© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 13 Issue: 03 | NCASIT- 2022 | April 18th 2022
Paper is available at http://www.jrps.in | Email : info@jrps.in
Refereed & Peer Reviewed

Non-Fungible Token Environment using Blockchain

Ms. Vaibhavi Weiginwar
Department of Computer Engineering
St. Vincent Pallotti College of Engineering & Technology
Nagpur, India.

Ms. Shubhi Rai
Department of Computer Engineering
St. Vincent Pallotti College of Engineering & Technology
Nagpur, India.

Ms. Vibha Dodke
Department of Computer Engineering
St. Vincent Pallotti College of Engineering & TechnologyNagpur, India.

Abstract: In today's world, everything is digitalized and people continueto rely more on the technology. Due to this the need tominimize the manual work continue to arise. After the covid pandemic this need has increased tremendously. Everyone wishes to claim ownership of their work, rather it be a new discovery or simply a digital art. To claim ownership of one's digital art the concept of NFT can be used. These are non- exchangeable token which identifies a resource uniquely. By means of this project, our aim was to create an environment where a person can claim ownership of their work. The user canadd these work and then a NFT will be generated by the use ofa smart contract drafted in the ERC 720 standard. Ethereum blockchain used ensures the security for the digital assets. The ownership rights can be obtained digitally by the use of this environment.

I. LITERATURE REVIEW

NFTs in Practice – Non-Fungible Tokens as Core Component of a Blockchain-based Event Ticketing Application

The motivation behind this research considers NFTs as an emerging aspect and estimates NFTs as a core component for a blockchain along with inscript this space between theoretical and practical knowledge and illustrates the capabilities of NFTs in the domain of event ticketing. They go along with a design science method based on the instructions by Hevner et al. (2004) The use case of this paper itself is limited to a simplified model of necessities for an event ticketing system and does not trap the part of other stakeholders. In Spite of these they focus on the contrast between NFTs and fungible tokens and also contribute benefits of NFTs for the use case of event tickets and grant proof by construction through an achievable implementation of a working prototype (Hevner et al., 2004). Finally, this research provide as a foundation for forthcoming theoretical and practical research on NFTs also allow researchers to design principles and lay ground to higher-theory development (Gregor, 2006) [1].

Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges

Proposed technical report looks into the NFT ecosystems in various aspects. They begin with the introduction of state-of-the-art NFT solutions, giving technical components, protocols, standards and desired resources also provide dependable evolution, with analysis on the prospect of their design models, opportunities and challenges. This report explores the advantages and challenges of NFTs in various fields like gaming industry, virtual events, digital collectibles. Metaverse also discusses some issues of usability, security, governance, and extensibility [2].

The non-fungible token (NFT) market and its relationship with Bitcoin and Ethereum

In this thesis connection between NFT sales, NFT users (unique active blockchain wallets), and the ratings of Bitcoin and Ether is proposed with the outcome that (larger) cryptocurrency markets influence advancement of the (smaller) NFT market, but there is no vice versa. The results provide research on spillover outcomes between blockchain-based markets of various sizes also limited with an argument that suggests notable challenges to blockchain based and cryptocurrency markets (Cong et al., 2020; Le Pennec et al., 2021). This paper has inspected the flexibility and adaptability between the cryptocurrency market and the NFT market, advancing to the appearing literature on the latter [3].

Blockchain Based Decentralized Computing And NFT Infrastructure For Game Networks

Proposed system constructs decentralized computation and token management infrastructure for game networks. This paper targets on using Ethereum Blockchain, IPFS and ERC - Ethereum Request for Comment 1155 architecture to construct a gaming-oriented public decentralized network. The architecture of this paper makes use of the decentralized network in which independent proxy nodes are accessible

throughout. Also explains the complexities with the current centralized gaming networks and suggests a protocol for its thorough decentralization [4].

II. INTRODUCTION

OVERVIEW

NFT is a method to store, analyses and track the possession of a unique digital asset. NFT can be used to display the work of art, contracts, music, paintings, book, etc. any type of Item that would be considered unique or rare. With the minting process NFT's are stored in the block-Chain environment and hence it cannot be forged by any bad actors. With the help of NFT owner can get instant authenticity to his digital asset, by eliminating the problem of counterfeiting. Some of the key characteristics of NFT are indivisibility, ownership, uniqueness, rarity, transparency, interoperability.

ADVANTAGES

Decentralized Marketplace: According to the research the token standard that is most widely used is ERC-721 and ERC – 1155 token standards. They are used to create various NFTs. Some of the recent launched NFTs use hybrid ERC-20 token standard to create NFT. Creators work to get money directly from the NFTs created. NFTs eliminates all the technicalities and allow the artists or the owner to transact directly with their customers. The creators are benefited by the NFT exchange because it gives them a chance to earn a commission.

Unique: They are limited or only one of them exist and is not easy to forge. In many cases, an artist or a seller will have numerous NFTs. It is therefore safe to presume that you are the only owner of your collectibles.

Collectibles: According to technicalities NFTs are collectibles. They are unique as discussed above and only one of each exist. While buying the, you can keep a hold on them and their value increases over time.

Resalable: Most of the people get involved in NFTs for making money. There are numerous people who are making money after reselling them. Thinking of investing in NFTs due to its resale value may lead to huge profits. Some of the buyers invested only few thousand dollars but were profited by the collectibles which were resold for more than 20,000 USD. By reselling they were profited by 15000 USD in just one trade.

Immutable: The token metadata can never be altered by people. And also it can never get erased, misplaced nor be removed from the blockchain. They are meant to last forever and their data will always remain the same. This gives them collectability and high value.

Copyright: One of the greatest advantages of NFT is that it gives artists and the content creators to keep their full copyright. In most of the licensing agreements it is uncommon. Without giving the copyrights it allows them to generate revenue.

Security: When it comes to NFT we can be assured of security. The nature of blockchain is decentralized, which means around the globe the data they hold is hosted in different nodes. Even if the network is down, somewhere the record of is always stored.

The blockchain technology assures that no matter what happens there are always nodes running. SO nothing can really happen to the data.

NFTs are given leverage in various industries like art and music wherein gatekeepers such as brokers, galleries, agents, and labels holding keys to the kingdom of intellectual ownership. In gaming industries where one would adopt NFTs because most of the games have created virtual economies by adding in-app purchases, tokenize assets which one can buy within a game like shield or skin. In metaverse digital 3D universes give users and businesses opportunities to port real-world assets and services for fair economy backed by blockchain technology. Sports industries are the ones who are most impacted by the NFTs because it caught the mainstream attention in 2017 with Crypto kitties collectibles. For IOT it creates the token for massive data so that it could be traced easily and can be prevented from being forged by common public over internet. Land assets are represented as NFT, letting the individual or a group prove their ownership using crypto securing the digital token. Instead of legalities smart contracts ensures that money and assets change hands and both parties honor their agreements.

If one wants to buy NFTs first of all he needs to get digital wallets which allows you to store NFTs and cryptocurrencies. Then you'll need to purchase some cryptocurrencies lie ether or depending upon what cryptocurrency the provider accepts. Some of the popular marketplaces for buying NFTs are OpenSea.io, Rarible, Foundation. Like purchasing there is a platform in the same way a person can trade them on the marketplace from where he has purchased.

III. BACKGROUND AND RELATED WORK

Smart Contract: Smart contracts are one of the most powerful features of blockchain technology. A smart contract is a digital contract where the terms of agreement between users is set in code. A smart contract can also be programmed to self-execute when a set of predefined conditions are fulfilled. Smart contracts exist on decentralized and distributed blockchain networks. There are efforts underway by several organizations to create smart contracts which will hold up in a court of law. The solutions will likely be in the form of smart contract interfaces where the code in a smart contract will simultaneously create a document in plain English defining the terms of the contract.

Smart contracts can be programmed to trigger other smart contracts into action or create new events when they are executed. Smart contracts can also hold assets, NFTs and cryptocurrencies within them. These assets can be distributed

upon execution when a set of conditions are met based on the code defined in the contract.

Minting: Minting, in regards to NFTs, is the process of taking a digital asset and converting the digital file into a digital asset stored on the blockchain. Making it officially a commodity that can be bought and sold. To break it down further, a digital asset refers to any file that is created electronically. This can be an image, article, video etc. Converting it into an NFT, is known as minting, this is where the digital asset is added to a blockchain, typically Ethereum. The blockchain is a decentralized, digital ledger and once an asset is added to it, it cannot be modified, edited or deleted. Once the asset is minted and officially an NFT it can be sold at an NFT marketplace.

Blockchain: Blockchain is a system for securely recording and storing information and transactions in a database that is duplicated and distributed across a network of computer systems. The blockchain database is referred to as a "ledger" and for this reason, blockchain is also referred to as "distributed ledger technology." Blockchain ledgers can be made either public (like Bitcoin) or private (similar to a closed corporate intranet network). Unlike a traditional database which usually structures its data into tables, the blockchain ledger collects information together into groupings or units known as "blocks" that hold sets of information or data. The type of transaction and amount of data that can be captured in a block depends on the particular blockchain. When a transaction is entered into the blockchain system it is transmitted to a network of peer-to-peer computers that can be anywhere in the world. There are different protocols available for validating transactions on the blockchain. Bitcoin, for example, relies upon Proof of Work, whereby computers on the blockchain use their processing power to solve equations to confirm the validity of the transaction. Other blockchains may use other protocols for validation of transactions. Once the transactions are confirmed to be legitimate, they are chained together in blocks that are given an exact time stamp and a cryptographic signature called a hash. The blocks constitute the ledger to create a long history of all transactions that is permanent and generally immutable, i.e., it cannot be changed. Immutability is an important feature, because it means that if one block in one chain is changed, then the block fails. This makes it difficult (although not impossible) to change, hack, or cheat the system. For example, if hackers wanted to corrupt a blockchain system, they would have to change every block in the chain, across all distributed versions of the chain, which is highly unlikely from a technical perspective.

Ganache: Ganache is part of the Truffle Suite ecosystem. Specifically, the Truffle Suite consists of Ganache and an additional pair of tools; Truffle and Drizzle. Ganache is a high-end development tool used to run your own local blockchain for both Ethereum and Corda dApp development. Ganache is helpful in all parts of the development process. The local chain allows you to develop, deploy and test your projects and smart contracts in a deterministic and safe environment.

There are two different "versions" of Ganache, one desktop application, and one command-line tool. The desktop application is called Ganache UI, and it supports development for both Ethereum and Corda; meanwhile, the command-line tool is called ganache-CLI, which solely supports Ethereum development. Furthermore, all the different versions of Ganache are available for Mac, Windows, and Linux.

IV. METHODOLOGY

BRIEF OVERVIEW

NFTs are used to generate unique tokens and provide ownership rights. To provide a platform to connect the solidity drafted smart contract with the Ethereum blockchain, a platform is required to connect and provide an interface for the user, python language is used for that. The user interface is created entirely in python. The user can put the digital art and then keys will be generated for the same. When a smart contracted by the use of such set of keys, the NFT is now ready to be minted. The minting can be done on the Ethereum blockchain and EVM (Ethereum Virtual Machine). The successful generation of NFT needs to be verified. The Ethereum is a secured blockchain and the testing cannot be done directly, as such minting process will require the transactions based on real money. To avoid dealing with real money, the software Ganache can be used. This software is useful to test the environment and check whether the NFT has been generated. To fulfill this, Ganache provides test eth also known as dummy Ethereum for testing and verification that NFT has been generated properly or not. Using Ganache one can trade and do minting of NFT.

ARCHITECTURE

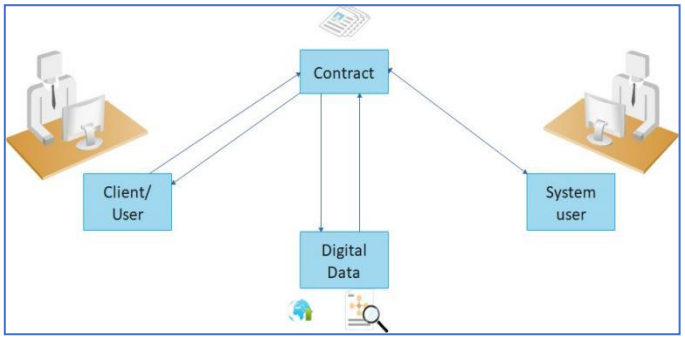


Fig. 1

The architecture of the system is depicted in fig. 1. The user can put the asset in the environment then a smart contract will be drafted using the solidity language. The platform will act as a bridge between user and the blockchain technology to obtain the NFT.

WORKING

The system will begin when a user will submit the digital art in the system. A smart contract will be drafted using the use of solidity language. The smart contract drafted will be based on the ERC 720 standard. When a smart contract is drafted then

the NFT will be generated. This NFT can now be minted by using Ethereum blockchain.

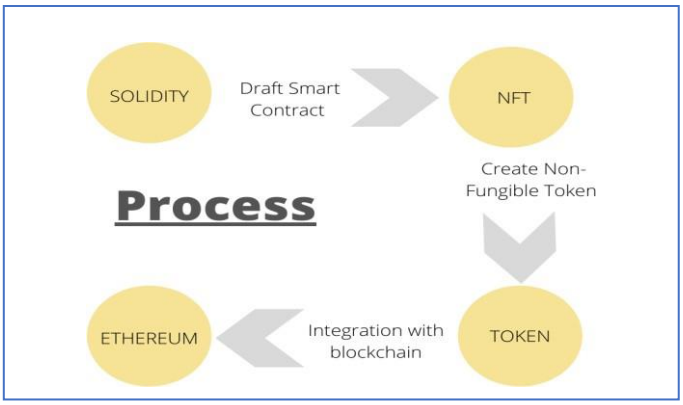


Fig. 2

V. RESULT

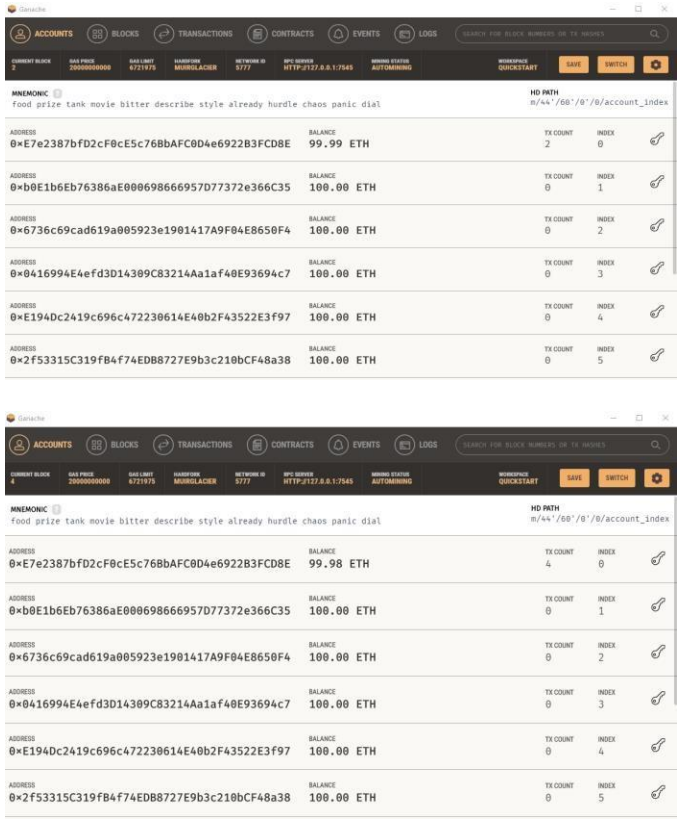
The non-fungible token environment was implemented. The tools used were python, solidity, Ethereum blockchain and ganache software.
The screenshots of the finished projects are attached below.

The images used for NFT generation.

```
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May  3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: D:\docsclg\study from home\major project\NFT_Project\Smart Contracts
in Blockchain\deploy.py
Installing...
Deploying Contract!
Waiting for transaction to finish...
Done! Contract deployed to 0xdDBE3b6B37A96019bB1c9D29620028F62B14D41A
Initial Stored Value 0
Updating stored Value...
15
>>>
= RESTART: D:\docsclg\study from home\major project\NFT_Project\Smart Contracts
in Blockchain\deploy.py
Installing...
Deploying Contract!
Waiting for transaction to finish...
Done! Contract deployed to 0xDaCF967767eFe885C55C2b55A8c058F85b979058
Initial Stored Value 0
Updating stored Value...
15
>>>
```

Deployment of the smart contract of solidity.

The test environment of Ganache.



Minting of the NFT by test Ethereum

VI. CONCLUSION

NFT (Non-fungible token) are used to establish ownership rights. By means of this project an environment was created to generate NFT for the digital data taken in consideration. Initially one image was taken into consideration for development of this environment. As the project progressed the project can now generate NFT for multiple datasets at once. The testing of this environment was concluded successfully using the means of Ganache software.

The future scope for this project is a wider one. The environment can be developed as a web based tool so that installation and set-up process can be avoided all together. This will make the project easier to use and make it platform independent.

ACKNOWLEDGMENT

We extend our gratitude to Mr. Krunal Kalbhende and Cojag Smart Technology, Nagpur for giving us this opportunity to work on this project and for continuous mentorship. We are especially indebted to Prof. D. Wajgi for his insights and valuable comments that improved this project immensely. We thank Dr. S. Wanjari, HOD of our department for his continuous guidance. We kindly thank the management of our college for their support. We are immensely grateful to our colleagues who have been supportive of this project throughout.

REFERENCES

[1] NFTs in Practice – Non-Fungible Tokens as Core Component of a Blockchain-based Event Ticketing Application
https://www.researchgate.net/publication/336057493_NFTs_in_Practice_-_Non-Fungible_Tokens_as_Core_Component_of_a_Blockchain-based_Event_Ticketing_Application

[2] Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges
https://www.researchgate.net/publication/351656444_Non-Fungible_Token_NFT_Overview_Evaluation_Opportunities_and_Challenges

[3] Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges
https://www.researchgate.net/publication/351656444_Non-Fungible_Token_NFT_Overview_Evaluation_Opportunities_and_Challenges

[4] The non-fungible token (NFT) market and its relationship with Bitcoin and Ethereum
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=386