MVS: A Decentralized Currency in Multiverse

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Contents

Abstract

The multiverse is a grouping of all sub-universes [1]. We start with a dream to create a multiverse ecosystem to empower people to realize where players and creators could have an equal opportunity to participate. Existing metaverse projects are not fair to players, as creators have high control over or hold a considerable portion of tokens, making them virtual worlds' Gods. People have high hope for bitcoin; however, its drawback is the inconvenience of exchanging with other metaverse tokens. What is needed is a coin connecting all metaverses that provides a decentralized way to store, account, and exchange values. The multiverse ecosystem we attempt to create has the multiverse coin and multiverse NFT, where the NFT is the miner to mine the multiverse coin. The coin mining mechanism is similar to bitcoin, except the hash power is replaced by holding stakes of NFTs. One might consider power or electricity a limited resource on earth. Bitcoin is an earth coin because its mining consumes earth resources. In the multiverse, resource and scarcity can only be defined by NFT; thus, multiverse NFT is the resource to mine the multiverse coin. The value of the coin should be correlated with the value of the NFT. Therefore, the coin's value goes up when more consensus is reached on the scarcity of the NFT and vice versa. By connecting all metaverses, the multiverse coin is the one coin to traverse the entire multiverse.

1 Introduction

Ever since bitcoin (Nakamoto, 2009) in 2009, blockchain technology has drastically evolved and changed the world. While DeFi applications aim to replace traditional financial systems, such as banks and exchanges, the idea of metaverse emerges even to recreate our world in virtual reality on the internet. Though the idea might sound aggressive, as the graphics, sounds and VR devices evolve, the gaming experience becomes more and more realistic. People began to question what is real and what is virtual?

The human quest for the truth of our world dates back to the inception of human history. The bible said, "In the beginning, God created the heavens and the earth. Now the earth was formless and empty, darkness was over the surface of the deep, and the Spirit of God was hovering over the waters. And God said, 'Let there be light,' and there was light." In Tao Te Ching (Laozi et al., 2007), Lao Tzu talked about his view on the origin of our world, "There was something undefined and complete, coming into existence before Heaven and Earth"; "The Dao produced One; One produced Two; Two produced Three; Three produced All things." Recent successful movies like the Marvel Cinematic Universe, the Matrix Trilogy (Wachowski et al., 1999) and Rick and Morty (Genovesi, 2020) have all talked about the creator, dimensionality, and multiverse from different perspectives. Today, scientists found that the quantum mechanics has reached

[1] Metaverses in various domains, such as game, art, social, gamble, film, work, education, event, and festival. Every metaverse is a sub-universe inside the multiverse. Metaverse usually runs on a blockchain or virtual reality.

beyond the known physical realm that consciousness is a fundamental component of the nature of our world. Shockingly, one might find the quantum theory shares similar aspects with the ancient buddha's views on the universe and mindfulness. For thousands of years, we have been kept seeking the answer to the question: what is our reality? Let us for now call the world we live in real and the world we create virtual.

The definition of the metaverse is the hypothesized next iteration of the internet, supporting decentralized, persistent online 3D virtual environments, according to (Ondrejka, 2004). Metaverses have become increasingly popular among millions wordwide due to there being an endless amount of possibilities to whom a person can be and what they can do in them. The lure of escapism is one of the main drivers that attracts so many to want to be completely different from what they are like in the real world. Numerous entertainment and social media companies have invested in metaverse-related research and development and expanded the use of metaverse spaces to social, games, business, education, and retail applications.

1.1 Drawbacks of Centralized Metaverses

The problem of existing metaverse projects is that their currency is highly centralized or controlled by the metaverse creators. Players are at high risk due to mainly these reasons,

- The creator has the power to mint new tokens depreciating players' assets.
- The creator holds a considerable portion of tokens, having the possibility to dump their holdings, thus triggering a panic selling or rug pull (abandon the project and run away with funds).
- The tokenomics is not transparent. The exact token mechanism and distribution might not be apparent to the public.
- Project intrinsic risk. The developers might choose a very wrong path causing its metaverse to lose players' interests; or generate a severe bug causing a financial crisis.

To tackle these problems, the multiverse ecosystem is proposed. The model consists of two components, a multiverse coin and a multiverse NFT.

2 One Coin Traverses all Metaverses

We highlight the key features of the multiverse coin:

- **First, the coin is decentralized. All coins are in circulation on the market.**

- **Second, only specific amounts of coins are generated and mined per block, giving the coin a deflationary model with a fixed max supply, similar to bitcoin.**
- **Third, the coin is bridged with all metaverses, making the exchange fast and straightforward.**

The first and second features ensure that the multiverse coin is safe and a good store of value. The third feature provides flexibility and convenience. Users can exchange the coins for tokens when they participate in certain metaverses and change their tokens back to the coins at any time, in a second, when they decide to lock the profit.

By connecting all metaverses into a multiverse ecosystem, the multiverse coin is the medium of exchange. Players and creators are free to exchange and store value for the first time without worrying about a third party.

3 Philosophy in Multiverse NFT

Non-fungible tokens (NFTs) are cryptographic assets on blockchain with unique identification codes and metadata that distinguish them from each other (Ante, 2021). The NFT can be associated with a particular digital or physical asset and a license to use the asset for a specified purpose. Traditionally, NFT has been used in including digital art, games, virtual festivals, music, films. More advanced applications include property rights, real estate, particular privileges, and identities.

One could think of NFT as a one-to-one mapping that maps X to an NFT. The next question that comes to mind is about NFT's value. Who exactly sets the price is a common question for those who have never dealt with NFTs or blockchain technologies before. Historically, the economic value of a good or service has puzzled economists since the beginning of the discipline. Among the competing schools of economic theory there are differing theories of value. In classical economics, the value of an object or condition is the amount of discomfort/labor saved through the consumption or use of an object or condition (Desai, 2010). In neoclassical economics, the value of an object or service is often seen as nothing but the price it would bring in an open and competitive market. It is determined primarily by the demand for the object relative to supply in a perfectly competitive market. The idea of value has evolved throughout human history.

NFTs are not restricted to typical assets such as conventional paintings with a real-world value attached to them. They also extend to virtual content such as social media posts that usually come without a price tag. According to (Chang, 2020), NFT can be valued as a function of four components: utility, ownership history, future value, and liquidity premium. The key takeaway is that NFT creates many new ways for values to be created for both developers and asset owners.

3.1 Fundamental Elements in Multiverse and Scarcity

Here, we elaborate from one perspective that valuation is driven by scarcity of supply and speculation. Scarcity means that the demand for a good or service is greater than the availability of the good or service (Society, 2020). Things on earth that are considered limited, like gold, diamonds, or certain kinds of knowledge, are more valuable for being scarce because sellers of these goods and services can set higher prices. Sellers know that because more people want their goods or services than goods and services available, they can find buyers at a higher cost. As a result, the price or value goes up.

In the multiverse with all metaverses, we define the multiverse NFT as the fundamental element, a limited original resource. A multiverse coin provides the utility to store and exchange value. Together, the coin and NFT, just like Yin and Yang (Wong, 1997) serve the decentralized currency in the multiverse.

3.2 Proof of NFT Stake and Environmental Impact

Bitcoin is thought to consume 707 kwH per transaction (Gallersdörfer et al., 2020). In addition, the computers consume additional energy because they generate heat and need to be kept cool. A University of Cambridge analysis estimated that bitcoin mining consumes 121.36 terawatt hours a year. This is more than all of Argentina consumes, or more than the consumption of Google, Apple, Facebook and Microsoft combined.

The multiverse ecosystem solves the energy problem by mapping resources and mining machines to multiverse NFTs. Proof of NFT Stake does not require computational power to solve puzzles for the right to verify transactions. Rather it works like a lottery. To be considered, potential validators stake their multiverse NFTs; the more they stake, the greater their chances of being selected randomly by the system to be the validator. The system ensures security because if validators cheat or accept false transactions in the block, they lose their NFT stakes and are banned from the network.

4 Tokenomics and Mining

The max supply of the multiverse coin is 20 billion. Five billion coins are locked in liquidity pools as the initial circulation. Initial liquidity is added 100 percent; there is no presale, private unlocks, or dev holdings. The remaining 15 billion coins are locked in the mining pool as rewards.

On BSC, every 3 seconds, a new block is generated. Every block generates 120 coins as a reward which are mined and distributed. The reward will be reduced by half every 42,048,000 blocks (approximately every four years).

The initial circulation is 5 billion coins in 2021. The mining reward is 120 coins per block. 4 years later, another 5 billion coins are mined and added to the circulation, leaving 10 billion inside the mining pool. After 2025, the mining reward is reduced by half to 60 coins per block. At the end of 2031, the mining reward will be reduced to 15 coins per block (figure 1).

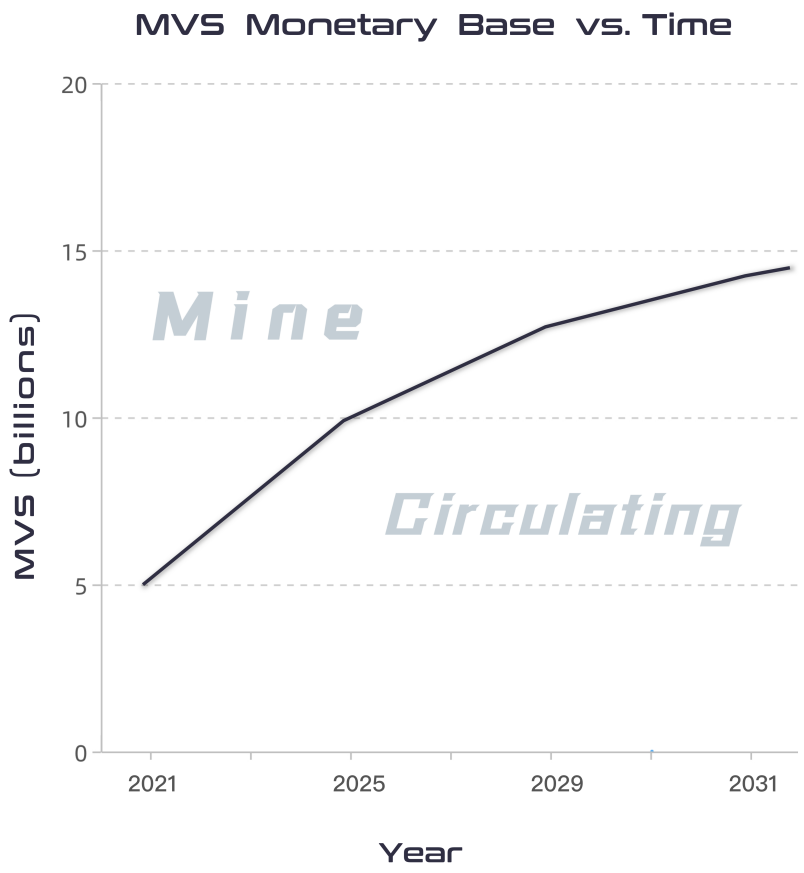

Figure 1: MVS Circulation and Mine

Multiverse NFT is the resource in the multiverse. By staking multiverse NFTs, users can mine multiverse coins.

- Each multiverse NFT has a computation power of 1.
- Mining rewards are distributed to staked NFTs.
- Multiverse NFT is free to be traded and exchanged on the market.

Compared with bitcoin proof of work mining, multiverse coin mining does not compete in hash rate or cost electricity. This proof of NFT stake mining has several advantages,

- Zero Energy Consumption.

Much of the impetus for multiverse coin mining is avoiding the tremendous amount of energy proof of work demands while preserving the same profit level.

- Flexible Design.

  Unlike bitcoin mining, which often requires enormous effort to set up mining machines and infrastructures, multiverse coin mining can be highly flexible. Miners choose to stake or unstake; trade in or out, instantly.

- Strong Incentives.

  Due to the hash rate competition and bitcoin reward reduction, the infrastructure demand is way higher than before but with less profit. The economic interest makes multiverse coin mining much more attractive.

5 Multiverse Road Map

The dream is to create a multiverse where players can traverse metaverses easily. We start with the launch of the multiverse coin and NFT. Next, by staking multiverse NFTs, miners are mining multiverse coins as a reward. The multiverse NFT market provides the trade and exchange of multiverse NFTs. To further publish and spread the multiverse ideology, DAO is the core of our community.

A decentralized autonomous organization (DAO) (Chohan, 2017) is an entity with no central leadership. Instead, decisions are governed by a community and organized around a specific set of rules enforced on a blockchain. DAOs are internet-native organizations collectively owned and managed by their members. The multiverse team will utilize its coin and NFT to eventually launch a process allowing all holders to vote on the project's future direction or changes that will be implemented as the ecosystem evolves. DAO will ensure that the multiverse remains relevant and enjoyable for the people it serves and maintains the core tenant of decentralization.

For every patch of multiverse NFT, 90 percent directly goes into circulation; 10 percent donates to the multiverse community to develop the ecosystem.

The MultiverseSwap is the bridge for metaverses to communicate with each other. DeFi (Zetzsche et al., 2020) is the key component in multiverse financial system. To prosper the ecosystem, the Multiverse Investment Fund is established at this stage for expansions to entertainment, NFT museum, art, finance, technology, and the Proof of NFT Stake practice.

5.1 Multiverse Coin and NFT

- Launch of the coin and NFT
- Development of the mining and market
- DApp (Cai et al., 2018) entrance and websites ready
- Marketing push to spread multiverse ideology

- Multiverse DAO (Chohan, 2017) and community

5.2 Multiverse Bridge and Swap

- Launch of the MultiverseSwap
- Development of the Multiverse Bridge.
  This includes exchange, liquidity, farm, pool, vault, and bridge
- Multiverse NFT museum
- Influencers marketing push
- Listing on major exchanges
- Third party audit

5.3 Multiverse Ecosystem

- Launch of the Multiverse Investment Fund
- Investment and development on more metaverses
- Expansion of multiverse to art, finance, entertainment, technology, etc
- 1T market cap
- Proof of NFT Stake
- Multiverse ETF and trust

6 Technical Report

Blockchain is the fundamental technology to support the multiverse economic system. The decentralization of MVS ensures that users' virtual assets can be stored and circulated across various sub-universes.

MVS has applied numerous state-of-art blockchain technologies, NFT, DAO, smart contracts, and DeFi. The multiverse team's mission is to effectively provide a decentralized multiverse ecosystem that is fair, stable, efficient, transparent, deterministic, and sustainable.

All of our applications are implemented by smart contracts technology. **Every operation, including transfer, transaction, trade, numerical randomization, stake or unstake, is recorded on the blockchain forever.**

MVS contains three layers of blockhain applications:

- Application Layer.
  DApp (Cai et al., 2018) (Decentralized Application) connects users' wallets and assets. This is the entrance to the multiverse.

- Logic Layer.

  BSC, BEP20, BEP721, ERC20, ERC721, smart contracts, decentralized algorithm and data structures.

- Data Layer.

  Assets and data are stored using state-of-art techniques, IPFS, ERC721, cryptography, ChainLink Oracle (Breidenbach et al., 2021).

Multiverse NFT is a significant resource in the multiverse. To make a fair and transparent market, binary search algorithms and ChainLink oracles (Breidenbach et al., 2021) are in the contract to calculate the probability in NFT blind boxes.

6.1 CodeSnap (ChainLink Oracle)

```
1  import "@chainlink/contracts/src/v0.8/VRFConsumerBase.sol";
2
3  contract Random is VRFConsumerBase {
4      bytes32 internal keyHash;
5      uint256 internal fee;
6
7      constructor()
8          VRFConsumerBase(
9              0x747973a5A2a4Ae1D3a8fDF5479f1514F65Db9C31, // VRF
                   Coordinator
10             0x404460C6A5EdE2D891e8297795264fDe62ADBB75 // LINK
                   Token
11         )
12     {
13         keyHash = 0
               xcaf3c3727e033261d383b315559476f48034c13b18f8cafed4d871abe5049186
               ;
14         fee = 0.2 * 10**18;
15     }
16
17     /**
18      * Requests randomness
19      */
20     function getRandomNumber() internal returns (bytes32 requestId)
           {
21         require(LINK.balanceOf(address(this)) >= fee, "Not enough
               LINK - fill contract with faucet");
22         return requestRandomness(keyHash, fee);
23     }
24
25     /**
26      * Callback function used by VRF Coordinator
27      */
28     function fulfillRandomness(bytes32 requestId, uint256
           randomness) internal virtual override {}
29 }
```

6.2 CodeSnap (Binary Search Randomization)

```
    function getBunnyIdByRandom(uint256 random) public view returns
         (uint8) {
        uint8 left = 0;
        uint8 right = bunnyCount - 1;
        uint8 mid;
        while (left <= right) {
            mid = (left + right) / 2;
            if (random < bunnyIdToProp[mid].weight[0]) {
                right = mid - 1;
            } else if (random >= bunnyIdToProp[mid].weight[1]) {
                left = mid + 1;
            } else {
                return mid;
            }
        }
        return 255;
    }
```

6.3 CodeSnap (ChainLink Oracle Blind Box)

```
    function fulfillRandomness(bytes32 requestId, uint256
        randomness) internal override {
        uint8 bunnyIndex = getBunnyIdByRandom(randomness %
            totalAward);
        require(bunnyIndex != 255, "error");
        while (bunnyIdToProp[bunnyIndex].amount == 0) {
            bunnyIndex++;
            if (bunnyIndex == (bunnyCount - 1)) {
                bunnyIndex = 0;
            }
        }
        bunnyIdToProp[bunnyIndex].amount--;
        uint256 tokenId = nft.mint(
            requestIdToAddress[requestId],
            bunnyIdToProp[bunnyIndex].uri,
            bunnyIdToProp[bunnyIndex].bunnyId
        );
        emit OpenBoxWithOracle(requestId, requestIdToAddress[
            requestId], tokenId, bunnyIdToProp[bunnyIndex].bunnyId)
            ;
    }
```

6.4 Mining Mechanism

By staking multiverse NFTs on cloud mining pools, multiverse coins are mined as a reward. Smart contracts make sure security and transparency: computation power, rewards are calculated on the BSC blockchain. **The number of block rewards, the halving cycle, the releasing algorithm logic is all constant parameters in smart contracts, thus unchangeable.**

On BSC, a new block is generated every 3 seconds. Every year generates about 10,512,000 blocks. Each block releases 120 coins as reward. The number of rewards is reduced by half every 42,048,000 blocks (about 4 years).

From 1-4 year, every block generates 120 coins as a reward, totally 5B.

$$4 \times (60/3 \times 60 \times 24 \times 365) \times 120 = 4 \times 10512000 \times 120 \approx 5B \tag{1}$$

From 5-8 year, every block generates 60 coins as reward, totally 2.5B.

$$4 \times (60/3 \times 60 \times 24 \times 365) \times 60 = 4 \times 10512000 \times 60 \approx 2.5B \tag{2}$$

.....

6.5 CodeSnap (Mining Constants)

```
...
  uint256 public MVS_NFT_HASH_RATE = 1;
  uint256 public MVS_BLOCK_TIME = 3;
  uint256 public BLOCKS_PER_YEAR = 10512000;
  uint256 public MVS_HALVING_PREIOD = BLOCKS_PER_YEAR * 4;
  uint256 public REWARD_PER_BLOCK = 120;
...
```

6.6 CodeSnap (Reward and Halving)

```
  // Each block rewards number
  function getRewardTokenPerBlock(uint256 blockNumber)
    public
    view
    returns (uint256)
  {
    uint256 _phase = _phase(blockNumber);
    // Half cycle
    return rewardPerBlock.div(2**_phase);
  }

  // The halving period of current block
  function _phase(uint256 blockNumber) internal view returns (
      uint256) {
    if (MVS_HALVING_PREIOD == 0) {
      return 0;
    }
    if (blockNumber > startBlock) {
      return (blockNumber.sub(startBlock).sub(1)).div(
          MVS_HALVING_PREIOD);
    }
    return 0;
  }

  function getRewardTokenBlockReward(uint256 _lastRewardBlock)
    public
    view
    returns (uint256)
  {
    uint256 blockReward = 0;
    uint256 lastRewardPhase = _phase(_lastRewardBlock);
    uint256 currentPhase = _phase(_getCorrectBlock(block.number));
    while (lastRewardPhase < currentPhase) {
      lastRewardPhase++;
      uint256 height = lastRewardPhase.mul(MVS_HALVING_PREIOD).add(
          startBlock);
      blockReward = blockReward.add(
```

```
        (height.sub(_lastRewardBlock)).mul(getRewardTokenPerBlock(
            height))
      );
      _lastRewardBlock = height;
    }
    blockReward = blockReward.add(
      (_getCorrectBlock(block.number).sub(_lastRewardBlock)).mul(
        getRewardTokenPerBlock(_getCorrectBlock(block.number))
      )
    );
    return blockReward;
  }
```

6.7 Multiverse NFT Market

The vitality of decentralized API service and graphics technology ensures fairness and complete decentralization; smart contracts are used to process NFT transaction operations, such as transaction NFT, purchase NFT, cancel the sale, modify the price, purchase matchmaking for other businesses. Thegraph is used to synchronize events in the block for DApp to display the records of transaction activities and provide data services. All transactions are decentralized in the multiverse Market.

```
    /**
     * @notice Buy nft by matching the price of an existing ask
         order
     * @param _collection: contract address of the NFT
     * @param _tokenId: tokenId of the NFT purchased
     * @param _price: price (must match the askPrice from the
         seller)
     */
    function buyNft(
        address _collection,
        uint256 _tokenId,
        uint256 _price,
    ) internal {
        ...
        Ask memory askOrder = _askDetails[_collection][_tokenId];
        ...
        _tokenIdsOfSellerForCollection[askOrder.seller][_collection
            ].remove(_tokenId);
        delete _askDetails[_collection][_tokenId];
        _askTokenIds[_collection].remove(_tokenId);
        ...
        IERC20(WBNB).safeTransfer(askOrder.seller, netPrice);
        ...
        IERC721(_collection).safeTransferFrom(address(this),
            address(msg.sender), _tokenId);

        emit Trade(_collection, _tokenId, askOrder.seller, msg.
            sender, _price, netPrice);
    }
```

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