

Essential Collector Knowledge: NFT storage, hosting and backups

Async Art, July 2022 - Lauren Mae



Ever wondered where your NFTs are stored? The obvious answer is “in your wallet” but that isn’t technically true. Indeed a crypto wallet gives access to your digital assets, but it doesn’t store them. NFTs can be stored on a blockchain, referred to as “on-chain”, or linked to a blockchain, referred to as “off-chain”. As a collector, it’s important to know the whereabouts of your digital assets, whether they’re backed up, and what would happen in the event that they were somehow deleted. It isn’t beyond the realm of possibility that you could invest in an NFT only to find that an image hosting service removed the file or encountered a technical problem causing the file to be irrevocably lost. In that case, the NFT is rendered worthless. However, there are solutions that collectors can put in place to ensure the security and longevity of their digital assets.

It’s estimated around 9% of NFTs are stored on-chain, 36% are stored on decentralized storage (IPFS), and up to 55% are stored on private servers, according to [YourNFTs](#). We’re going to break down what this all means and the advantages and disadvantages of storage methods, followed by an explanation of how your NFTs purchased on Async are stored. As an NFT creator tool and marketplace, we feel it is important to keep you, the collector, informed about the safety of the NFTs you hold.

NFTs stored on-chain

NFTs stored on-chain are in the minority. On-chain means that the NFT in its entirety is written to a blockchain, such as Ethereum. The NFT's information, its image file and metadata (rarity traits, storage information, and description), is stored on the blockchain, locked in a smart contract. The downside, and the reason most NFTs are not stored on-chain, is that storing large files on a blockchain is expensive.

Cryptopunks is a notable on-chain generative art collection. The Larva Labs generative collection of pixelated punks launched off-chain in 2017 and was moved on-chain in 2021. The decision to move it on-chain was made because the Cryptopunks are small (24x24px), making it viable to store them on Ethereum. Making the transition from off-chain to on-chain was expensive and cost Larva Labs 73M ETH in gas fees. Other on-chain NFT projects can be found on oxchain.art.

NFTs stored off-chain

Off-chain NFTs are linked to the blockchain but do not live there, unlike on-chain NFTs. The image file (artwork) and metadata are stored elsewhere in off-chain storage, such as on a hardware server, in cloud storage (such as Google or AWS), or on IPFS (Interplanetary File Storage).

Private Servers

Hardware servers are the most expensive option because you or an NFT storage business will need to purchase a physical device. Cloud storage is a cheaper option but relies on a centralized, private company, such as Amazon, to host it. If a company goes out of business, gets hacked, or encounters a technical error, you may lose your digital assets. Despite this, about 40% of NFTs currently in circulation are being stored in this capacity.

IPFS

IPFS solves the centralized storage problem with a decentralized solution. Using a P2P (peer-to-peer) network, IPFS stores NFT data in multiple locations, across multiple nodes. There are two caveats with IPFS: your data may only be stored on one node, if instructions

are not set for it to be pinned to multiple locations. Secondly, files can disappear from IPFS. Each node on IPFS stores a cache of your file but that does not equate to permanent storage.

Image files, while stored on IPFS, still need to be stored somewhere, either by the collector or in most cases, by a marketplace that may rely on its own centralized private server. We have already identified the problem with private servers, so it's important to go a step further than IPFS to ensure the safety of your NFTs.

[Pinata](#) is a file storage solution based on IPFS. As noted, NFTs are not permanently cached on IPFS. Pinata offers a paid-for service that can keep a cache of your files forever through storing on its own IPFS nodes. While data stored on IPFS is public, and anything pinned via Pinata will be public, Pinata does have an option called Submarine to store data privately as well.

Another emerging storage platform for NFTs is [Arweave](#) where you pay a one-time fee that then accrues interest. This interest gets slowly distributed towards miners over time as they continue to store the data. Data can be [pinned to IPFS then the files stored with Arweave](#).

The importance of cryptographic hashing

Another way to ensure the security and longevity of NFTs is through cryptographic hashing. This is a function employed by IPFS that takes a file and generates a unique code for it, known as a content identifier (CID). When an NFT is minted, the CID is written to the blockchain and stored on IPFS. If the image is removed by its host or from IPFS, it can be reuploaded and connected to the cryptographic hash, providing you have the exact copy of the image backed up somewhere. For a more in-depth explanation, read our [article on cryptographic hashing](#).

How your NFTs purchased on Async are stored

All NFTs minted on Async are stored on IPFS (Interplanetary File System) and incorporate cryptographic hashing. We took this storage route because we believe it to be the most cost-effective and secure way to store NFTs. Other NFT websites, such as KnownOrigin

and SuperRare also use IPFS as a storage solution when an NFT is minted, which [ClubNFT](#) credits as following best practices.

That does not mean that all NFT marketplaces are made equal and employ the same reliable and responsible methods. NFTs minted on OpenSea are also off-chain but rely on two storage methods: a private server for NFTs that remain editable after minting and IPFS for those that are locked (uneditable) after minting.

What can I do to keep my NFT collection secure?

Verify the location of NFTs before purchasing

Going forward, be sure to do your due diligence on where the NFT you're buying is stored. NFTs stored on-chain, or off-chain but always stored in decentralized storage such as IPFS are safer choices. This will ensure if a server storing your NFT goes down or a host goes out of business, your NFT will be backed up somewhere and can be recovered.

Always have a local backup of your NFTs

While IPFS is reliable, it isn't without risk. It's possible to manually backup each of your NFTs but it can be tricky knowing you've downloaded the correct files and thumbnails. [ClubNFT](#) has created a tool to assist with the NFT backup process. The service supports NFTs minted on Ethereum and Tezos, as well as ENS and TNS names.

Sign up for the ClubNFT backup service by email. Add your wallet address (no need to connect the wallet), then the service will start creating a backup of the NFTs stored in that wallet. You can back up your wallet and someone else's wallet, although having the backup does not give you ownership of another person's NFTs. Watch a [walkthrough video guide of the process](#).

Store NFTs using Pinata

A final option is to pay to store your NFTs on Pinata. This will ensure your guarantee that your NFTs are pinned to IPFS forever, on the Pinata nodes, rather than temporarily saved as a cache.

Conclusion

The information above should have made it clear to you the different storage options for NFTs, which of your NFTs are safely stored, and which ones aren't. Both on-chain and off-chain are secure and viable options for NFTs. The most secure thing to do is ensure your NFTs are on IPFS with transaction hashing, and are backed up locally or by a service like Pinata. Keep in mind that digital artwork requires upkeep and maintenance, much like traditional artwork.