



Free Version

Intro to the Metaverse

Newzoo Trend Report 2021



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Understanding the Metaverse Relevance for Games

Foreword

By now, it's hard not to have become aware of the metaverse. The combination of COVID-related stay-at-home orders, which led to increased simulation of real-world activities, and the thought leadership of visionaries such as Tim Sweeney and Matthew Ball, have shined a spotlight on the virtual concepts most famously depicted in science fiction classics **Ready Player One** and **Snow Crash**.



Candice Mudrick
Head of Market Analysis

Now, there is a feeling of inevitability about the coming of the metaverse, which is also often referred to as “Web 3.0.” Although it's far from a unified concept, most would agree that **we are collectively hurtling towards greater participation in simulated worlds that are even more limitless than our real one.**

While the metaverse can feel like an impossibly “far away” concept in the eyes of many beholders, the truth is that we are already living among proto-metaverses, and the future will be here before we're truly ready for it. In this report, we aim to cover the more immediate opportunities and impacts to the gaming ecosystem, highlighting where the immediate value lies among the promising aspects of the collective concepts currently referred to as the metaverse. Ultimately, we'd like to share our own vision for its evolution, focusing on the implications for gaming.

We will briefly look at how the “metaverse” concept has evolved, dive into the reasons why it's important for gaming stakeholders to understand, and give our view on how it might evolve in the coming decade. We will also highlight NFTs and explain why decentralized infrastructure is a central part of the metaverse discussion, but a deeper dive into decentralized infrastructure is beyond the scope of this report. Most excitingly, we feature stakeholder spotlights, where we interview key players with different roles in bringing the metaverse to life. Among these trailblazers, you'll find **The Sandbox, Crucible, Hadean, PIXELYNX, Manticore Games, Mythical Games, and NVIDIA.**

Finally, we consider barriers to the metaverse, and review some of the open questions that exist today.

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Metaverse Ecosystem Diagram

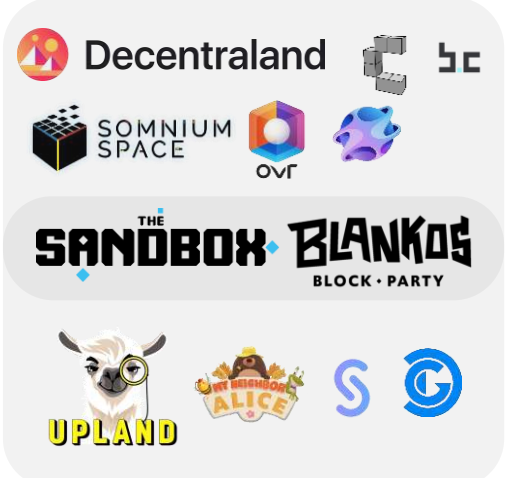
Metaverse Gateways

Centralized

Decentralized

Player-first creation
(UGC Tools)

Dev-first creation



Avatar & Identity

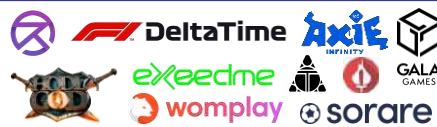
User Interface & Immersion

Economy



Social

Play-to-Earn & Play-to-Collect



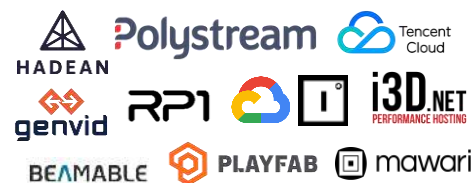
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Infrastructure

Cloud, Scalability, & Hosting

Visualization & Digital Twin

Artificial intelligence



Decentralized Infra

Adtech & Marketing

Connectivity



What Is the Metaverse?

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



We recognize the metaverse trend with respect to gaming as the growing importance of virtual (game) worlds and digital persistence in unlocking creative spaces and identities for social experiences.



Selected Definitions from Thought Leaders

a16z

Jonathan Lai
Partner

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

ROBLOX

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.

newzoo

Peter Warman
CEO/Co-Founder

A destination where people can enjoy being a fan, a player, and a creator often simultaneously, maximizing engagement and therefore business potential.



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, organization, and commercial enterprise.

<https://www.matthewball.vc>

What Are the Key Metaverse Elements for Gaming?

The metaverse features more than just virtual reality

The metaverse trend in gaming often incorporates multiple key elements

- New (social) modes of in-game engagement and behavior
- Innovations in content delivery, tech, and game design, including growth of UGC
- Rising popularity of NFTs and the concept of “persistent digital ownership”
- Merging of different game worlds and IP
- Growing importance of in-game identity and customization options
- Blending of digital and physical worlds

Metaverse concepts can improve metrics across acquisition, retention, and monetization

- Enhancing in-game experiences that are repeatable
- Adding new revenue streams and finding new business models
- Expanding reach to new audiences and even non-gamers
- Creating new reasons and motivations to play



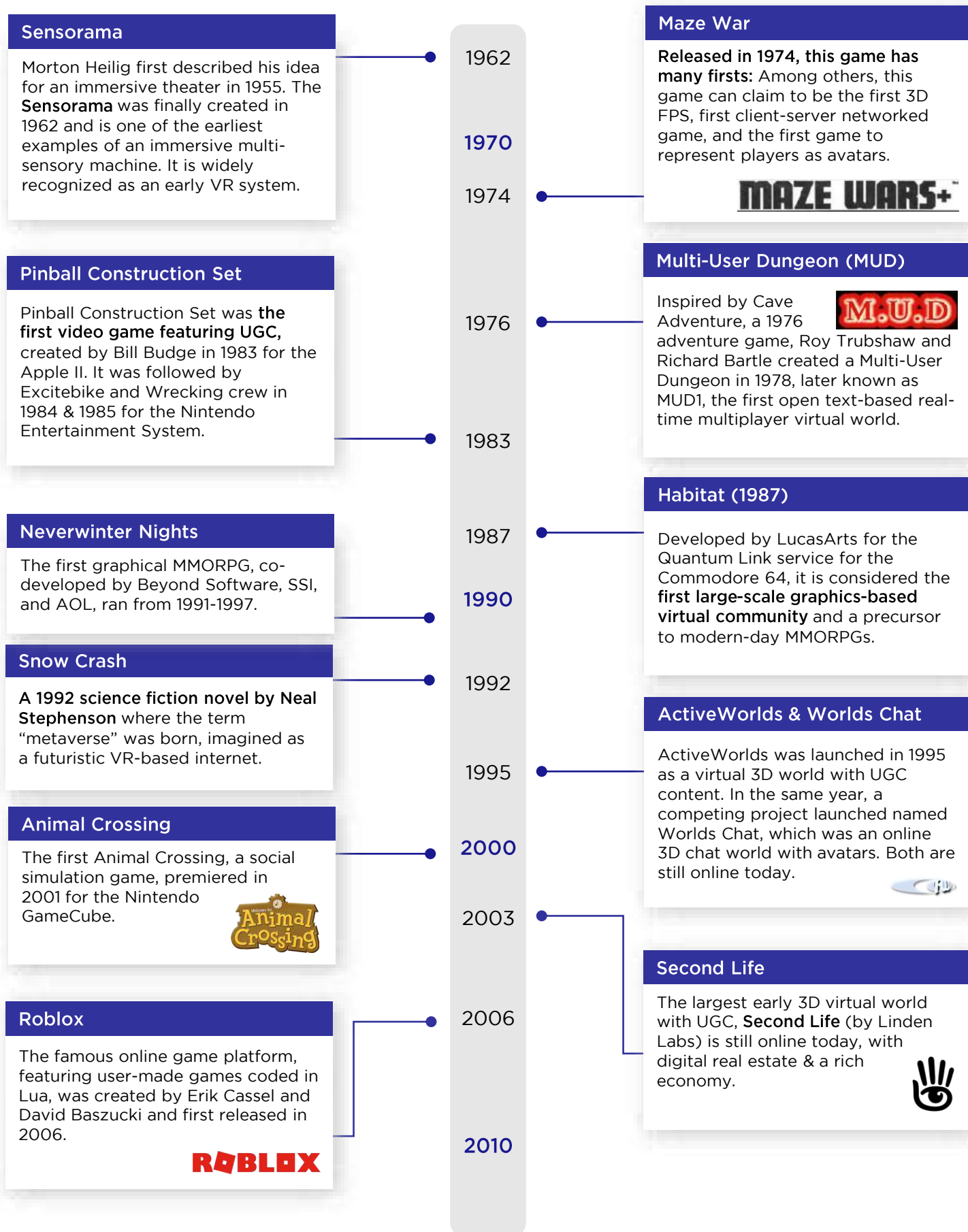


History & Evolution of the Metaverse

How key themes have developed
and the relevance to gaming

History of Virtual Worlds From 1962-2010

Milestone events in the history of the metaverse



History of Virtual Worlds From 2010-Today

Milestone events in the history of the metaverse

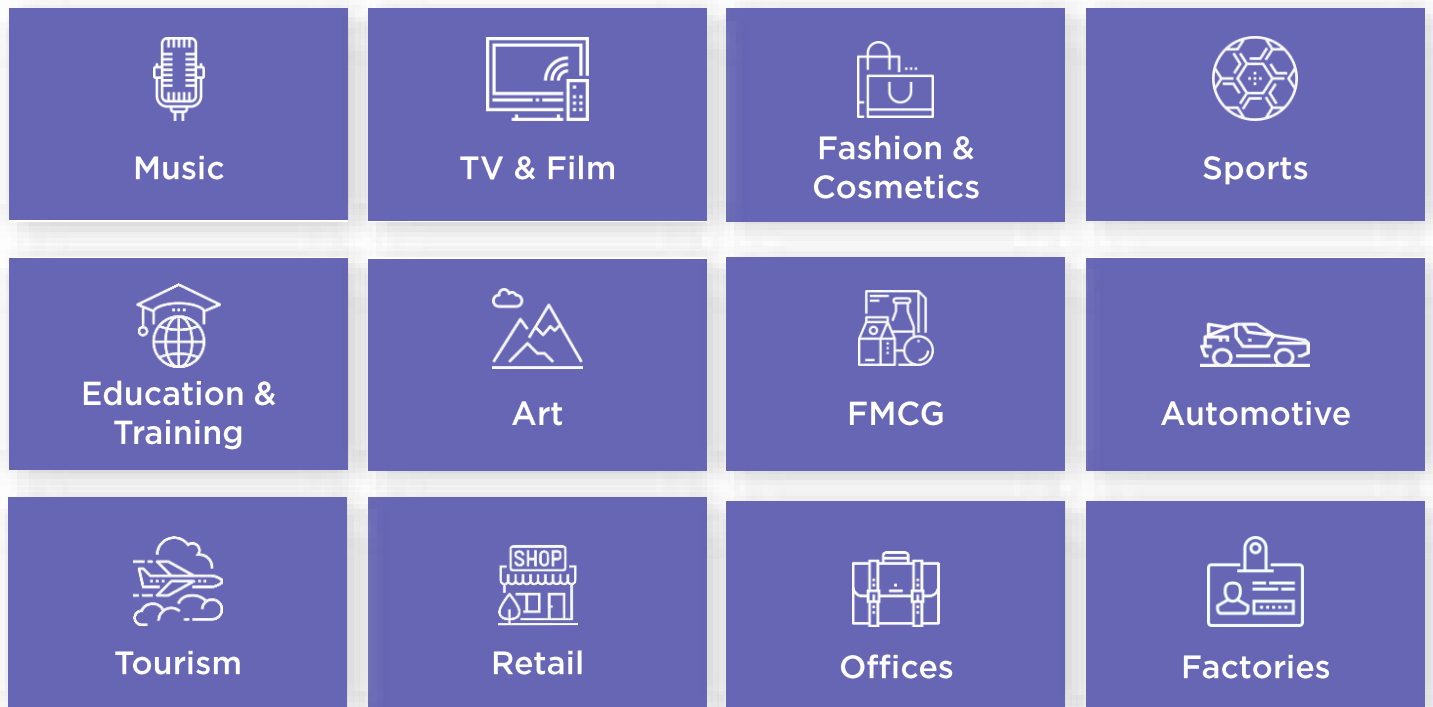


Find the complete insights in the full report

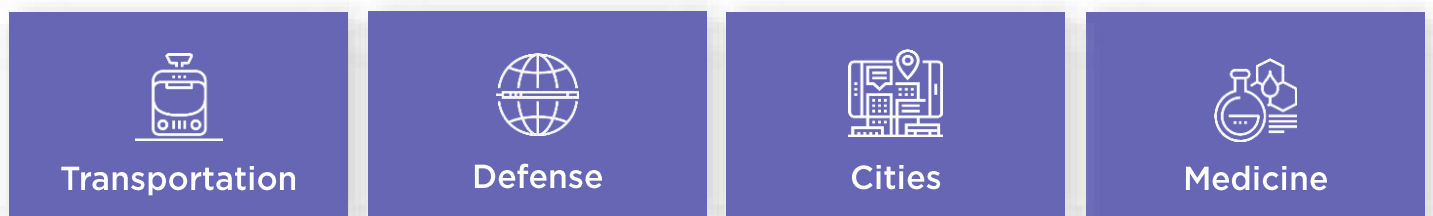
Which Industries Have Jumped Into the Metaverse First?


Eventually, every industry is likely to have a form of business opportunity in the metaverse

Early activities have centered around brands collaborating with games to give players a way to express themselves or engage with their favorite content. In return, brands receive exposure, audience expansion, and new revenue stream opportunities. However, there are also several enterprise applications that will use games or game technology as a platform.



Which industries are soon arriving?





“If web developers are the architects of the internet as we know it (Web 2.0), then game developers are the architects of the metaverse – Web 3.0.”

Ryan Gill, Crucible CEO & Co-Founder

Why Is the Metaverse Relevant for Gaming Today?

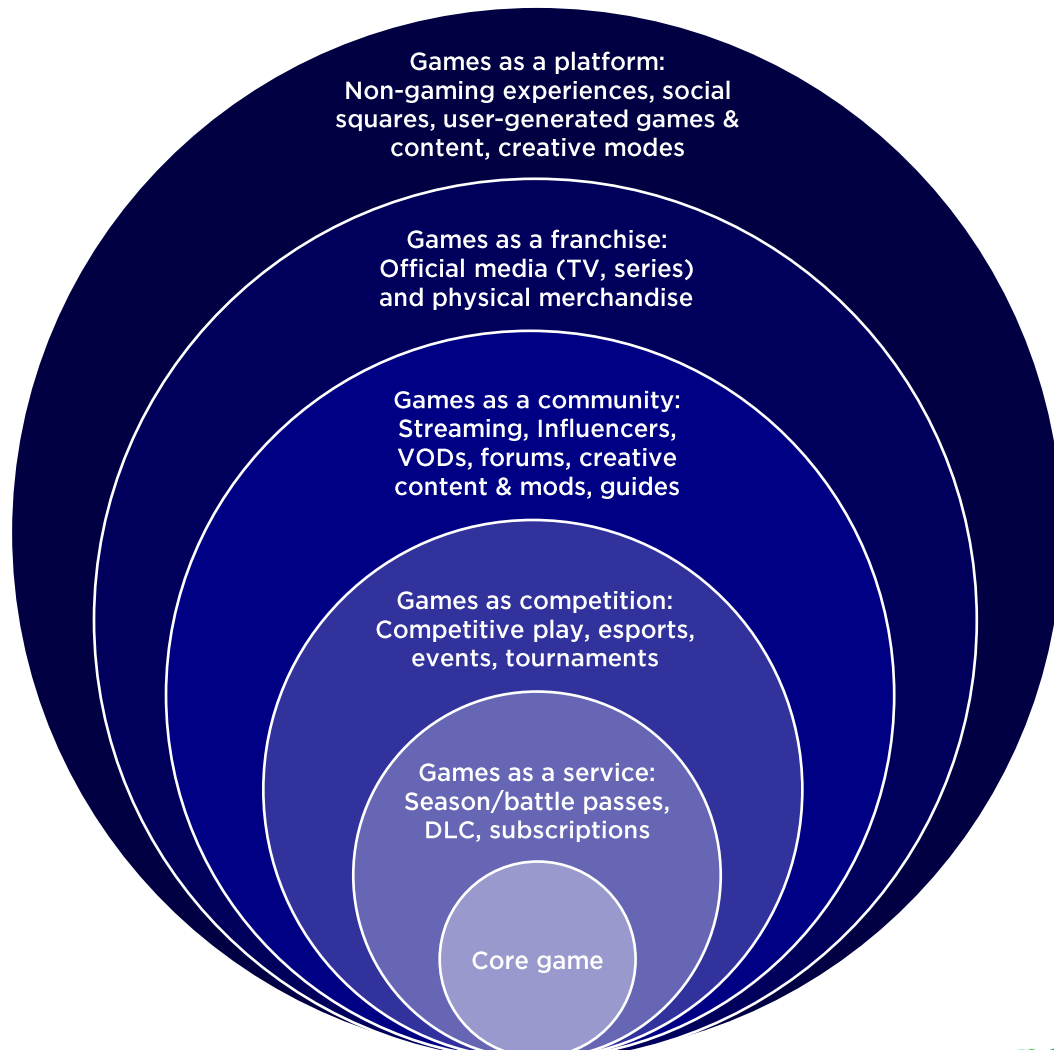
An opportunity to create new modes of engagement with players and non-players

The next big shift in gaming: from Games-as-a-Service to Games-as-a-Platform

- Gaming has evolved over the last decade to become **an experience, encompassing playing, viewing, and engaging**.
- The metaverse is the next stage which **integrates non-gaming experiences**, driven by a combination of technology and how consumers are interacting with games. This evolution allows games to become platforms where multiple stakeholders can create and capture value beyond the core product.
- Publishers are driving new experiences through these non-gaming experiences, such as **virtual concerts, virtual fashion shows, IP activations, and media/product partnerships**. The broad appeal of non-gaming experiences is powerful: things like virtual concerts can also attract non-gamers.
- Meanwhile, players are driving metaverse-like experiences by using games as a platform to **express their identity, host social events, or create their own game modes**.

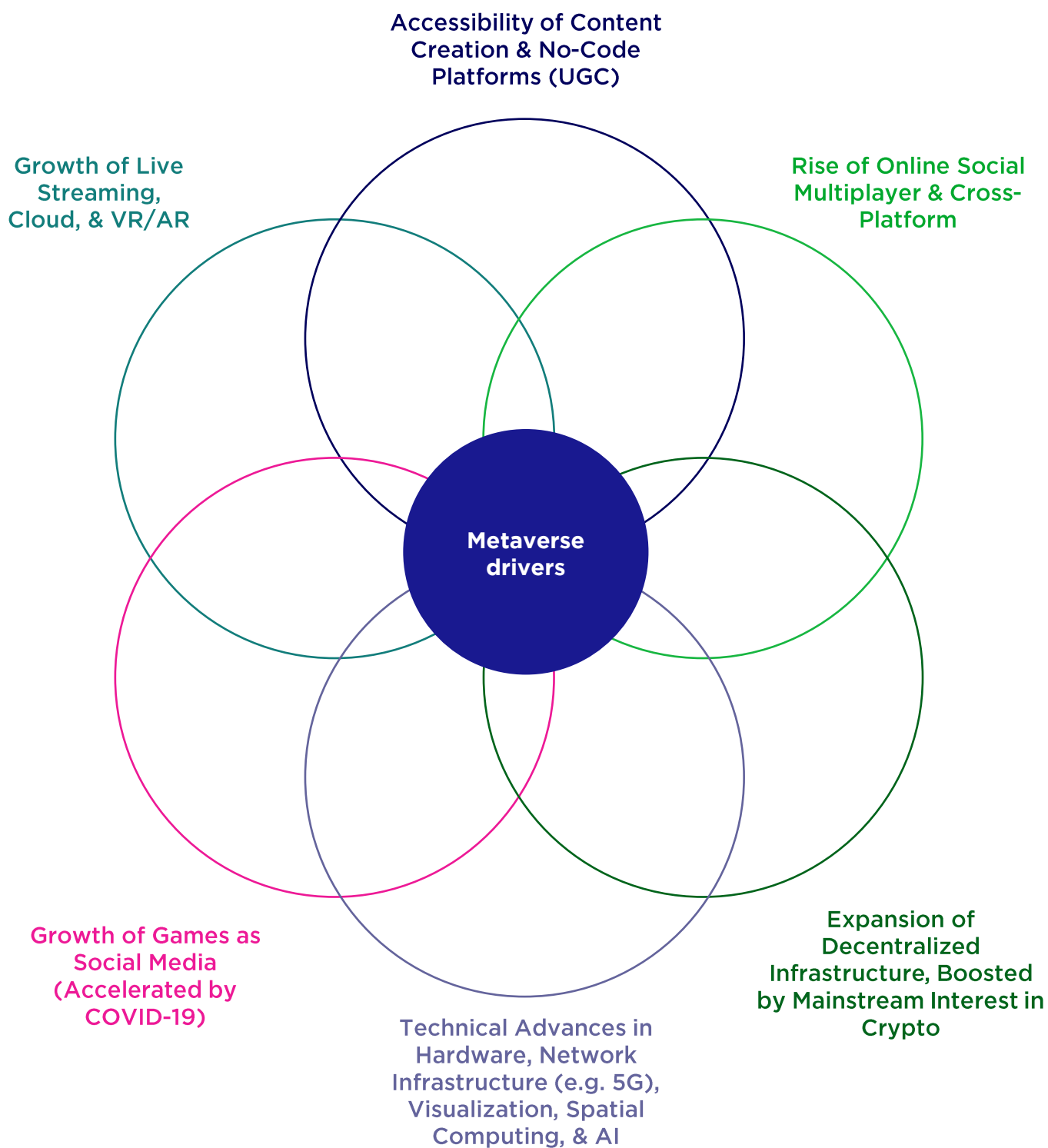
Viewing games as a simulation platform unlocks vast new opportunities, right now

- Both the long- and short-term evolution of the metaverse will see new business models, content generation, interactions, and **novel modes of engagement, with players and non-players alike**.



Together, Many Trends Propel the Metaverse Forward

Both technological and social trends underpin metaverse growth



Redefinition of Norms for Next-Gen Metaverse Games

The next decade will bring new expectations for games

The future of games is more social, more immersive, and more creative

- **Game design:** Beyond standard single/multiplayer modes, metaverse games will have creative, social, and in-game event modes designed for people to create shared experiences beyond the core game.
- **Content:** The community will have a much larger role in development, powered by AI and other no-code tools that simplify creation aspects.
- **Business model:** The metaverse will open up the economic possibilities, both inside of and outside of games. These are just some of the new possibilities:
 - **Virtual events:** Pay to attend digital concerts, talks, or other non-game events.
 - **NFTs:** Non-Fungible Tokens, or persistent digital items that can be sold/traded outside of the game
 - **Play-to-Earn:** Powered by blockchain, players can earn game rewards for contributions to the game ecosystem, which can then be exchanged outside of the game via secondary markets for real money
 - **Play-to-Collect:** Exemplified by NBA Top Shot and CryptoKitties, the collection of NFT items is a new way for players to engage with game IP and might even attract those who don't play the game itself.
 - **Pay-to-Socialize:** Monetization mechanics which are designed to encourage in-game social activities
- **Marketing:** Interruptive advertising may be harder to translate to immersive worlds, leading to growth of native ads. Native brand integrations/activations, influencers (both real and virtual), and IP will be fixtures of metaverse marketing tools. Limited edition NFT releases can help generate buzz as well.

	Past	Present	Future
Typical “default” game design	Single player stories, local co-op	Single player & competitive multiplayer	Regular game modes plus social, creative, & other non-game ways to engage
Average players per instance*	1-4	100-1,500	10,000+
Reach	Local, single platform	Online Multiplayer (MMOs); 1-3 platforms	Limitless Online Multiplayer & spectator non-players; all platforms
Content	Large game studios	Lean developers and/or player-driven	Community & AI-driven
Business model	Physical premium one-off transactions	Premium, In-App Purchases, In-App Advertising, subscriptions, licensing	Multi-stream, including digital events, play-to-earn, NFTs, & pay-to-social
Delivery model	Single content release, DLCs	Games-as-a-Service	Games-as-a-Platform
Hardware / platform	Console + high end PC	Mobile + more powerful PC/console; AR & VR	Multi-platform, mixed reality, & cloud-native
Marketing	Traditional retail, linear, large publisher partnerships	Social media-based digital advertising & performance marketing, influencers	Influencer-first (real & digital), IP-driven, NFTs, native ads & in-game activations

*in one zone, while retaining uncompromised performance

Key Themes of the Metaverse

Proto-metaverses share some of these characteristics



Games-as-a-Platform

- Increasing amount of non-game social activities happening in games: community events such as weddings, graduations, and birthday parties, but also official brand-driven events such as virtual concerts, activations, and fashion shows.
- Games replacing social media for casual connection, enabled by the enrichment of in-game social engagement features.

User-Generated Content

- The metaverse requires community-sourced creation to scale effectively. Game platforms such as Roblox, Crayta, and Core lead the trend of user-created experiences, games, mods, and worlds.
- Growth of in-game creator tools and no-code development to simplify the creation process.
- AI-assisted UGC.

Merging of Virtual & Physical Worlds

- Real places, cities, and objects that are mapped digitally 1:1 (e.g. NVIDIA Omniverse, Digital Twins).
- Virtual fashion that can be “tried on” using AR.
- Improving augmented reality lenses / glasses.
- Growth of immersion tech for virtual reality such as haptics.

Persistent Avatar & Identity

- Concept of a persistent digital identity that accumulates unique digital assets (fashion, land, art) which can be used or interacted with in various games / metaverse gateways.
- Increasing importance and complexity of digital avatars as representation in virtual worlds, with associated digital assets to match, such as pets, land, or vehicles.

Cloud & Scalability

- Large-scale persistent simulations.
- Increasing mass concurrency from 100 participants per shard/instance to 10,000+.
- Expanding accessibility and entry into the metaverse through instant-join experiences that don't require download or installation.
- Games designed without processing power limits in mind.

AI & Procedurally-Generated Content

- Rich and dynamic AI avatars/NPCs (Non-Player Characters), enabling interactivity & influencing behavior via community input (e.g., Rival Peak).
- Rapid auto-generation of maps, worlds, and other elements, especially in open worlds.
- Real-time creation and simulation/visualization.
- Hyper-realistic digital humans adapting to real-time situations and able to read emotional states.

Decentralized P2P Economy & NFTs

- Player-to-player economy and new types of virtual jobs.
- True, persistent ownership of unique digital items that can exist (and be bought/sold/traded) outside of the game (NFTs); grey markets may be replaced by official NFT marketplaces.
- Play-to-earn games and modes which enable a new earning economy.

Interoperability & Standards

- Technical standards, interfaces, and protocols that enable cross-application interoperability and make it easy to bring an item from Fortnite into Roblox, for example.
- Examples: Pixar's [USD](#) (Universal Scene Description), NVIDIA's [MDL](#) (Material Definition Language).
- Khronos Group's [glTF](#) (3D file format standard).

Why Games Work as a Platform for Other Experiences

The ever-expanding gaming ecosystem represents the perfect mix of elements for brand and entertainment collaborations

Games provide the perfect vehicle to reach highly engaged consumers

- **Live-service features:** During the last decade, post-launch support for games has become a popular business model. With consistent updates, gameplay balancing, and an evolving game world, games are already built to nurture audiences receptive to experimentation and new content.
 - **Mainstream penetration among a deeply engaged and hard-to-reach audience:** Games have grown to become a bigger business than other entertainment sectors. Especially with younger audiences, games have become completely mainstream; at the same time, this same audience is hard to reach through other traditional advertising methods or linear entertainment.
 - **New game-native brand integration with authenticity:** It has historically been challenging to include brands in games in an authentic and non-intrusive way. With platform games, the players are here for the shared experience – which the collaborations have become a part of.
-



Find the complete insights in the full report

Digital Identity Is More Than Just a Customized Avatar

A robust metaverse will need digital credentials, much like a passport or driver's license, to unlock access to a variety of services

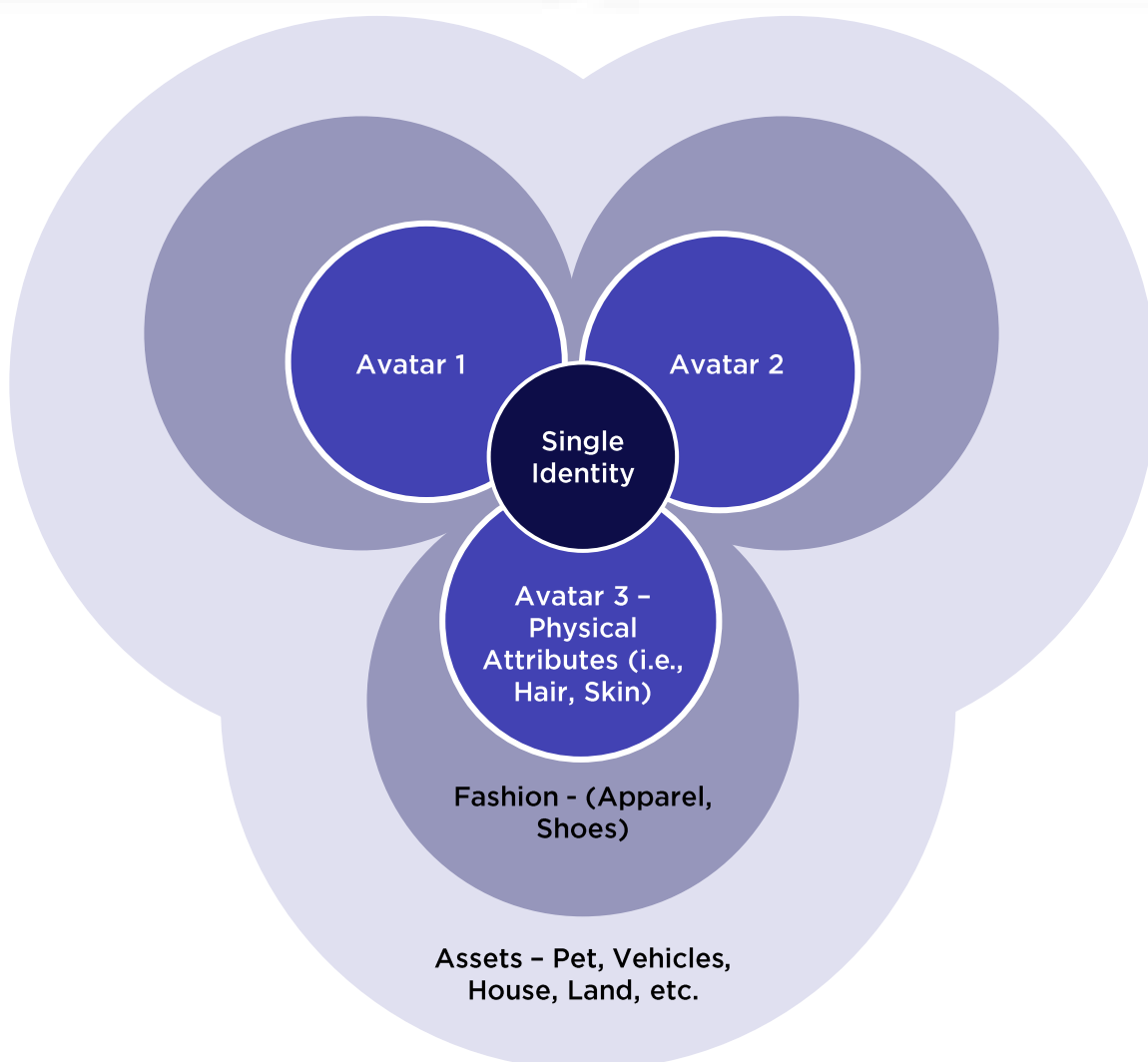
Gamers already value their in-game representations greatly, as demonstrated by the universal popularity of in-game cosmetics. But beyond the expansion of customization options and the blurring of virtual and real selves, the identity trend is also about a growing interest in the idea of a persistent interoperable and decentralized digital identity, often referred to as Self Sovereign Identity (SSI). **Crucible** is one of the key orgs working to bring open avatar standards and SSI to life in gaming—see interview on p.56.

Single Identity, Multiple Avatars

- The **Self-Sovereign Identity** movement aims to protect user privacy through decentralized identifiers (DIDs), which can be thought of as **digital passports**.
- DIDs can verify identity & ownership between two parties without needing to reveal detailed personal information or having that information stored (and therefore accessible) on a centralized server.
- **Ready Player Me** has an avatar system that can be integrated with virtual worlds & game engines. Users can create one or multiple 3D avatars to be used across games as they travel through the metaverse.

Self-Expression Beyond Avatars

- Metaverse citizens will be interested in **more than just their avatar**. Games following the metaverse trend are expected to let players own and customize assets as well, such as pets, vehicles, houses, or real estate.
- Aside from avatar-based assets, several orgs are pursuing **virtual apparel** for your real-life self, to be “worn” using Augmented Reality (AR) or simply collected and viewed gallery-style.
- Influencers can also use avatars to interact with fans. **Genies** has partnered with many artists who use avatars for promotional activities or fan interactions.







In-Game Events & Platform Possibilities

Virtual concerts, brand collaborations & more

Top 10 In-Game Concerts by Live Hours Watched

Combined engagement from live and on-demand viewership demonstrates the expanded reach beyond those attending the event

Rank	Event	Game	Date	Artists	Live Hours Watched  	VoD YouTube* Views
1	Astronomical	FORTNITE	4/23/20 4/25/20	TRAVIS SCOTT	16.2M	181M
2	Party Royale Premiere	FORTNITE	5/8/20 5/9/20	DILLON FRANCIS	11.9M	3M
3	Llama-Rama Kaskade	FORTNITE	3/26/21 3/27/21	KASKADE	6.3M	376K
4	Lavapalooza	MINECRAFT	8/14/20 8/15/20	Several artists	6.6M	147K
5						
6						
7						
8						
9						
10						



Find the complete ranking in the full report

* Data up to May 26, 2021, from the top five most-viewed YouTube videos of the event combined.

In-game concerts are some of the most engaging metaverse events, which can drive viewership across several social platforms

- According to Epic Games, the **Travis Scott Astronomical Fortnite** concert drew nearly 28 million unique players who collectively attended the event nearly 46 million times, meaning many players attended more than once. The performance posted on Travis Scott's official YouTube channel has exceeded 150 million views, demonstrating the reach possible beyond attendees and beyond gamers.
- Based on the music research and analytics tools Soundcharts and Viberate, Travis Scott received 1.4 million new followers during the event across Instagram, Facebook, Deezer, Spotify, and Soundcloud. During the Astronomical event, his music on Spotify was streamed 81.9 million times.
- As part of Roblox's attempt to reach an older audience, the game hosted a Lil Nas X concert, garnering over 33 million unique players. Mike Guthrie, CFO of Roblox, stated that the usage among players age 13 and older doubled after the concert, and now the demographic (age 13 and older) accounts for 44% of DAU (daily active users).

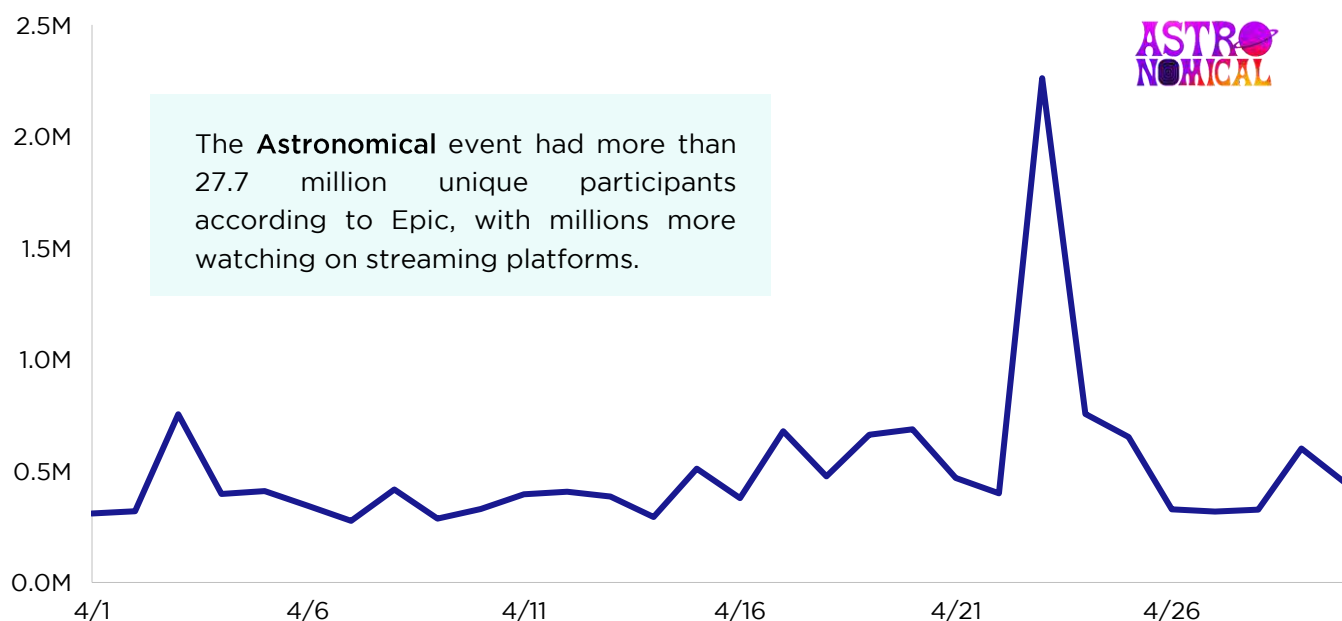
Games Offer Unlimited Creative Content Possibilities

Games are now seen as a blank canvas for all types of activations

The Astronomical Impact of Travis Scott

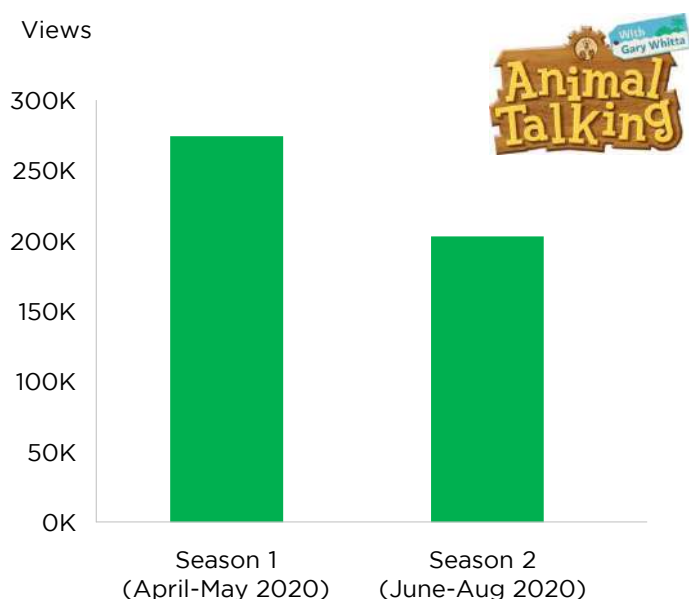
Peak Concurrent Viewers in April 2020; YouTube & Twitch Combined

FORTNITE



Animal Talking Viewership

Video views on YouTube*



Animal Talking, a talk show simulated using **Animal Crossing: New Horizons**, was a charming late-night TV “show” created and hosted by **Gary Whitta**, which featured famous guests such as actor **Elijah Wood**. The viewership for the first season reached over 459K live hours watched on Twitch, and 274K VoD views on Gary Whitta’s YouTube Channel.

Despite the audience decrease in Season 2, episode seven of the second season featuring **Selena Gomez** (who even had a musical performance) accounted for almost 40% of the total views, indicating that viewer interest was primarily driven by famous guest appearances more than anything else.

* Data up to May 26, 2021. Combined views of Animal Talking episodes on Gary Whitta’s [YouTube Channel](#).

Avakin Life & Zepeto Are Key Mobile Platforms for Brands

Both Gen-Z apps are pioneering the mobile metaverse space



Avakin Life is a social simulation platform launched in October 2013 by Lockwood Publishing. According to the company, Avakin Life has over **200 million downloads** and 1.3 million daily active users. Lockwood develops all assets & worlds, unlike other platforms like Roblox. Tencent led a \$25M investment into Lockwood in Nov 2020.



Zepeto is a creator-powered social game/app developed by **SNOW Inc**, a subsidiary of **NAVER**. In May 2020, the company reported **150 million registered users**. Zepeto, like Roblox, features 3D virtual worlds and items powered by creators. There are also several social-focused features, including an Instagram and TikTok-like functionality where users can create their own videos and animations featuring avatars.



Avakin Life is a social metaverse gateway with a heavy emphasis on customization. Users can decorate their avatar with over 30K items (with several official brand collaborations), explore different settings, build and decorate houses, and interact with players from all around the world. In-game events are also common, such as the **Blasterjaxx** concert in August 2020, pictured left.



Find the complete insights in the full report

Events Also Create Opportunities to Localize Content

Knives Out resonated with a Japanese audience through Nogizaka 46



Find the complete insights in the full report

Avakin Life Grew its Brazilian Audience Through Events

The mobile social simulation platform can draw crowds larger than Coachella

O Boticário Event Drove Avakin Life Downloads

Downloads on App Store & Google Play in Brazil*



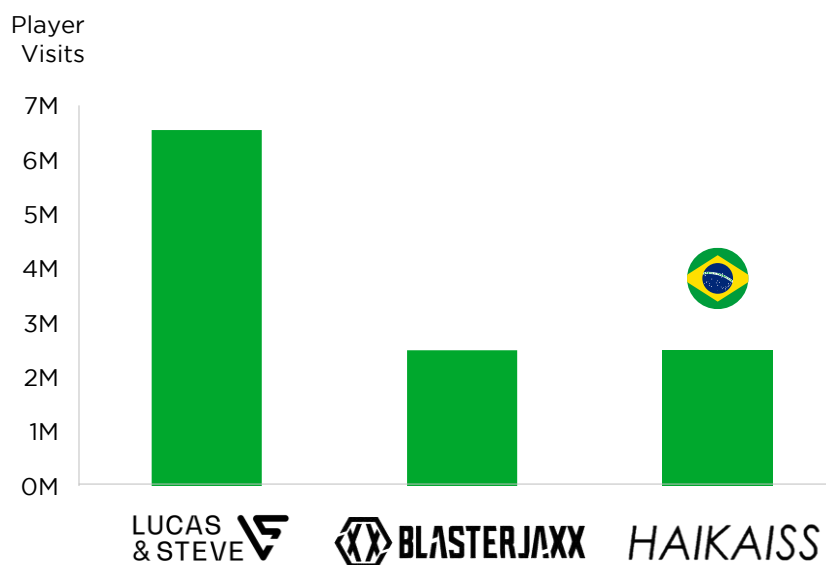
O Boticário, a top Brazilian cosmetics brand, held a 5-week activation with a virtual store within Avakin Life. In total, 2.3 million unique players engaged during the event.

The launch event ran Feb 16-22, 2020. On Feb 20th, Avakin Life reached the highest number of downloads for the entire year of 2020 in Brazil, which is one of the strongest markets for Avakin Life.



Avakin Life Virtual Concerts

Event Visits in the Game (can be multiple per player)



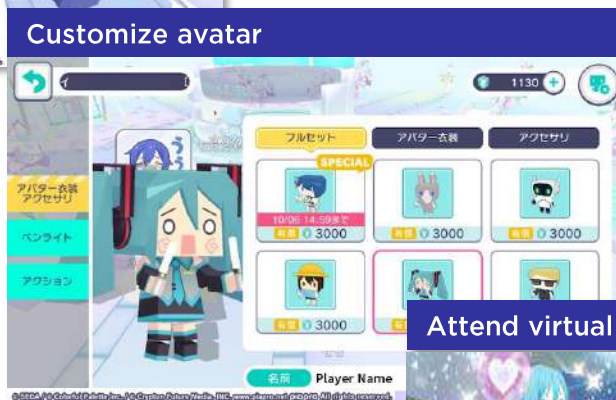
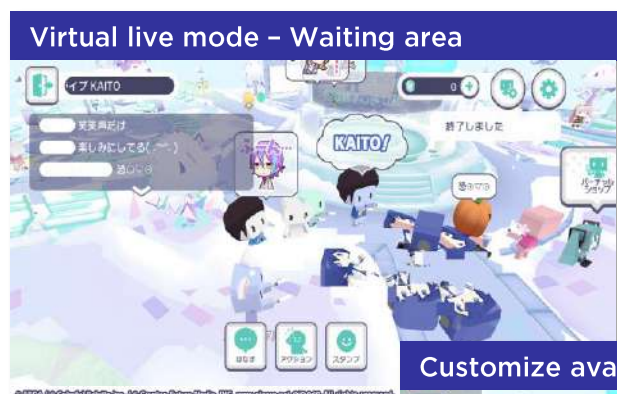
*Source: Lockwood Publishing

In May 2020, Avakin Life closed a partnership with the Brazilian company Som Livre for the broadcast of the first virtual concert by a Brazilian rap artist, Haikaiss. The in-game show, which was available until May 17, 2020, saw 2.5 million visits, according to Lockwood.

In total, 980k unique visitors attended the Blasterjazz event in August 2020, and 1.58 million unique visitors attended the 3-day Lucas & Steve event in Dec 2020, reaching audience sizes that rival those of the largest real-world concerts ever held.

Project SEKAI: COLORFUL STAGE! feat. Hatsune Miku

The Japanese music game features repeatable “live” virtual concerts



Variety of ways to express and socialize


ライブを盛り上げよう!

他のプレイヤーと一緒に、色んな応援ができるよ!



- **Waiting area:** Players enter either a private room with their real/in-game friends or a randomly picked room and can interact with each other, thereby chatting, sending stamps, and taking actions till the live event starts.
- **Customize avatar:** Avatars are customizable via IAP, and the wide configuration in avatar skins, accessories, penlights, and actions stimulate players' desire to stand out.
- **Attend virtual live:** Players enjoy the animated virtual live event with others, cheering the virtual singers by using penlights, actions, stamps, and items.

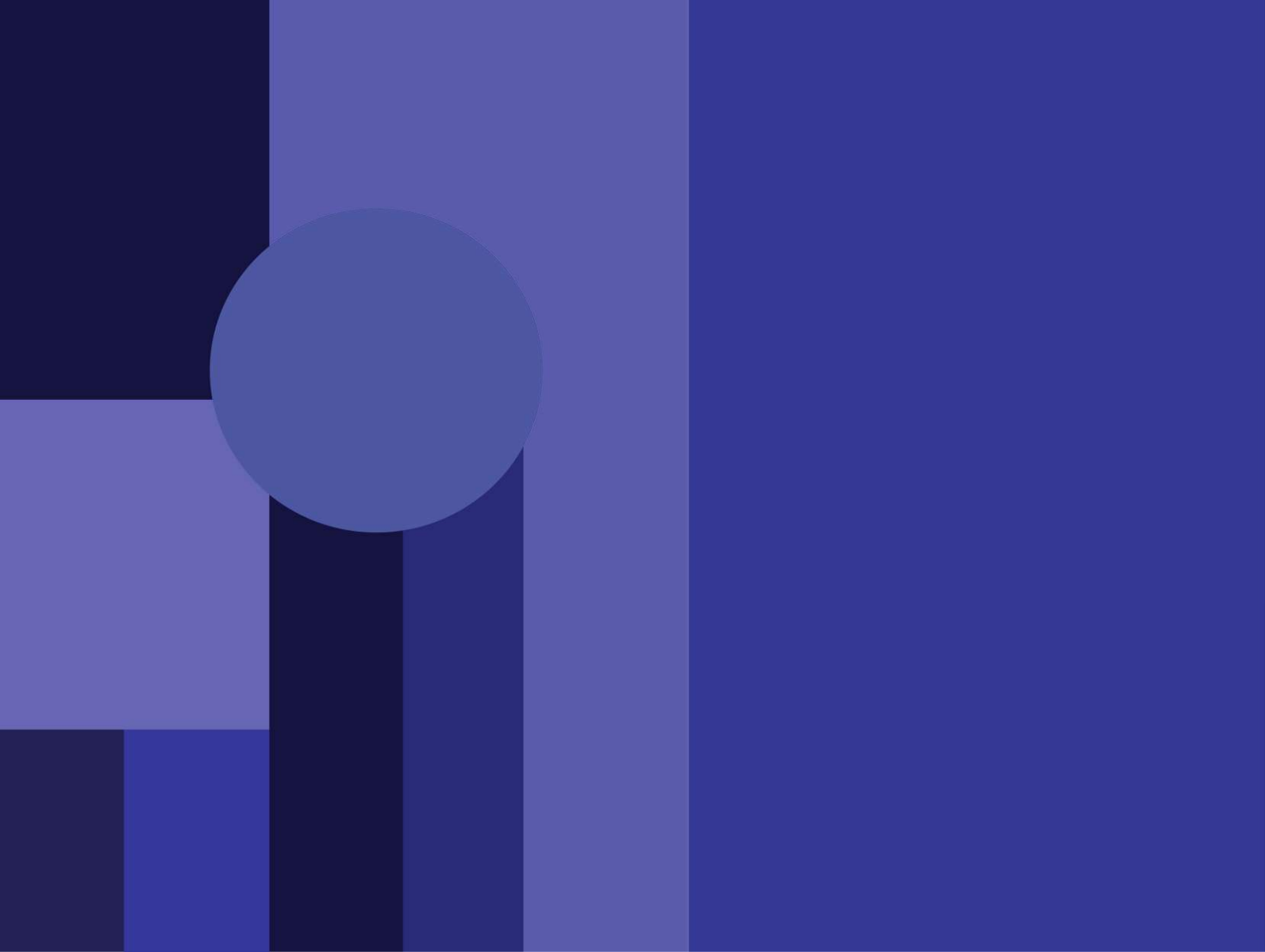
- Project SEKAI: COLORFUL STAGE! feat. Hatsune Miku is a mobile music/adventure game cooperatively developed by Colorful Palette, Craft Egg, and Sega. The game was published in September 2020 exclusively in Japan.
- The game offers an extensive story with full-voice narrations and rhythm single/multi-gameplay featuring Crypton Future Media's popular virtual singers, such as Hatsune Miku and Kagamine Rin.
- Besides its main music/adventure mode, the game has a **Virtual Live** mode where players can attend in-game music live events of favorite characters, regularly held at designated times.
- Regular real-time virtual live events provide players with a place and reason for players to gather for sharing a fun moment.



“As we look at the metaverse, whether in the context of video games or more broadly, we need to focus on inclusion and representation that is reflective of the world and society today.

Designers of the metaverse should include people who are Black, Latinx, Asian, female, LGBTQ, and those physically challenged to ensure inclusion is at the foundation of the metaverse. We should be thoughtful and purposeful about creating a metaverse that is a welcoming place for all.”

Stanley Pierre-Louis, President and CEO of the Entertainment Software Association (ESA)

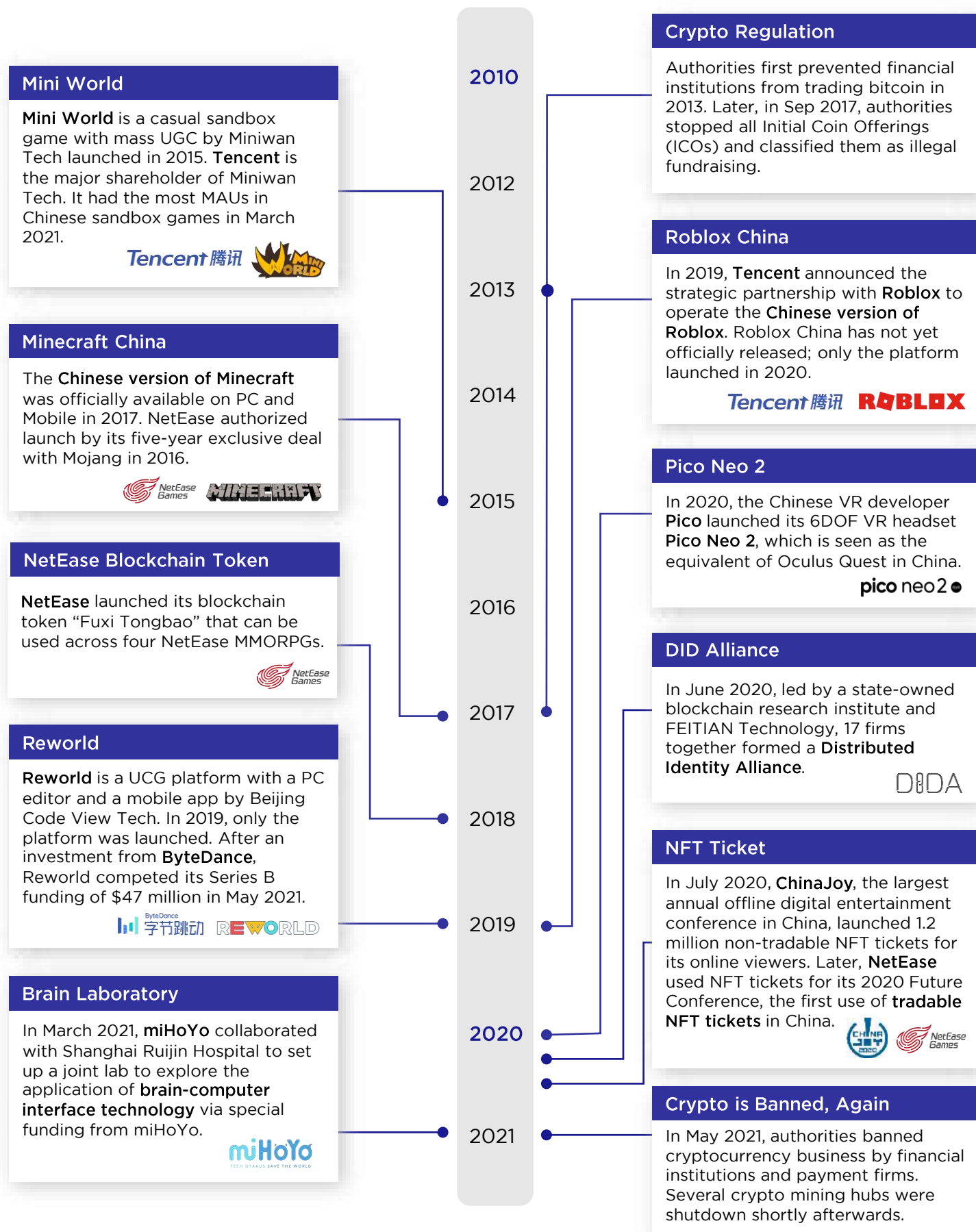


China's Metaverse

Similarities and differences with
the West

History of the Metaverse in China From 2010-Today

Milestone events in the history of the metaverse



China's Metaverse Will Evolve Differently

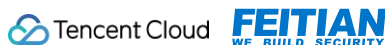
Decentralized infrastructure is not a requirement for development



At the **Tencent Annual Game Conference 2021**, Tencent's vision for the metaverse featured heavily. Tencent's vision can be interpreted as "**Super Digital Scenario**," which is an alternate term to describe the "early" metaverse trends seen today. This includes the blurring of boundaries between real and virtual worlds through expanded content, social interactions, and increasing offline activities. In fact, Tencent is placing greater emphasis on offline events than is seen in the West, launching the **Super Digital Scenario Co-development Project** that aims to provide players immersive game experiences in offline activities.

Distributed Identity

In 2020, 17 firms, including cyber security-leader **FEITIAN**, state-owned **Blockchain Technology Research Institute**, **Tencent Cloud**, and **Baidu** formed **Distributed Identity Alliance (DIDA)**, aiming to build an **interoperable** DID network to protect privacy during the account verification process—meaning third parties can only access the data they requested. Importantly, DIDA plans to adopt international standards to create a bridge from China to international alliances.



Metaverse Interest is Growing

Both Tencent and NetEase have invested in "metaverse" titles like **Mini World**, **Avakin Life**, & **IMVU**. Tencent is working on several sandbox games like **Ylands**. The Chinese version of **Roblox** was officially introduced during the **Annual Game Conference 2021**. But due to China's policies, UGC editors are limited and companies must closely monitor content. Roblox China currently focuses on education activities and encourages UGC through competitions, such as the **Roblox National Awards**.



Challenges

User content generation is more difficult in China given the tough restrictions. Instead, Tencent can produce metaverse content through **reusable game modes, live-ops, and IP collaborations**, leveraging its investments in popular TV and film IP. It may also take longer for high-fidelity immersive metaverse experiences to come to China, because local game companies' expertise lies in mobile, rather than in AAA PC/console development. China's metaverse focus will **surely be mobile-first but cross-platform** supported.

Blockchain Developments – NetEase More Likely Than Tencent to Use Blockchain in the Metaverse

China has issued multiple bans against cryptocurrencies: in 2013, 2017, and 2021. This suggests that Chinese authorities are **not likely to approve decentralized currency in the short term**. However, that's not to say that blockchain and NFTs have no place in China's metaverse longer-term.

There is a huge grey market for games in China, which Tencent fights due to the impact on game operations. In April 2021, Tencent sued DD373, one of the largest game trading platforms, for \$6.2 million. Nevertheless, it's difficult to prevent all illegal activity, especially on ecommerce platforms like Taobao. In contrast with Tencent, after fighting grey markets, NetEase built its own official trading platform **Treasure House (CBG)**, where players trade game assets with real currency while NetEase takes a commission. Theoretically, NFTs could further facilitate secondary market activity. Plus, NetEase is no stranger to blockchain, with several blockchain experiments and even its own currency, "**Fuxi Tongbao**," which acts as a cross-server asset standard, interoperable across NetEase MMORPGs. In 2020, NetEase used tradeable NFT tickets (a first in China) for its **Future Conference 2020**.

Meanwhile, Tencent can achieve its metaverse without decentralized infrastructure. Although it is a member of the DIDA, Tencent can theoretically achieve high **interoperability without decentralized infrastructure because the Tencent ecosystem itself already covers most verticals in the game and tech services industry**. In fact, in 2002, Tencent launched a **virtual currency Q Coin** used for in-game purchases. It soon became widely accepted as online "fiat money," used for several non-game goods and services, until the government intervened in 2009 to limit its use.



Consumer Insights: Metaverse

Understanding what the metaverse
means to consumers

What Does the Metaverse Currently Mean to Consumers?



Custom Consumer Insights from Newzoo

To get a consumer perspective on potential engagement, interest, and use cases for the Metaverse, we conducted around 5,500 surveys spread evenly over four key markets (the U.S., China, Japan, and the U.K.).

We asked current players of video games for their views (the audience that is expected to be first to jump in), but also those who do not currently play. We learned what consumers want to do when they get involved, and whether it would impact their likelihood to play in the future.

A significant challenge was to present concepts to consumers in a way that we could be sure they'd understand in as equal measure as possible. The term 'metaverse' itself was replaced by a description related to using game and game-like worlds for socializing and as a creative platform, and activities and assets were presented clearly (but also neutrally) and in terms of real-life activities and transactions that consumers can relate to. We also want to ensure that we were not simply recording increased engagement with social-gaming content during COVID-19 lockdowns (we cover that story amply elsewhere!), so while we touch on current metaverse-like activity, much of the content was about future interest and behavior.

The findings presented are an excerpt from the full Intro to the Metaverse report, available to Newzoo Global Games Market Report subscribers now!



Headline findings

Consumers are enthused by the idea of the metaverse: response to the overall concept is overwhelmingly positive, and all ideas are good ideas at this point.

There is an appetite to get involved: Many are already using gaming as a social platform (that is, joining game worlds to meet friends and hang out, rather than play). There is also high potential interest in doing so in the future.

Enthusiasm varies by market: The response in China and the U.S. is generally more positive than it is in the U.K. and Japan. There are also some demographic variations— younger consumers tend to be more positive.

The metaverse will likely encourage consumers to play (even) more games: Most consumers expect that jumping into the metaverse will increase the amount they play. What is more, a significant proportion of non-gamers want to get involved, and this group indicated that the metaverse would encourage them to play more games in the future.

The metaverse will be evolutionary, not revolutionary, when it comes to social get-togethers: Consumers are most interested in doing things in the metaverse that they often do in real life. The metaverse is less about forming flash mobs than it is about meeting friends and family to hang out (in a virtual space).

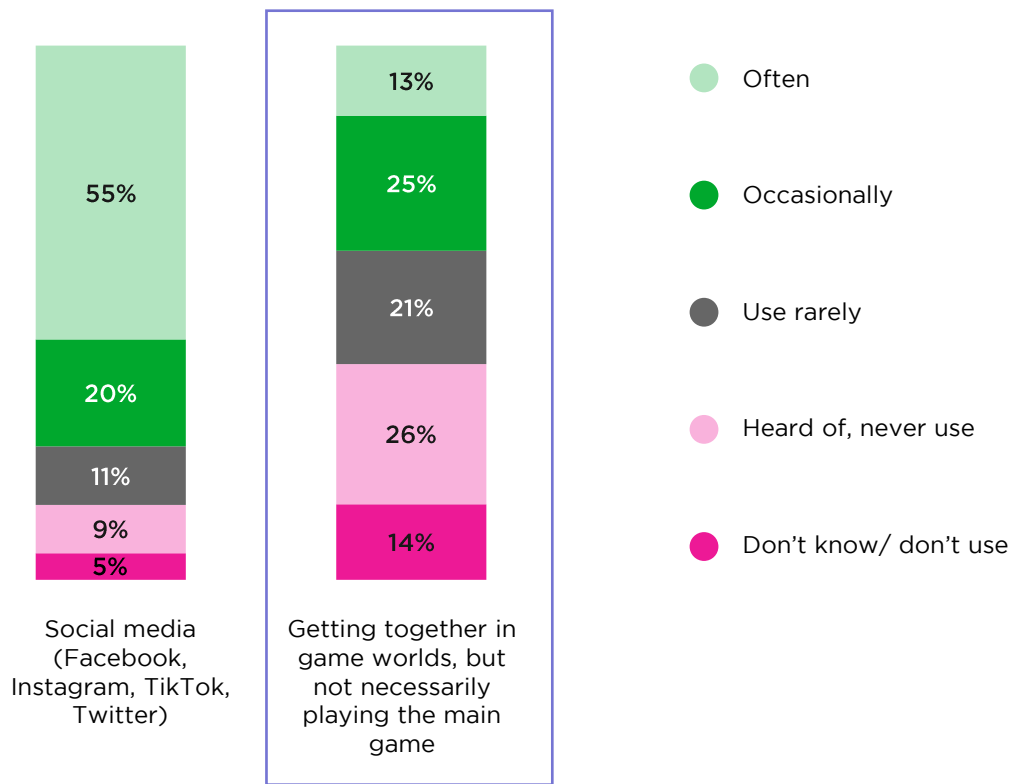
Current Engagement With Metaverse-Like Activities

Awareness of metaverse-like gaming activity is high, and usage reasonably so.

Current engagement with traditional social media & social get-togethers in game worlds (consumers aged 14 – 50)

As would be expected, game-world hangouts do not yet come close to the ubiquitous usage of traditional social media, although reasonably high numbers say they are using them, nonetheless.

13% of gamers say they often join game-worlds for a social rather than a gaming need. This is distinct from Multiplayer in that players will often just socialize instead of play the main game together.



It is nearly **twice as common for under 18s** to do this compared to over 35s.

In terms of market differences, when it comes to either occasional or frequent usage, **engagement is more common for consumers in China (53%) and the U.S. (34%)** than it is for those in the U.K. (27%) or Japan (23%).

Current and Potential Interest in Metaverse-Like Activities

Potential future interest is generally high.

Potential interest in socializing in game worlds (markets) (consumers age 14 – 50)



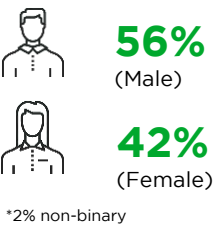
Do you think you will [socialize in game worlds, including just hanging out in the game world, chatting to people, sharing or watching content, attending in-game concerts, events, or playing mini-games] at all in the future?

- No, definitely not
- No, probably not
- Not sure
- Yes, probably
- Yes, definitely

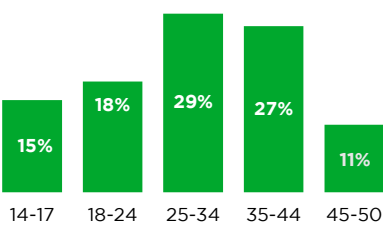
Find the data in the full report

Demographics (those probably or definitely interested)

Gender*



Age



Platforms Used



Who Is Interested and How Is Gaming Affected?

Potential interest is higher amongst current gamers, but metaverse-like activities also appeal to reasonably large number of consumers who are not currently playing.

Potential interest in socializing in game worlds (players and non-players)

(consumers age 14 – 50)

Do you think you will [socialize in game worlds, including just hanging out in the game world, chatting to people, sharing or watching content, attending in-game concerts, events, or playing mini-games] at all in the future?

● No, definitely not ● No, probably not ● Not sure ● Yes, probably ● Yes, definitely



Find the data in the full report

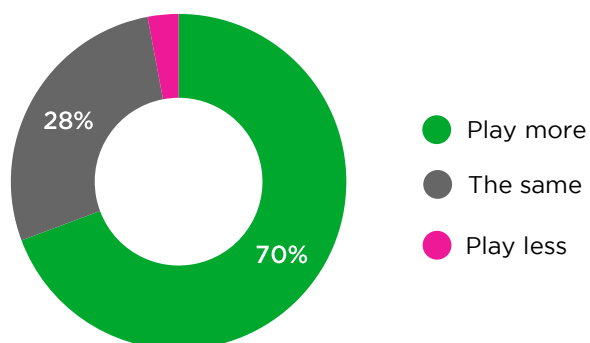
Expected effect of socializing in game-worlds on the amount consumers play

(consumers age 14 – 50)

While almost all non-gamers indicate a likelihood to play games in the future (77%), the intent rises (to 86%) when they also show interest in game world hangouts.

This suggests the metaverse can be a catalyst to encourage even more consumers to play or return to playing games.

This is supported further in direct questioning, where the vast majority (70%) expect in-game-world hang-outs to increase the amount they play.



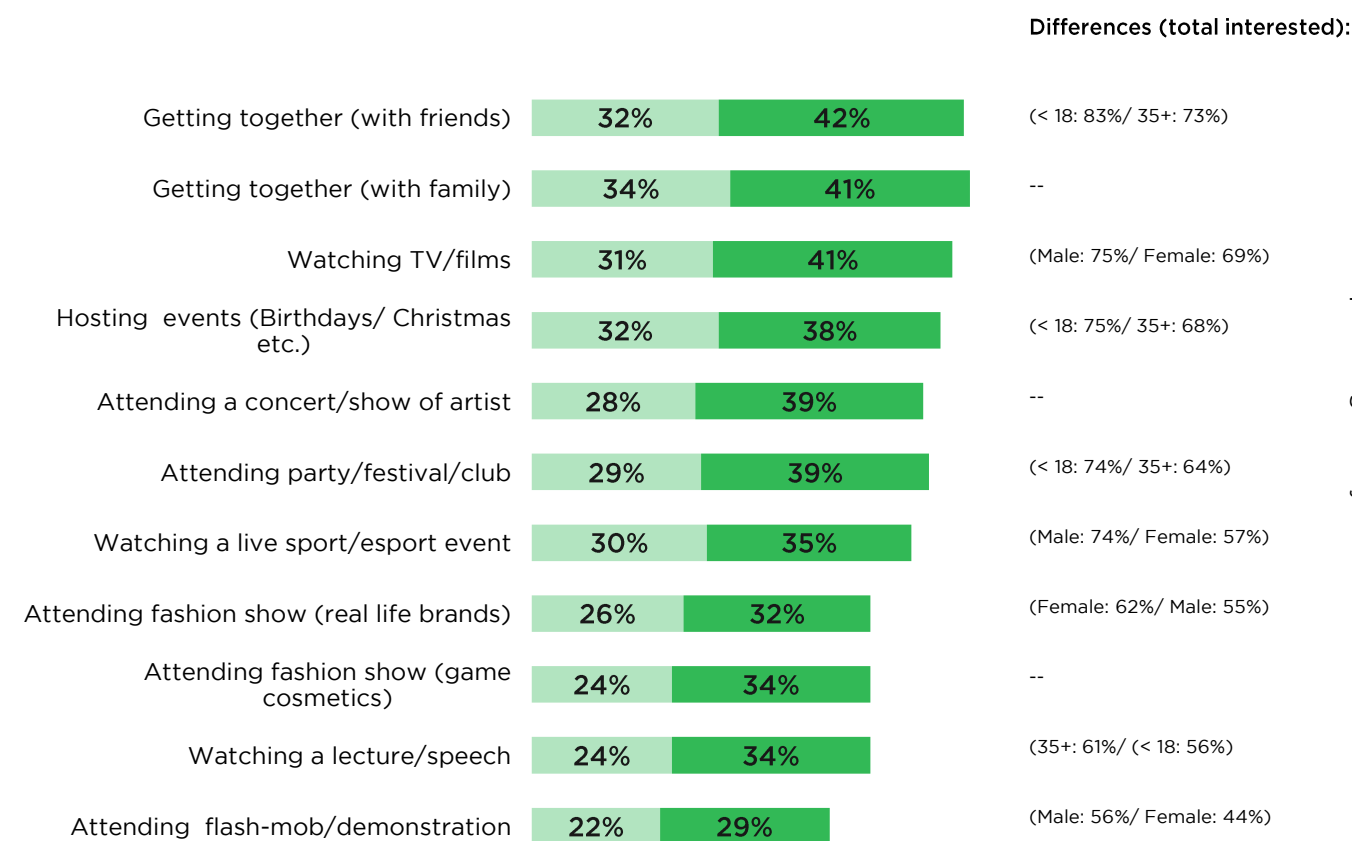
If you were to start socializing in game-worlds, how would it affect how much you play games overall?

What Do Consumers Want to Do in the Metaverse?

Consumers are enthused by all the metaverse might offer, even if they tend to be most keen to do things that are common in their real lives.

Metaverse activities of interest

(consumers age 14 – 50, who are non-rejectors of socializing in game worlds)



Consumers in Japan are generally less interested in all activities.

Please say how interested you might be in [activity]

Interested Very interested

What Features Do Consumers Want in the Metaverse?

Ideas, features, and benefits of the metaverse are met with similar degrees of enthusiasm by consumers—all ideas are good ideas. The possibilities still need time to develop in consumers' minds.

Metaverse features and benefits

(consumers age 14 – 50, who are non-rejectors of socializing in game worlds)

Ability to choose your avatar's physical appearance	5.32
Free content funded by advertisers & sponsors	5.26
Ability to create content for other players (cosmetics, art, mini-games)	5.23
Ability to jump from one game to the next without leaving a game world.	5.22
Special credits so you can buy items in one game, and take them into others	5.22
Access to player created content (cosmetics, art, mini-games)	5.20
Ability to buy decorations/ pets for your avatar's house	5.18
Ability to buy outfits for your avatar to wear	5.11
Ability to watch movies, or TV shows whilst in the game world	5.08
Ability to buy real-life products whilst in the game world	5.07

How good or bad do you think each of the following content and features would be, in terms of your overall enjoyment? [Mean score out of 7]

**Note: Both gamers and non-gamers are included in consumers*

Are Consumers Looking Forward to the Metaverse?

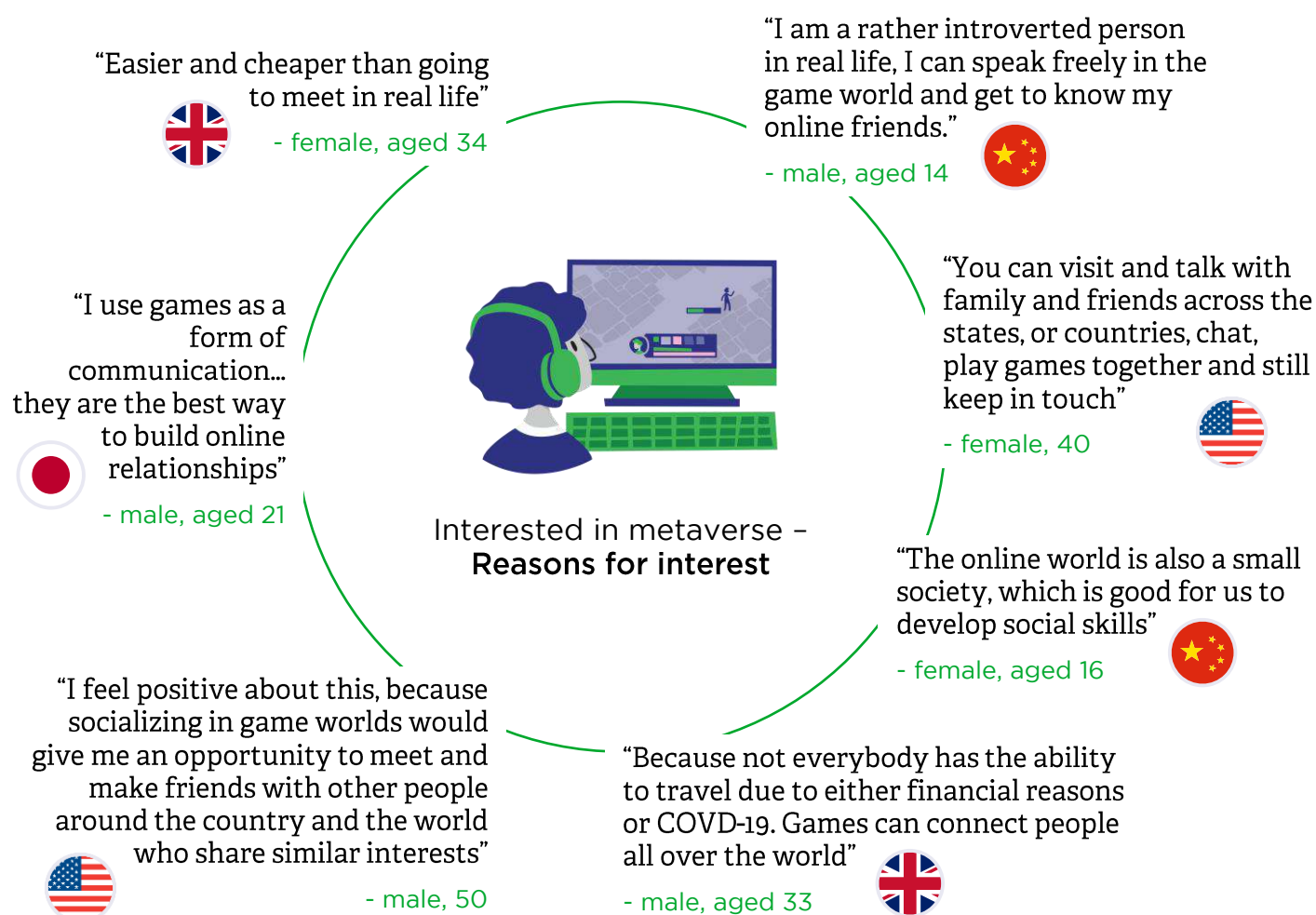
Consumers are overwhelmingly positive about the idea of the metaverse, and are excited by the opportunity it presents for socializing and community building.

Positivity about the idea of the metaverse, and the things it might offer

(consumers age 14 – 50, who are non-rejectors of socializing in game worlds)



Find the data in the full report





Understanding NFTs, Play-to-Collect, & Play-to-Earn

Why Non-Fungible Tokens are
part of the metaverse discussion

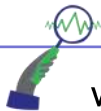
NFTs Enable True Digital Ownership and Cross-World Asset Utility



What is an NFT?

In simple terms, a **Non-Fungible Token (NFT)** is a unit of data stored on a blockchain that certifies the uniqueness and ownership of digital assets.

In other words, NFTs are a kind of digital “certificate of authenticity” for unique digital items that are secured / verified by blockchain tech. Today’s most popular NFTs include (digital) art, collectible cards, fashion, and virtual land. The surge of interest in NFTs is sowing the seeds for the metaverse foundation and evolution.



Why are NFTs important to the metaverse?

Until recently, players **did not have a way to truly own their in-game items**, characters, or aliases; instead, these assets were technically “licensed” for use to the player. Most items and cosmetics in mainstream games are limited to one game and have no value or existence outside of that game. As an example, a mount obtained in **World of Warcraft** cannot be used in another game such as **Minecraft**. If there isn’t an official in-game trading/auction system, and sometimes even despite having one, secondary “grey” unofficial marketplaces often pop up where players can trade or sell items. This is often done despite violating the game’s T&C, and gamers put themselves at risk for being scammed (fraud is quite common) or banned. However, the demand for player-to-player trading is so strong that grey markets thrive despite the risks.

Enter NFTs, which disrupts this system by allowing players to claim full, undisputed ownership of in-game assets. NFTs create a legal way for digital assets to retain value and be used not just in one game, but in potentially several games, and even outside of a game. This aligns closely with the metaverse ideal of identity and ownership that exists **between** games, not just inside individual game silos.



What is the impact to games today?

NFTs open the door to legal secondary market activities, which have further downstream implications. True digital ownership could boost engagement & spending levels within games. If players believe their digital item investment can retain value outside of the game, it might encourage additional spending.

Furthermore, players may place more value in an NFT versus a normal “Rare” item because it is truly “theirs.” In contrast to regular “Rare” items, which any gamer can obtain with enough effort (the scarcity is artificial / uncapped, determined by players’ luck in loot boxes), NFTs open the door to more unique, one-of-a-kind items (the scarcity is real / capped, determined by blockchain ownership), and importantly, **a history of ownership**. This has powerful implications for esports: imagine “owning” the unique cosmetic previously used by **Faker** in a game-winning **League of Legends** tournament. Another possibility is that persistent items can potentially be used (and take different forms) across *several* games, depending on the developer support.

While many games will not implement NFTs overnight, there are several experiments ongoing among a variety of publishers, and the long-term implications of **true digital ownership** are exciting to consider for games, the metaverse, and esports.

More About NFTs

Understanding the trend



What is Play-to-Collect?

In 2017, **Dapper Labs** released **CryptoKitties**, a decentralized collectibles game built on Ethereum. Featuring digital cat NFTs that can be collected, bred, and resold, the game would become an inspiration for other collectible “games.” **Dapper Labs** would later go on to create **NBA Top Shot**, which created NFT collectibles using video clips of memorable NBA gameplay moments.

These games, while not having gameplay in the traditional sense, are examples of how NFTs can inspire the growth of a new category of playing: **Play-to-Collect**. This is not a new phenomenon; for example, CS:GO has developed a following that primarily loves to trade skins for profit (on secondary markets). Though **CryptoKitties** and **Top Shot** moments don’t have utility today beyond collection, there are other NFTs that can and do have utility in games.



Can NFTs be implemented alongside a regular game economy? What is the process?

In principle, NFTs (both pure collectibles and usable items) can bring increased monetization opportunities for developers:

- Attract new high-value users and monetize those who want to engage with the IP not by playing but through **Play-to-Collect** items.
- Increase the **Average Revenue per User**, assuming that players will spend more for truly unique and truly owned items that can retain value longer term, and have proven capped scarcity.
- Charge “**entry fees**” to bring other developers’ NFTs into a game.
- Collect **transaction fees** (via smart contract) on secondary market activities between players.

The “How” & The “Where”: First, developers need to decide whether they want to develop a structure and contract for minting and selling NFTs themselves or whether they prefer to use third-party services. Doing the former can be expensive, because it requires new organizational capabilities that most traditional game studios do not have. Choosing to work with a third-party full-service platform simplifies the process, but there is less control over it as well—the developer would need to rely on the service provider for authenticity, which could potentially be called into question. There are reports of artists who have had their work minted and sold without their permission because the NFT system currently doesn’t require someone to own the copyright before minting it. For those that do decide to use a third-party service for minting and selling, the next choice becomes *which* service and marketplace to use.

The “What”: The next step is to decide on the type, number, and frequency of NFTs to be minted. As an example, there will only ever be 90,601 plots of virtual land in **Axie Infinity**. Given that a primary NFT stems from scarcity, a high supply implies lower average value. The easiest way to implement NFTs is to keep them separate and offer collectibles based on the IP outside of the game, with no in-game utility, much like CryptoKitties or Top Shot. However, this can be low-engagement and hold lower value for players, in comparison to NFTs that have utility (such as ones that can be used or worn *within* the game). Best practice would be to build an NFT strategy starting from conception into the fundamental game design, but it does increase design complexity as developers doing so need to balance both traditional game development and the management of a token economy.

The “How Much”: Developers will need to decide on the price of their NFTs and how they sell –e.g., via bidding or fixed price. They can also consider adding a transaction fee to secondary market activities.

Regardless of whether minting NFTs is a one-time or recurring event, introducing tokenomics will surely impact the player ecosystem. While a game economy flooded with NFTs might make them worthless and uninteresting to the players, too few might create a feeling of unfairness among players, fostered by the feeling the game’s token economy is non-inclusive and only available to high-value users.

What is Play-to-Earn?

Similarities and differences with other crypto games



What is Play-to-Earn?

Play-to-Earn is a blockchain game model where players earn assets in the form of tokens or other rewards that can be used in the game or traded in an open market. In exchange for helping to grow the gaming community, players are rewarded with cryptocurrencies while playing. **Axie Infinity** and **Ember Sword** are decentralized games employing the Play-to-Earn model. In **Axie Infinity**, the blockchain economic design is used to reward players for their contribution to the ecosystem, and players earn AXS tokens through skilled gameplay. While Axie is a game, it also acts as a social network and job platform, even famously **attracting some communities in the Philippines who used it to generate income** during the COVID-19 pandemic.



Differences between CryptoKitties (Play-to-Collect) and Axie Infinity (Play-to-Earn)

CryptoKitties and **Axie Infinity** are decentralized applications built on Ethereum. They both offer players the ability to collect, trade, and breed virtual pets that they can exchange for cryptocurrencies: cats in CryptoKitties and fantasy creatures called Axies in Axie Infinity. These digital pets are NFTs, each with unique colors, abilities, and rarities, and there's even a complex breeding system in both as well. However, **this is where the similarities end**. In a way, Axie Infinity is an evolution of CryptoKitties. While CryptoKitties only allows players to trade and collect cats, embodying **"Play-to-Collect"**, Axie Infinity also encourages them to **form teams of three Axies each and fight other players or AI-controlled Axies** for a chance to win Smooth Love Potions (SLP), the native cryptocurrency of the game. In other words, **Axie Infinity introduces the Play-to-Earn concept, in which users can earn real money by simply playing the game**. Whereas in CryptoKitties the main attraction is that of collecting and reselling cats, Axie Infinity builds on that and allows players to utilize their Axie NFTs as both a type of capital that can appreciate and as a vehicle for regularly generating new income.



What is the difference between gold farming and Play-to-Earn?

Gold farming is a long-standing practice of acquiring in-game currency while playing a massive multiplayer online game (MMO) such as **WoW (World of Warcraft)**. Players can later sell their in-game currency for real-world money, typically "illegally" in secondary or grey markets. Grey markets for games like WoW have flourished, with players keen on spending large amounts of real money in exchange for in-game items, despite the many risks involved.

Games like Axie Infinity present users with a similar concept: players can engage in PvP or PvE battles and receive loot in the form of SLP if they win. However, there is a vital difference. SLP, as opposed to gold in WoW, **is itself a cryptocurrency that, apart from being used to breed new Axies, can also be legally bought and sold on exchanges like Binance for real money**. Therefore, transacting SLP on 3rd party exchanges is **perfectly legal and bears none of the risks that are present when trading in grey markets in games like WoW**. In short, Play-to-Earn models allow players to easily convert in-game earnings to real money safely. To do that, users are only required to own a digital wallet in order to store and transfer SLP to crypto exchanges. Play-to-Earn games like Axie Infinity offer players a **source of legal income** while also encouraging them to use part of their earnings to acquire stronger in-game assets (like Axies) that can further augment their earnings in the future. For publishers, Play-to-Earn can help unlock more revenues from gamers in growth markets.

Addressing Common Questions About NFTs

Crypto stuff is too complex. Why should a developer bother with NFTs?

- Decentralized ownership is sowing the seeds of a new era of gaming, where players will be able to own, collect, and trade their items outside of games and across games. **All else equal**, users will likely grow to prefer games in which they can own a part of that universe. Ultimately, real ownership confers **more benefits to users**.
- In the future, NFT compatibility might be an attractive feature for players searching for new games. Subsequently, the absence of NFTs might have consequences in terms of player engagement, the height of a game's revenue success, and the theoretical maximum audience reach. As a result, **if NFTs become a consumer expectation, developers who seek to maintain a strong market presence might be indirectly forced to adopt NFTs**. Doing so relatively early and actively experimenting now might grant game studios an expanded player base from the get-go and a first-mover advantage over competitors in terms of technological know-how.

What happens to IP rights and licensed or branded items?

- The rights associated with buying and selling NFTs generally differ across asset types, platforms and games. Nevertheless, NFTs generally grant buyers **ownership of the token itself, and not the underlying IP rights** that are still held by the IP owner. It's possible that some NFTs would be limited to one game to simplify IP agreements, removing some of the benefits of NFTs in the first place.
- In many cases, NFT owners can use their tokens for personal purposes, without having the right to use them for any commercial endeavors other than trading. Thus, **most NFT owners are prohibited from making derivatives** based on the original work, distributing copies or reproducing and selling any derivative NFT for which no IP rights are owned. However, developers need to make these rights explicit to limit the number of potential infringement issues. They can do so by specifying terms in the smart contracts that both parties must agree to before a transaction occurs. Trademark registrations should also be extended to cover NFT collections.

Why would a developer want to let players bring others' items into their game?

- Developers can charge a "commission" fee for bringing an item into a game, much like a corkage fee to bring your own wine bottle to a restaurant. Initial sales of NFTs currently generate the largest revenues for developers, though this may change in the future. Given that studios can take a commission on each NFT transaction on the secondary market, wide-scale adoption would lead to more trades and hence to more royalties, thus opening a **new revenue stream**.
- NFTs can act as a new user acquisition method. People who play to collect that were not previously part of a game's universe are now likely to emerge as a new category of gamers and an important revenue provider.
- By introducing NFTs, developers may increase engagement. Players in games like **World of Warcraft** spend hundreds of hours to farm gear and mounts they merely license. Having full ownership of in-game assets that retain value outside of the game can prompt users to dedicate even more time and effort towards their favorite games. With ownership comes attachment and greater implied value.

What about the "high gas fees" and slow transaction process?

- Due to Ethereum technology limitations, there are a limited number of transactions per second (TPS) that can be processed. This can lead to network congestion, slow processing of transactions, and high "gas" fees, which are fees paid to miners for the work involved in securing a transaction. Today's NFT transaction process requires a lot of computing energy to process each stage of the lifecycle, and the extra gas fees alone can sometimes dwarf the cost of the NFT itself. However, this will certainly change in the future as more scalable blockchain solutions that allow for higher throughput are being developed and improved upon—it's important to remember that **decentralized infrastructure is still young**.

The Environmental Impact Should Also Be Considered

Today, NFTs and blockchain are massive power consumers. However, there are “greener” options and more efficient tech is on the way.

How do NFTs impact the environment?

- Most NFTs are created on the Ethereum blockchain, 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. For instance, a Nyan Cat NFT inspired by the famous GIF was sold for 300 ETH earlier this year. In this case, its carbon footprint included not only the impact of the transaction itself but also the energy consumption required to mine the 300 ETH. French artist Joanie Lemerrier 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**.

Electricity consumption

2017-2020 | Studio Joanie Lemerrier



Source: Joanie Lemerrier

The Environmental Impact Should Also Be Considered

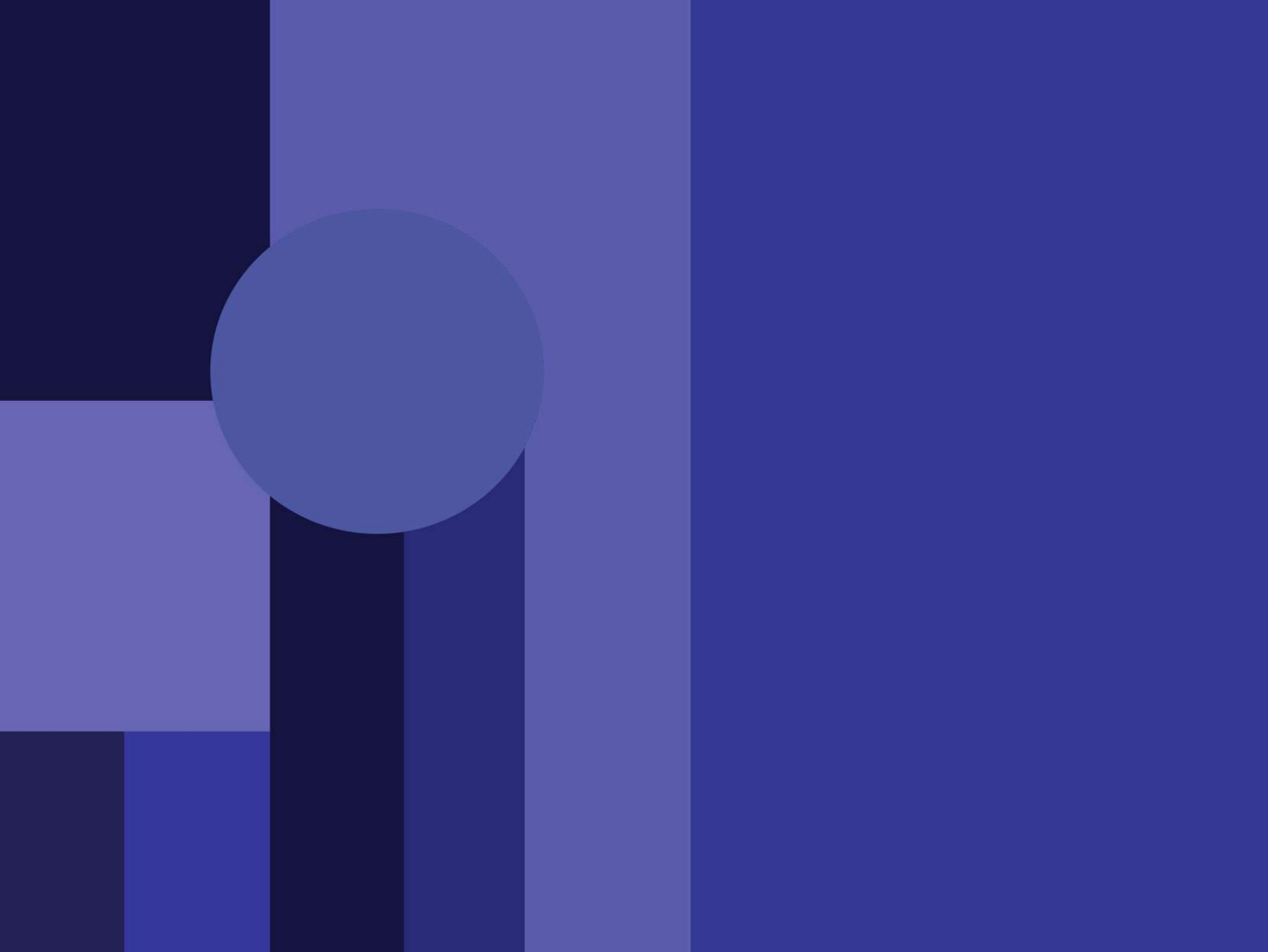
Today, NFTs and blockchain are massive power consumers. However, there are “greener” options and more efficient tech is on the way.

What is being done to address the environmental impact?

- There are alternatives to using the energy-intensive PoW mechanism, the most notable of which is the **Proof of Stake (PoS)** algorithm. PoS elects individuals as the miners of new blocks as a function of the number of coins they hold, thus eliminating the high-energy consumption that PoW entails: the more coins one user stakes, the higher the chances of being chosen as the miner of the next block.
- With the advent of Ethereum 2.0, a set of updates to the Ethereum blockchain that will make it more secure, scalable, and sustainable, **Ethereum will switch from a PoW to a PoS consensus mechanism**. This change is anticipated to **decrease the energy consumption of the Ethereum network by as much as 99.5%***, thus greatly reducing the environmental impact of NFTs built on its blockchain. Ethereum 2.0 will also exponentially improve the number of supported TPS, from **currently between 10 and 30 TPS to potentially 100,000 TPS**. This can lead to faster transaction times, fewer network congestions, and significantly lower gas fees.
- There are also other more environmentally-friendly alternatives to Ethereum, such as **Cardano**, the Flow blockchain on which the **NBA Top Shot** collection is built, or **Solana**, which uses a combination of PoS and Proof of History (PoH). PoH is a protocol that provides a fast and accurate ordering of transactions across time, thus significantly boosting the number of TPS while simultaneously reducing the environmental impact.
- 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 mining would continue to increase **even if NFTs were not to become mainstream**. However, this ceases to be true if high demand for NFTs pushes up the price of Ethereum, thus prompting miners to acquire more (sophisticated) hardware which in turn leads to more carbon emissions.



*According to Carl Beekhuizen, a researcher at Ethereum Foundation



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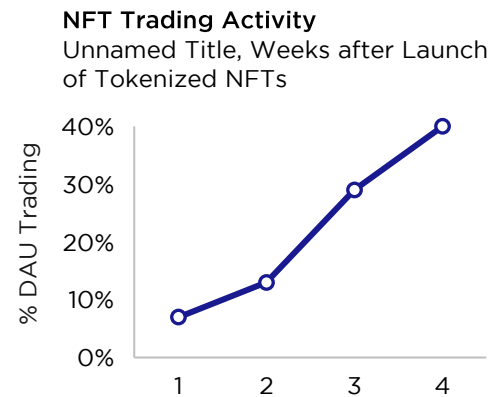
Preparing for the Metaverse: Finding the Right NFT Partner

Hear from Forte on navigating a tokenized economy



Forte Case Study: Driving Marketplace Adoption Amongst Players

Forte recently worked with one of the world's largest game publishers, with tens of millions of players interacting in real-time globally amongst its titles. Instead of overhauling its tech stack to open up new economies within its titles, the publisher partnered with Forte to launch a peer-to-peer marketplace where players could trade tokenized NFT game items. Forte's customizable and compliant end-to-end solution enabled the publisher to easily build and scale its token economy, enabling the publisher's players to list & trade items without leaving the native game environment. Four weeks after launch, more than 40% of daily active users (DAU) were trading tokenized NFTs with other players in game. The fast adoption of these new marketplace features is a clear indication audiences are receptive to new economy dynamics, if the buying experience is organic and seamless.



Insights from Forte's CEO

Josh Williams, Founder & CEO

It's no surprise that game publishers remain in pole position to create the first true metaverses. The world's largest game publishers already have the key attributes of scale, and millions of players as captive audiences, always-connected, buying virtual assets in self-contained ecosystems within the publishers' games.

But the massive scale that makes these publishers successful can also be a **double-edged sword**. As they transition from games-as-a-service to games-as-a-platform, these key attributes are major challenges that could potentially slow down the transition to the new platform-play business model needed to survive in the next frontier of **Web 3.0**.

One of the first opportunities for game publishers to unlock is the offering of NFTs, which is a natural avenue for merging virtual and physical worlds. But for game publishers — or any large-scale business — to build entire new systems that enable the minting and selling of NFTs and other token assets, the effort needed will be hugely time-consuming and expensive, both in financial investment as well as in opportunity costs. Additionally, such efforts

could become detrimental distractions from core business priorities.

Another option in this build-versus-buy tradeoff is to partner with a third-party platform to unlock NFT capabilities and other token economies. Though it comes with its own set of tradeoffs, partnering with a third-party platform affords the benefits of accelerating a go-to-market strategy and preserving the funds and focus needed for a game publisher's core business — making games.

Forte's goal is to open up massive new revenue streams for publishers and increase economic opportunities for players and publishers alike.

Through a seamless UX, maximal liquidity & demand, and full regulatory compliance, Forte helps publishers embrace NFTs and create rich, sustainable token economies. The new metaverse includes marketplaces where buyers and sellers own and trade digital assets and currencies. It is imperative that technology keeps up so that we all have true property rights. This will create thriving economies from which everyone in a game's community benefits.



How Forte Helps Game Developers Navigate NFTs

Aspects to consider when building a fully-compliant token economy

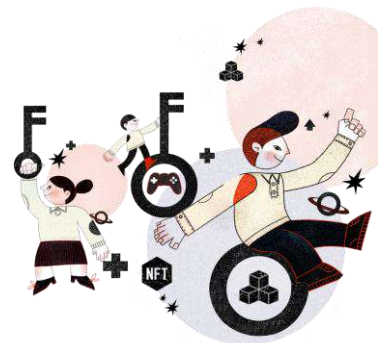
- **Seamless solution for game economies**, including wallets, NFT and token asset minting, institutional grade custody, and fiat and crypto on- and off-ramps. Disparate systems are difficult to interoperate, can harm the user experience, and are internally inefficient to integrate and manage.
- **Fully compliant, licensed platform** to mint NFTs and token assets, and facilitate player-to-player secondary trading. Full compliance with money transmittal, securities, tax, and other regulations in the US and beyond— a critical requirement for any enterprise. Even the slightest incident of non-compliance can lead to millions of dollars in fines, downtime, and brand damage. Serious infringements can induce existential risk.
- **Customizable and white-label wallets** that can be embedded in any game or application, allowing users to purchase, hold, manage, use, and sell token assets and virtual currencies directly from their trusted brand. Brand confusion and dilution can cause consumer dissatisfaction and poor user experience, resulting in lower engagement and spend.
- **Tailored user experience** covering initial onboarding, token purchase, trading, and selling. Integrate NFTs and virtual currencies directly into existing product experiences and checkout flows. Poor crypto-native onboarding experience is often the biggest barrier to mainstream adoption. Most users do not own crypto wallets; many first-time users do not want to. Sending users to external exchanges can create a high-friction user experience, or risk regulatory infringement with unregulated exchanges.
- **Maximize liquidity & demand** for game economies by connecting to multiple blockchain ecosystems. Fiat rails and multi-chain interoperability with the largest Layer 1 blockchains and exchanges can help game publishers maximize reach. Choosing a single chain for minting NFTs & token assets can force game publishers to rebuild their solutions— and migrate their assets and users— down the road.
- **Proven scale to mitigate risks** relating to traffic & computing needs. Forte has over 8M Monthly Active Users across 20+ countries, and over 10M wallets created.



About Forte

Forte is building economic technology for games. Its end-to-end platform enables the emergence of community economics, a system where the interests of game developers and players are aligned, leading to healthier, sustainable game communities. The team is composed of longtime industry members (Unity, ngmoco, Riot Games, Electronic Arts, Sony, and Rockstar Games, among others), and is currently working with over 20 acclaimed game developers from across the industry to reimagine the economics of games.

www.forte.io



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Stakeholder Spotlights

Insights on the metaverse from
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Spotlight on: The Sandbox

Sébastien Borget, COO & Co-Founder



The Sandbox is a decentralized, community-driven gaming ecosystem where creators can share and monetize voxel assets and gaming experiences on the Ethereum blockchain.

The Sandbox

Sébastien Borget, COO & Co-Founder



Q: What was the key inspiration to move The Sandbox to the blockchain?

Nearly a decade ago, we built a user-generated content (UGC) experience on mobile, called **The Sandbox**. It was fun, it was successful, and the original game and its sequel were downloaded over 40 million times. Players built millions of pieces of content and hundreds of thousands of playable pixel-based games and experiences they could share. Yet, our game was a closed-economy system where the creators who contributed to the game's success received nothing in return. Platform restrictions and the lack of a mechanism to compensate them made it impossible.

So, when we saw the first NFTs with **CryptoKitties** and **CryptoPunks** in 2017, we realized that blockchain is a key technology to support our vision and provide true ownership of digital assets. We immediately thought of combining UGC and NFTs, allowing any creator to make their own NFTs, use them in games, and monetize them. It was exciting!

By designing a content ecosystem with authorship and ownership tied to blockchain, we're making big steps toward achieving these goals in our gaming metaverse. **The Sandbox** is a unique virtual world where players can build, own, and monetize their gaming experiences on **LAND** they own using NFTs (non-fungible tokens) and **\$SAND**, the platform's main utility token. **\$SAND** serves as the basis of transactions and interactions, enabling players to play, own, govern, trade, and earn.

Q: Where is The Sandbox today, on its path to building the open metaverse?

We already have a vibrant community of 100k+ followers on Twitter, 35k on Discord, and 25k on Telegram who are using our creation tools daily and are engaging with various contests, game jams, and more.

One of the main assets of **The Sandbox** are its **LAND** NFTs, which according to a **DappRadar** report, represent \$10.7 million in trading volume over the past 30 days, up 162% compared to the previous period. These numbers are driven by the launch of the official **The Sandbox** Marketplace, but even more by several land sales and auctions that attracted many investors.

The Sandbox is now the #1 virtual world in terms of volume, traders, and number of sales. Additionally, our creators made 700K+ **\$SAND** (\$400K+ USD) profit in the past three weeks since we launched our #NFT marketplace ahead of the full platform launch.

We envision that within the next 10 years, the metaverse will have transformed profoundly how we're thinking about the way we'll be working, socializing, playing, and earning through the economic opportunities and jobs it is creating. It is already shaping up to be a place of non-stop fun where users can choose the experiences they want to engage with; and as they will truly own their currency, their data and digital assets, they will wholly be contributing as part of this digital economy revolution. Events are shaping up



Spotlight on: The Sandbox

Sébastien Borget, COO



to provide strong momentum for what we're planning. This can be seen in three important milestones:

- **UGC gaming is on a roll:** The pandemic is boosting user engagement and Roblox's \$70B IPO show how this is valued.
- **NFT boom:** The \$69M sale of an NFT [Beeple] demonstrates interest and valuation.
- **The crypto rally:** BTC moving to \$60K and a \$2B valuation of \$SAND, our utility token.

Q: The Sandbox franchise has a strong history of integrating IP into games. What do you envision to be the role of IP in a UGC-driven space?

Yes, in **The Sandbox**, we bundle many IPs including **Ghostbusters**, **Shrek**, **The Invincibles**, and many others. I'm a true believer in pop culture. I've always wanted to bridge the gap between the real and digital worlds, and IPs, brands, artists and celebrities help connect players with the digital world. And because of our experience in games with licensed IP, we understand how IPs can be helpful for monetization and user acquisition.

That understanding has driven our strategy, and **The Sandbox** has brought over 65 IPs and artists into our metaverse, including brands like **Atari**, **RollerCoaster Tycoon**, **The Smurfs**, and **Care Bears**. We'll soon be announcing celebrities who are buying **LAND** to have a presence—DJs, rappers, influencers, etc. We seek to connect with fans of the IP, and offer something of unique value for them—the capacity to create their own experiences, games, stories, and adventures involving their favorite IP, and monetize these experiences.

If brands take the right approach with the new medium of NFT, the connection between brands and fans in the metaverse can be closer than ever before. In partnerships we've signed on the licensed IP side, brands are offering a real-use case benefit to their fans. For the first time, players can use authorized NFTs we've made with our partners to create their own adventures, stories, and experiences on their LANDS. It also opens the potential to offer custom or more exclusive events based on which NFTs an individual user owns. An NFT collectible can thus become a kind

of ticket to future engaging experiences, so the NFT can deliver more value to its owner over time. On the other hand, we're now seeing a new trend emerging: New virtual brands and IPs are being born directly into the metaverse. Creators can use The Sandbox virtual world to showcase and interact with their community—virtual fashion designs and virtual sneakers can become popular in the metaverse without ever having existed physically. Our players and creators have limitless creativity, and this could result in items created in The Sandbox eventually becoming IPs in the physical world, completing the circle.

Q: How does The Sandbox stand out relative to other games?

We are a blockchain-native virtual world where anyone can import and create their NFT. We are building a completely new way to play and create for gamers, where they can create, store, and trade value on multiple levels based on their profile: artist, players, land owners or SAND owners. We are the first gaming NFT metaverse using **Interoperability**, Ownership (**LAND**, **AVATAR**), Governance (**DAO**), and **Play2Earn**.

For UGC, to make it easy to create visually consistent content, we chose 3D voxels and blocks so creators can make assets out of "digital Legos". As you can see from **Minecraft's** success, millions of players are already comfortable building with digital **Legos**, and we've made tools to enhance the creative process and instantly turn your work into an NFT that you can monetize. All the assets you see in our game have been created as NFTs by our artist community—the UGC pipeline is already running strong.

On the NFT side, compared to other blockchain games, we're building a gaming-first, native gaming experience. As a player, you have your own gaming space where you can play and display your NFTs.

Q: Blockchain has long been touted as a gaming disruptor for a long time, but until only recently its impact has been relatively muted. What do you think the turning point was, and how do you see its trajectory going forward?



Spotlight on: The Sandbox

Sébastien Borget, COO



We can look back and see where and why the turning point happened. The Sandbox metaverse is made up of 166,464 unique **LAND** NFTs—digital pieces of real estate—that players can own to publish their creations, monetize their games, or rent to other creators. On April 14th, 2021, **The Sandbox** held a **LAND** sale to sell virtual **LANDS** for 8.9M **SAND**, which is worth about \$5.9M USD. That's nearly \$6M to buy virtual land on a single day with players and investors wanting to reserve their space in the metaverse in prime locations near premium, larger **ESTATES** (made up of multiple individual **LANDS**) owned by people and entities such as **Bill Lee**, **Ken Howery**, **Galaxy Interactive**, **Tyler** and **Cameron Winklevoss**, **Gemini Frontier Fund**, **Nifty Gateway**, **Chris Ye**, and **Avenged Sevenfold**. By end of May, The Sandbox had another successful **LAND** sale which sold out in 15 seconds! On June 7th, a (24x24) Estate of 576 **LANDS** in The Sandbox sold for \$650,000 USD. This is an indication of the power of a decentralized gaming metaverse on the blockchain.

The paradigm shift that got us here is the new, revelatory proof of authorship (who made an item) and proof of ownership (who owns it), made possible by NFT and blockchain technology. This made it finally possible to establish the primitive for the trading of digital assets and hence kickstart a virtual economy where assets and services can be valued, held in custody, traded, and monetized.

With NFTs, anything you buy in games is actually yours. Each asset is uniquely identifiable, can have a provable limited number of copies, and can be transferred between users, without asking or requiring permission from the developer. The trading and selling of digital goods isn't new; this is something we've seen before in MMO RPGs like **World of Warcraft** or **Animal Crossing**. However, in those cases it had to be done in gray/black markets due to the restrictions of the centralized platforms. **The Sandbox** is an open metaverse, where all the content, the economy and even the governance of our virtual world will be in the hands of the players, creators, and users who contribute to this world.

That's what players were looking for, and that's what we're giving them. It starts with ownership of **LANDS**,

which constitute the map of our virtual world. To date, only 45% of this map has been sold, so there's lots of room to expand, across a multiplicity of interesting locations that combine brands, IPs, games, artists, social lounges, and more.

Q. How is the economy of gaming changing?

If you look at the monetization of video games over the past 20 years, you start with buying a game in a box. Ten years ago, we saw the rise of freemium games. The third wave, which we are predicting and implementing, will be play-to-earn. Play-to-earn goes far beyond just esports and competing. We believe that any profile in **The Sandbox** economy can earn through unique activities. Our ecosystem has a circular economy that will create new kinds of digital jobs.

We anticipate an explosion of **demand for new jobs in the metaverse**, such as virtual architects who build the visual environment of the games and experiences, or virtual fashion designers. You can have farmers, people who specialize in collecting one type of resource that you can buy and exchange. You can have a virtual coach who will explain how to get better at the game, beat specific quests, and collect specific kinds of resources to optimize your time and value.

Perhaps as a player, you will join a guild that will train you to optimize the ROI of your time and generate more revenue from your play time, then split the revenue among the guild members. Content curators may become a prominent role to facilitate discovery and save time and effort for users as they adventure through these virtual worlds.

These and other roles could become meaningful full-time jobs in the metaverse. This future may be closer than we realize, as the pandemic has accelerated our acceptance of spending more time in virtual worlds. Gen Z has already grown up accustomed to digital only. Today's kids already accept and value virtual items more than physical, as they comprehend that value isn't only from physical attributes, but from scarcity and desirability. **Will the next generation grow up in the metaverse?** It's entirely possible!



\$69m

Price for artist
Beeple's digital
work *Everydays:
the First 5000
Days*, the highest
known price paid
for an NFT



Spotlight on: PIXELYNX

Inder Phull, Co-Founder & CEO



PIXELYNX is creating a portal into the metaverse by helping brands and creators launch digital collectibles, gaming partnerships and virtual worlds.

PIXELYNX

Inder Phull, Co-Founder & CEO



Q: What inspired PIXELYNX, and what is the role PIXELYNX will play in the metaverse?

It's hard to pinpoint the exact moment of inspiration but the combined influences of everything happening in gaming, digital fashion, virtual concerts and blockchain played a key role in helping forge the ideas of the business. We've been close to the gaming industry for many years through deadmau5 and our other ventures and always felt that **gaming** is going to play a more important role in how artists, brands and fans connect.

We are trying to create a new category in the metaverse where music, film, gaming and blockchain come together. Our aim is to explore how virtual worlds can bring fans closer to their favorite artists and brands whilst using blockchain technology to change the economic models and give fans a way to engage in a more meaningful way.

Q: There's always been a strong overlap between gaming and dance music communities. How do you envision the future opportunities for collaboration between developers and DJs/musicians?

The most important trend is that the tools to create virtual worlds and games are becoming more accessible. User-generated platforms like **Core** & **Roblox** will continue to grow and will give musicians/DJs the ability to launch their own virtual experiences. The success of virtual concerts in games including **Fortnite**, **Roblox** and **Grand Theft Auto** have

also shown the power of music in these platforms and we will see more collaborations taking place.

We will see artists launching their own virtual worlds and venues on their own and in partnership with other developers. The rise of platforms like **The Sandbox** and **Decentraland** will also become more prevalent as virtual venues and artists will experiment with their physical to digital strategy in these spaces.

Q: We've all seen the Fortnite and Roblox in-game concerts. What's the next step for virtual concerts?

The biggest challenge at the moment is the skills gap in the music industry related to gaming and virtual concerts. As a result, the ability for artists to launch a unique virtual event without budget or large teams is limited. This will change over time as more UGC-style platforms create ways for artists to launch their own virtual space and invite fans into it. The democratization of this is key to it scaling and not having gatekeepers as the core mechanism for artists to explore this new medium.

A really interesting next step away from virtual concerts is playable albums and music releases as streaming is not delivering revenue for all artists. We are developing a new format around this idea where the music is released in an interactive, playable format. Achieving scale is crucial to this new idea becoming a normal part of a release strategy. Alongside this, the live show has always been one of the most important



Spotlight on: PIXELYNX

Inder Phull, Co-Founder & CEO



aspects of an artist's strategy and the ability to reach millions of fans whilst monetizing through a virtual event can't be ignored.

I believe fans will play a more interactive role in these virtual events. The exact output is still undefined, but it will transition from passive viewing to more immersion and interactivity. We will also see physical and virtual events existing together. The virtual events will be connected to a physical show, and it is very likely there will be 1:1 replications of physical shows taking place in CGI environments that can be experienced through VR and traditional game views.

Q: What has more potential in 10 years, the real Berghain or a virtual one?

That is an impossible question. Being in lockdown and not having any physical events has made us all miss live shows even more than usual. Some venues have a certain magic that can't be disputed. But the possibilities in virtual venues are endless and can take a music experience to a new level.

I think the opportunities to create a narrative around a virtual event are really interesting and new collaborations that could never really exist in the physical world now become possible. The virtual event provides a chance to inspire and interact with fans in a completely different way and it's important we don't just replicate what happens in physical reality but take inspiration from gaming, film and theatre to create an experience that pushes boundaries.

Q: What idea doesn't get enough attention?

Accessibility. I think console/PC gaming is amazing and naturally has its place as well as VR however we are still in a transition period and mobile/web dominate the bulk of the market. I'd love to see more experiences developed that are accessible to the general public without the need for expensive equipment. Web technology is moving fast and it's exciting to see how these tools will change the way fans experience gaming content through the browser. It's not just about cloud gaming but also pure web technology like WebGL,

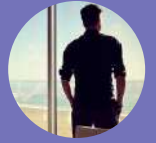
WASM and PlayCanvas that have huge potential.

Q: What is your biggest challenge?

Managing in-bound interest and prioritizing the right projects with partners that understand the long-term opportunity as opposed to trying to just capitalize on something that is trendy.

We're also scaling quickly and are always aware that we need to move as fast as the industry. The evolving metaverse conversation is still not fully understood by everyone. We spend a lot of time educating and changing perceptions about what this new world means for creators and brands.

Naturally, investment conversations also take up a lot of time and picking the right partners that see the future requires time to make sure we align on philosophy, ethos and vision. My biggest challenge though is finding time to sleep when we're going through one of the most exciting moments of the internet.



Crucible is working to build tools to enable persistent, platform-agnostic digital identities in the open metaverse.

Crucible

Ryan Gill, Co-Founder & CEO



Q: Different companies define the metaverse in slightly different ways. How do you define it at Crucible?

The metaverse is the next decade of the internet. Imagine if game developers designed the internet from the ground up: that's the best way to think about the metaverse. It all started as a sci-fi concept, so many people will frame it from that perspective. But now that the metaverse is becoming a reality, we feel that decentralization plays a key role, and as experts in Web 3.0 technologies, we refer to it as the open metaverse.

Q: What is Crucible's role in defining an open metaverse? And could you tell us about Crucible's development process?

The tools we are creating are empowering game developers to build a more open metaverse. Throughout the process, we have broken a lot of new ground and have even created a lot of the language and terminology around the open metaverse, but we're also building tools that give the development community a chance to create our vision of the metaverse together.

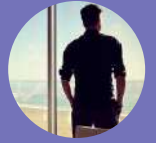
The "open" in open metaverse draws from the standards of open-source technology, allowing developers to give players their own portable digital identity—one that's secure and compliant with best practices for data management. We're also giving developers a chance to create NFT marketplaces, as

well as play-to-earn mechanics to empower players. The pay-to-earn mechanics are getting a lot of traction in Southeast Asia, where plenty of gamers are making a decent living via playing titles like **Axie Infinity**. Simply put, our company is laser-focused on building tools to help developers transition to the open metaverse and Web 3.0 way of thinking.

Q: Can you tell us more about your Emergence SDK?

Emergence is our first suite of products. We are currently in the early stages of an alpha and are getting feedback from developers in the **Unreal** ecosystem on our Emergence SDK. The players will get what we call a "personal stack", an in-game overlay that is part of the SDK. After the user downloads a dedicated mobile app and browser extension, they can manage their identity, and everything is secured on the blockchain. We then allow users to create as many personas as they like attached to that single identity—and each persona is a credential, which could be a game account, a specific avatar, specific profile, or an account on a website.

Everything is based on the **Self Sovereign Identity** standard, which has emerged as sort of the gold standard for digital identities. It's already in use across many different sectors. But it hasn't yet been adopted into gaming, which is something our company has set out to change. The first step there is taking the **Self Sovereign Identity** standard and making it compatible with game engine technology such as Unreal and Unity.



Q: Crucible is pioneering a new value chain concept called direct-to-avatar, where brands and creators can sell virtual items directly to players without using an app store. How does this disrupt current game monetization systems?

We coined **direct-to-avatar** to help people understand the paradigm shift gaming is undergoing. Many companies are very familiar with the **direct-to-consumer** concept, and **direct-to-avatar** suggests a shift in the supply chain.

The games space has pioneered monetizing digital items like cosmetics, and the business world is applying these learnings to other sectors. At the same time, NFTs—essentially a digital supply chain—are disrupting the business ecosystem. Direct-to-avatar is a full digital supply chain, in which the end-user is an avatar that stays digital. **Shopify** took direct-to-consumer to the mainstream; we're following the same path for direct-to-avatar.

Q: How will game design and the broader gaming ecosystem change in this future metaverse, when people do have a persistent avatar and identity that can be shared across worlds?

Interoperability, a portable digital identity, and a digitally scalable supply-and-demand economy are what the metaverse needs from a technical and business perspective. All three of these things are the logical starting point for the metaverse, and Web 3.0's value proposition delivers almost everything the open metaverse needs.

Blockchain, decentralized tech, and experimental phases with cryptocurrency have certainly led to many opportunities. The problem is: crypto has been so experimental and complex so far that a lot of people have written it off. To combat that issue with Web 3.0, we're aiming to help game developers understand and absorb Web 3.0 in a way that's specifically tailored to them, taking the complexity and frustration away. We're supplying developers with the tools to embrace the metaverse on their own terms; after all, the

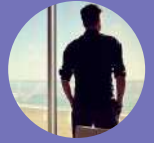
changing economics of gaming, the business model, and interoperability are all challenges the industry has to figure out together.

You see Tim Sweeney and **Epic** talking about standardization a lot; you see **NVIDIA** working with the standard and the **Omniverse**—these are the companies that we are talking with to explore a shared vision, along with **Ubisoft**. This collaborative way of working is a far better way to map out the future of the open metaverse and Web3. While much is still unclear, a group of excited companies is eager to leverage these innovations. Once these concepts are more proven, other, more corporate-style companies will follow suit.

Q: What would you recommend for publishers and developers who are just learning about this space now and they're interested? What are the first steps that they should take?

I like to reflect on the arc of the games market and how it's evolved. The industry started with basic single-player games with a boss at the end of the level, right? It was very linear and sequential. More recently, we've moved into open-world games—as well as free-to-play, and cross-platform games, two things **Epic** has succeeded with via **Fortnite**. Companies like **Activision** have taken their IP and applied these models, finding similar success. I think we're on the advent of the next evolution, which takes things beyond cross-platform play with interoperability.

As a developer, it's important to think about the change in mindset that came after cross-platform play, which brought about new revenue and business opportunities. Some of the public disclosures around the **Epic-Apple** case have shown the financial gain associated with embracing cross-play. From this point forward, companies have to decide how to experiment and evolve. Many big publishers are already considering expanding IP to an open-world, cross-platform, free-to-play model with an endgame economy—these things represent huge opportunities. And the new era of Web 3.0 and the open metaverse mean these opportunities have never been more exciting. To any company that



wants to get involved, I'd say get in touch with us, because we've built tools that will make your life easier in a space that many find overwhelming.

Developers should be thinking about how they build the game, what features they prioritize, and how Web3 can enhance the player experience. If there's one thing the whole industry can agree on, it's the fact that the player is at the center of everything. Everyone—from the most corporate giant publishers to the most innovative startups—lives and dies by their player base. What we're offering are the tools and opportunity to enhance the player experience and show them something new and seminal.

Q: What would you recommend for publishers and developers who are just learning about this space now and they're interested? What are the first steps that they should take?

We're a group of people who have spent a long time thinking about the future. A famous quote from sci-fi writer William Gibson comes to mind: "The future is here. It's just not widely distributed yet." The factors that make up our futuristic open-metaverse and Web3 vision are actually already happening in R&D labs across the world. We've been at the forefront here for years, and we like to envision a world we'd like to see and then work backward, to see how we can make it a reality.

When we think about the influence the metaverse could have on our lives, it's very much akin to the early days of the internet, bringing us back to the transition from Web 1.0 to Web 2.0. And now, before we start this third act, we're making precise decisions to reach our globally shared vision—almost like a beacon guiding us. But there are also many other factors to think of, particularly the discussion around ethics, which is always at the front of our minds.

In a time where Valve is talking about brain-computer interface technology, ethics takes on a whole new level of importance. A [decentralized autonomous organization](#) (DAO) is our way of putting the power in

the community's hands, allowing everyone to make decisions collectively as a community. Many of Web 3.0 and the open metaverse's pivotal decisions should be community-driven. At Crucible, we've established the Open Meta Association, which will become a DAO at the end of the year and enable us to bring to life the principles we want to embody as a company.

Gaming has already faced challenges with self-regulation. If you look at the ESRB in the U.S., there have been some issues around lootboxes, but these pale in comparison to some of the issues the industry will face in the coming decade. Some of the upcoming metaverse and Web 3.0 decisions are far too big and important to be the remit of industry consortiums alone.

We believe such decisions should be cross-disciplinary—a community of people that have an equal voice and equal say, a truly community-driven group of decision-makers. This is how we cater to the best interests of different stakeholders, groups, and therefore the whole community, not just one part of it.



Spotlight on: Mythical

Rudy Koch, SVP Business Development, Mythical Games



Blankos Block Party is a decentralized MMO developed by Mythical Games Inc. where players can design their own games/'parties' and collect custom characters based on toy figurines.

Mythical Games

Rudy Koch, SVP Business Development



Q: Tell us about Blankos Block Party. How is the Blankos approach to the metaverse unique?

Mythical set out on a mission three years ago to bring blockchain technology and NFT-based economies to mass market games. Our game **Blankos Block Party** and our NFT Engine are the first game and product releases for us as a company. Both were built with the goal of bringing players and creators closer to the games they play by making them key stakeholders in game economies.

Throughout the games industry, there has been a demand from players to buy, trade, sell and creatively invest in their favorite games. But despite investing billions of dollars into games and content, players own nothing. It's all content sub-licensed from the publisher or developer and your investment is fully locked behind your character at worst or locked into a publisher's economy at best.

Players invest an incredible amount of time, effort, love and creativity into games and their digital creations, but they don't own any of it, have any way to participate in the value, and have no ability to sell that value elsewhere if they wanted to; at least not legally. For decades, gray markets have surfaced around every major game title where players buy and sell in-game assets, gold, content, accounts etc. but they bring risks to both players and developers. The demand is clear, and now we can meet that demand with blockchain technology and NFT-based game economies. With

NFTs, like those in **Blankos Block Party**, we're able to provide a way for players to participate in game economies and own the items they acquire. They can buy a **Blanko**, then later sell it on the secondary market and earn real money for it. Our community currently holds more than 60,000 NFTs, making us one of the biggest players in this space, and we're only in beta.

Q: Well-established game developers have largely ignored blockchain tech so far, with a few exceptions. Do you see the industry sentiment shifting? What are the key drivers behind that? Why should developers be excited about this now?

One of our goals is to drive mass adoption of NFTs and blockchain technology in the games industry. We see this as the biggest evolution in gaming since the free-to-play model was introduced. Our proprietary engine is the backbone of these new NFT-based economies where players can be enterprising and make real money from the games they play.

Beyond that, NFTs have a wider application by allowing developers, creators or brands to participate in game economies in a way they haven't before. These stakeholders are able to tap into a small portion of every sale in perpetuity, whether in primary or secondary markets. We're working on several amazing partnerships that will demonstrate this concept. One example are vinyl toy artists like **John-Paul Kaiser**, **James Groman** and **Junko Mizuno**, who we worked with to design some of our first Blankos. With most of their



Spotlight on: Mythical

Rudy Koch, SVP Business Development, Mythical Games



work, what they make from the initial sale is the extent of their profit. But by creating NFTs in the form of Blankos, we're able to offer them a long-term source of revenue for the work they've contributed. We're building creator-friendly economies that reward creators for their great work, as well as rewarding players for their investments in our game.

At scale, NFTs allow us to democratize value and monetization across the community of players, developers, and creators, allowing everyone to participate. And we believe this is the future of game economies.

Q: What are the key benefits for users to buy and sell items through official marketplaces versus secondary (grey) markets? Have you noticed any changes in expected user purchasing behavior for IAPs versus NFTs?

Our company was created to solve a real problem for game audiences: As game makers and game players, we want to be able to own the digital creations that we spend so much time creating, investing in and playing with. We've already seen the demand for secondary markets in the form of gray markets around games like **World of Warcraft**, **Fortnite** and **Animal Crossing**. But these gray markets aren't legal or legitimate and can be rampant with fraud. They operate outside the game ecosystem, which means developers can't participate and have no incentive to support them; in most cases gray markets are a big problem for the industry. Despite all of that, these gray markets are flourishing and it's clear that players want to transact in this way.

Our technology gives developers and publishers the tools to create legitimate secondary markets where players, creators and developers can participate. As a result, developers can provide a safe and streamlined experience for players.

For us, it goes beyond digital item sales. NFTs give us a lot of room to get creative. As an example, say you bought an in-game gun used by a pro esports team in a **Call of Duty** final; the gun that took that final shot for the win. Like a museum piece, that gun is valuable as a

one-off piece of game history. There are a number of factors that create value - the player or team that used it, the historical moment, the rarity of owning 1 of 1, etc. This is how we go from simple digital item sales to creating fun and engaging game economies that players want to be part of.

Then say at some point you didn't want the gun anymore; you could sell it to another player and make real money. When that item is sold, the publisher, the esports team and the original creator of the asset would also get a small cut. Everyone gets to participate.

NFTs and blockchain create an irrefutable source of truth for scarcity, ownership, and the value of in-game assets.

Q: How is Mythical approaching NFTs differently?

We're offering NFTs with utility. The NFTs you collect don't just sit in a wallet passively, you can play with them in the **Blankos** universe; they're your playable character in-game. You can level them up, compete in tournaments and build up skills, all of which may make them more valuable if you decide to sell them later. Through our proprietary engine and game model, we're allowing players to unlock the time and monetary investments they've made into their NFTs by selling them for real money (fiat or crypto) on the **Mythical** marketplace.

Q: How is Mythical addressing the environmental concerns around NFTs?

Unlike cryptocurrency, NFTs can be produced without mining; it's simply a way of recording ownership to the blockchain. We are building Blankos and our marketplace on a private blockchain that uses a Proof of Authority (PoA) model that is more efficient and less reliant on electricity than the Proof of Work (PoW) model used to mine cryptocurrencies. This provides a more scalable and eco-friendly model for the types of mass-market transactions you'll see in Blankos and our marketplace.



Spotlight on: Hadean

Craig Beddis, CEO



Hadean is a distributed computing platform that lets developers rapidly build and scale cloud-native applications.

Hadean

Craig Beddis, CEO



HADEAN

Q: How is Hadean helping to enable the metaverse?

Our technology will enable the architects of the metaverse to achieve the sheer scale and performance required to power these simulations.

A simple aspect of scale is concurrent users: our technology enables simulations to exist past current limitations of 50 - 150 participants on a single shard to thousands of concurrent users, which we have proved on multiple occasions with partners including CCP Games, Minecraft and XSolla. As an example, when Fortnite hosted its huge concert with Travis Scott last year, they declared that there were 12 and a half million participants. However, these participants weren't together in one shared world, they were actually in sharded versions of the concert capped at 50 participants each, that were not entirely in synchronization with each other.

Scale can also include characteristics such as geographic size and fidelity. For instance, the ability to build virtual worlds that are like-for-like replications of megacities such as Tokyo or Shanghai with digital twins of every building and road made up of billions of interacting entities, or even simulations that span multiple times larger than the physical world.

Additionally, because Hadean's technology harnesses the true power of the cloud and can dynamically scale resources up and down as required, we are able to build these virtual worlds to be persistent, so that they

can live and breath indefinitely. Creating and scaling simulations with such a high degree of data, connections, and complexity requires effective allocation of computational resources, which is a distributed computing problem that we at Hadean have been focusing on.

Q: Do you have any recommendations for game publishers/developers based on your experiences? How should they approach designing or evolving their games to be "metaverse-ready"?

Currently, the inability to efficiently maximize resources and harness cloud computing has prevented games reaching their full potential. Instead, developers have been left searching for ways to incrementally improve the speed, scalability and reliability of distributed systems. It has forced us to experience games within a seemingly immutable set of confines, including finite artificial intelligence, overly simplified physics and limited player counts. Therefore, evolving the way games are designed and built to be cloud-native to harness the true power of the cloud will be a step in the right direction.

The potential of cloud-native development was demonstrated in our partnership with CCP Games in EVE Aether Wars where we were able to achieve 14,000 connected clients across 120 countries with the game built entirely on the cloud.

Developing truly cloud-native games will also enable



Spotlight on: Hadean

Craig Beddis, CEO



persistent world building experiences that can grow as social networks with no specified hardware and installation requirements, which is what we envision when we talk about the metaverse.

Q: We've seen that music, art, fashion, and film are among the first adopters (outside of gaming) to dabble in metaverse activations. Which industries or applications do you think are the next most likely to get involved?

As with any form of media, where there is a concentration of arts and culture, we will eventually see brands looking to take advantage of these audiences. This could either be through sponsorship placements or means such as digital collectibles that sports clubs and franchises are currently dipping their feet in.

At Hadean, we have also observed the demand for virtual events such as conferences and concerts as well as the demand for virtual workspaces that have been accelerated by the pandemic and the need to socialize virtually. There is also a growing demand in enterprise use cases such as digital twins and synthetic environments that model our physical world through life-like simulations with multiple layers of data, entities and AI. These shared and interactive simulations are used for multiple purposes such as decision making in complex scenarios and training in hazardous environments. Enterprise versions of the metaverse will be a key driver in innovation and investment to realize the broader metaverse vision.

Q: What challenge do you think doesn't get enough attention from the industry?

One key challenge, which has been voiced but not necessarily actioned, is that no one company can build the metaverse on its own and that it is a collective effort. The industry needs a common language, a set of standards, protocols and agreements that will enable us to answer a number of outstanding questions: How can avatars and artifacts be interoperable? Who will pay for server costs? How do we optimize power and compute resources? There appears to be some working groups that are looking into such questions, but they need

greater engagement and must involve the key players and stakeholders in the industry.

Q: What are your thoughts on how the metaverse will evolve in the next five years?

Independent platforms will advance specific features of the metaverse, with a few of these platforms breaking into the mainstream. They are likely to include a combination of elements such as extended reality, spatial mapping and virtual economies, driven by network effects and a new generation of influencers.

I am optimistic that we will be even closer to the metaverse than we are today, with certain elements gaining mainstream adoption, but the true vision of a single shared metaverse may still just elude us in five years.

Q: What is unique about Hadean's technology?

Current approaches for large scale simulations are dependent on a bloated and outdated technology stack that was not designed to harness the true powers of cloud and edge computing. Large scale persistent simulations need an architecture that can dynamically scale without manual provisioning and operations.

In anticipation of this challenge, we redesigned and built the technology stack for the cloud from the ground up, treating distributed computing as a first-class concern. Unlike existing approaches, the Hadean distributed process model ensures "scale-invariance" by preserving crucial properties in behavior and execution as it seamlessly scales resources up or down.

Aether Engine, our spatial simulation library takes advantage of these unique properties and dynamically distributes resources, allowing a simulation to grow and scale dynamically. In conjunction with Muxer, our edge networking library, vast numbers of connections from a geographically dispersed user base can join a simulation. Together these products enable large scale, persistent virtual worlds that are a core part in realizing the metaverse.



Spotlight on: NVIDIA

Richard Kerris, General Manager Omniverse & Head of Developer Relations



NVIDIA Omniverse is the first open platform where 3D design teams can work in a shared virtual space and collaborate with each other in real-time across multiple software suites.

NVIDIA Omniverse

Richard Kerris, General Manager Omniverse & Head of Developer Relations



Q: At GTC 2021 in April, we saw an impressively simulated BMW factory recreated via Omniverse technology. What do you think will be its biggest impact on the future of work? What other industries will be among the early adopters?

The **Factory of the Future with BMW** was a joint project between NVIDIA and BMW Group, where we showcased how factories will be digitally simulated in the future. The impact of this **'Digital Twin'** is significant across many areas:

- Simulating logistics for manufacturing setups and how workers will interact with the various machinery and parts can save significant time and costs before committing to it in the physical world.
- Using that same simulated digital twin, the training and managing of factory floor robots is much more efficient to do in the digital world before committing to the physical world. (i.e.. Training hundreds of simulated robots then download to the physical ones, etc.)

3D workflows are now an essential component of every industry. Enterprises today are facing unique challenges with the rise in remote workforces and increasingly complex 3D production pipelines. Omniverse is a platform that enables true real time collaboration across 3D design tools, users, and their asset libraries -

enabling teams to visualize their work in physically-accurate, photorealistic simulation. By providing teams with the ability to work simultaneously across their favorite software suites, designers and developers can achieve faster time to market, exponential increase in number of iterations at virtually no opportunity cost, and new heights of creative innovation.

Beyond Factories and Manufacturing, Omniverse will be perfect for [Architecture](#), [Engineering/Construction](#), [Product Design](#), [Media/Entertainment](#), and [Game Development](#). Each of these industries have highly complex 3D production workflows, vast, diverse and globally-spread teams, and a growing need for ultra high-fidelity, physically-accurate simulation.

We already have several hundred companies across these industries who are actively evaluating Omniverse, with **AEC** being the furthest along. The BMW Group is an excellent example of an end-to-end use case for the Omniverse platform - from collaborative design, to simulation of operations, and training of AI agents.

Q: Is Omniverse only aimed at enterprise-level clients? What about applications for game developers, or at the consumer-level?

Omniverse can be used at any scale - from individual creators, artists, developers, and designers - to large enterprises. The platform is free for individuals to use



Spotlight on: NVIDIA

Richard Kerris, General Manager Omniverse
& Head of Developer Relations



and has a new [Enterprise](#) license. We currently have almost 50,000 active users of Omniverse Open Beta for Individuals. Omniverse is a platform and has several core applications that feature the unique capabilities of the platform, as well, we are working with several companies throughout the global community who are looking to develop their own products and services to enhance Omniverse for their specific markets.

The **Omniverse Core Applications** from NVIDIA are:

- [Omniverse Create](#) can be used by technical artists, designers, and engineers across industries for physically-accurate, photoreal world building and scene composition.
- [Omniverse View](#) is an advanced visualization application that can be used by any collaborator - whether a technical artist, a project manager, or a client/customer.

We also have additional Applications for Omniverse beyond the core set:

- [Omniverse Audio2Face](#) - a deep learning-powered end user application that generates realistic facial animation from just an audio track
- [Omniverse Machinima](#) - an app for content creators to easily build their own animations and cinematics using game assets.

Omniverse also has apps for researchers & developers:

- [Omniverse Kaolin](#) is an app to accelerate 3D Deep Learning research workflows and serves as a companion to the NVIDIA Kaolin library.
- [NVIDIA Isaac Sim](#), for building, testing and training robots
- [NVIDIA DRIVE Sim](#), for validating and testing self-driving cars.

For game developers, Omniverse is a powerful platform that can help optimize game content creation workflows:

- Using **Omniverse Connectors**, plug-ins to leading industry content creation software, developers

among artists and interchange among tools.

- With **Omniverse Nucleus** and **Omniverse DeepSearch**, developers can search through their large asset libraries intuitively, with natural language or an image query, to find what they need quickly, and simply place within a 3D scene.
- With Universal Scene Description (USD), Developers can create ground truth assets that can be accurately translated across many use cases, from games, to cinematics, to merchandise, or even marketing materials, etc.

Omniverse gives Game Developers access to our latest in NVIDIA graphics, simulation and AI technology, such as [Audio2Face](#), [PhysX 5](#), [Flow](#), [Blast](#), or the **Omniverse RTX Renderer**.

Q: What are NVIDIA's ambitions for the metaverse outside of Omniverse?

There will be many worlds that make up the Metaverses, some will be proprietary from individual enterprises or studios, ISVs, or communities and others will be expansive and open. One of the key goals of Omniverse is to be the connector of these worlds through the support of standards and which aim to connect different virtual worlds together to achieve an open, shared virtual world where we can collaborate between humans or AI agents, where we can create, build, or play, all together.

Q: What steps should developers be taking now to be prepared for the metaverse in the next five years?

To build a truly open and extensible Metaverse, we believe in the need for open standards. Omniverse adopted **Pixar's USD (Universal Scene Description)** which we feel will be the key to unlocking the open Metaverse.

USD is a scene description: a set of data structures and APIs to create, represent and modify all elements of virtual worlds. USD stemmed from Pixar's need to represent film-quality virtual assets, scenes and animation in a way conducive to effective teamwork among artists and interchange among tools. Its features



Spotlight on: NVIDIA

Richard Kerris, General Manager Omniverse
& Head of Developer Relations



for teamwork are exactly what's needed for the collaborative and social aspects of the metaverse. We are seeing exponential proliferation of USD across industries today including in Architecture and Engineering, Manufacturing and Product Design, and Game Development.

Q: What is a key problem Omniverse is working to solve?

Omniverse supports real-time collaboration across local and/or global teams - which has long been a struggle across each of the industries we have discussed so far. Data management along with the size and scope of projects continues to be complex and challenging. Omniverse enables a unified approach based on common standards which results in the most efficient and effective means to manage these projects for teams, whether working across the room or across the globe.



The digital twin of BMW's assembly system, powered by [Omniverse](#)



Spotlight on: Manticore

Patrick Buechner, CMO



Manticore is the developer of **Core**, a centralized digital playground and community with an integrated game creation system. In **Core**, players can create, share, and earn from their own games.

Manticore

Patrick Buechner, CMO



Q: What is Manticore's role in the metaverse?

Core makes it easy for just about anyone to build interconnected worlds, games, and universes, and make money doing so. That's why we describe what we're doing as building the infrastructure for the multiverse. We imagine that the multiverse will be created, not by one company with a single vision - but by millions of individuals and teams with their own ideas. **Core** was built from the ground up to enable everyone to collaborate in building a connected web of entertainment, experiences, and worlds.

Q: The ratio of creators to consumers in UGC games has traditionally been modest. How does Core aim to improve this, and how does Core approach UGC differently to other platforms that are already out there?

Manticore's mission is to give anyone the power to create, share, and experience worlds instantly without barriers. Core opens gaming to anyone, not just folks who consider themselves developers, and therefore dramatically increases the size of the whole pyramid.

Anyone can be a game creator and **Core's** tools make it easy enough for anyone to build their first in under an hour. Everything you need is built in, from art tools and sound assets, to frameworks and a shared collection of thousands of pieces of community content - all of it free. No programming knowledge is required, but those

who wish can script their own game logic. **Core** is also built on top of **Unreal**, making it by far the most immersive, flexible, and powerful UGC platform. We also hear from creators that some of the current UGC platforms are played out, that if you're not already established there, it's too late to make your mark, let alone a living. By contrast, **Core** is still very much fertile ground

Q: In a UGC-driven space, where is the biggest opportunity for brands and external IP? How do you envision the relationship between you, creators, and any 3rd parties who may be interested in being virtually represented in-game?

We envision brands building their own experiences in **Core** - to engage with the brand in a fun and immersive way and as a new avenue to monetize the brand. Today we have influencers using **Core** to build games and immersive social experiences for their fans - and some are using it as a new revenue stream.

We also see huge potential for shared social experiences like concerts and festivals and are working with some artists now to enable these in a way that other UGC platforms simply can't.

One of my favorite **Core** brand-integrations was a contest we held to build fantasy worlds and games inspired by **Dungeons & Dragons**. More than 100 D&D games were created: everything from action-adventure and tactics-style games to PvP and MMO RPGs.



Spotlight on: Manticore

Patrick Buechner, CMO



Q: What have you noticed about the differences in creator communities across different countries or regions?

What has been fascinating is that there isn't much difference between creator communities on **Core**. Because **Core's** creator tools are accessible to anyone for free with a PC, we have successful creators on every continent and almost every country.

More than half of the top 10 most-played games are by creators outside the US. They include a teenager in **Norway**, a tank engineer from **France**, a rapper/educator from **Germany**, and a team of indie developers in **Russia**. We're also seeing pockets of AAA developers from **Europe**, **South America**, and the **US** starting to team up and create polished experiences. Something these creators all have in common is they are creating social spaces where players hang out,

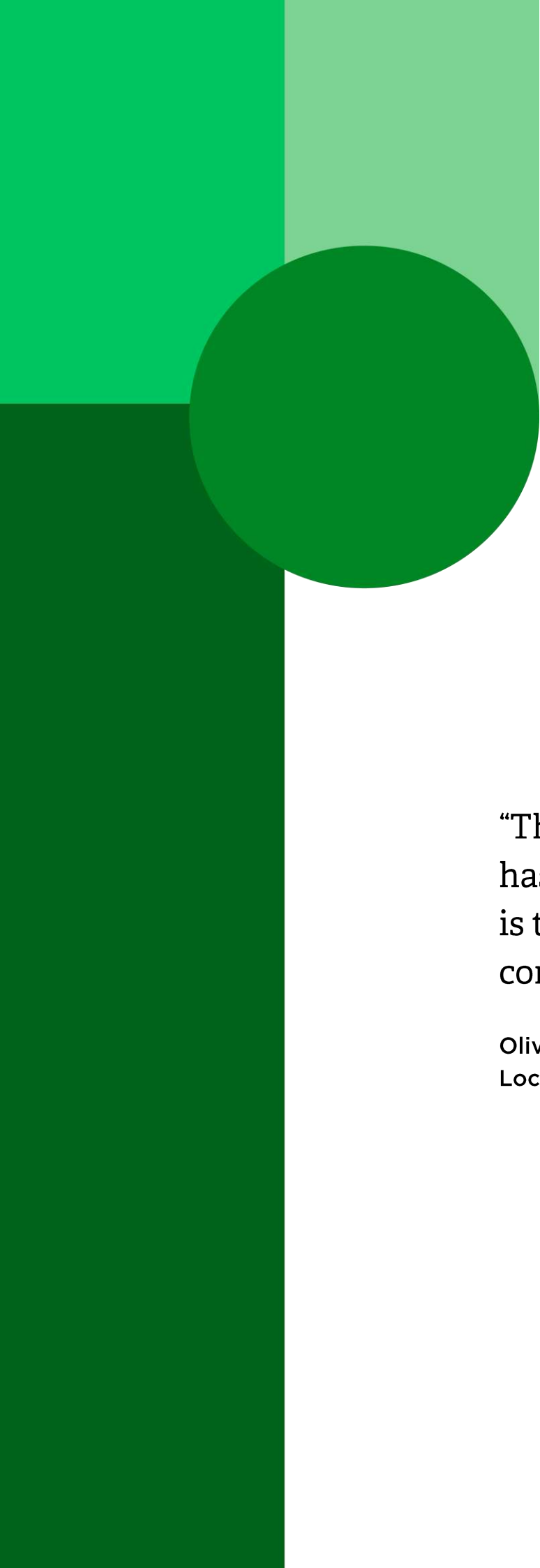
sometimes for hours. This has held true irrespective of the language they speak.

Q: What is a key challenge you are hoping to address this year?

Core has just launched into Early Access on the **Epic Games Store** and we're just getting started. We are always improving the platform for both players and creators.

A focus for us will be enabling richer games and new types of experiences. **Core** creators have already made tens of thousands of experiences that have been played millions of times, and they've only scratched the surface of what they can do. It may be primarily games today, but over time, we expect creators will build all kinds of social and interactive experiences, many of which may not even exist right now.



A decorative graphic on the left side of the page consisting of a solid green circle, a lighter green vertical bar behind it, and a dark green vertical bar at the bottom left.

“The metaverse fundamentally has to be on mobile, because that is the ultimate social platform and communication tool.”

Oliver Kern, Chief Commercial Officer,
Lockwood Publishing







Barriers to the Metaverse

Open questions and considerations

What Stands Between Us and Virtual Utopia?

Among the key challenges, these stand out

 Politics & Regulations	 Moderation & IP Rights	 Privacy & Ethics	 Accessibility & Scale
<p>Governments will desire to control virtual worlds, and regulations may create new barriers between worlds.</p> <p>E.g., in April 2020, China banned Animal Crossing: New Horizons after the platform was used to stage digital protests about Hong Kong.</p>	<p>UGC spaces require strong safety and content moderation processes in place, supported by machine learning and trust/safety agents.</p> <p>Furthermore, IP & copyright management will need radical modernizations to account for a myriad of new situations.</p>	<p>Metaverse activity-tracking has the potential to become far more powerful than web-tracking.</p> <p>Organizations such as Crucible thus work towards an open metaverse, rather than a closed one controlled by a few entities.</p>	<p>The metaverse is not yet accessible or interoperable at scale. New standards and protocols are needed.</p> <p>Mass concurrency on a global scale is still a challenge, though one that Polystream and Hadean hope to solve.</p>

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—e.g., 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 than they do now in keeping spaces safe. Imagining what metaverse "deepfakes" could evolve into, with avatar duplicates impersonating others, **it's easy to imagine how society will struggle with evolved forms of existing challenges** like disinformation,

harassment, and identity theft. On a similar note, privacy and ethics 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 orgs are working to create open standards.

Lastly, 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 a more equal participation, which is likely to be driven by mobile than anything else. Mobile devices and app stores are **the most global ecosystems today**, and it's hard to imagine a true metaverse that doesn't have access via mobile.

Looking Ahead

Last thoughts

The science-fiction dreams of the metaverse envision a world that has solved all potential and future barriers that now stand before it. Several of the world's greatest minds are now tackling some of these challenges, though it's unlikely that the metaverse will turn out exactly as **Ernest Cline** or **Neal Stephenson** imagined it (authors of *Ready Player One* and *Snow Crash*, respectively).



Candice Mudrick
Head of Market Analysis

Each time there has been a new introduction of technology to the games industry, we witness an expansion. Much like how mobile gaming, and now cloud gaming, has grown alongside PC and console gaming, so too will the metaverse exist alongside our physical experiences, complementing and augmenting them rather than replacing them.

However, that isn't to say the metaverse is without its own risks. For better or for worse, the digital worlds will inevitably be a reflection of our real one. It's up to us to make sure we're headed towards utopia, rather than dystopia, and each of us shares responsibility in creating, moderating, and improving our digital spaces. And, most importantly, the creation of a virtual world should not be at the cost of the real one.

We might look to Burning Man, perhaps the most advanced (if fleeting) decentralized society, for how a positive culture might emerge from an open metaverse. I'm reminded of the time I interviewed the CEO of Burning Man Project in 2016 about what a Burning Man in VR might be like, and what implications it could have for virtual societies.

She shared that the Ten Principles, today known as the behavioral rules of Burning Man, came about as an observation of the culture that evolved over time. The principles weren't mandated top-down from the organization; they were cultivated bottom-up, simply recording the behaviors that became normalized.

As early architects and inhabitants of the metaverse, the games industry has a fundamental role to play in shaping its culture. Together, we can lay a metaverse foundation that is not just imaginative but also open, inclusive, and accessible.

[What would you like to see in the next Newzoo metaverse report? Tell us here!](#)



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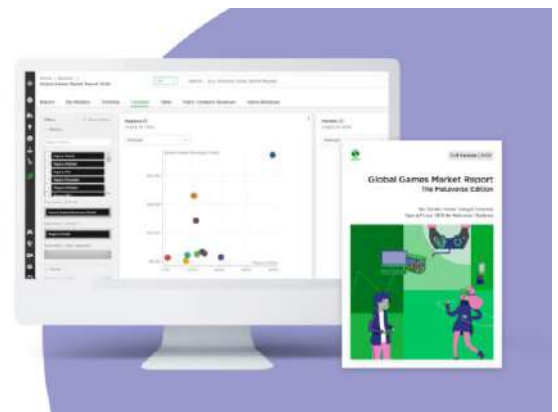


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