

**Non-Fungible Tokens & Libraries**

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NFTs

Non-Fungible Tokens (NFTs) are a rapidly emerging technology that sit at the intersection of cryptocurrency, digital ownership, and preservation. These trendlines are of particular importance to libraries, which often work collaboratively with their communities to share and preserve intellectual property. This column will define what a NFT is, explore the relevant trends impacting its development, and examine how it intersects with the traditional roles of the library.

What is a NFT? Part I: Non-fungible

One explanation of NFTs is fairly straightforward: they are digital objects usually built off existing properties that are designed to be non-fungible. That is, NTFs can be given or sold to another person like an original copy of a panting. Each NFT is a unique digital object that cannot be replaced by another. The internet is a technology that dramatically reduces the barrier to mass distribution. This has resulted in digital objects that are easily copied and shared, reaching a massive potential audience. It also has resulted in digital objects that are often interchangeable. Even cryptocurrencies, which we will discuss later, is fungible in the sense that they have obvious value. One bitcoin can be exchanged for another bitcoin, and each will be identical to each other. Because many people have created digital objects that they would like to be able to sell it to a single individual rather than monetizing its distribution, this creates a new opportunity. With the advent of blockchain technology, it has become technically plausible to create digital objects that are non-fungible, resulting in NFTs.

To really understand NFTs, it can be helpful to examine a few specific examples. The 2007 viral video “Charlie bit my finger” was sold as a NFT for \$760,000, funding the brothers’ college aspirations. As part of the sale, the video will be removed from YouTube. The first tweet ever sent by Twitter’s CEO, Jack Dorsey, recently sold for \$2.9 million (Locke, 2021). In this case, the tweet will remain on Twitter for everyone to view. A collage of digital art titled "Everydays - the First 5,000 Days" was auctioned off by the prestigious auction house, Christie’s, for \$69 million. The artist will retain the copyright to the images that make up the collage, which are available on their website, but the new owner does have the right to display the collage. The Fox television network is even developing a new show being promoted as the first show “curated on the blockchain” alongside a new company that promises to connect advertisers “directly with fans and enthusiasts through NFTs” (Hibberd & Hibberd, 2021).

As these examples demonstrate, whoever purchases a NFT obtains ownership of something that is non-transferable. That is, they own the NFT, and they can transfer that NFT to someone else. Along with that purchase, the seller may choose to include any number of other rights. For example, they could sell the copyright, but that is not the NFT. On the other hand, they might agree to take down the original digital object. What additional intellectual property rights are to be the expected norms of NFTs are still being determined.

What is an NFT? Part II: Tokens and Trust

The “token” part of non-fungible token is certified and hosted on blockchain ledger and consists as a unique digital token. If the creator of the token chose, they could make as many tokens as they wanted, modeling NFTs after limited edition collectibles, but instead, these creators usually choose to artificially manufacture just one token and connect it to another digital object with more prominence. This connection is done using blockchain technology. Blockchain technology was invented in 2009 by an anonymous person (or people) in order to facilitate the cryptocurrency, Bitcoin. In 2011, the technology

was turned over to its community, and its creator(s) disappeared. Bitcoin is designed to serve as decentralized currency, where no single entity or government controls it. It is maintained through peer-to-peer networks rather than on a central computer (Jaffe, 2018).

Cryptocurrencies are a fascinating technology, which have the potential for massive technological, ecological, and societal disruption. They already have made some people very wealthy, even as many traditional economists remain skeptical of it. For the purposes of understanding NFTs, cryptocurrencies operate as a blockchain platform, enabling the creation of digital objects that theoretically will be maintained without a central hub or institution. Importantly, maintains a record of ownership in a way that has captured the imagination of users around the world. Because of the social capital they enjoy, users are confident that if Google goes out of business or shuts down YouTube, the NFT for “Charlie bit my finger” will remain hosted on a trusted peer-to-peer network. With some cryptocurrencies, as long as the cryptocurrency is hosted, it will still be viable.

Many academics have highlighted that the true value cryptocurrencies create may not be as currencies, but rather as sources of trust. In this context, it is worth recalling that they were first promulgated in the aftermath of a global financial crisis. This was a time when trust in institutions, like banks and governments, was at an understandable low ebb. While the average consumer/investor in blockchain products is unlikely to be able to evaluate the viability of the technology that powers cryptocurrencies, they often place their confidence in concepts like “peer-to-peer” and “algorithms”. This is bolstered by the number of prominent figures who have become rich through speculative investing in cryptocurrencies. These figures have gone on record praising the technology. The idea of moving away from currencies dominated by banks and being able to interact directly with peers fits within an appealing worldview and serves to generate a sense of trust that is critical for any economic activity (Baldwin, 2018; De Filippi et al., 2020).

NFTs & Library Activities

NFTs are a distinctly odd proposition by any conventional understanding of property. In essence, what is being sold is a digital “token”. The token is maintained on a novel peer-to-peer network. The token claims to correspond to ownership of the digital object it represents. Other properties enforced by institutions like the government, such as copyright or display rights, may come along with the sale, but these properties are not the NFT. The connection between the digital object and the NFT is largely ill-defined except as a new socially created concept, which depends on trust between everyone involved. Instead, inherent trust in cryptocurrencies, the reputation of the seller, and sometimes the reputation of the auction house that facilitates the sale help provide that sense of trust.

Viewing NFTs through the lens of some traditional library activities can help shed light on what they are. One thing libraries often do is purchase print books to share with their community. The intellectual property laws that allow this are relatively straightforward. The books are relatively interchangeable, since one copy of a book is usually just as valuable as another. Having obtained ownership, the library is able to distribute the books with relative freedom. Libraries might purchase NFTs, but it would not make much sense to do so, since they would then be owners of a digital object that cannot be easily shared in most cases.

Another relevant thing that libraries often do is purchase access to digital materials on behalf of their communities. Here the intellectual property rights are usually negotiated by contract. This is similar to what happens with some NFT sales, where various rights accompany the sale. Since most digitally native

objects have very low barriers to distribution, libraries also use software to enforce artificial scarcity through digital rights management (DRM). Blockchain provides its own DRM for the NFT, which anyone with the proper software can view. In many cases, the digital object the NFT “represents” is actually still freely accessible on its native platform. When rights are transferred, that transfer depends on a separate contract that is enforced through traditional laws.

If NFTs continue to grow in popularity and it becomes commonplace to attach intellectual property rights to the sale, one can imagine libraries purchasing the NFT in order to gain the connected property rights to digital objects similar to how special collections often operate. Depending on the library’s mission, the library may choose to share the digital media freely and place it in the public domain. Even then, the NFT would not likely be the goal of the library’s purchase, but rather the legal permissions that accompany it.

Increasingly, libraries are also producers of digital materials. A library could easily create an NFT of one of these materials. If the underlying digital material had some value to the larger community, the library could sell its NFT for a profit. But most libraries are not involved in directly creating intellectual property as a primary means of funding their organization. This might change with NFTs, but beyond a general popularity with their communities, it is unclear what particular skillset libraries would bring to bear in this market.

All of this highlights that the creation of NFTs is perhaps best understood as filling an economic and social need. People who own digital objects that otherwise have wide distribution want to be able to “sell” them. Other people want to be able to “own” them. According to the conventional models of “ownership” that the libraries and other similar institutions operate within, this does not quite make sense, but blockchain technology has created a new model of trust that allows for new social conventions.

Preservation

One threat to the viability of NFTs is the fact that they can break easily and might disappear without proper maintenance. These are preservation problems that libraries have relevant expertise with which to help. While libraries have been quite active in preserving other forms of more fungible digital materials, the motivation and model for libraries to preserve NFTs remains unclear. More narrowly, communities that produce valuable NFTs and have an existing relationship with libraries could create opportunities for partnership. Libraries often have the experience and reputation to provide long-term assurances that a NFT will not disappear.

This is meaningful because NFTs do require ongoing maintenance for their continued existence. The reason so many computers continue to host peer-to-peer blockchain technology is because they are also hosting cryptocurrency that has proven to be a lucrative investment property. As an investment though, cryptocurrency is relatively new and still very volatile, and it has not yet become widely accepted as a currency on the retail market. It is easy to imagine scenarios where, due to government regulation or a fickle market, any particular currency rapidly falls out of favor and is no longer maintained. This is exacerbated by the tremendous environmental costs of this technology. New bitcoins are created by having computers solve complicated problems. This creates an ecosystem where the entire network is using a tremendous amount of electricity in order to create additional currency, a serious problem for a world that is also searching for ways to minimize climate change (Calma, 2021).

What is less intuitive is that related technologies also have to be maintained for NFTs to function. NFTs hosted on the blockchain demonstrate the ownership of a unique digital asset, but they hold very little information about what that actual asset is. Instead they rely on other technologies to point to more information about the object and who owns it. Because URLs can easily change hands, be redirected, or be otherwise compromised, most NFTs use an InterPlanetary File System, which stores the file with additional identifying information on multiple computers.

Yet many NFT files have been found that will not load (Kastrenakes, 2021). They have been restored, but unlike the blockchain that hosts the NFT, the system relies on a relatively small number of computers that have to be maintained, a precarious position for a new technology. For headline generating NFTs worth millions of dollars, this may not be a concern, but if the technology expands and lasts for decades, it begins to generate a host of issues.

Conclusion

NFTs represent a new and growing technology that intersections with many of the same concepts that are core to librarianship. Libraries are community institutions that engender widespread trust, while NFTs are built atop cryptocurrency that seeks to enable anonymous peer-to-peer interactions. Libraries specialize in preservation and dissemination of materials that were originally interchangeable, while NFTs are digital objects that are limited in quantity. The argument here is not that this is a list of opposites but rather that there are potential roles for libraries in helping to preserve NFTs. Libraries have already embraced global communities in new and innovative ways, and if these trends continue, NFTs will likely continue as well. Rather the trends that NFTs represent are vital to understanding the culture and technology that the internet has unleashed. For libraries to continue to evolve, they must continue to engage with these trends wherever they lead.

Baldwin, J. (2018). In digital we trust: Bitcoin discourse, digital currencies, and decentralized network fetishism. *Palgrave Communications*, 4(1), 1–10. <https://doi.org/10.1057/s41599-018-0065-0>

Calma, J. (2021, March 15). *The climate controversy swirling around NFTs*. The Verge.

<https://www.theverge.com/2021/3/15/22328203/nft-cryptoart-ethereum-blockchain-climate-change>

De Filippi, P., Mannan, M., & Reijers, W. (2020). Blockchain as a confidence machine: The problem of trust & challenges of governance. *Technology in Society*, 62, 101284.

<https://doi.org/10.1016/j.techsoc.2020.101284>

Hibberd, J., & Hibberd, J. (2021, May 17). Dan Harmon Making First Blockchain Animated Series as Fox

Embraces Crypto. *The Hollywood Reporter*. [https://www.hollywoodreporter.com/tv/tv-](https://www.hollywoodreporter.com/tv/tv-news/dan-harmon-blockchain-nft-crypto-series-fox-1234954403/)

[news/dan-harmon-blockchain-nft-crypto-series-fox-1234954403/](https://www.hollywoodreporter.com/tv/tv-news/dan-harmon-blockchain-nft-crypto-series-fox-1234954403/)

Jaffe, J. (2018, February 12). Bitcoin: The newcomer’s guide to cryptocurrency. *CNET*.
<https://www.cnet.com/how-to/what-is-bitcoin/>

Kastrenakes, J. (2021, March 25). *Your million-dollar NFT can break tomorrow if you’re not careful*. The Verge. <https://www.theverge.com/2021/3/25/22349242/nft-metadata-explained-art-crypto-urls-links-ipfs>

Locke, T. (2021, March 22). *Jack Dorsey sells his first tweet ever as an NFT for over \$2.9 million*. CNBC. <https://www.cnbc.com/2021/03/22/jack-dorsey-sells-his-first-tweet-ever-as-an-nft-for-over-2point9-million.html>