NON-FUNGIBLE TOKEN (NFT)WHITEPAPER

To better understand the modalities and intricacies involved in the ongoing technological shift brought about by NFTs and to keep pace with the transformation and redefining long-term value and purposes.

Author: Aritra Sarkhel, Shashank Raut, Anuj Chaudhary

WazirX

https://blockchainpapers.in/

1. What is an NFT?

1.1 Blockchain-based tokens can be classified into two sets of categories:

i. Fungible: Identical set of tokens that can be traded or replaced by another group of identical tokens. Bitcoin, along with all other cryptocurrencies to any other tokens which represent any real-world assets are basically fungible tokens.

ii. Non-fungible: Non-fungible tokens are irreplaceable and non-interchangeable. NFTs can be a wide range of digital tokens like a digital piece of art or digitized piece of music rights.

1.2 Characteristics of NFTs:

Verifiable: Being a Blockchain-based token, all the past ownership data of NFT can be traced back to establish its authenticity without involving any other entity for verification.

Unified Entity: NFTs cannot be divided into any further smaller units, like that of Bitcoin Satoshi. They always exist as one whole item. With the new concept of fractionalization, only the ownership of NFT is split and not the NFT itself. We can relate it in the same way real estate ownership works, where ownership can lie with multiple people, but the real estate entity remains one whole.

Indestructible: NFTs are stored on blockchain-based smart contracts, which are immutable and cannot be replicated or destroyed.

Uniqueness: The unique trait belonging to NFT comes from the unique identifying codes enabling NFTs with a one-of-a-kind identity. Also, NFTs derive their uniqueness through the Metadata that is an immutable record, and it is like certifying its authenticity and uniqueness.

1.3   Value of NFTs:

Similar to all other assets, the value of NFT is determined in accordance with the demand andsupply. With their uniqueness and scarce nature, NFTs are usually high in demand amongthe crypto community.

2.   How is NFT created?
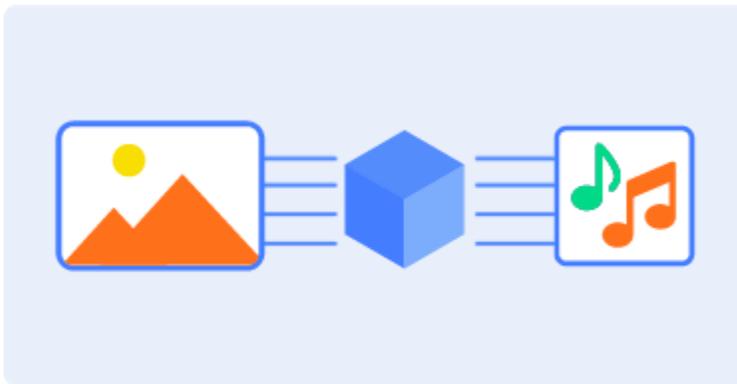
The procedure to create an NFT is known as Minting, it is basically converting a digital file or digital content into a digital asset on a blockchain-based platform. Once the digital file is minted on a blockchain, it becomes immutable and tamper-proof.

The creators firstly need to finalize on the format and platform to mint their NFT. Afterward, creators need to choose any multimedia file to generate NFT. Basically, any image, text, audio, or video can be used to generate NFT. Also, there are several other items that can be chosen to be generated as NFT, like virtual land and currency. The minting process begins after the creator has signed its NFT and paid gas fee to the NFT platform. The creator would get the newly minted NFT in their profile post successful validation of the transaction. Post minting, the NFT can be traded.

Once the NFT starts its trading journey, it can be purchased and traded; also, every trade made can be traced and tracked. This helps creators with a continuous commission program where they are paid with royalty with every subsequent sale of their NFT.

Step-by-Step Process:

NFT Platform:
Creators need to carefully choose the NFT platform, as it is an important part of Minting. While choosing, creators need to carefully factor in the platform's support standard, blockchain type, and fee for minting NFTs.

Crypto Wallet:
Setting up a crypto wallet to access platforms, mint, and carry out trades and proceeds. Examples - Metamask, Brave, Coinbase**.**

Selling an NFT:

Across platforms, there are two ways of selling an NFT – Fixed Price and Auction. Fixed price selling is a simple arrangement where creators specify a price at which they are willing to sell NFT. Whereas the Auction mode provides the creator with two options to sell
- English Auction and Dutch Auction. English auction is the increasing price auction, and the highest bid wins, while Dutch auction is decreasing-price auction until someone buys an NFT.

3. **How big is the NFT Market? Describe by quoting numbers from the market in terms of value, total players in terms of platforms, users, amount of capital inflow in terms of new money and old money, etc.**

Global NFT Trading Volume (in 2021)	**$23 Billion**
Unique active wallets engaging with NFT	**Up from 5,000 to 140,000**
Number of NFT Platforms	**179**
Venture capital investment	**$4 Billion**
Celebrities with NFT Collection	**Amitabh Bachchan, Salman Khan, ParisHilton and Eminem etc**
Brands getting into NFT	**VISA, Nike, Gucci, D&G, and Burberry**
Auction Houses into NFT	**Christie's and Sotheby**

4. A brief History of NFTs and what part of the Technology layer made it happen?
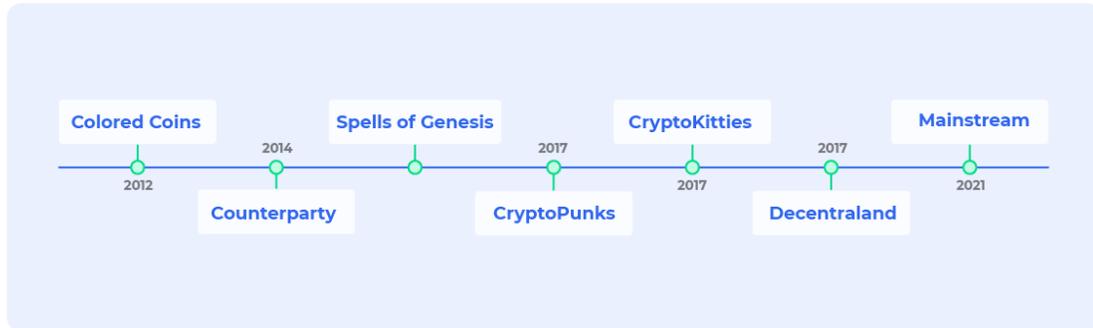
Lots of people still believe that NFTs appeared out of nowhere, but they can be traced back to 2012.

Colored Coins: During the course of 2012, Colored Coins (CC) was derived from Bitcoin and was treated as its small denominations having prevailing use cases like coupons and subscriptions.

Counterparty: Counterparty was developed in 2014 as a peer-to-peer financial platform on Bitcoin Blockchain. It enabled creators to come up with their own digital tokens that couldn't be exchanged.

Spells of Genesis: Creators of this blockchain-based trading card game came up with the idea to check counterfeiting by determining the authenticity of cards.

CryptoPunks: In 2017, creators John Watkinson and Matt Hall created a unique 10,000 set of characters on the Ethereum blockchain. These were rapidly snapped up and traded online.

CryptoKitties: Again, in 2017, a virtual game based on Ethereum blockchain was launched, allowing players to purchase, pet, breed, and sell virtual cats. Players used to sell and buy crypto kitties to level up and unlock different levels. Cryptokitties were one of the prominent reasons for the rapid spread of NFTs.

With the launch of CryptoKitties NFT market witnessed a tremendous growth period, with users engaged in exploring different functionalities of NFTs. Despite all the growth, the NFT space was still in its nascent stage, and users took some more time to experience & embrace true potential, and post this period, the NFT industry revived significantly.

Decentraland: Also, in 2017, Ethereum based platform let the players buy empty land parcels of 3D virtual space.

2021: NFT goes Mainstream

5. Use cases of NFT in the last four years?
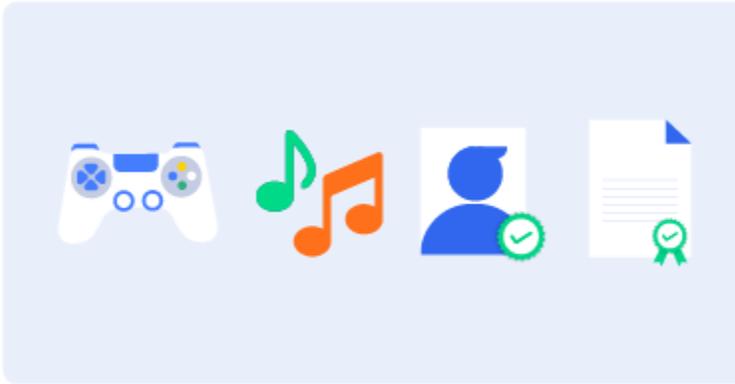
NFTs are continually offering means to create digital assets and their monetization. NFTs are generally being used to represent digital content and physical assets, but NFTs have some more use cases:

Gaming: Blockchain-based gaming has given wider acceptance to NFTs which involve trading and swapping of items through which allow gamers to earn money, and this has proven to be one of the best use cases for NFTs benefiting gamers in multitude. The space for in-game assets now accounts for a significant portion of the total value of the gaming industry, which according to a recent report, is set to $300 Billion in the next four years.

Music: We can consider the Music industry to be in nascency regarding the adoption of NFTs; although being the first mover to the NFT space, the music industry has been carefully moving ahead on its adoption. Recent use cases being renowned artists launching theirNFT works. Since NFTs are immutable, they can solve the massive problem of piracy, and building on it, artists can score on a lot more royalties when their NFTs are shared or sold.

Identity Verification: Governments have initiated to consider the use of NFTs for personal identity management. This tokenized system can be used for documenting educational qualifications, licenses, certificates, and medical records. All these documents can be issued as NFTs on a blockchain, making them traceable to their original owner.

Patent and Intellectual Property: NFTs have a very useful use case to protect and certify the rightful ownership of patents and intellectual properties. The creation of a public ledger can provide the necessary data to document transactions related to patents.

6. Future NFT use cases in other industries?

Building on recent developments, we can certainly predict some NFT use cases for various other industries:

Real Estate: NFTs can help the Real-estate industry to address all of its issues regarding documentation, land deeds, and proof of ownership. An innovative concept of fractional ownership of real estate is gaining momentum, which is basically enabled by smart contracts for properties. This will help simplify transactions between buyers and sellers as NFTs will establish the much-needed trust with the furnishing of all required information.

Supply Chain: NFTs can be attached to all the goods establishing their authenticity and helping counter counterfeiting. This will certainly help customers to verify its origin and to track the product from manufacturing to shipping to delivery. Companies would also stand to benefit by streamlining the supply chain with much-needed inputs gained through tracking of shipments.

Ticketing: NFTs are touted to replace the ticketing system, as it scores a lot more benefits like eliminating frauds and reduced paper usage. This concept of NFTs is applicable for all forms of transportation where payment verification occurs.

Health-Care: NFTs can be used to secure the health records accessible to health authorities universally to track down medical history. It can as well be used to track the supply and tracking of medication and to counter counterfeiting of medicines.

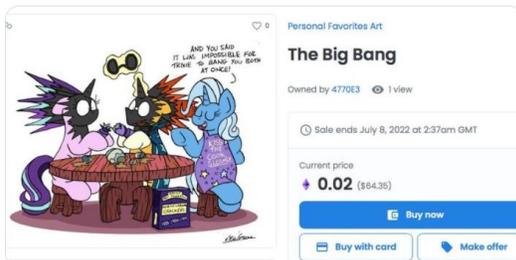## 7. Challenges/Weakness with the current NFT Infra.?
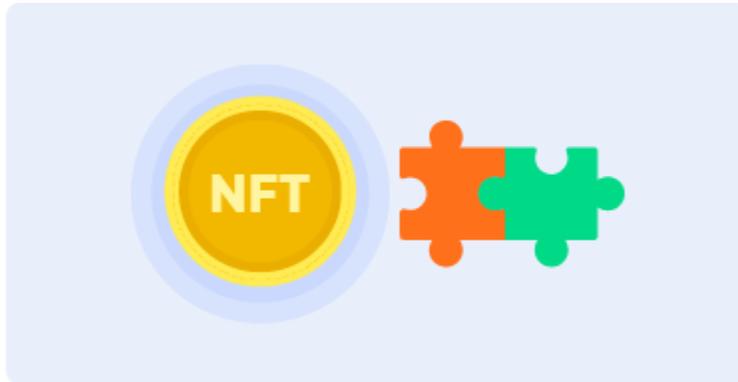
Cyber Threats: With the growing popularity of NFTs, it has also attracted the risk of cyber threats. Recently, a lot of cases were reported where replicas of original NFTs were listed for sale. These fake NFTs pose a massive risk to the whole ecosystem; on top of it, fake NFT stores can trade counterfeit NFTs.

Identity Risk: Someone impersonating some renowned artist and selling fake NFTs can certainly undermine trust. They also come up with fake giveaways and airdrops promoting it on social media and end up scamming people with fake NFTs and fake stores.

Legal Challenges: We all are witnessing a considerable rise in the NFT market, with more

and more people joining the NFT marketplace. But, as such, there is no legal definition of NFT anywhere in the world, now this calls for an international body for regulations and setting up the right tone for exploring the use cases of NFTs. The regulatory body will address all the existing issues while laying down rules and regulations for NFTs.

Digital Millennium Copyright Act (DMCA) is a law that governs the organizational and individual intellectual property and copyright issues, having the right to penalize dissemination of copyrighted works, technology, and services. Google has incorporated a module to get content takedown requests from users under the same DMCA Act, post scrutiny of requests the contested content is removed or access to the content is disabled.

Some arrangements on the lines of DMCA Act need to be enacted for the NFT industry, where the original creators could have the platform to raise and contest issues regarding their copyrighted works. Or else an alternate system to establish the ownership and subsequent copyrights for their works.

Evaluation Challenges: The price of any asset depends on various parameters like demand-supply, uniqueness, and many other factors. But, the price determination of NFTs is based on the perceived value, and it gives rise to uncertainty in the determination of the price of NFTs. And when people are unable to determine the price, a large fluctuation in price remains constant, making it very difficult to evaluate.

8. How does NFT impact Data privacy?

In different parts of the world, users have varying degrees of rights over their personal information. Also, different governments have sanctioned data protection laws that govern and protect users.

Blockchain-based systems have certain limitations while ensuring the data privacy of users, and this is due to the non-mandation for disclosure of user's identities. So, considering NFTs holding out some personal information, it won't be possible to exercise privacy rights over various data subjects.

Now, with data protection regulations in place, users have the right to modify their existing personal details, but it is very hard to do the same on any blockchain-based system which also includes NFTs. So, NFT with private information does not necessarilywholly comply with data protection laws. A well-designed regulation could be helpful in addressing these existing concerns.

9. NFTs cross-over between bonds/securities?

There is a general perception among the masses of treating NFT as security. Securities and Exchange Commission (SEC) traded a has clearly stated that NFTs are being sold and transacted as securities, but judicial authority has clearly associated NFTs only with investment contracts, and if NFTs wants to be made eligible as securities, then it needs to fulfil certain criteria of Howey Test.

Also, if any particular asset is to be considered as security, then an array of securities law becomes applicable to the asset. Also, the trade of assets classified as a security in the United States needs to be registered with the SEC. Moreover, marketing and sale of securities would be subject to various laws under the purview of securities violation laws, breach of which can call for civil and criminal penalties.

10. Skill Sets for NFTs current and future required?

10.1 Minting and Trading

10.1.1. Opening and connection of Wallet: To start with, the user needs to open a wallet and subsequently connect it with the desired NFT Marketplace. Completion of profile with all requisite details along with mention of choice of crypto for acceptance of payment is required.

10.1.2. Minting: Convert your digital file into NFT and specify all the required details and descriptions about it. You can also specify the royalties to be paid if the NFT is sold again.

10.1.3. Gas fees: Get some funds into your wallet for listing up your NFT. Marketplace charges users with a 'Gas Fee' for doing the back-end computational processes for listing the NFT.

10.1.4. Listing for Sale: Post-minting NFT is listed for selling. This step requires the user to decide with the mode of sale, fixed price sale, or a fixed time auction. After completion of listing, the user needs to pay the marketplace with the Gas fees to complete the process.

10.2 Technical Skills

To start with the NFT development, there are certain prerequisites to get through. Familiarity with the concepts of web3.0 and DeFi and how the decentralized ecosystem functions, along with solid knowledge of Javascript and Solidity, will eventually help with smart contracts. Moreover, knowledge regarding the roles of various web 3.0 tools to help connect with middleware platforms.

11. Forward Outlook

It is beyond any doubt that NFTs have use cases in various sectors from Real Estate to Supply Chain and Ticketing to healthcare, and it is not confined only to Arts and Media. So, we can easily presume that NFTs are here to stay, and with the rising use cases and applications in varied industries, NFTs could majorly contribute to creating more opportunities.

The need of the time is to bring about clarity around the legal framework of NFT ownership; it will help users educate themselves and open up and create more opportunities, simplifying the process and increasing engagement.