

Deep dive into the virtueal world of **Metaverse**



Understanding how the
technology is transforming
experiences

In this article, we would like to bring in a quick overview of the metaverse, its business drivers, underlying technology, early adopting industry segments and the foreseeable challenges in its adoption to mainstream business.



Overview

Metaverse got its name from the 1992 sci-fi novel "Snow Crash"—it is more of a vision than a concrete reality. "meta" is a Greek word which means 'beyond or across' and verse is "universe". So, it is a place which transcends beyond the world or the universe in the virtual 3D (Virtueal). Metaverse reduces the gap between the physical, financial, and immersive world and expands upon the

global economy model. People around the world can perform any activity in the virtual world similar to what they can do in the physical world like work, meet, play games and socialize together, except in 3D space. Metaverse is expected to generate an economy of \$1 Trillion by 2028. Gartner predicts that 25% of people will spend at least 1 hour a day in Metaverse by 2026

either for work, shopping, education, social or entertainment. All gaming software fans are already experiencing the rapid transition into embrace Metaverse using VR technology, networking components for multi-player experience, more so with the use of crypto-wallets.

We categorise Metaverse applications under two groups

As a new channel –

It is a simple virtual world (Virtual Reality- VR) where people can work, interact and collaborate. Facebook/Meta is working towards creating this version of Metaverse. It is an extension of an omnichannel experience. These applications can also be hosted and visited using virtual real

estate platforms like Decentraland, Sandbox etc. who can provide global addresses to your business apps. Web 3.0 capabilities are also part of such apps.

As a crypto enabled market –

These are powered by blockchain platforms and provide additional

capabilities for customers and businesses to have market-like experience using crypto wallets for Non-Fungible Tokens (NFTs) / FTs. These capabilities can also be expanded to include gamification in the channel meta-apps

How does Web 3.0 and Interoperability boost Metaverse adoption ?

The Web 3.0 is the concept of next generation internet. It brings decentralization to content, application, and infra layers. The users will be able to create, own and carry their assets, avatars, collectibles from one platform to another for various purposes, including trading, integration of their new business, and gaming. On the other hand platforms can provide services/APIs/storage that can be used across different metaverse platforms to provide seamless experience e.g. avatars as a service, crypto wallet service. This interoperability will bring a marked shift in paradigm compared to current Web 2.0 where once enterprise/business owns your content (e.g. your in-game purchases like avatars and accessories cannot be moved out to another game). Web 3.0 standardization is underway and is powered by Blockchain, NFTs, decentralized autonomous organizations (DAOs)- dApp/DeFi is a classic reference use case. Metaverse, on the other hand, is concerned with how users can interact on the next generation internet. It transforms the content from 2D to 3D objects. It utilizes Virtual Reality (VR) and Augmented reality technology to enter the internet and navigate between the virtual worlds as digital avatars using VR headsets. The underlying technologies leverage decentralization, human interaction and connectivity. Both the technologies will complement each other in due course. Metaverse is a digital space while Web 3.0 favours a decentralized can serve as the basis for connectivity in Metaverse. Similarly, creator economy in Metaverse can supplement Web 3.0 with the creation of a new financial world.

Let us look at the building blocks of Metaverse

The key elements of Metaverse include 5G, Block Chain, AR/VR/XR, Digital Twin, Web3.0, AI/ML and IOT.



Immersive experience

AR/VR is the key element which provides immersive experience in metaverse. Combination of AR/VR is used to achieve 3D visualization, real time interaction and merge real and virtual environment.



3D content creation

The metaverse involves creation virtual words and objects in it. The 3D content creation helps in creation of scenes, avatars, virtual lands, assets, etc. to achieve an immersive experience.



Blockchain

Metaverse replaces real assets with digital and hence it is important to use reliable algorithm for transaction. Blockchain decentralization aspect helps to validate and perform secure transactions.



Web 3.0

The users can create digital assets. They can own, control and monetize the assets. Web 3.0 is decentralized and hence serves as a connectivity in Metaverse.



Infrastructure

Connectivity, Compute and Edge, GPU, Devices, sensors, storage and caching.



AI

Applies AI in avatar to bring in human like behaviour and in 3D chatbots react and respond user actions in the VR world.



Human Interface

Metaverse opens up a new approach on UX since it combines computer-generated content, a persistent shared world, and unique digital Avatars.



Tokens

User can use their own digital assets as Non-Fungible Tokens (NFTs), to trade in immersive world. It improves the digital ownership. The NFT's can be avatar, virtual lands, video, music, etc.



We conceptualise typical Metaverse apps as 4-Layered solutions

From a bird's eye view, there are 4 layers which help in realizing Metaverse solutions. They are Infrastructure, Technology, User Interaction and Experience.

The technology layer can be further sub-divided into Blockchain decentralized which has all the components associated with digital

transactions such as NFT, Crypto, smart contracts and the AI Spatial layer – AR/VR/3D engines etc.

Experience Layer

Use cases – Meetings, Virtual Learning, Social Interactions, Personalized Avatars, Virtual Real-estate, commerce, Digital identity, Buy and sell of digital assets in metaverse Metaverse, live events etc.

User Interaction

- Gestures, Voice, Haptics, Neural
- Devices for experience – Mobile, Smart glass, HMD, Browsers

Technology Layer

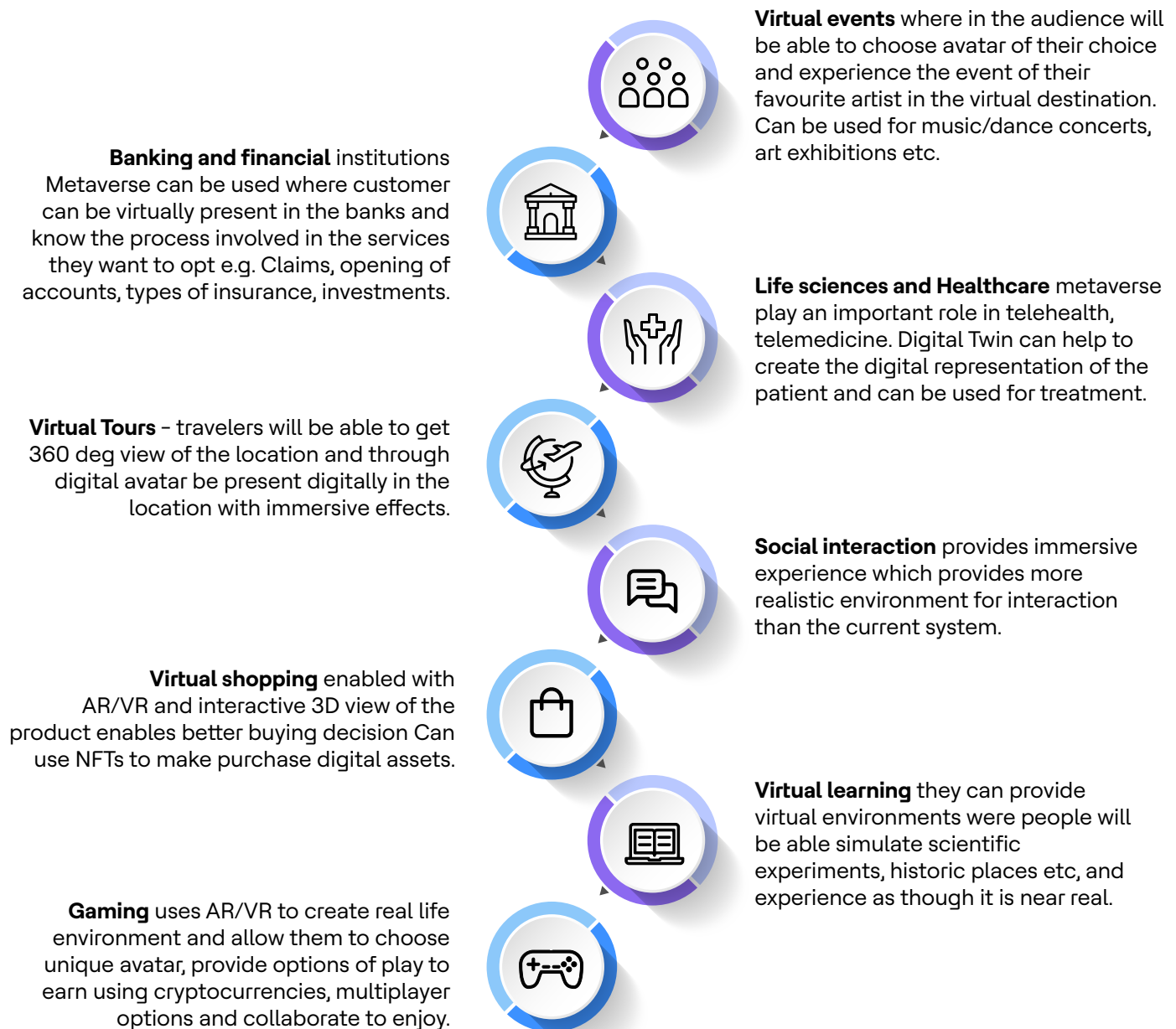
- AR/VR/MR – Immersive experience
- Blockchain – Decentralized trading through NFT, Crypto, Smart Contract, Wallet and Coins
- AI/ML to bring in intelligence to the avatar so that it brings in human like behaviour. Also bring in audio/text chat into the scene
- 3D content creation– Scene Avatar
- Web 3.0 – decentralize and distributed application
- Digital Twin– Data Modelling /Fusion

Infrastructure Layer

- Network Access – 5G, 6G,
- Cloud Platforms
- Compute– AI model creation and Rendering, Blockchain mining
- Edge Service – AI model caching, 3D content caching.
- Data storage
- Devices – Mobile, Head Mounted devices, Haptics
- Sensors – IoT

Potential use cases

Metaverse has opened up a whole new world of use cases across various Industry segments



Let us look at some key business drivers that are fuelling the Metaverse adoption by enterprise & consumers:

- Expands business without large investments in buy, build & operations of physical brick & mortar stores/offices
- Reduces carbon footprint by lowering the need for travel
- Promotes global economy using e-wallets and cryptocurrencies via blockchain powered marketplaces
- Events & Promotions in meta can scale beyond boundaries and open new vistas for business
- Keeps the human experience of every customer engagement intact

On the ground, here are some Metaverse adoption challenges that we encountered

- Rich immersive experience to the user is critical – The scenes with 3D contents & avatars are of high polycounts resulting in huge file sizes, requiring good speed network connections to transfer the data seamlessly to get the best experience. Hence, it is imperative that we have at a minimum 5G speed available for a seamless experience
- As Metaverse is about decentralisation, it leads to creation of Decentralised Autonomous Organisations (DAOs), a shift from conventional regulatory based set ups and thus, Democracy in Metaverse is of the highest order providing a variety of opportunities and benefits to people at large when used with good responsibility
- Since it involves many interfaces, heterogeneity is a key element in Metaverse, and this leads to many vulnerabilities which open a whole new market for mitigating the security concerns for safe usage of Metaverse. This will give rise to the need of defining new protocols unique to Metaverse
- Since Data is of high order in a decentralised world, we need to bring in Zero Knowledge Proof where the sender shares the data with the receiver without revealing it to maintain privacy.
- Initial investment on VR headset with controllers to get the immersive experience can be a price barrier
- More than coding abilities for Metaverse, the priority requirement is people who have high digital creativity . Any organisation developing or working on metaverse will need to invest in a large pool creative people over coders.
- As most Metaverse users are in the age group of 15- 35 years, the negative impact on the younger generation needs to be assessed and handled with care such as availability of psychiatric help & bringing in proper controls and mitigation within Metaverse to alleviate some of the mental health issues
- Social Impact- It is suspected that people can get addicted to the Metaverse and spend most of their time in the virtual world than in the real world. It will lead to lack of social skills and induce anxiety and depression among people or can also lead to social exclusion.



How Law & Order will be maintained in the Metaverse ?

This is a very interesting aspect that enterprise and consumers have to carefully tread as they move from real to virtual world as new rules and cyber policies will have to be framed and deployed. In a recent conversation with Human Resources team in our organization, who very exploring adoption of Metaverse for employee / HR/ Manager interactions, highlighted that video of entire interaction should be recorded for audit and

compliance purposes and verbal & gesture control should be set in place. There have been reports of misconduct in some metaverse platforms where visitors misbehaved with other guests. We feel that some form of MetaPolice using power of AI/ML will have to be deployed to build disciplinary and law enforcement regulations for the Metaverse.

Metaverse will bring in a significant paradigm shift in how enterprise and consumers interact and we are confident that rapid technology improvements, regulatory guidelines will be imbibed in all commercial deployments of the Metaverse solutions to make it a truly immersive real life experience.

References

https://www.researchgate.net/publication/358497370_Metaverse

https://www.researchgate.net/publication/359052509_A_Survey_on_Metaverse_Fundamentals_Security_and_Privacy

<https://www.blockchain-council.org/metaverse/web-3-0-vs-metaverse/#:~:text=Portraits%20of%20Metaverse%20and%20Web3&text=The%20metaverse%20is%20a%203D,users%20can%20charge%20their%20creations>



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