Chapter 5
The World of NFTs (Non-Fungible Tokens): The Future of Blockchain and Asset Ownership

Ramakrishnan Raman
https://orcid.org/0000-0001-8934-8625
Higher Colleges of Technology, UAE

Benson Edwin Raj
Higher Colleges of Technology, UAE

ABSTRACT

Tokenizing assets through the use of blockchain is the next big thing in digital currency markets. Securing the assets in the world of the internet is challenging as most of them can easily be copied and sold in the secondary market. Protecting the rights of the asset owner is one of the challenging research areas. NFTs (non-fungible tokens) are very useful in representing the ownership of unique items for any assets. NFTs ensure that an asset can have only one official owner at any point in time with the help of Ethereum-based blockchain network. Ethereum NFTs can ensure that no one can modify the ownership rights or copy and paste the digital assets. NFTs are a boon to the artists, musicians, and others who want to create impressive digital assets. The objective of this chapter is to take you to the world of NFTs and to explain how the NFTs are going to impact digital transactions in a bigger way in the future. This chapter covers the introduction, technical aspects, security impacts, use cases, and successful implementations of NFTs in various realms.

INTRODUCTION TO BLOCKCHAIN AND BITCOINS

Blockchain has the huge potential to challenge the way the businesses are working in digital realm. In 2008, the first blockchain was conceptualized by Nakamoto where it's evolved and applied in many domains

DOI: 10.4018/978-1-7998-5839-3.ch005

beyond cryptocurrencies. In the whitepaper released by Nakamoto in 2009, he provided technological aspects of blockchain with how the decentralization and trust works together. This paper focused on the usage of cryptocurrencies as an alternative to the fiat currency. Blockchain is a P2P DLT (Peer-to-Peer Digital Ledger Technology) which is secured and record transactions across many computers commonly known as nodes. In other words, blockchain is a platform where people are allowed to perform transactions without the centralized control or trusted arbitrator. P2P networks take care of managing these records and along with a time-stamping server.

A blockchain is a collection of blocks. Each block contains the transaction data, the timestamp of the transaction and the crypto key. For example, in the bitcoin blockchain network, each block can have basic information about the transaction such as receiver, sender and the value of the bitcoin. Each block in a blockchain is references the content of the previous block which are cryptographically secured together. The blockchain uses asymmetric cryptography for securing the transactions. A user can generate a random private key and use it to derive a public key. The address of the user is generated using the private key and the amount also stored. The user can sign transactions from his address using his private key. The public key will be used for the verification of the origin. If the user loses the private key is equivalent to losing crypto-money in his/her account. Users can maintain digital wallets to manage their funds. The batches of transactions in the blockchain are approved by all the participants in the node. Every transaction in the ledger is added to the chain makes it difficult to tamper or revise the data. Any new transactions to the blockchain network need to get approval from all the nodes or in other words, "consensus" to add the transaction to the existing chain. Hence, the blockchain transactions are trusted, shared, public but with no single user control (Beck, R. and C. Müller-Bloch., 2017). The following four pillars of blockchain technology ensure this technology is creating ripple effects in the various sectors from financial to manufacturing to education.

- Immutability ensures the transaction data in blockchain environment are immutable
- Finality gives the assurance that the transactions cannot be cancelled or altered once completed
- Consensus a fault-tolerant mechanism that is used in computer and blockchain systems to achieve the necessary agreement on a single data value or a single state of the network among distributed processes or multi-agent systems. (Investopedia)
- Provenance allows businesses to collate, verify and validity of the key data in the blockchain platform.

Here is the quick summary of how does the blockchain works:

1. The transaction request is the first step in blockchain
2. To represent this transaction, a block will be created
3. This transaction block is sent to all the nodes in the blockchain network. Each block consists of the data, the previous block hash, and the current block hash.
4. The nodes once received the block, it starts validating the block using a consensus method.
5. After successful validation and approval from 51% of the network nodes, the block will be added to the existing blockchain environment.

Many of us believe, bitcoin and blockchain are same. However, we need to understand that the blockchain is the underlying technology for cryptocurrencies such as bitcoins. Bitcoin is the first real world