

Non Fungible Token

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ABSTRACT

An NFT is a digital asset that represents real-world objects like art, music, in-game items and videos. They are bought and sold online, frequently with cryptocurrency, and they are generally encoded with the same underlying software as many cryptos. Unlike cryptocurrencies, they cannot be traded or exchanged at equivalency.

This differs from fungible tokens like cryptocurrencies, which are identical to each other and, therefore, can be used as a medium for commercial transactions. Types of NFT data units may be associated with digital files such as photos, videos, and audio each token is uniquely identifiable, NFTs differ from blockchain cryptocurrencies, such as Bitcoin.

In this paper, we aim to simplify the journey for anyone looking to understand this new technology by providing them a thorough overview which includes investigating the history of NFT, what brings it value, the technical details, the challenges it faces, the use cases, security, risks, NFT Marketplace and Vulnerability of the new digital asset world of NFT.

KEYWORDS: Non Fungible Token, Ethereum, Money Laundering, NFT, ERC 1155, ERC 721

INTRODUCTION

The origin of the concept which led to the creation of today's NFTs can be traced back to 2012 when "colored coins" were being discussed in the bitcoin community. The idea of colored coins was simple yet novel, as we all know that bitcoins are fungible, that is, one bitcoin can't be differentiated from another. However, it was observed that by meticulously tracing back the origin of a particular bitcoin, it was feasible to distinguish it from others by assigning a 'color'. The use cases of this new concept included digital collectibles, community currencies, corporate currencies, smart properties, and issuing shares of a company. Through various research papers were written on it, including one from Vitalik Buterin, Ethereum's founder, the idea of colored coins didn't materialize due to the reluctance of the bitcoin community, but it certainly laid the foundation for NFTs.

In 2019, NFT marketplaces, or exchanges launched, the popular ones being Opensea.io and Rarible. Users could trade using smart contracts, allowing trustless transactions to happen securely, and a record of the ownership of the NFT is maintained on the

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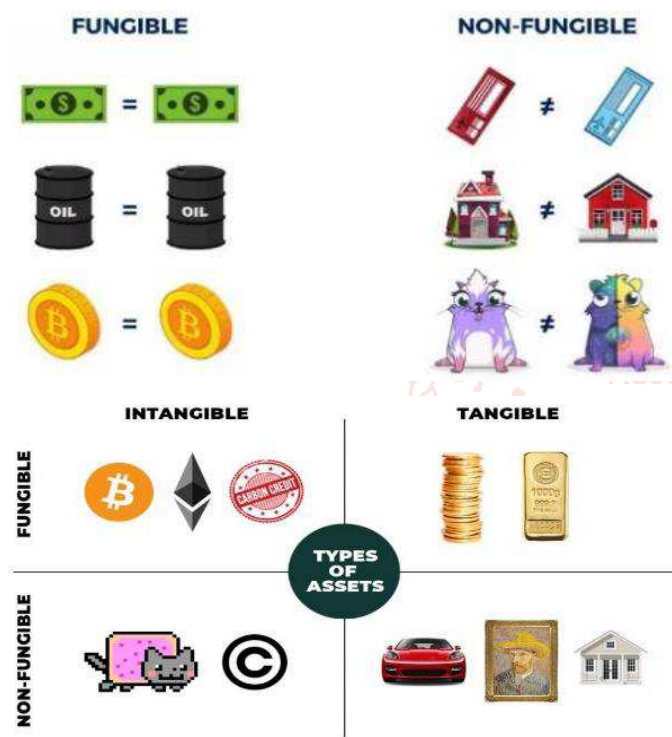
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blockchain. Further, the creator of the NFT gets royalties whenever it is re-sold to a buyer. With the features of scarcity, high liquidity, valid ownership, royalties to the creator, secure trustless transactions, and ease of exchange NFTs tend to have the potential to become intellectual properties. This is what ascribes value to it. As a result of which the artist Beeple was able to sell their digital art as an NFT for about \$69 million and Twitter's CEO Jack Dorsey sold the first-ever tweet for about \$2.9 million. Even though NFTs have gained a lot of attention in a short period, one should not take it for granted, it is still in the initial stages of its development. There are many challenges yet to be overcome and many opportunities to be explored. Through this paper, we intend to provide a one-stop-shop for anyone looking to grasp this new concept by going through the overview of what an NFT is and how it is made, going into the technical details of it, explore the potential use cases, point out the challenges and lastly correlate the price action of NFTs and the active wallet addresses to the market price of Bitcoin and Ethereum.

What is Non Fungible Token?

A fungible token is very intuitive concept, it is a dollar, a bitcoin, an ETH, and basically any asset that can be exchanged for another like one. Here the forbidden genius of crypto math shines: 1Bitcoin = 1Bitcoin. If I gave you a Bitcoin that was extracted in block #310,000 & you gave me back a Bitcoin that was extracted in block #330,000 there is no difference to our network. When thinking about a non-fungible value it is best to imagine real-estate. If you have a 5 acre plot of Land with a blue 4 family house & I have a 5 acre plot with a red 4 family house there are so many micro nuances that suggesting trading the two is insane. Perhaps your house had new piping done & mine had new roofing; you have a brilliant garden & I have a tire swing; maybe even the fact that they are a block away can influence the properties value. This is non-fungibility.



Characteristics of NFT:

While it is impossible to account for every variation and standard, we can identify some widely accepted and foundational characteristics that are shared amongst most NFT deployments. These include uniqueness, transparency and provability of ownership, asset programmability and immutability of records.

➤ **Uniqueness:** With NFTs it is possible to produce a limited number of tokens, with each being individually identifiable. A popular example are the 10 000 unique NFTs issued by CryptoPunks. Though in some cases having similar NFTs is plausible, as is the case with numbered series of an artist's digital work. A good way of thinking

this is the analogy of 1:1:X, or one, out of one, out of X.

➤ **Rarity:** Rarity in NFTs can come in many forms and can be either artificial, numerical or historical.

1. Artificial rarity refers to the uniqueness of the NFT as determined by its code, or the specifics of its issuance. To better understand this concept, we can again utilise the popular Cryptopunks. As determined by their issuance, only 1.75% of the total Cryptopunks have a Medical Mask feature. Contrasting this with the 24.59% chance of having an Earring, we can denote that a punk with a Medical Mask will always be rarer than the one with the Earring, if all else is equal.

2. Numerical rarity is closely tied to Artificial and as such, is relatively intuitive to understand. Consider the example of a popular artist releasing 100 digital copies of their latest music album as NFTs. Intuitively those 100 copies that come with the artists "digital signature" and can be verifiably owned, will be more scarce and thus rare, than simply streaming the album off Spotify. It is useful to think of this as the analogous of owning a physical album that is signed by the artists, and one that is not.

3. Finally, historical rarity refers to the historical significance of an NFT. This comes in many different forms. For example, part of the allure of Cryptopunks is that they were some of the first generative NFTs ever issued, thus they are special in that sense. Moreover, since blockchains record an immutable history of ownership, some NFTs might be historically significant, as they were owned by notable entities or individuals. This is analogous to how Stevie Ray Vaughan's Fender Telecaster, or Paul Newman's Rolex Daytona, are more special and shout after than any the same item, not owned by them.

➤ **Ownership:** Proof of ownership of underlying assets, potential of fractional ownership, provenance tracking of assets are some characteristics that may be highly relevant in the context of NFTs backed by real-world tangible assets.

➤ **Immutability:** This is an inherent quality of all blockchain-based tokens. The tokens as well as the information embedded on the tokens are highly resistant to tampering, absent a compromise of the underlying blockchain protocol. This results in substantial trust and transparency.

- **Programmability:** This is considered by many an important differentiating factor separating NFTs from real world assets. In addition to allowing artistic or business expression, NFTs can be programmed in any way that programmable software can – for example to ensure artists continue to receive residuals or moral rights throughout the lifetime of a work and not just the first sale. Moreover, experimental applications showcase how NFTs can be used as collateral for a plethora of DeFi applications, similarly to a mortgage.

How Does Copyright Work in NFT?

Ownership of an NFT does not inherently grant copyright or intellectual property rights to the digital asset the NFT purports to represent. Someone may sell an NFT that represents their work, but the buyer will not necessarily receive copyright to that work, so the seller may create additional NFTs of the same work. So an NFT is merely proof of ownership separate from copyright. According to legal scholar Rebecca Tushnet, "In one sense, the purchaser acquires whatever the art world thinks they have acquired. They definitely do not own the copyright to the underlying work unless it is explicitly transferred."

Use Cases of NFT:

- **Digital Art:** NFT platforms provide an avenue for artists to showcase their work, in some cases directly to the public with new or no intermediaries and lower associated costs – connecting the artist directly to the public who thereby are compensated in a fair manner by the smart contracts underlying the digital art galleries for not just the initial sale but also subsequent sales – thus making it easier to enforce moral rights that exist in some EU jurisdictions.
- **In-Game Assets:** With a market cap above 100 billion USD for the gaming industry, monetising the collectibles is certainly attractive. Major gaming houses such as EA sports, Ubisoft have already started experimenting with tokens in their platform besides provenance tracking and transaction recording on the blockchain. NFTs bring about an additional source of revenue for gamers who can buy/sell the collectibles, in-game “skins” and other assets.
- **Content ownership:** Videos/audio content in the art and music space have recently been auctioned out by artists via NFTs to raise funds for new albums, sell out old records, whereby the NFTs depict a fractional right of ownership of the content and any proceeds earned from the resale

of underlying assets will be distributed proportionally to the NFT token holders.

- **Tickets:** Tickets to events in the form of NFT serve as memorabilia to be part of a collection.
- **Certificates:** NFTs are utilised for transparency, provenance tracking and to facilitate for the authenticity and verification of records.
- **Metaverse:** NFTs are steadily emerging as the building block for the metaverse, a future state of the internet, made up of all-encompassing virtual spaces and assets that replicates or even iterates upon the physical world.

How to create an NFT:

The process of creating and then trading an NFT can be a hectic one for a newcomer, here we will give an overview of the process. There are five main tasks involved.

- First, The actual creation of art, as in a photograph, digital art, audio file, and so on.
- The NFT creator uploads the file, writes a description and title, sets the percentage of royalty they desire on the resale.
- The owner then stores the data into the database of the exchange where they are listing their NFT, this database is outside the blockchain. The owner also has the option to store the data in the blockchain but it will require them to pay some gas fee.
- A transaction is sent to a smart contract, this transaction includes the signature of the owner and the hash of the NFT data.
- This is when the NFT is minted and the trading process begins, on the confirmation of the transaction by the smart contract the minting process completes. Meaning that now the NFT is stored at a unique address inside the blockchain forever.

The NFTs are stored on the blockchain, it is possible to maintain the record of the original owner of it, as the transactions are stored in blocks that are linked to the next block creating a long history that is immutable. Also, whenever an NFT is created or traded a new transaction interacts with the smart contract, after the validation of which the new owner details and the NFT metadata are added to the new block. Hence giving a secure property right to the owner.

Technical Foundation of NFT:

1. A review of blockchain and smart contracts

In order to understand the technical foundation of NFTs, it is important to have a clear understanding of

blockchain and smart contracts. In fact, they constitute the building blocks of a functional NFT scheme.

Blockchain: blockchain – as an idea – was first proposed in 2008 by Satoshi Nakamoto where he simultaneously introduced the concept of bitcoin. Satoshi aimed to create a peer-to-peer system for financial transactions, and unlike any traditional financial system, bitcoin uses algorithms to reach an agreement on transaction data – blockchain is the technology that powers said algorithms. The blockchain can be thought of as a distributed database that maintains a list of records in blocks of data that are protected and linked to one another using cryptographic protocols. Once a transaction happens, these cryptographic protocols are solved and confirmed by a decentralized set of computers (or nodes). After the shared data on the blockchain is confirmed in most distributed nodes, it becomes immutable because any changes in the stored data will invalidate all subsequent data. The most common blockchain platform used in NFT schemes is Ethereum; this particular platform introduced the notion of smart contracts.

Smart contracts: Smart contracts are computer programs that can automatically verify, execute, document and accelerate a set of digital actions defined by their authors. Their novelty resides in the fact that the author of a smart contract can pre-define a set of conditions or terms under which the contract would be executed. Therefore, they allow decentralized parties to transact fairly without a trusted third party. Ethereum further developed these smart contracts in the blockchain ecosystem. Under Ethereum, the terms of a smart contract are shared by all stakeholders, thereby guaranteeing more transparency. An example of the application of smart contracts in the NFT space is that they allow developers to place a cap on the supply of non-fungible tokens and enforce persistent properties that cannot be modified after the NFTs are issued.

Address and transaction: A blockchain based address is made of a fixed number of alphanumeric characters. It is the unique identifier for a user to send and receive an asset. To transfer the ownership of a digital asset (including an NFT), the owner must prove its possession; this operation is usually performed using a cryptocurrency wallet.

NFT encoding: Encoding can be defined as the process to convert a piece of data from one form to another. Typically, data tends to be encoded in a compressed format to save memory space or into an uncompressed format to preserve its high resolution. In the Ethereum blockchain, hex values are used to

encode the elements of a transaction. This includes its function name, parameters and values. The ownership of an NFT can therefore be transcribed to the ownership of a set of hex values defined by its creator.

2. Different NFT standards and underlying blockchains

Before an NFT is uploaded in the blockchain there are a couple of steps that must occur in the back end:

- The NFT is digitized meaning that the owner checks that the file, title, description are completely accurate. Then, the owner digitizes the raw data into a proper format.
- An NFT owner stores the raw data into a database that could be outside or inside the blockchain
- The NFT owner signs the transaction including the hash of the NFT and sends it to a smart contract
- The minting and trading process begins. The main mechanism behind NFTs is the logic of the Token Standards that will be discussed in the coming paragraph. Here, the mint function has to check if the specific hex code of the color had already been minted. To proceed, the color token has to have never been minted before

An NFT scheme is a concept/technology that can be built on top of various blockchains. Given that each blockchain is distributed and not controlled by a central authority, developers within a community commonly agree to a set of standard rules that should be followed for the implementation of NFTs. This ensures the uniformity of each NFT. However, it is important to note that the standards across different blockchains are not necessarily interchangeable. This means that while it is possible to transfer an NFT from a blockchain to another one is possible, it remains a very complex task. The following section will cover the most popular blockchains and NFT standards.

ERC 721:

Ethereum is regarded to be a pioneer in the NFT space and remains to this date the most widely used blockchain platform to power NFTs. In particular, the most popular standard used is ERC 721 on the Ethereum blockchain. ERC721 represents a standard for tokens that are non-fungible, and is considered the first standard for non-fungible tokens and was released in 2018. It allows each token to be unique and to have a price associated with it that is independent of other tokens. Inside every ERC721 smart contract, a given NFT is identified by a unique unit256 variable also called tokenID. This token cannot be changed during the lifetime of the contract.

The code below represents the fundamental functions of smart contract under ERC 721 - the owner Of function allows users to check the owner of different assets and the transfer From function allows the transfer of assets between wallet addresses.

Algorithm 1: NFT Standard ERC721

```
interface IERC721 {
    function ownerOf(uint256 _tokenId) external view returns (address);
    function transferFrom(address _from, address _to, uint256 _tokenId) external payable;
}
```

ERC-1155:

ERC-1155 allows for the representation of both fungible and non-fungible tokens.; the standard was first developed and intended for use across the gaming community. In fact, fungible tokens could represent a currency in any given game while non-fungible tokens could represent different assets of the game. It was therefore important to have a set of standards that would allow both fungible and non-fungible tokens. The main advantage behind ERC 1155 is that a single smart contract can govern an infinite number of tokens. Therefore, creating a new token only requires a function to add an ID to the pool of tokens available. In contrast, creating a new token on ERC 721 requires deploying an entirely new smart contract which is very costly.

The code below represents the most fundamental functions under ERC1155. Both functions feature the uint256 variable `_id` for referencing token categories; the `transferFrom` function features the uint256 variable `quantity` for transferring an amount of the specified type (variable is commonly defined in fungible tokens).

Algorithm 2: NFT Standard 1155

```
interface IERC1155 {
    function balanceOf(address _owner, uint256 _id) external view returns (uint256);
    function transferFrom(address _from, address _to, uint256 _id, uint256 quantity) external payable;
}
```

Flow-NFT Standard

Flow-NFT standards are set of rules for the Flow blockchain network. It was created after the success of one of the first NFT games: Cryptokitties.



The team behind cryptokitties (Dapper Labs) realized the limitations of using ERC-721 at scale. They decided to solve this problem by creating the flow blockchain which uses the proof of stake mechanism along with initiating the Flow-NFT standard. This is the standard behind NBA Top Shots, the most popular NFT-based platform to date. The Flow-NFT standard deviates in some of its properties when compared to the ERC standard. First and foremost, smart contracts on Flow are written in Cadence, a different programming language that is arguably easier and more accessible than other blockchain native languages. Moreover, it allows “upgradeable smart contracts”; these smart contracts are first deployed in a beta state where they can be improved or fixed even after they have been deployed. They are then deployed in a “final state” where they become immutable like the other smart contracts.

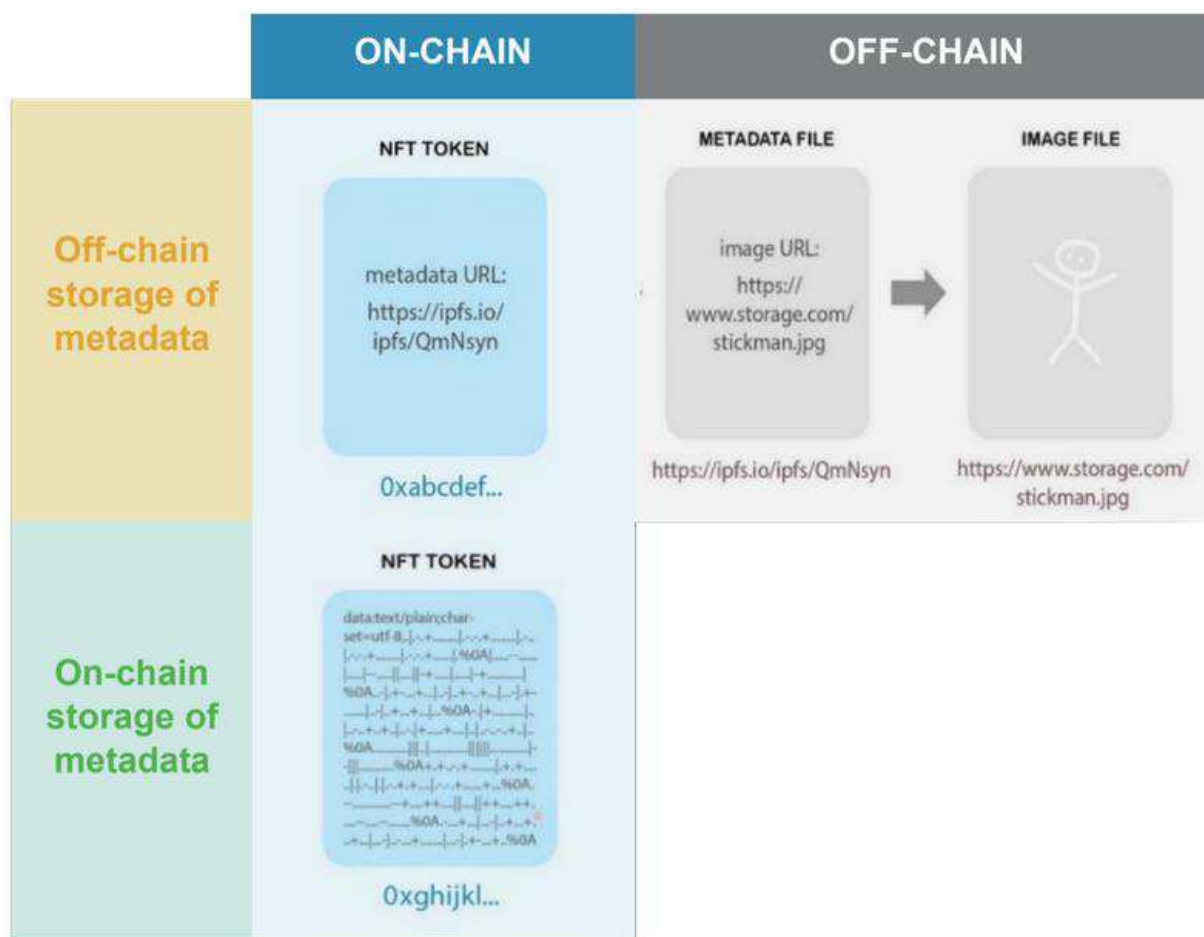
3. Storage of metadata

Metadata is a crucial part of the NFT scheme. It corresponds to series of variables that describe the characteristics of an NFT. An example of a metadata file would be the following:

When the ownerOF function described above is used to verify the ownership of an NFT, it references to the metadata files. In fact, each NFT corresponds to a specific set of metadata file that describe the NFT. For example, the metadata of an NFT representing an event ticket might include the date, seat, type, and the owner of a ticket. Many encodings and format can be used to store the metadata but the most common one is to store it as a JSON. There are 2 storage solutions to store the metadata: On-chain and off-chain storage.

Algorithm 3: Metadata file

```
{
  "name": "Color",
  "hex": "#F08080",
  "link": "https://bit.ly/3mdRahT",
  "owner": "0x6902702BB5678D7361C94441c71F600C255dd833"
}
```



Ultimately, we can observe that the technical blocks powering NFTs are fundamentally tied with the innovation and basics of blockchain technologies. The Ethereum blockchain and supporting standards are to date the most important technologies enabling NFTs.

However, due to the large gas fees associated with it, developers need to adapt and often innovate to deploy NFTs at scale. It is important to note that these are

still the early days of the cutting edge technology that is the NFT, and yet, we can bear witness to its rapid evolution. It is fair to assume that new standards and storage solutions will come to place in the coming months; however, the fundamental logic and foundation shall remain the same.

NFT Vulnerability and Security Concerns:

Although the popularity of NFTs is increasing day by day, hacking incidents make it important to

understand the NFT security issues. Let us find out more about the individual challenges, vulnerabilities, and security risks evident for NFTs in present times.

➤ **Challenges for Asset Ownership**

The creation of NFTs introduced new prospects for transforming conventional precedents for asset ownership. However, one of the foremost NFT vulnerabilities challenges the very concept of true ownership in NFTs. The foremost challenge at the time of the creation of NFTs was the limitation on storage capabilities. As a result, it was impossible to store images in the blockchain.

On the contrary, the blockchain would store an identifier of the image, which can be the hash of the image or its web address in the blockchain. You would have to use the identifier for viewing the NFT on a third-party platform. So, an individual purchasing an NFT would not be purchasing the actual image. On the contrary, they are purchasing the identifier, which leads them to a URM on the internet. The identifier could also lead to the Interplanetary File System (IPFS).

When you think of IPFS, it is important to note that the company from which you bought the NFT would be running the IPFS node. So, you can clearly notice one of the foremost NFT vulnerabilities in scenarios where the platform minting the NFTs goes out of business. In such cases, you would lose access to the NFT, or the NFT might lose its value.

Marketplace Security Risks

While NFTs are based on blockchain technology, they depend on centralized platforms, which help people interact with digital assets. You can find different centralized platforms such as Nifty Gateway and Open Sea as suitable portals for buying and selling NFTs. However, one of the formidable NFT vulnerabilities and security concerns emerges due to these centralized platforms.

The centralized platforms like Nifty Gateway and Open Sea store the private keys associated with all assets on the platforms. As a result, any type of compromise in the platform would automatically imply the loss of NFTs. The example of the attack on Nifty Gateway in March shows how attackers were able to capitalize on this vulnerability. Despite the recovery of money of the victims, they were not able to recover the NFTs, thereby implying a formidable risk.

On the other hand, it is also possible to argue in support of strong security measures on NFT marketplaces. However, strong security measures by the marketplace might not be adequate for addressing NFT security issues in using centralized

marketplaces. Platform users might be responsible for exposing many other vulnerabilities in security of NFT marketplaces. Weak passwords or the lack of two-factor authentication can be some of the reasons for which users can lose their valuable NFTs.

➤ **Cyber Security and Identity Fraud**

The next formidable entry among NFT security concerns points towards cyber security issues and possibilities for identity fraud. One of the foremost cyber security issues noted with NFTs would refer to cryptocurrency scams. An example of such a threat has been evident in a scam involving high-volume email.

Apparently, the high volume of emails is presented as if they are being sent by Coinbase regarding suspicious activity in their Coinbase accounts. Users are asked to open an attachment in the email, which asks them to provide the password for login and verifying their account. Such scams can end up compromising the credentials of a user on an NFT platform. Malicious actors could also leverage such NFT vulnerabilities for implanting malware such as remote access Trojans in the user's machine.

Smart Contract Risks

Smart contracts are the most fundamental aspect in the design of NFTs and are the reason for prominent NFT security issues. As a matter of fact, smart contract risks and the concerns of NFT maintenance are notable factors you can identify in the existing NFT market.

One of the recent incidents involving an attack on a renowned DeFi protocol, Poly Network, shows the effect of smart contracts risks on NFT security. Hackers were able to steal almost \$600 million in the attack, only due to setbacks in smart contract security. Interestingly, Poly Network is not the only example showcasing NFT vulnerabilities and security concerns clearly.

The most popular NFT project, CryptoPunks, had to face the implications of smart contract vulnerabilities in 2017. In 2017, CryptoPunks was affected by a bug that prevented the transfer of ETH into the seller's wallet. Attackers could leverage the bug for purchasing CryptoPunks NFTs and retrieve back the money from the contract. Therefore, CryptoPunks had to launch again with a completely different and newly updated smart contract.

Challenges of NFT:

➤ **High gas price** - This is the price that the users have to pay on any transactions that they make on a blockchain network, the gas price increases with the higher congestion in the network, which poses a major problem for the NFT exchanges, as it

becomes not feasible to mint a collection of NFT. This fee is charged as every transaction related to the blockchain requires computation and storage resources.

- **Art Theft** - This is a big pitfall of the NFT ecosystem as any user could steal someone else's artwork that hasn't been published on the blockchain yet and turn it into an NFT to claim its ownership.
- **Processing time** - Whenever minting or exchanging NFTs transactions go through the smart contract which involves interaction with the blockchain, which currently has a low transaction per second, making the processing time - consuming and a bad user experience. Some of the new Proof of Stake (PoS) blockchains like Algorand have fixed this issue to quite an extent, but there is a long way to go.
- **Anonymity** - Currently most of the NFT projects are based on Ethereum, Flow, and Tezos which do not provide total anonymity to their users. They provide pseudo-anonymity, where every transaction of every wallet address is visible to anyone, including the wallet balances. This information can be used by bad actors such as hackers to get access to some of these wallets. Though solutions like zero-knowledge proofs, multi-party signatures are already developed, but they haven't been implemented on most of these blockchains.
- **Carbon footprint** - We live in a time where environmental impact and energy crisis are some of the biggest problems that our planet faces. In such a situation using computational resources to secure our digital art isn't seen as an important issue and it's even condemned for increasing the carbon footprint.
- **Legal issues** - It has been observed that many of the NFT exchanges do not have a KYC (know your customer) policy. As it involves trading commodities and even cross-border transactions, it is important to know the regulatory stance of a country before investing any amount of money in the space. Also, as of now the sales of NFTs aren't considered as a taxable event, this can give rise to huge sums of financial scams in the system. Hence governments should consider regulating and taxing to protect its citizens from any potential danger.
- **Storing NFT off-chain** - Currently what most of the NFT marketplaces are doing is that they store the digital art in a separate database which isn't a blockchain, as storing an image or video file takes

a lot of block space and computational resource and hence a huge gas fee which can eventually even congest the network, making the minting of NFTs a really expensive process for the users. So, to overcome this they only store a cryptographic hash as an identifier on the blockchain, which is tagged with the token. This process leads to a situation of lack of confidence among the users for the NFT marketplaces.

NFT Marketplaces:

By comparing data provided by the data aggregator dappadar.com, we identify the following as the NFT marketplaces with the highest adoption as interpreted primarily by two metrics: number of wallets used the marketplace and total volume as captured in US dollars. For the scope of this research, we present the first five ranking marketplaces.

The most popular with a significant difference is **Open Sea** which is available both to Ethereum and Polygon Blockchain networks. OpenSea is the original peer-to-peer NFT marketplace. OpenSea saw USD 3.4 billion in trading volume across 2 million transactions in August. The marketplace is imposing a 2.5 % fee on sellers and accepting three currencies. It is supporting two types of sales: timed auctions and fixed price. The max file size is capped to 100 MB, while the most dominant categories within the marketplace are art, utility, collectables, trading cards, sports, metaverse and virtual worlds, as well as domain names. It has been established back in 2018 and enables royalties according to the artist's preference.

Rarible is the second most popular NFT marketplace. It imposes a fee on both ends of a transaction (seller and buyer) who are paying 2.5 % each. Rarible is community-owned by a Decentralised Autonomous Organisation. It supports slightly more currencies than OpenSea, while it has its own platform currency, the \$RARI; Rarible showcases two types of sales: auctions and fixed price. The maximum file size is capped to Page 34 | 54 30MB, while the dominant categories are supporting are art: gaming collectables, trading cards, sports, music, photography, metaverses, domains and memes. Rarible is active since 2020.

SuperRare is third in terms of ranking marketplace. In comparison to the previous two, it is curated more actively, while positioning mainly as a social platform to empower and promote crypto art. It is not acting only as a marketplace. Instead it works closely with artists, and has an approval system before a listing will be active. It imposes a 15 % fee on sellers, while accepting only \$ETH as a payment currency. It supports three types of listings: timed auctions, fixed price and open-ended offers. It is currently supporting

limited file formats, with the maximum size to be capped to 50 MB. The main category supported is fine digital art. Super Rare has been operating since 2018.

Foundation is fourth in the ranking of NFT marketplaces. It has a 15 % transaction fee on sellers and accepts \$ETH as the main currency. It has its own sale model, which requires a reserve price to be met, which then enables a 24hr auction. The number of supported files is relatively limited and capped to 50MB. The marketplace mainly serves fine digital art listing, with specialisation in crypto art. The marketplace has been operating since 2020.

The fifth ranking NFT marketplace is the **hic et nunc** on Tezos blockchain. It has a 2.5 % fee imposed on sellers and accepting \$XTZ as the platform currency. It supports only fixed price sales and caps the maximum size of files sold to 40 MB. Key categories within the marketplace are fine digital art, collectibles, trading cards and photography. It was established in 2021. All sales are subject to a 10 % royalty fee on secondary sales. Protocol fees for each marketplace are solely impacted by the market, and depending on numerous factors such as popularity of a marketplace, compliance expenditure, market positioning, size of the community, trading volume or even structure. Several of these NFT marketplaces are governed by their community through a Decentralised Autonomous Organisation, while others belong to corporate entities.

Money Laundering through NFT:

In theory, laundering money with NFT is very easy. Parties who want to launder money with the help of NFT follow a few simple and straightforward steps.

- Firstly, they create an artwork. These can be low-effort, even blank or generated algorithmically – in the past, such NFTs have sold for millions of dollars. Thanks to the availability of the metadata and code, fraudsters can create similar works by replicating the required algorithm.
- Secondly, they create the artists. Artist personas are often anonymous in the cryptocurrency world.

Conversely to Beeple, likely the most widely known artist, Pak – a similarly prolific creator (or group) has never been identified. It remains unclear whether Pak is even an individual or a team. Behind this anonymous guise artists can mint an unlimited number of NFTs.

- Thirdly, they create a web presence, using servers in jurisdictions that do not cooperate with international policing efforts.
- Finally, they can trade their digital NFT using cryptocurrencies. Either inflating the price by buying many works from an artist at higher than market rates, or by acting as both the buyer and seller in a trade. This can be done by registering two separate accounts (one for selling and one for buying) and purchasing the NFT from themselves – a practice commonly known as “wash-trading”.

There are certain indicators that may signify suspicious activity, especially when the fiat value of trade is substantial. For example, a user buys NFT for EUR 1 million and two days later sells it for EUR 900 000 can indicate that the investor was either inexperienced or had planned the loss as a write-off. This may be an indication of money laundering.

Conclusion:

Non-fungible tokens are unique pieces of data that are stored on a blockchain. Digital art, music, video clips, tickets are a few examples of the digital assets that are being converted as NFTs. Some people think that this is a bubble that will burst and some people think that NFTs will drive the digital economy. The technology is still in the initial stages, so we have to wait and watch how it evolves.

Today, NFTs are very easy to create for yourself. As the decentralized finance sphere expands its reach to more users, the quality and quantity of NFTs will continue rising. To conclude, NFTs represents a highly innovative use-case of the powerful Blockchain technology that is currently uprooting the worlds of computation and finance.

There is no shortage of NFT marketplaces where you can buy, sell, and even create your own unique NFTs.