NFT Collections

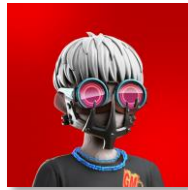
Profile Picture (PFP) NFTs are status symbols and offer revenue-generating capabilities



Moonbird
#1551



Azuki #1775



CloneX
#16911



Goblintown
4426



Doodle
#480



BAYC
#8824

What Makes PFP NFT Collections Successful?

Though in hindsight, there are certain attributes that successful NFT collections share, it is generally difficult to assess the medium-to-long term prospects of a project before launch. However, some factors to consider include:

- Track record of founders
- The art style of the NFTs
- Endorsement from popular influencers
- Mint price
- Notable partnerships
- Innovative/original features
- Community engagement over and above the financial incentives the project provides

NFT trading volume has hit \$18.3 billion in 2021,¹ up a staggering 22,300% from 2020's \$82 million.

The Appeal for PFP NFTs Originates Primarily From Three Different Sources

Social Status and Community Belonging

Social status and being part of an exclusive club are important factors when acquiring a PFP NFT, especially for—but not limited to—**celebrities and high-net-worth individuals** seeking to keep up with the latest pop culture trends. However, the networking and community aspects these assets provide are equally important for some buyers.

Advertising and Brand Building

The creative commons (cc0) status of many popular projects—most notably BAYC or CryptoPunks—provides owners with IP rights over the underlying PFP asset. Such NFTs can then be used by individuals and brands in various (revenue-generating) ways—from opening a business to leasing an NFT to interested third parties. Moreover, having a popular NFT as the face of a brand can make it easier to convert NFT enthusiasts and young consumers into clients, thus increasing the brand's appeal across this growing demographic.

Financial Incentives and Speculation

Social status aside, a substantial portion of market participants trades NFTs for the (large) profit-generating opportunities they provide. The novelty of the space allows for rampant market manipulation by NFT influencers and whales who are using their (Twitter) followers as exit liquidity. Though this tends to happen mostly with less popular projects, it is still a pervasive issue in this space. Moreover, most PFP NFTs are illiquid assets. This makes them particularly vulnerable compared to other asset classes in severe market downturns, such as the one we are currently facing. Now, not even the top NFT collections seem to be perceived as particularly safe anymore, a fact illustrated by the substantial drops in floor prices across the board.

8.2 An Introduction to NFT Collections

PFPs are only a subset of the growing NFT ecosystem

Not all NFTs are PFPs

Though PFP NFTs are usually in the spotlight due to their high selling prices, high-profile collaborations with large brands, and fervent media coverage, there are other use cases for NFTs that extend beyond that. These range from virtual land and music collectibles to digital art and utility NFTs, among others. A number of notable collections have rapidly gained popularity and have become textbook examples of what non-PFP NFTs can achieve.



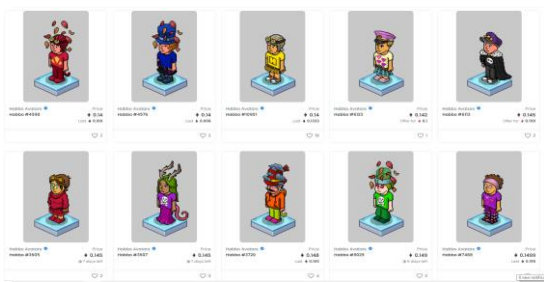
VeeFriends is a collection of 10,255 NFTs created by entrepreneur Gary Vaynerchuk.

- VeeFriends NFTs provide exclusive access to VeeCon, a yearly conference attended by keynote speakers across the globe.
- These NFTs allow owners to meet Gary Vaynerchuk in different one-on-one sessions, i.e., lunch or training sessions.
- They also facilitate community-building and allow Gary Vaynerchuk to easily engage with his most invested followers.



NBA Top Shot allows fans to own iconic moments from NBA's history.

- The moments have collectible value for fans and are NFTs that live on the Flow blockchain.
- The business model presents opportunities for other (e)sports leagues, as fans appear eager to engage with their favorite players and teams.
- The moments provide an additional, perpetual revenue stream for both the NBA and the NBPA.



Habbo Hotel released 11,600 NFTs that players can use inside the game.

- The Habbo Hotel NFTs sold out in just over 24 hours and generated over \$14 million.
- Pitched as “Your chance to own an early, nostalgic, and iconic bit of the internet”, they were created to revitalize the community around the franchise by catering to both nostalgic old-time players and the general NFT public.



Metakey is an example of the early potential of interoperability across games.

- Metakey NFTs are passes that provide owners with certain premium perks—such as VIP access, avatars, or in-game items—across a number of different experiences.
- Metakey NFTs come—for now—in four different edition sizes, each of which has a different supply. The early editions currently provide more perks when compared to the newer ones.

9.1 The Transition from NFT Collections to Global IP

The BAYC collection is the poster child of the early rush for PFP NFTs

PFP Collection of 10,000 NFTs

The Beginning

The Bored Ape Yacht Club (BAYC) is a profile picture (PFP) NFT collection created by Yuga Labs that started minting at the end of April 2021. Each picture has different visual traits with distinct rarities attached to them. For instance, the “Solid Gold” fur is much more sought out when compared to the “Cheetah” fur. Though not many NFTs were minted in the first few days, a popular NFT trader by the name of Pranksy—one of the most successful and popular NFT traders to date—made a big purchase of BAYC NFTs and tweeted about it on May 1st. The collection was then sold out within the next 12 hours.



BAYC starts as an NFT collection of 10,000 “JPEGs”.



The Most Influential NFT Project

Turning Hope into Certainty

In the weeks succeeding the mint, sales quickly picked up on the secondary market. As time went on and the BAYC ecosystem matured, celebrities like Eminem, Justin Bieber, and Gary Vaynerchuk, among others, joined the club (though some of them were gifted the BAYC NFTs), thus cementing BAYC’s status as one of the most popular NFT collections on the market. BAYC NFTs were now used as social status symbols that emphasize one’s belonging to an exclusive social organization. While meetups across the globe for community members became more common, it all culminated with the Ape Fest during NFT NYC—a token-gated suite of experiences specifically dedicated to BAYC holders.



Celebrities and high profile buyers acquire BAYC NFTs.



Globally Recognized IP

The Road Ahead

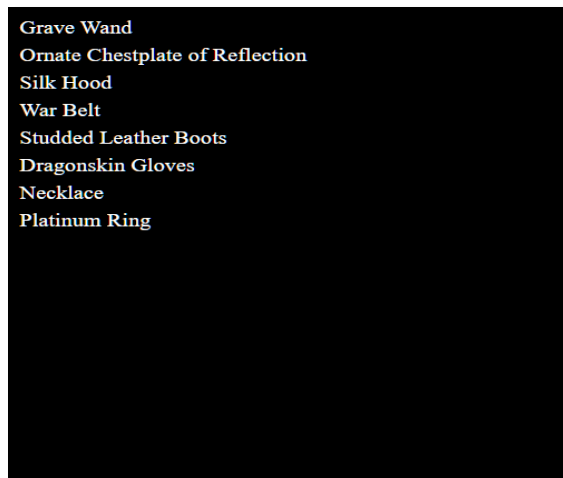
The traction around BAYC has led to Yuga Labs raising \$450 million in a recent funding series. This was shortly preceded by Yuga Labs’ acquisition of the IP rights of CryptoPunks—the second-most-popular NFT PFP collection. Part of its plans includes building Otherside—an interoperable MMORPG meant to challenge other popular virtual worlds—and growing its brand outside the NFT space. An early example of that is the virtual band featuring BAYC NFTs created by The Universal Music Group. This is possible because BAYC holders own the IP rights to their NFTs, which in turn opens opportunities for brands and consumers to integrate BAYC NFTs into their future strategies.



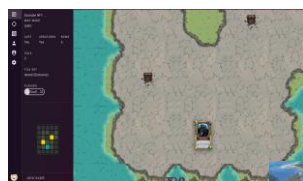
The Universal Music Group creates a **virtual band** using BAYC NFTs.

9.2 The Transition from NFT Collections to Global IP

Loot allows for the decentralized creation of completely new IP



Bag #3989, part of the Loot ((for Adventurers) NFT collection)



Crypts and Caverns: an on-chain dungeon generator for Loot.

Realms are procedurally generated maps that generate in-game resources.



Role is a collection of characters that can wear the items in the Loot collection.



Loot Mart allows owners to unbundle their items to be used or traded individually.

- Loot (for Adventurers) initially started as a collection of 8,000 NFTs and was created by Dom Hofmann, the founder of Vine. Unlike other NFT launches, Loot was a free mint—except for gas fees—and anyone with a crypto wallet like Metamask could acquire an NFT.
- Unlike BAYC, Loot is not a PFP collection. Loot NFTs are comprised of a black background featuring several lines of white text. These lines of text represent fictional items, i.e., Silk Hood, in a gamified universe that does not yet exist. Consequently, it is up to the community at large to build experiences from scratch that make use of the original NFT collection and that can expand the Loot ecosystem.
- Loot is an experiment in decentralized IP building. Unlike in traditional companies, anyone can build on top of the Loot ecosystem and increase the value of the IP while also benefiting on a personal level if Loot picks up in popularity.
- Because most projects in the Loot ecosystem are fully built on-chain, new developers can leverage the publicly available code and resources to more easily build new experiences that enrich the ecosystem as a whole.
- The Loot universe has been steadily growing since the initial drop at the end of August 2021. The vision for a truly decentralized, global IP has spawned tens of derivative projects and developer tools that each contribute to the growth of the ecosystem.
- The Loot ecosystem also features several currencies, one of which is \$AGLD. \$AGLD was created by community members and airdropped to Loot holders shortly after the project launch.
- Initiatives such as BibliothecaDAO aim to form a governing body in the form of a DAO, which is tasked with facilitating the easy inclusion of future projects in the Loot ecosystem.
- Lastly, DivineDAO plans to add an immersive, community-led storytelling layer to the Loot ecosystem.

10.1 Crypto and The Promise of Interoperability

Ethereum currently boasts the largest ecosystem of decentralized applications (dapps)

What is Ethereum? Why is it important for NFTs?

- Ethereum is a smart contract platform—or programmable blockchain—that allows for the development of dapps—these can range from decentralized exchanges and lending platforms to blockchain games and NFT marketplaces. Ethereum also allows for the development of layer-2 solutions on top of it that keep transactions secure while improving scalability and speed.
- Many of the most popular NFT collections are built on the Ethereum blockchain. Contrary to popular belief, the actual image and the metadata behind most NFTs are usually stored on IPFS or centralized databases like AWS, primarily because the cost of storing data on the blockchain is high. Subsequently, the unique digital identifier—which provides a verifiable and immutable proof of ownership and points to where the data is located—is stored on the blockchain.

What are Ethereum's limitations?

- The Ethereum network can only process around 30 transactions per second (TPS). This can lead to network congestion, slow processing of transactions, and high “gas” fees—the fees paid to miners for the work involved in securing a transaction. In times of severe network congestion, the gas fees alone can sometimes dwarf the cost of the NFT itself and can even reach three or four figures. However, the advent of Ethereum 2.0—which includes the switch to a proof of stake consensus mechanism—is likely to mitigate these issues.
- High gas fees are especially impractical when it comes to blockchain games, which should, in theory, allow for the frictionless trading of the many—relatively cheap—NFTs among the players of the game. This is the primary reason for which most blockchain games are built on layer-2s such as Polygon or Immutable X or on other blockchains—like Solana or Avalanche—entirely.

What is the difference between layer-1s and layer-2s?

- Layer-1 (L1) refers to the base layer of a network and is used to describe the main architecture of a blockchain. According to Binance Academy, L1s are protocols that allow for the processing and conclusion of transactions on the same blockchain.¹ Moreover, transactions on L1s—as opposed to L2s—can be validated without the need of another network. Ethereum, Tezos, and Bitcoin, among others, are all L1 blockchains.
- L2 solutions address some of the issues of L1s—most notably scalability and efficiency—while still enjoying the benefits they provide, i.e., security and composability. Though the validity of the transactions is still verified on the L1, L2s bundle many individual transactions and send it back to the base layer to be verified—this allows L1s to operate more efficiently as a result of the decreased number of transactions that need to be checked. Given that some—though not all—L1s can only handle a small number of transactions per second, they are inappropriate for applications—like blockchain games—that need to support large numbers of transactions.
- As opposed to being built on top of an already existing L1, sidechains are their own blockchains that are connected to the mainchain via a bridge. The main difference between L2s and sidechains stems from the fact that while the former's security is tied to that of the L1, sidechains need to ensure the security of their network themselves. To compensate for this, transactions on sidechains are generally both faster and cheaper than on L2s.

10.2 Crypto and The Promise of Interoperability

The adoption of interoperability at scale faces multiple challenges

Are NFTs bad for the environment?

- Most NFTs are created on the Ethereum blockchain—though Solana NFTs, among others, are catching up in popularity—which currently uses the **Proof of Work (PoW)** consensus algorithm. PoW encourages miners to compete in solving complex mathematical puzzles to add new blocks to the blockchain and to get rewarded with the native cryptocurrency. However, the main issue with PoW is that solving such puzzles requires a sizable amount of computational power in the form of high-end hardware, which in turn leads to **very high levels of energy consumption and carbon emissions**, not to mention the electronic waste coming from hardware that becomes outdated.
- For example, the yearly amount of electricity consumed by the Ethereum network is estimated to be equivalent to the **annual energy consumption of countries like Peru or Qatar**, according to the Ethereum Energy Consumption Index. As a result, everyone creating or transacting NFTs on the Ethereum blockchain implicitly **contributes to the high carbon emissions** generated by mining the cryptocurrency. More specifically, it is the carbon footprint of NFTs, that is, the total emissions generated by the process of creating and trading them on the secondary market, that is especially harmful. Hence, the carbon footprint of an NFT includes not only the impact of the transaction itself but also the energy consumption required to mine the ETH used to make that purchase. French artist Joanie Lemercier used a carbon calculation tool from Offsetra to determine that the release of 6 NFTs in 10 seconds would consume **approximately the same amount of energy as his studio for a period of over two years**.
- However, there is an ongoing debate on whether NFTs specifically are the source of increased carbon emissions from the Ethereum blockchain. Given that they represent a relatively small percentage of total transactions on the Ethereum network, it can be argued that Ethereum mining would continue to increase even in the absence of NFTs. For example, January 2022 - the most prolific month for NFTs to date—saw a total NFT trading volume on leading NFT marketplace OpenSea of almost \$5 billion.¹ On the other hand, over \$15 billion worth of Ethereum was traded on the 25th of April alone.²

Is interoperability feasible?

- Interoperability has been one of the most hotly debated topics when it comes to the future of the metaverse and of blockchain gaming. This is not only limited to games but also to the wider crypto ecosystem—projects like Polkadot or Cosmos aim to create a decentralized web powered by separate blockchains that can communicate with each other.
- While the ability to transfer assets and NFTs across different experiences and games might sound appealing, technical and political roadblocks are currently preventing true interoperability from becoming an industry standard. For example, game publishers need to agree on a set of shared standards that would allow assets to exist across a variety of vastly different games—while creating an asset in one game is relatively straightforward, transferring it to a title that uses a different game engine or to one where it doesn't have a functional purpose can be difficult.
- Moreover, it might not be in the publishers' best interest to foster an environment where players are encouraged to take their items out of a game's ecosystem at will since this is likely to lead to IP diffusion, copyright infringements, and arbitrage opportunities that can prove damaging to some publishers—players will buy skins and items wherever it's cheaper and transfer them to their preferred virtual world.
- If interoperability is to be achieved, brand activations might not be limited to only the most popular virtual worlds and games anymore. IP holders will partner with whoever offers the best rate while still benefiting from their branded items reaching a large number of experiences.
- Despite that, some orgs have already made great strides when it comes to interoperability at scale. For example, Ready Player Me is an avatar creator platform allowing users to explore over 2700 different apps using one consistent digital identity.

What Stands Between Us and Virtual Utopia?

Key challenges and closing thoughts



Politics & Regulations

Governments will want to control virtual worlds, and regulations may create new barriers between worlds.

E.g., in April 2020, China banned **Animal Crossing: New Horizons** after the platform was used to stage digital protests about Hong Kong.



Moderation & IP Rights

UGC spaces require strong safety and content moderation processes in place, supported by **machine learning** and **trust/safety agents**.

Furthermore, IP and copyright management will need radical modernizations to account for a myriad of new situations.



Privacy & Ethics

Metaverse activity-tracking has the potential to become far more powerful than web-tracking.

There already are certain organizations working toward an open metaverse rather than a closed one controlled by a few entities.



Accessibility & Scale

The metaverse is not yet accessible or interoperable at scale. New standards and protocols are needed.

Mass concurrency on a global scale is still a challenge, though one that increasingly more companies are trying to solve.

Today's gaming and tech ecosystems are largely split along regional and cultural lines, and the same is likely to hold true for the early metaverse. Political objectives may clash with business or consumer desires, much like they already do in gaming, for example, when India's government first banned PUBG Mobile.

Beyond politics, moderation on a global scale in an open metaverse with boundless UGC content presents a wealth of challenges, even more hazardous than those that already exist on an unmoderated World Wide Web. It may not be enough to simply have community moderators; individuals will need to take a more active role in keeping spaces safe. Imagining what metaverse "deepfakes" could evolve into, with avatar duplicates impersonating others, **it's easy to imagine how societies will struggle with evolved forms of existing challenges** like disinformation, harassment, and identity theft—the highly realistic Tom Cruise deepfake created by Metaphysic is but a glimpse into that future.¹ Similarly, privacy and ethical considerations have barely scratched the surface. We will also need to create new laws for a myriad of new situations regarding IP and copyright, such as

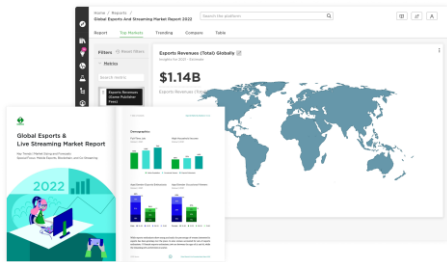
"Do the image rights that I have in real life extend to my unique avatar, even if the avatar doesn't look like me?" The potential for abuse of power in a centralized metaverse is also **non-trivial**, which is why several organizations are working to create open standards. We also need to keep in mind that, as with any new technology, the transition to the metaverse will happen gradually, and it is up to the individuals building it to do so in a responsible manner.

Mass concurrency and interoperability are immature, but new protocols are being developed, and more is yet to come. Hopefully, new standards can also open doors to more equal participation, which is likely to be driven by mobile more than anything else—though VR and AR technologies are also evolving; mobile devices and app stores are **the most global ecosystems today**, and it's hard to imagine a true metaverse that users can't access via mobile.

Finally, we expect the leading companies of tomorrow to build a solid foundation and come out stronger from this bear market. Until then, we look forward to seeing you in the metaverse!

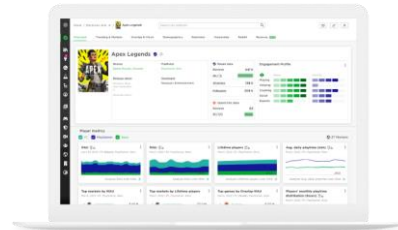
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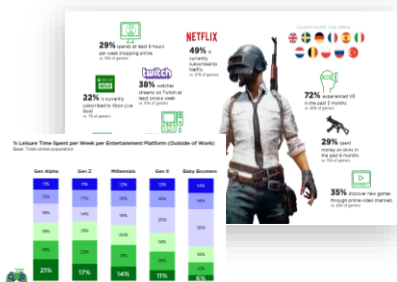
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