

# Blockchain Technology in Metaverse: Overview

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## ABSTRACT

*The tremendous popularity of social network and advancement in extended reality and distributed ledger technology (DLT) are helping to usher in a new technological frontier: an emerging computer-generated universe called as Metaverse. Metaverse is just like real world where all things happen like socializing, business transaction, game playing, shopping, buying & selling real estate, office employee meeting, art exhibition, live concerts and more. Central to emerging metaverse ecosystem is block chain technology, distributed ledger technology, buy & sale of Non-Fungible Tokens by using peer to peer network and consensus algorithm. While living in the virtual ecosystem identity and transaction need to be transparent, so to carryout transaction block chain technology is useful as it is immutable and permanent and verifiable by all the peers in the network. Block chain is a technology that permanently records transactions, typically in a decentralized and public database called a ledger. Bitcoin is the most well-known block chain-based cryptocurrency. Every time you buy some bitcoin, for example, that transaction gets recorded to the Bitcoin block chain, which means the record is distributed to thousands of individual computers around the world. In this paper we have discuss the motivation behind using the block chain technology for the metaverse. Moreover, we investigate the impact of block chain on key enabling technologies in metaverse. We also present some major projects to showcase the role of block chain in metaverse applications and services.*

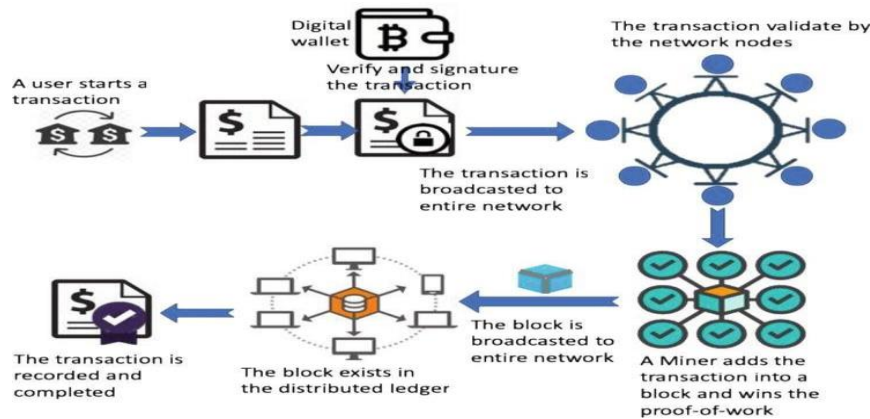
**Keyword:** - Distributed ledger Technology (DLT), Metaverse, block chain, peer to peer network, Non FungibleToken(NFT), Cryptocurrency

## 1. INTRODUCTION

Blockchain [1] technology first came in light when Satoshi Nakamoto published a white paper on Bitcoin: A peer-to-peer electronic cash system in 2008. Blockchain technology is most simply defined as a decentralized, distributed ledger that record the provenance of digital assets. Blockchain is an especially promising and revolutionary technology because it helps reduce risk, stamps our fraud and brings transparency in a scalable way for myriad uses. Consensus protocol is the backbone of blockchain where the operating principles and legitimate actions are all regulated [2]. The famous bitcoin adopts Proof of Work (PoW) mechanism, which demands miners to contribute a great number of computing power to figure out an answer for the random mathematical problem [3]. In order to avoid centralization of computing power, the difficulty, also called nonce of next block generation, is dynamically changed on the basis of 10 minutes per block. Although unimaginable computation power hinders majority of attackers, PoW also leads to inefficient transaction rate and excessive energy consumption. Proof-of-Stake (PoS) alleviates the problems brought by PoW, so the miner who becomes ultimate winner depends on their quantity of holdings in the corresponding cryptocurrency rather than computing power [4].

### 1.1 Mechanism of Blockchain transaction

A typical[5] permissioned blockchain follows a similar data flow to that illustrated in Figure 1, where a signature is added to the transaction, which is then submitted or broadcasted to the network and added to a block. After the block is validated, the transaction is permanently stored in the chain. Permissioned blockchain differs from permissionless blockchain by how blocks and transactions are validated. To gain better performance and lower latency, most permissioned blockchain networks deploy efficient consensus protocols (e.g., the Byzantine fault tolerance consensus used by Hyperledger Fabric) that nodes use for validation.



### 1.2 Application of Blockchain [6]

The idea of a blockchain was first conceived as the mechanism supporting Bitcoin. To Solve the double-spending problem associated with digital currencies, Satoshi Nakamoto devised an immutable ledger of transactions that chains together block of data using digital cryptography.

- Money Transfers: blockchains use for money transfer using can be less expensive and faster than using existing money transfer services.
- Non-fungible Tokens: Non fungible tokens, often referred to as NFTs, are blockchain based tokens that each represent a unique asset like a piece of art, digital content or media.
- Financial services:
  - ABRA: A cryptocurrency wallet which uses the bitcoin blockchain to hold and track balances stored in different currencies.
  - Barclays: Barclays has launched a number of blockchain initiatives involving tracking financial transactions, compliance and combating fraud

## 2. INTRODUCTION TO METAVERSE

Metaverse is the connection between virtual and physical worlds having link between virtual and physical world. This is a future technology which will be handled with the help of some device. The device will use to manage the lives, access the virtual world by simply touch the button. This technology includes NFT's, block chain, games and crypto payments. This technology will be our future.



Fig -2: Metaverse

### 2.1 Definition of Metaverse

The metaverse is a concept of an online, virtual space, 3D technology connection the users with the friends and other user. This will implement multiple platforms; same as the internet connect the different user and different websites accessible through a single browser or by single application. This concept was developed in the science-fiction novel Snow Crash by Neal Stephenson. However the idea of a metaverse was once fiction, it looks like a reality in future. The metaverse will be driven by Virtual reality, augmented reality, with the help of those technology user will control its own character or called as an 'AVATAR'. For example, if you might attained a mixed reality meeting, then in this condition you may attained this meeting virtually with the help of metaverse by using some technology such as VR, AR.

## **2.2 What are enabling technologies of metaverse?**

The metaverse is a fusion of multiple emerging technologies such as 6G, artificial intelligence (AI), VR and digital twins. The core technologies required in the metaverse are: 1) The most important technology for realization of the metaverse is extended reality technology, including AR and VR. While AR can overlay and superimpose digital information onto the physical environment, VR allows users to experience the digital world in a vivid way [26]. Both these techniques are very important in the development of the metaverse, which creates digital space where the users can interact as in the real world. 2) The second important technology is digital twin, which establishes a virtual twin of a real world object by utilizing real world data to predict the expected behavior of the real world object [27]. In the metaverse, digital twin can mirror the real world into the virtual world.

Correspondingly, the metaverse can also find some trial solutions to the unsolved issues in the real world. 3) The third technology—blockchain plays two irreplaceable roles in the metaverse. On one side, blockchain technology serves as a repository, so users can use it to store data anywhere in the metaverse. On the other side, blockchain technology can provide a complete economic system to connect the virtual world of the metaverse with the real world. Especially, the above-mentioned NFTs allow virtual goods to become physical objects. Users are allowed to trade virtual items in the same way as in the real world. Hence, blockchain bridges the real world and the metaverse.

## **3. METAVERSE INCLUDES**

Digital proof of ownership: when we deal with metaverse technology, then in this case if we have to own the property in virtual world this will happen with the help of block chain technology name as digital ownership. Digital collectability: it means, we can also show that character as original and unique. For a metaverse looking to incorporate more real-life activities are important. A block-chain can also represent ownership of physical items. Transfer of value: In-game currencies in multiplayer game are less secure than crypto on a block chain. A metaverse will need a proper way to transfer value securely and in safe manner that users trust. Governance: The ability to control the roles of your interaction with the metaverse should also be important for users. In real life, we have rights to select a leaders and government similar way in virtual life we have need to implement fair governance and block chain is already a proven way of doing this. Accessibility: This makes it one of the most accessible way to manage finance and an online digital currency. Interoperability: This technology is continuously improving compatibility between different platforms. A single metaverse need to connect multiple application, projects, and block chain technology already has solution for this problem.

### **3.1 Metaverse Examples**

SecondLife: Second Life is a 3D virtual environment where users control avatars for socializing, learning, and business. The project also has an NFT marketplace for swapping collectibles. In September 2020, Second Live hosted Binnacle Harvest Festival as part of its first anniversary. The virtual expo showcased different projects in the BSC ecosystem for users to explore and interact with.

Axie Infinity:- Axie Infinity is a play-to-earn game that's provided players in developing countries an opportunity to earn consistent income. By purchasing or being gifted three creatures known as Axie, a player can start farming the Smooth Love Potion (SLP) token. When sold on the open market, someone could make roughly \$200 to \$1000 (USD) depending on how much they play and the market price.

Decentraland:- Decentraland is an online, digital world that combines social elements with crypto currencies, NFTs, and virtual real estate. On top of this, players also take an active role in the governance of the platform. Like other block chain games, NFTs are used to represent cosmetic collectibles. They're also used for LAND, 16x16 meter land parcels that users can purchase in the game with the crypto currency MANA. The combination of all of these creates a complex crypto-economy.

## **4. CONCLUSIONS**

With the help of metaverse users will easily take part in some meeting, concerts virtually with their existence. Metaverse also helps to interact with the people at next level. No doubt, it will experience next level but along with this it will also be helpful for those people who do not like real life, physical life. They will enjoy very well. We can also use as an entertainment purpose. It will include online game due to this it will be more popular among people. Due to this technology people will enjoy only in virtual life not in real life this will effect on their mental health and physical health. This technology will need advanced communication gadgets and tools. But it also possible that some people cannot afford these tools. Due to this metaverse world or virtual world, major metaverse stockholders become a monopoly. This will collect every single information about the user, due to these users privacy will harm.

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