

ELLIPTIC NFT REPORT 2022 EDITION

NFTs and Financial Crime

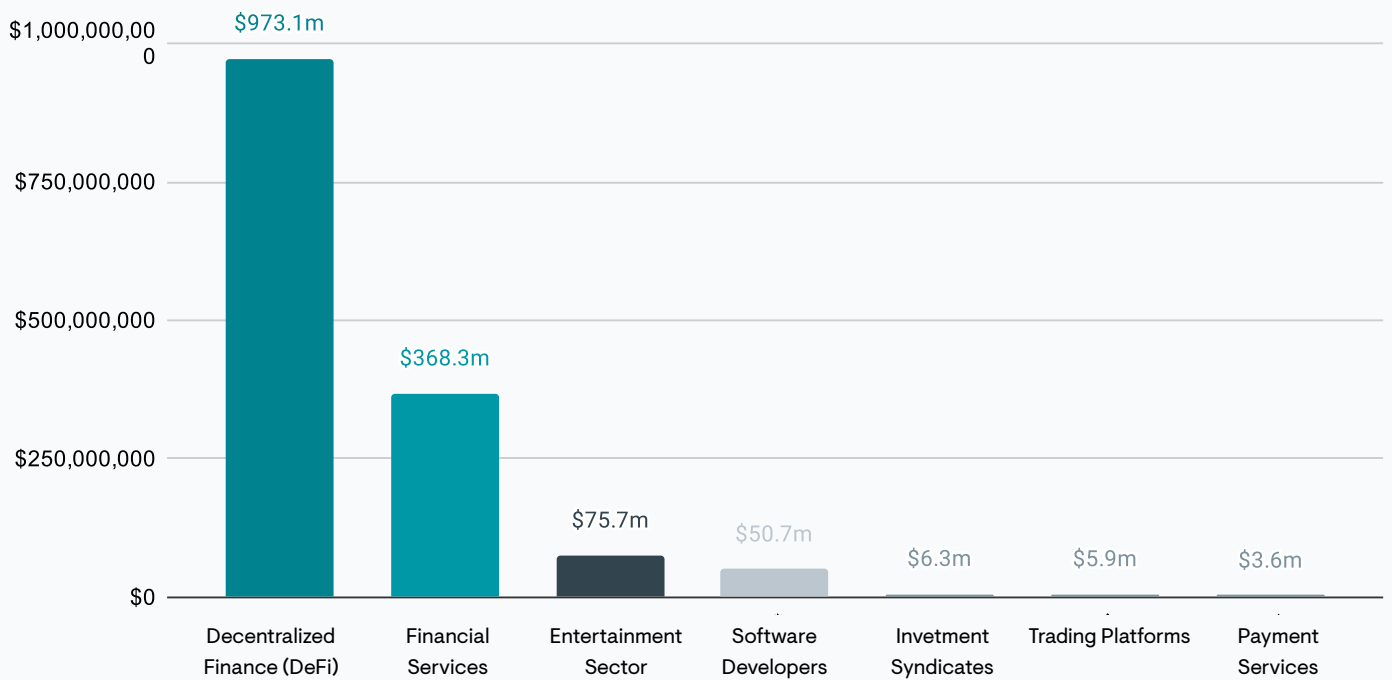
Money Laundering, Market Manipulation,
Scams & Sanctions Risks in
Non-Fungible Tokens

ELLIPTIC

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ETH investments into NFTs originating from different sectors (Q4 2017-Q2 2022)



Executive Summary

Our data-driven analysis into the prevalence of money laundering, terrorist financing, scams and sanctioned entities finds that these financial crimes represent a small portion of overall non-fungible token (NFT)-related trading activity.

Our key findings include:

- Over \$8 million of illicit funds has been laundered through NFT-based platforms since 2017 – representing 0.02% of trading activity originating from known sources.
- However, a further \$328.6 million (0.81%) originates from obfuscation services such as crypto mixers. A proportion of this may reflect proceeds from illicit activity.
- Over \$100 million worth of NFTs were publicly reported as stolen through scams between July 2021 and July 2022, netting perpetrators \$300,000 per scam on average. July 2022 saw over 4,600 NFTs stolen – the highest month on record – indicating that scams have not abated despite the crypto bear market.
- May 2022 saw the highest confirmed value of NFTs stolen through scams, at just under \$24 million. However, actual numbers are likely to be higher, as thefts are not always publicly reported.
- Social media compromises – particularly of NFT project Discord servers – have surged in 2022, accounting for 23% of all NFTs (close to 5,000, worth around \$20 million) stolen this year. The growing availability of tailored malware that can bypass multi-factor authentication is likely to be partially responsible.
- There is a growing threat to NFT-based services from sanctioned entities and state-sponsored exploits. This has been emphasized by the \$540 million heist from Axie Infinity’s Ronin Bridge by North Korea’s Lazarus Group and the possession of NFTs by the US-sanctioned Chatex cryptoasset exchange. Digital assets worth more than \$160,000 originating from sanctioned entities have been used to purchase NFTs.
- Tornado Cash, a US-sanctioned mixer, was the source of \$137.6 million of cryptoassets processed by NFT marketplaces and the laundering tool of choice for 52% of NFT scam proceeds before being sanctioned by OFAC in August 2022. Its prolific use by threat actors engaging with NFTs further emphasizes the need for effective sanctions screening by NFT platforms.

Although crime represents a small proportion of overall NFT trading, it has a disproportionate impact on the industry’s reputation and undermines the quality of experience of legitimate users. NFT marketplaces must be proactive in risk management to mitigate these repetitional risks and issues. Sanctions screening solutions are also becoming increasingly essential for NFT-based platforms.

This report provides and explains the trends summarized above to understand the nature, origin and scale of these select financial crime risks. Guidance is also provided on regulatory matters concerning NFTs and the utilization of blockchain analytics to detect, investigate and prevent exposure to illicit activity. The report is intended for all stakeholders engaging with NFTs. It provides red flag indicators and recommendations to improve the safety, security and enjoyment of partaking in this rapidly growing industry.

Introduction

By many standards, non-fungible tokens (NFTs) were the buzzword of 2021 – even word of the year, according to the Collins English Dictionary.¹ Google searches for “NFTs” reached new highs in early 2022 – indicating that the phenomenon has no signs of slowing. New investments in metaverse ventures, celebrity involvement and diversifying use cases have continued to drive the expansion of NFTs in both value and popularity. Proponents argue they are an innovative new solution to many problems particularly in artistic industries. Meanwhile, naysayers criticize them as environmentally unfriendly JPEGs that can simply be screenshotted – deriding them of any actual value.

So what are NFTs, where does their value come from and what can they achieve? This introduction provides an explainer into the phenomenon and a structural overview of this report.

What are NFTs?

NFT stands for non-fungible token – a blockchain-based asset that can have specific properties and value. They differ from fungible cryptoassets such as Bitcoin, Ether or Tether, which are interchangeable with any other unit of the same asset (e.g. one Bitcoin has the same value as any other Bitcoin).

Fungible assets can be analogized as a pile of 25 cent coins, which will have the same value regardless of how rusty or shiny they are. NFTs, however, are more akin to Pokémon cards. These have a different retail value depending on the unique characteristics of the Pokémon character. While an ungraded Weedle #69 (Pokémon Base Set) may be worth a few dollars at most, a 1999 First Edition Shadowless Holographic Charizard could fetch well over \$100,000.

A Brief History of NFTs

Despite being popularized in 2021 with the growth of NFT collections such as CryptoPunks and Bored Ape Yacht Club² – the origins of non-fungible tokens can be traced back to 2012/13. This is due to some early thinking in the Bitcoin community with the idea of “coloring” Bitcoins – or parts thereof – to enable them to represent different values or metadata. A whitepaper with this idea was created by Ethereum Co-founder Vitalik Buterin and an early implementation of this was the Counterparty marketplace, which sold early-NFT versions of trading cards and memes linked to the Bitcoin blockchain.

However, where the concept of non-fungible cryptoassets really started to grow was in 2017 with the CryptoPunks collection – 10,000 24-bit artworks created by a modification of the ERC20 standard. At the end of 2017, the Ethereum blockchain was brought to a standstill with the introduction of the ERC721 standard, with the CryptoKitties project – digital collectible and breedable cats – being the first to get mainstream attention and adoption. By December 2017, over 25% of transactions on the Ethereum blockchain were related to the buying and selling of these digital cats.³

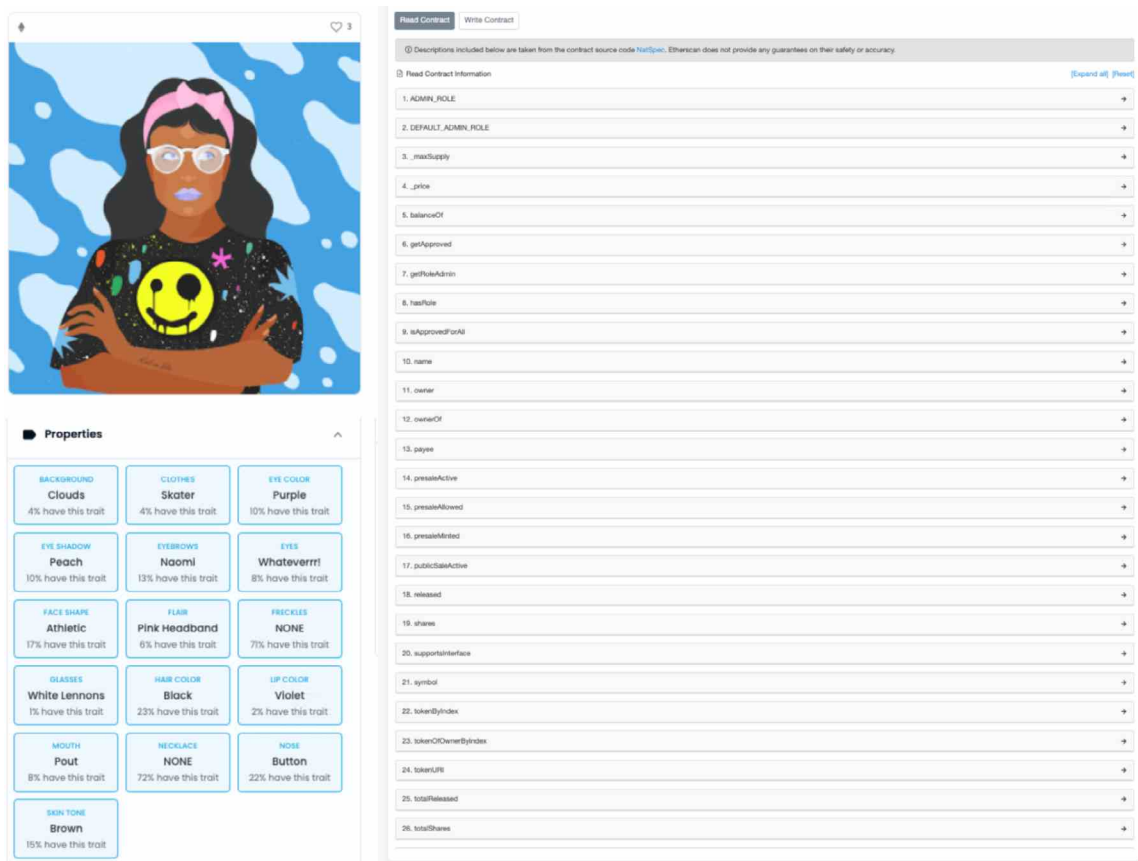
How NFTs work

On a technical level, these cryptoassets are represented on a blockchain by a smart contract that follows a predefined specification. These smart contracts are self-executing code which allows for the creation (“minting”), destruction (“burning”) and transfer of the specific cryptoassets, as well as the ability to create metadata about the asset. For the Ethereum blockchain – and other compatible blockchains – non-fungible tokens use the ERC721 standard or a modified version called ERC1155.

ERC stands for Ethereum Request for Comment. They are official specifications and implementation details for a piece of functionality on the Ethereum blockchain. Each ERC starts life as an Ethereum Improvement Proposal (EIP) which is discussed and peer reviewed before it may make its way into an official ERC. The number represents the unique identification number for the proposal.

The ERC721 contract was proposed in January 2018 to provide functionality above and beyond the existing ERC20 standard for fungible cryptoassets – notably the introduction of non-fungible tokens. To create a new NFT, creators deploy a new ERC721 contract and specify collection-level information as well as creating the ability for individual NFTs within the collection to have unique properties through metadata.

One alternative to the ERC721 standard that is growing in popularity is the ERC1155 standard, which allows for efficiencies such as batch transaction processing and the ability to create both fungible and non-fungible tokens from one ERC1155 contract. Both are common across Ethereum and Ethereum-compatible blockchains such as Binance Smart Chain, Polygon and Avalanche. However, there are also NFT standards across other blockchains such as FA2 on Tezos, Tron’s TRC-721, Flow’s representation as resource objects, Cardano’s use of PolicyIDs and metadata for native NFTs, and Metaplex’s Solana standard.



An ERC-721 NFT (top left), its unique properties (bottom left) and the ERC-721 contract that contains the metadata allowing for the creation of these properties (right).

Non-Fungible Volumes Across Blockchains

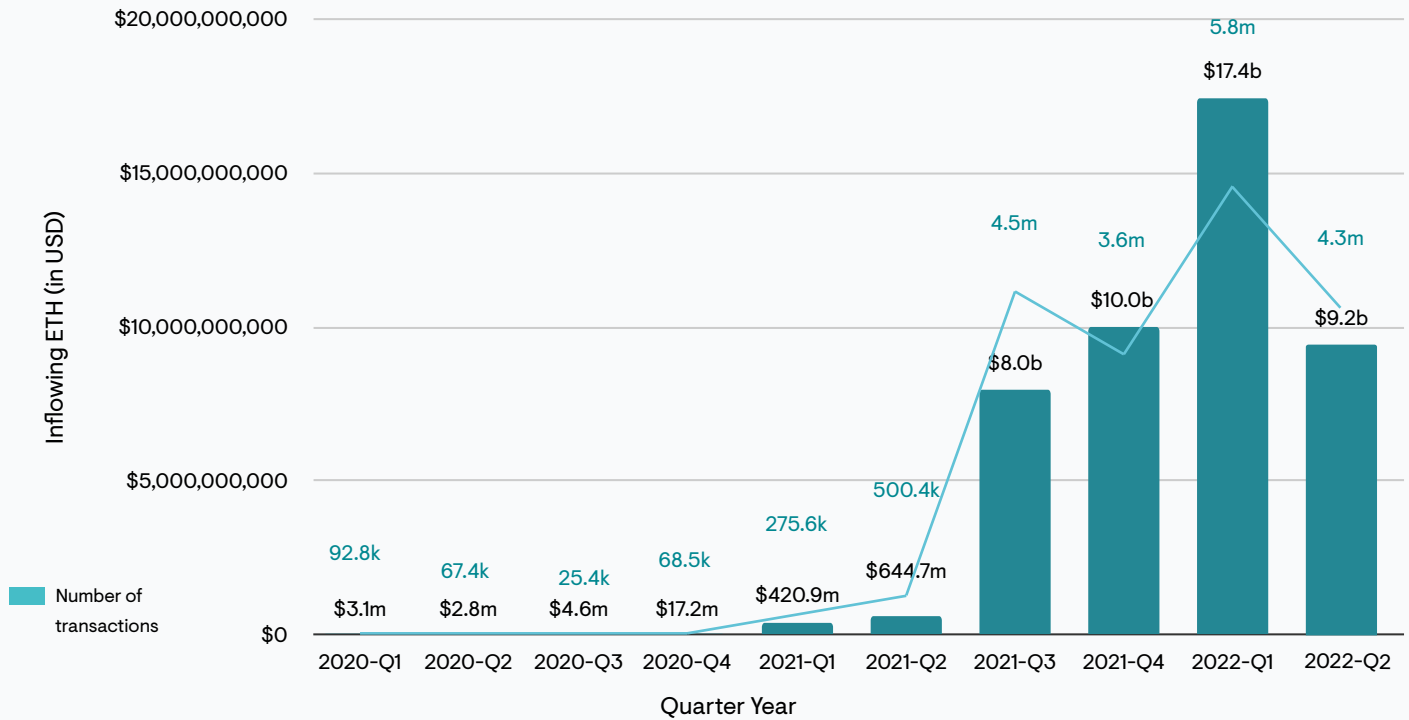
NFT trading increased notably from summer 2021, with daily average sales of over \$50 million and over \$17.7 billion in NFTs sold throughout that year – an increase of over 200% from 2020.⁴ NFT trading remains primarily on the Ethereum blockchain – despite high fees and congestion. A downturn in the crypto markets since early 2022 has more recently also affected the NFT industry – with sales decreasing in Q2 2022 but still standing at a notable \$9 billion. Meanwhile, alternative blockchains such as Solana and Polygon remain behind, despite aggressive marketing campaigns and creator funds to entice people from Ethereum.

The value of an NFT is determined by a number of factors – including but not limited to the popularity of its collection across social media, the involvement of influencers or celebrities, speculative trading, the rarity of individual NFTs based on their unique properties and their utility in crypto-based projects.⁵ The argument that NFT JPEGs are worthless due to the ability to easily screenshot and replicate them is rejected by the NFT community, which assigns value and social prestige to holding the original cryptoasset representing that JPEG on chain.

NFT Use Cases

A popular use for non-fungible tokens is developing communities or online prestige through profile picture projects (PPFs). However, there are use cases beyond this social media trend. Some of the popular trends include digital artwork, metaverse functionality, exclusive membership/ticketing and gaming.

ETH flowing into select Ethereum-based NFT platforms by quarter year



(Elliptic's internal analysis)

Digital Artwork

Two challenges that artists who create digital artwork face are proving authenticity of their pieces, and preventing copy-cat creators using their imagery and passing it off as their own. However, by linking their digital artwork to a non-fungible token on an immutable blockchain, the artist can cryptographically prove that the piece comes from their official collection (a contract they have created).

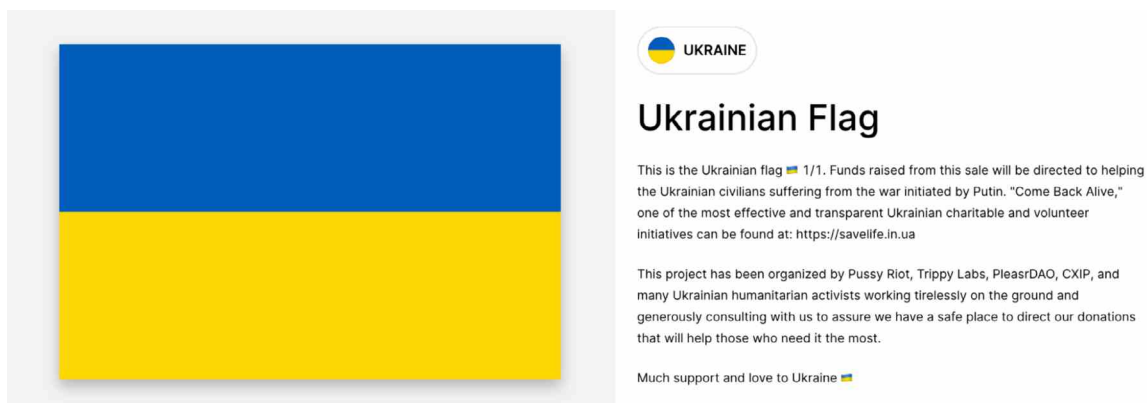
There is a booming digital art space involving non-fungible tokens with over three million pieces traded and a total value of over \$2 billion.⁶ This market saw a notable increase in 2021, and this is thought to be partly accounted for due to the inability for art collectors to physically purchase pieces during the COVID-19 pandemic.

The record for the most expensive NFT sold was broken most recently on March 11th 2021, when an artwork named *Everydays: The First 5000 Days* by artist Mike Winkelmann – aka Beeple – sold for \$69.3 million. In early December 2021, digital artist Pak sold 312,686 units of his collection *The Merge* to just under 29,000 collectors for \$91.8 million.

Many NFT marketplaces have introduced verified collection functionality – similar to the blue checkmark on Twitter – to prove collection authenticity. Digital art impersonation is, however, becoming an increasingly prevalent issue for NFTs. The largest NFT marketplace OpenSea said in January 2022 that over 80% of NFTs minted using its tool were “plagiarized works, fake collections and spam”.⁷

Fundraising

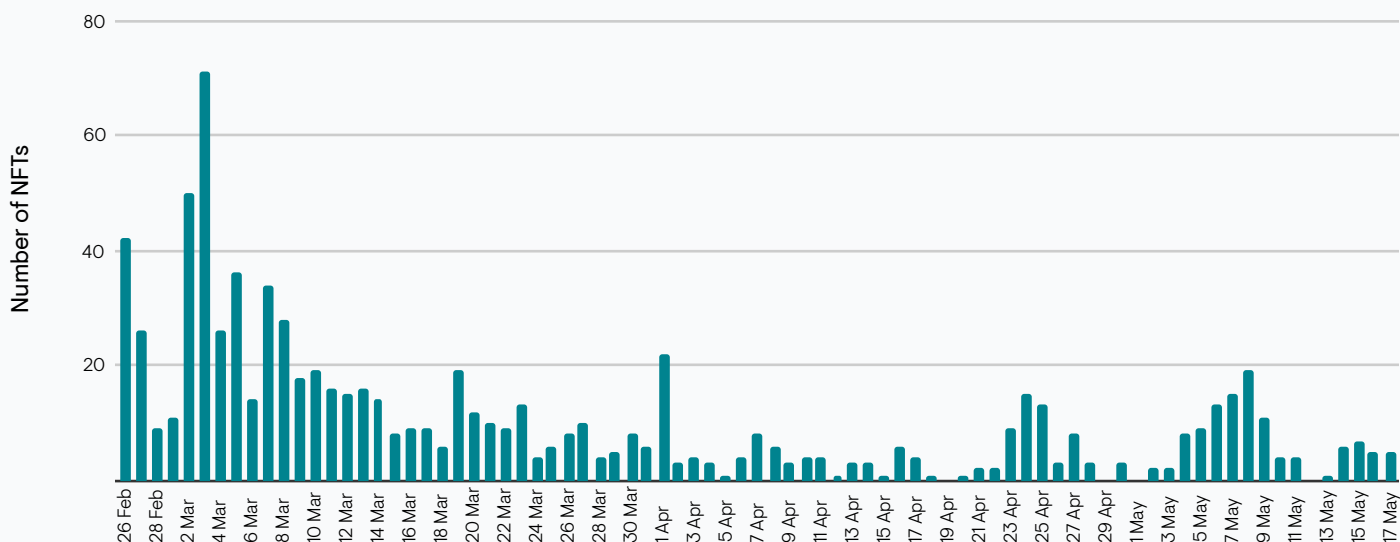
NFTs have featured prominently in the Ukrainian government's cryptoasset financing efforts to counter the Russian invasion beginning on February 24th 2022. Crypto fundraising campaign UkraineDAO sold an NFT of the Ukrainian flag for \$6.75 million – becoming the 10th most expensive NFT sale at the time. The proceeds were then donated to the government and numerous other charities.



UkraineDAO's NFT on Zora marketplace – the 10th most expensive NFT ever sold at the time

Over 840 NFTs – mostly worthless but including a Cryptopunk and numerous other prominent projects – were donated to the government as of May 17th 2022. These were then auctioned through a dedicated site run by the Ukrainian Ministry of Digital Transformation.⁸ The Ukrainian Cyber Police also began minting NFTs to finance resistance efforts. NFT donations stopped after May 18th and did not resume throughout June and July 2022.

Number of NFTs donated to or minted by the Ukrainian Government on Ethereum since Russia's invasion (2022)



Metaverse Assets

NFTs are a foundational building block for ownership within metaverses – digital worlds which foster social interaction through new digital technologies. While many use fungible ERC20 tokens for their native cryptoassets, the digital land which metaverse participants can own and build on – along with the digital wearables used to dress up avatars – are NFTs.

Technology consulting firm Gartner has predicted that by 2026, 30% of organizations from the real world will be ready to offer metaverse related goods and services, while 25% of people will spend at least one hour a day immersed in it.⁹ This is, therefore, likely to be a growing use case for NFTs. To understand more about illicit trends in the metaverse, you can read our [“Financial Crime in the Metaverse” report](#).

Exclusive Membership/Tickets

A growing trend is using NFTs to provide access to exclusive Discord channels, online private members clubs or real-life events. These include exclusive travel clubs where NFTs act as passes to private jets, exclusive hotel booking and private yachts. Other examples include NFTs granting membership to exclusive restaurants, cocktail/cigar lounges and private meeting/dining spaces.

Gaming

The Gaming Market was valued at over \$198 billion in 2021, and is expected to reach a value of \$340 billion by 2027.¹⁰ There are now several popular blockchain based games such as Axie Infinity and Aavegotchi, which utilize NFTs for playing characters. Furthermore, traditional gaming houses – such as Ubisoft – have integrated NFTs within their more traditional gaming concepts.¹¹

However, the traditional gaming community hasn’t unilaterally embraced the introduction of NFTs with open arms. EA Games¹² and Team17 are just some gaming companies that have backedpedaled on introducing NFTs into their games after a strong user pushback.¹³ The chart below shows the growth of Axie Infinity, one of the most popular blockchain-based NFT games, by amount of ETH invested by players over time.

NFT Use in Malicious Activity

Perception of NFTs, their value, how that value is derived and other such questions have proven unique compared to other emerging technologies. These considerations have also motivated concerns of how susceptible NFTs are to financial crimes. The potential of NFTs to be used for money laundering, tax evasion, price manipulation and other such illicit activities has been widely discussed by critics of the technology – often without many concrete examples or data to justify these assertions.

This report uses Elliptic’s deep industry knowledge and proprietary internal data to discover how – and to what extent – NFTs are being used for scams, money laundering, terrorist financing and by sanctioned entities. While it also considers rug pulls, market manipulation and tax evasion, their prevalence is not quantitatively evaluated by this report.

Sections one to four consider some mainstream financial crime typologies and trends often associated with NFTs, while section five considers the ever-recurring question of NFTs and money laundering. Each section seeks to provide relevant stakeholders a data-driven idea into the risks and their prevalence – accompanied by case studies. Section six explores the regulatory outlook for NFTs across different regions, including an overview of how different regulators have approached NFTs and financial crime risks.

This report aims to be a resource for policymakers, regulators, law enforcement, NFT-based services – such as cryptoasset exchanges and marketplaces – and traders. It contains blockchain analytics tips, risk management guidance, red-flag indicators and recommendations for how to make NFTs safer, sustainable and a more secure technology for the benefit of everyone.

Look out for these indicators for the different types of information contained in the report.



Red Flags & Warning Signs

Warnings describe significant issues and trends in criminal behavior that are worth highlighting and can indicate suspicious activity, while red flags are indicators of risk that might not clearly pinpoint illicit activity as a standalone.



Diagrams and Flowcharts

Illustrations, diagrams, graphs and charts are included throughout to help you visualize a typology and, where possible, give a relative view.



Case Studies

Wherever possible, real-life examples of how criminals are exploiting the typologies Elliptic has examined are included to evidence how the typology is played out.



Key Controls

These summarize solutions that compliance officers in Elliptic's network have devised to manage exposure to certain risks to demonstrate mitigating actions that have been effective.



Elliptic Analytics

A spotlight into the analytics tools we use to detect, study, and prevent financial crime.



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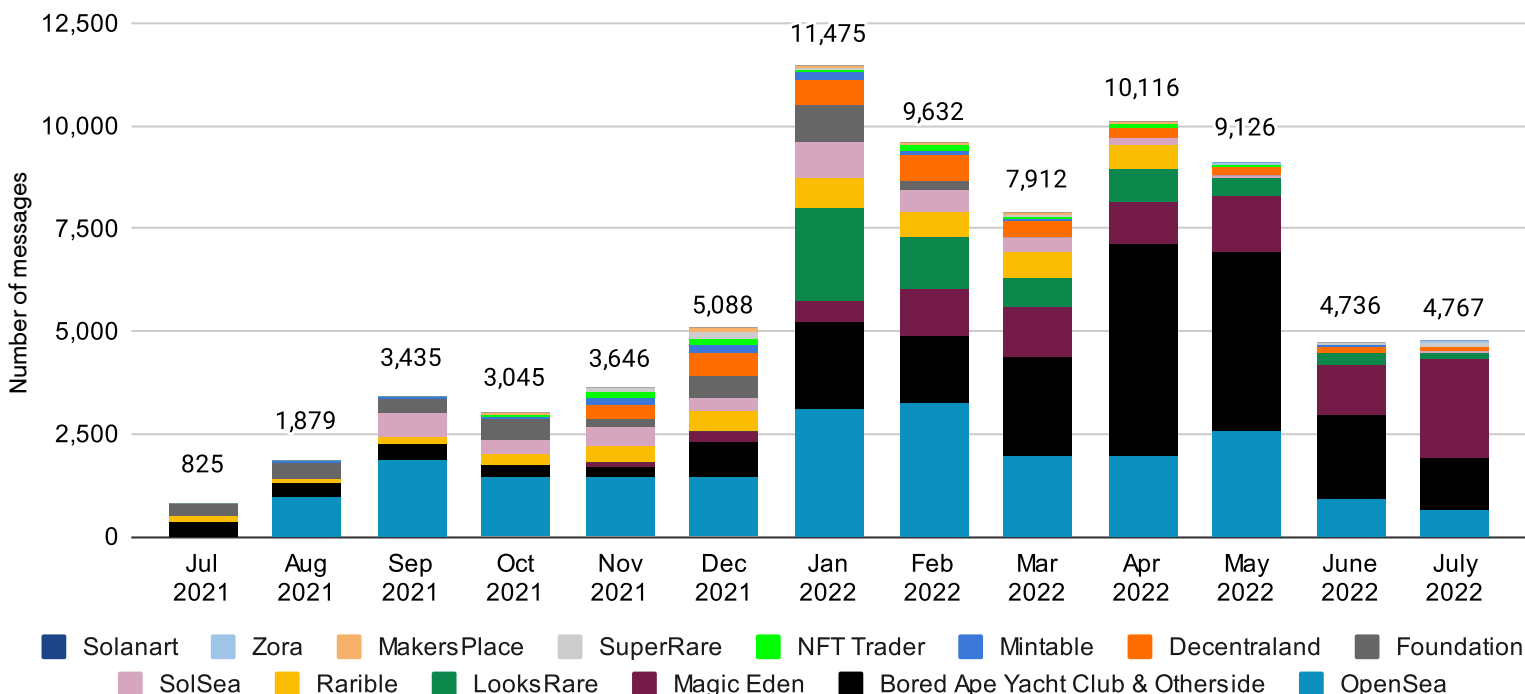
NFT Scams and Thefts

Perhaps the most frequent concern and reported financial crime across online NFT communities are the theft of assets through a variety of different scams. These involve any malicious behavior intended to motivate the victim through false pretenses to provide access to their assets. Predominantly perpetrated using social media, scams may range from deploying phishing links to impersonating NFT marketplace support staff.

The prevalence of scammers on online NFT communities remains a key issue for traders and marketplaces, and can result in millions of dollars worth of asset losses with a few seconds of complacency or accidental clicks. Ethereum – the most popular blockchain for NFTs – constitutes most of the cases and data presented in this section, though examples from other blockchains are also considered.

It is difficult to find an NFT server on Discord that does not display a “beware of scammers” message on its introductory channel. The NFT marketplace OpenSea has advised its Discord community to switch off direct messaging due to an “overabundance of scammers”. Users may find a direct message from a scam bot with a phishing link sent to them mere seconds after joining an NFT-related Discord server. Most mainstream NFT projects also have “report scams” channels within their servers. These channels have registered over 75,000 messages across select NFT platforms since July 2021, of which 76% were sent in 2022.

Activity across Discord scam report sections across selected NFT-related servers



Not all messages are scam reports – some may be replies or requests for further information

1. The Cost of NFT Scams

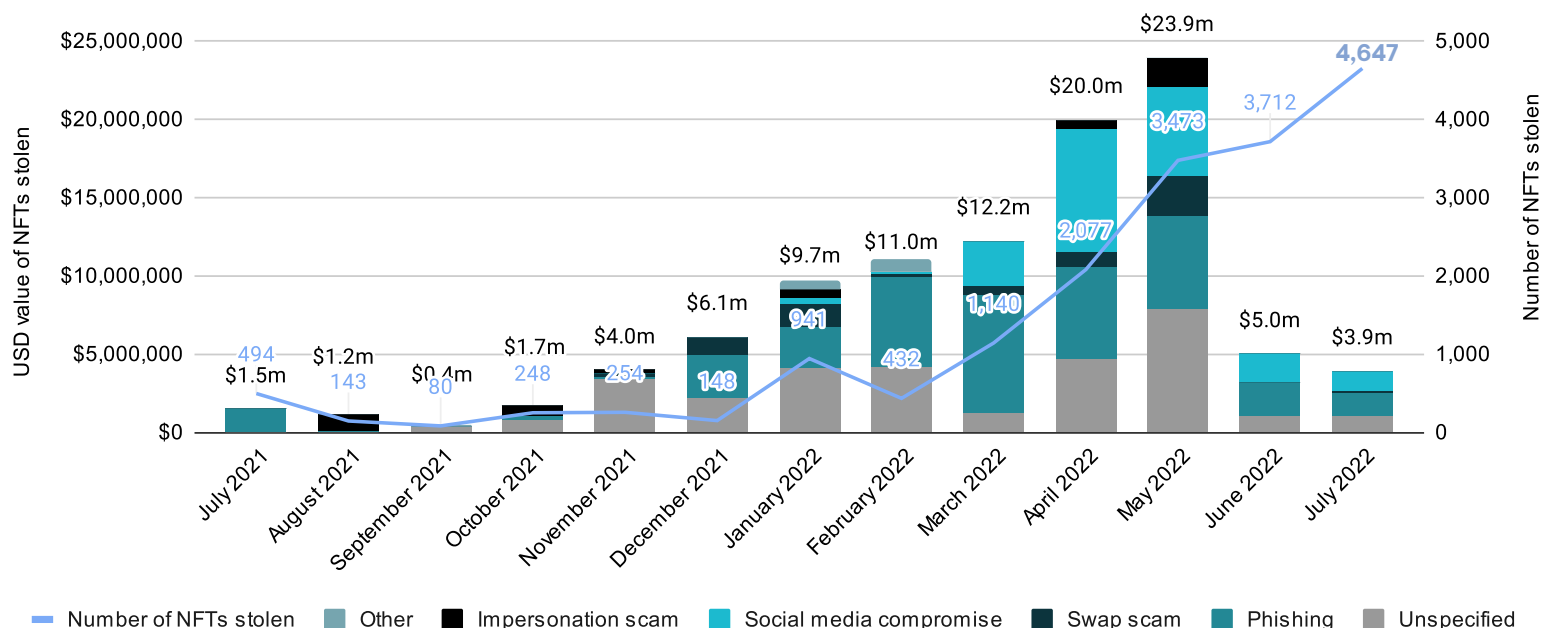
Elliptic has analyzed over 80 high profile NFT scams reported on social media since July 2021. At least 4,650 NFTs – worth over \$50.6 million based on average collection prices on the day of theft – have been stolen in that time period.¹⁴ July 2022 saw over 4,600 NFTs stolen – the highest month on record – indicating that scams have not abated despite the crypto bear market, which has seen the value of NFTs decrease significantly.

The most valuable NFT ever stolen is CryptoPunk #4324, which was sold by scammers soon after the theft on November 13th 2021 for \$490,000. Meanwhile, the largest single heist from an individual victim resulted in the loss of 16 blue chip NFTs worth \$2.1 million on December 28th 2021.

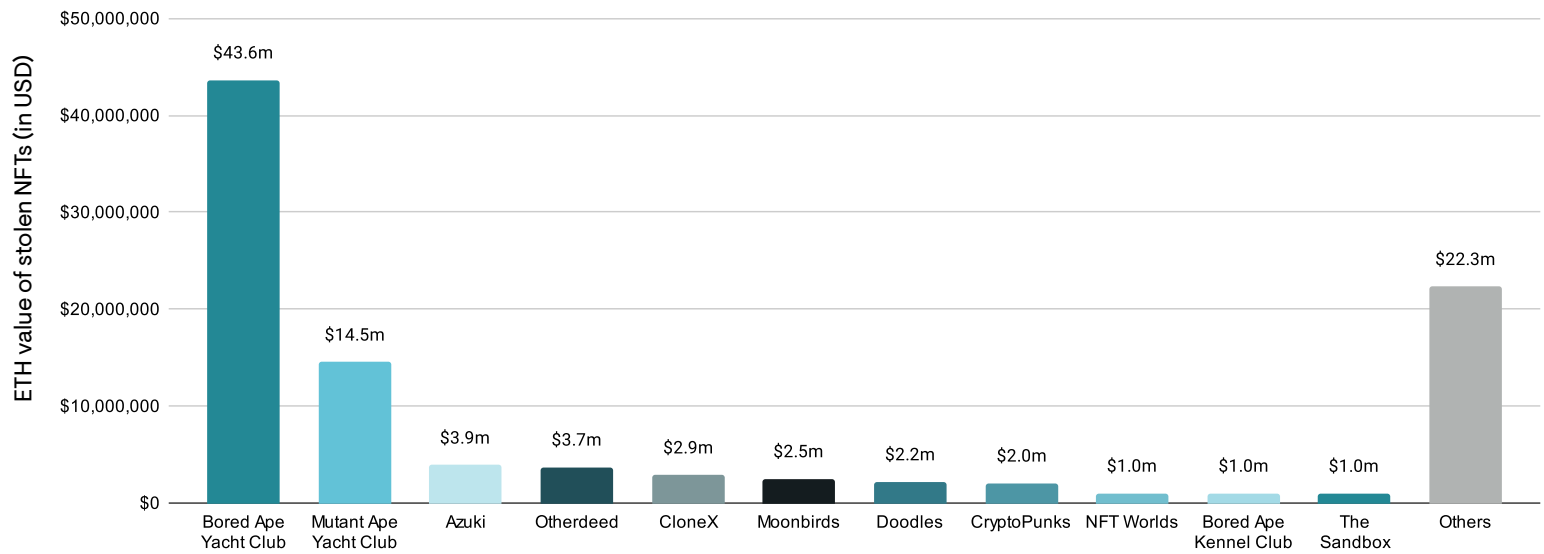
Emphasizing the persisting problem of scams, Assets #9650 and #5759 in the CloneX collection have been stolen twice in the space of three months – in two unrelated scam incidents – having been worth around \$50,000 on both occasions. Typically, when a scammer drains a victim’s wallet, they will take all assets – including NFTs, ERC-20 tokens and Ether (ETH) – beginning with the most valuable ones. Although the crypto bear market caused the value of stolen NFTs in June and July 2022 to slump, the number of NFTs stolen reached a new record in July, standing at over 4,600. These trends emphasize that scams continue to be a growing problem despite market conditions.

Prominent collections such as Bored Apes, Mutant Apes, Azuki, Otherside and CloneX constitute the bulk of value lost to scams. Together, these five collections constitute over two-thirds of the stolen NFT value since July 2021. However, scams of lower-priced NFTs are more likely to go unreported. As hype around the metaverse and virtual real estate continues, prominent virtual land NFT collections such as NFT Worlds and The Sandbox’s LANDs are being increasingly targeted. Yuga Labs’ Otherside metaverse project – released on May 1st 2022 – already saw NFTs from its collection being stolen just two days after launch.¹⁵

Value (bars) and number (line) of NFTs stolen by month based on scam type (according to social media reports)



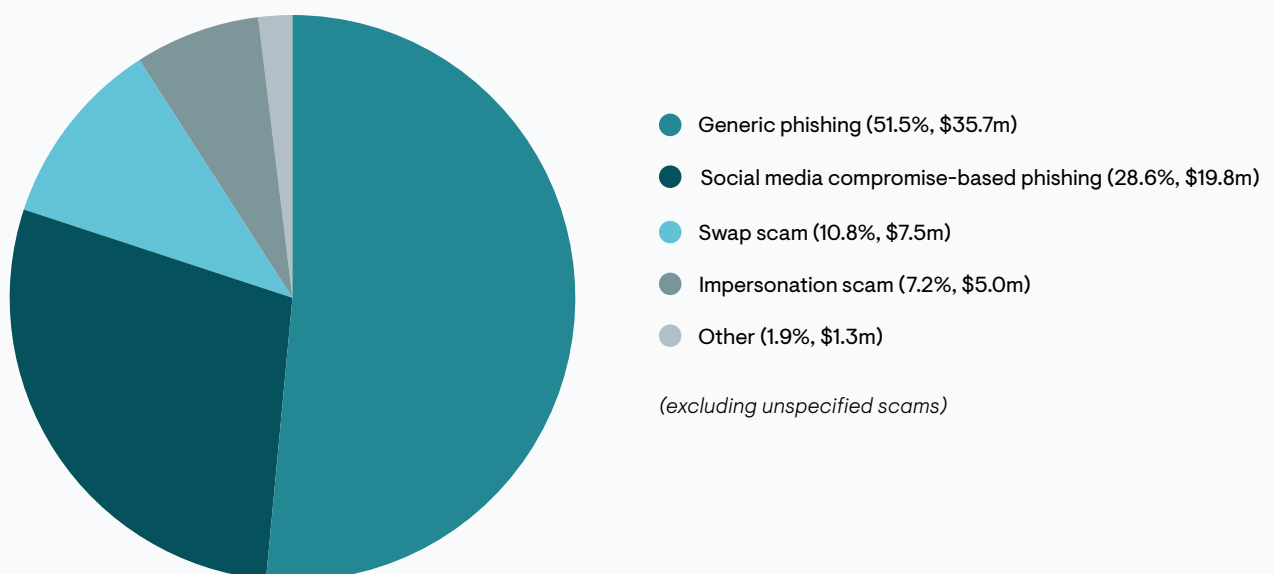
NFT thefts by collection to July 2022



Elliptic has identified 167 confirmed and publicly reported instances of a theft of Bored Apes – one of the most prized ‘blue chip’ projects – affecting 1.7% of NFTs within this collection. Across June and July 2022, thefts of valuable NFTs decreased while those affecting lower value early-stage projects rose. This trend likely partially reflects valuable NFT owners ‘hodling’ their assets throughout the bear market and not engaging as actively with new projects vulnerable to scammer activity.

Phishing scams account for the majority of instances observed. However, more sophisticated variants – such as phishing links deployed through compromising administrator accounts of social media platforms – are increasingly on the rise. The following sections explore the different types of scams typically affecting the NFT community.

Breakdown of \$69.5 million of identified losses based on scam type

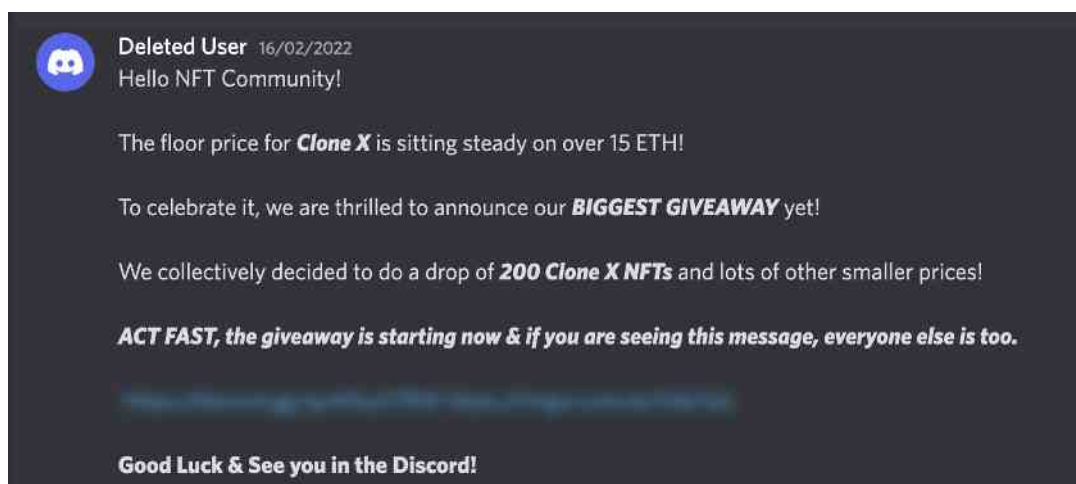


2. Phishing Scams

Phishing scams are possibly the most common scam observed in the NFT community, and perhaps across the wider crypto community as a whole. They involve fake malicious sites that compromise victims' cryptoassets through either one of two main ways:

1. Through a fake pop-up – posing as the login panel of a reputable custodial wallet provider – that steals victims' wallet information once they are entered.
2. Through encouraging victims to inadvertently sign malicious transactions so that scammers, posing as a legitimate NFT project, can steal their NFTs. This makes use of the 'SetApprovalForAll()' function in the ERC721 and ERC1155 standards, which allow – per wallet owners' approval – for others to manage their assets.

To incite clicks, scammers typically incite “fear of missing out” (FOMO). This is particularly prominent among NFT traders due to the rapid appreciation in value of numerous collections throughout 2021. As traders seek to seize opportunities at lower prices, scammers have exploited the frenzy to incite fast and careless purchases.

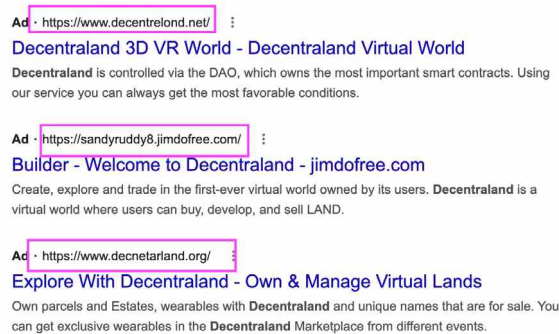


A typical example of a direct message phishing scam on Discord.

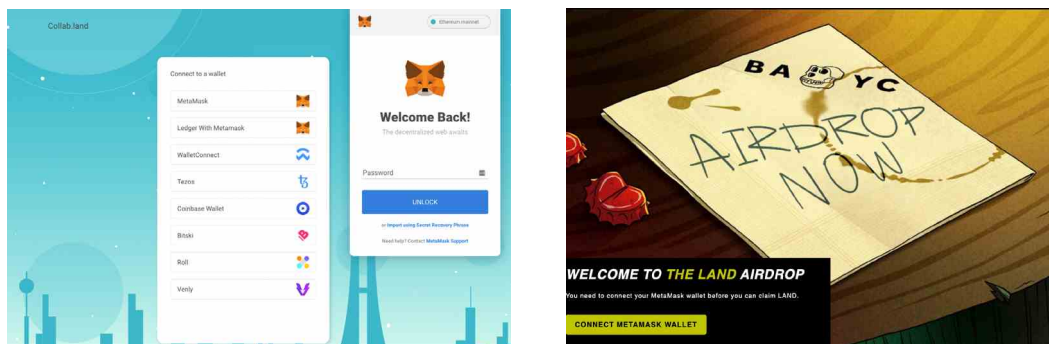
Phishing links can and have been deployed in numerous ways. As the community at large has become wise to typical direct messaging scams and other generic low-effort attempts, scammers' methods have gradually become more sophisticated and ingenious. New developments in the NFT space have also increased the opportunities for how scams can be deployed.

2.1 Domain Squatting and Impersonation

One of the most typical phishing methods – prevalent across cyberspace – involves mimicking the site of a well-known NFT platform or market. These typically use very similar domain names where the difference from the legitimate site is difficult to notice. Scammers have also been known to pay to advertise their sites on search engines, meaning that unwitting individuals searching for the impersonated NFT platform will see a host of phishing links at the top of their search results.



Fake phishing sites advertised during a Google search for Decentraland.



Phishing sites impersonating NFT projects Collab.land (left) and Bored Ape Yacht Club (right).



CASE STUDY

Jay Chou Loses Bored Ape NFT in Phishing Scam

On April 1st 2022, Taiwanese singer-songwriter Jay Chou announced that his Bored Ape Yacht Club NFT had been stolen after he clicked a phishing link. Three other NFTs belonging to Chou were also apparently stolen, with a total value of \$560,000. Chou became aware of the theft after a friend alerted him to unusual activity involving his wallet.

Scammers sold the stolen Bored Ape for \$535,000 soon after – well above the market price.

2.2 Social Media Compromises

Scammers have managed to gain control of social media accounts of popular NFT projects to post phishing links. Vectors for doing so range from technical infiltration techniques to inadvertent mistakes by NFT project admins. Some compromise techniques include:

- Squatting expired invite links of Discord servers
- Exploiting faulty tools used by servers to manage support tickets, verify new joiners or other such processes
- Socially engineering developers to unintentionally hand over their admin credentials

Close to 5,000 NFTs have been stolen through social media compromises, with the practice remaining highly profitable. Between the first and second quarters of 2022, the value of NFTs stolen through such compromises jumped by 386% – from \$3.2 million to \$15.4 million. NFT security analyst OkHotShot calculated that 71 Discord servers were compromised in May 2022, 99 in June and 101 in July.

Social media compromises are particularly attractive to scammers, as they give them perceived genuinity. During the compromise, phishing links can be deployed from the NFT project’s official admin account – leading to victims assuming that the link is legitimate.

Elliptic has identified a possible link between the surge in NFT social media compromises and the increasing prevalence of available malware-as-a-service (MaaS) designed to compromise social media account login credentials – including multi-factor authentication.

Potentially related to this or similar security threats, Yuga Labs – creator of Bored Ape Yacht Club, Otherside Metaverse and other well-known NFT projects – issued a tweet on July 18th, 2022.

```
root@debian-evtlglnx:~/go/src/github.com/kgretzky/evtlglnx2# ./bin/evtlglnx -p ./phishlets/
no nglnx - pure evll
by Mike (mike) @mrgretzky version 2.0.0

[11:42:32] [inf] loading phishlets from: ./phishlets/
[11:42:33] [inf] loaded phishlet 'facebook' made by @mrgretzky from 'facebook.yaml'
[11:42:33] [inf] loaded phishlet 'google' made by @mrgretzky from 'google.yaml'
[11:42:33] [inf] loaded phishlet 'linkedin' made by @mrgretzky from 'linkedin.yaml'
[11:42:33] [inf] loaded phishlet 'outlook' made by @mrgretzky from 'outlook.yaml'
[11:42:33] [inf] setting up certificates for phishlet 'outlook'...
[11:42:33] [su+] successfully set up SSL/TLS certificates for domains: [outlook.outlook.live.com.no-phish.com
-phish.com account.outlook.live.com.no-phish.com]
: sessions

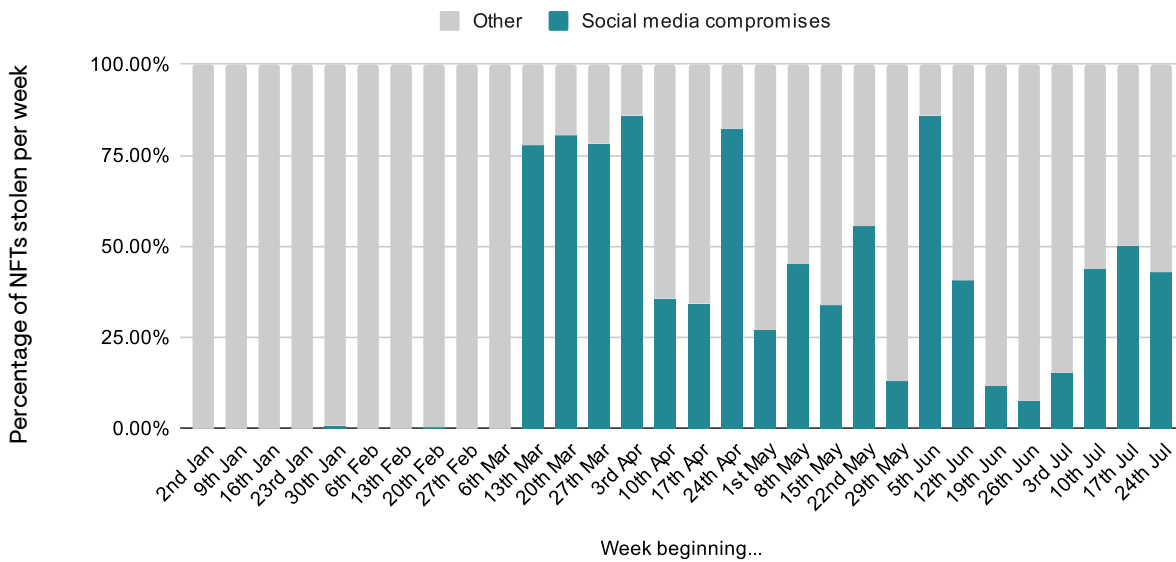
-----
| id | phishlet | username | password | tokens | remote ip | time
-----
| 1103 | outlook | [redacted] | [redacted] | captured | ** ** * | 2018-07-22 11:21:33
```



An example of malware with the ability to bypass multi-factor authentication (MFA) (left) and Yuga Labs’ warning tweet of co-ordinated social media compromises (right)

More granular and temporal analyses of incidents throughout 2022 furthers the possibility of ‘batch’ compromises, where sophisticated malware or exploits are deployed across several servers at the same time – and likely by the same threat actor. For example, on June 10th 2022, 10 Discord servers were compromised on the same day. In contrast, there remain times across mid-2022 when there were no or comparatively fewer incidents.

Percentage of NFTs stolen each week in 2022 through social media compromises, compared to other scams



CASE STUDY

April 2022 NFT Discord Compromises

On April 1st 2022, a number of prominent NFT projects announced that their Discord accounts had been hacked, with messages enticing users to mint “limited edition” NFTs leading to malicious phishing sites. Compromised projects included Doodles and Bored Ape Yacht Club, which warned against interacting with any Discord links while they worked to regain control. The compromise was allegedly attributed to an automated ticketing tool used by the affected servers to manage support requests.¹⁶ Scammers stole two NFTs worth around \$85,000.

One example of a fake phishing NFT mint opportunity posted on the hacked Discord servers (left) and subsequent announcement by the compromised NFT project (right).



Dobies NFT Discord Heist – One of the Largest NFT Scams by Number Stolen

Dobies NFT – an Ethereum-based NFT project – launched on April 13th 2022 and established a Discord server. However, the project kept the server’s invite link on its social media account bio even after it had expired. Scammers took the opportunity to establish a fake Discord server with the same link. Since it was still advertised on the official social media accounts, many victims joined it believing it to be genuine.

The scammers – posing as Dobies NFT admin – then posted a phishing link for a fake whitelist raffle giveaway. After connecting their wallet, victims unwittingly signed transactions that transferred their NFTs to the scammers. Over 300 NFTs worth around \$400,000 were stolen in the scam – making it the largest theft by number of NFTs stolen at the time.

2.3 Airdrop Phishing Scams

An “airdrop” involves a certain amount of unsolicited new tokens being dropped into a user’s wallet. They may be a legitimate advertisement campaign for new token projects attempting to generate interest. These campaigns are usually frowned upon and viewed either as spam or with suspicion. Airdrops may also target known celebrity or influencer wallets to generate the illusion that they have the backing of prominent individuals.

NFT scammers have utilized airdrops and the hype surrounding them in two main ways. Firstly, like many other fake social media-based scams, scammers have created malicious websites impersonating legitimate airdrops or entirely fake airdrops of their own. Upon clicking the “claim airdrop” button and connecting their wallet, victims give scammers access to their assets.

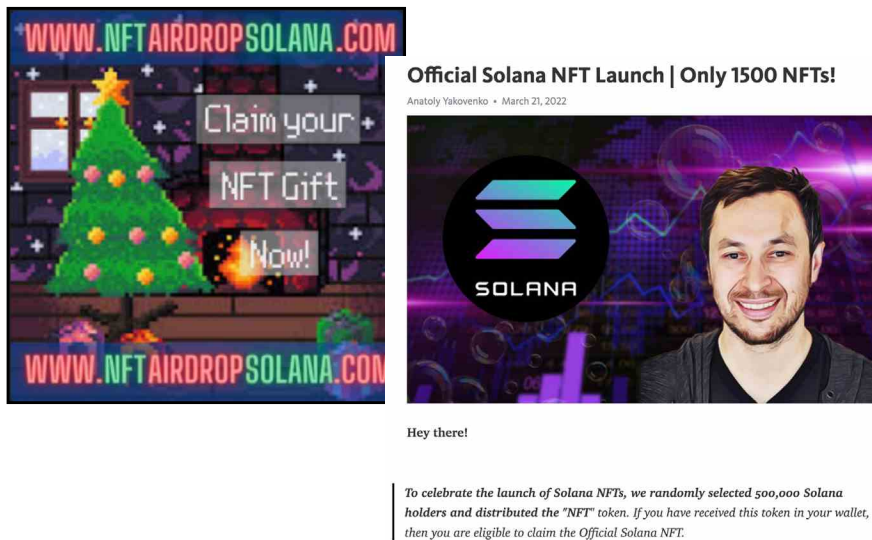
A second strategy involves scammers minting worthless NFTs and airdropping them into the wallets of potential victims. The NFT collection will claim that they can be redeemed for money, causing victims to navigate to the scammers’ phishing site and inadvertently sign transactions leading to the draining of their assets. Airdrop scams are not only specific to NFTs and have also been used to deliver phishing links in the wider DeFi community using scam tokens.



Airdrop Phishing NFTs on the Solana Blockchain

In March 2022, a scammer impersonating Solana blockchain Co-founder Anatoly Yakovenko claimed to have airdropped an alleged 500,000 NFTs to Solana wallets. The NFTs led victims to a number of different near-identical sites, inciting “FOMO” by claiming that they were eligible to mint one of 1,500 “official Solana” NFTs.

The sites then instructed victims to connect their wallet, thereby gaining access to their assets. One account linked to the scammer has \$18,000 worth of incoming SOL.



One of the airdropped NFT (left) and an associated phishing website (right).

2.4 Phishing Emails

Much like traditional scams, scammers may obtain email addresses of NFT users from their official sites – especially if they have been made public by prominent NFT influencers for contact – or from hacked databases sold on the dark web.

Typically, NFT-related phishing emails impersonate a marketplace or platform, advising that the victim must click on a link to facilitate a trade or verify personal information. They may also contain alerts inciting FOMO, such as notices of NFTs being listed for below their floor price. The links contained in these emails connect the victim to malicious sites – impersonating legitimate NFT marketplaces.



The February 2022 Contract Migration Phishing Incident

On February 20th 2022, several users of the NFT marketplace OpenSea announced that they had fallen victim to a phishing scam – claiming more than 260 NFTs. The scammer returned two thirds of the NFTs while selling off the higher value ones.

Though not confirmed, the exploit has been attributed to a phishing email encouraging users to migrate their wallets to OpenSea’s new contract address. OpenSea had opened migrations to its new Wyvern 2.3 contract on February 18th and implemented a deadline of February 25th for users to migrate their listings. However, the link in the malicious email instead resulted in users signing permissions allowing the scammer to drain their wallets.

Having stolen NFTs collectively worth approximately \$5.1 million, this scam remains the single largest NFT heist to date.



Hi there,

You can now migrate your Ethereum listings to the new smart contract today (gas free).

[Get Started](#)

You have until **2pm ET on Friday, February 25** to migrate your listings. After that time, any listings you haven't migrated will expire. All existing offers will also expire at that time.

If you don't migrate your listings by February 25, you will still be able to re-list your expired listings after that period without incurring any additional fees (including gas fees).

For more on why we're upgrading to a contract and how to get help migrating your listings, visit our [help center](#).

Thank you,
The OpenSea Team

A screenshot of an email, copying OpenSea's previous announcement about their contract migration, believed to be used for the phishing attack.

Red Flags & Warning Signals

- The site's URL does not match the verified URL of the NFT marketplace or project.
- The site, social media account or Discord server has spelling or grammatical errors.
- The site's name resembles a known crypto business, NFT project or financial service.
- The accessed site is slower, looks different or is of lower quality than the original site.
- The accessed site has no SSL certificate.
- A proposed or advertised trade, listing or swap is valued at significantly below the NFT floor price or is too good to be true.
- A communication calls on users to interact with a new minting or airdrop campaign and incites a sense of urgency.
- The contract or wallet seeking access permissions is not the verified address of the NFT project being interacted with.
- A communication has been received through a format that the alleged sender should not have access to (for example an email from an NFT platform to which an email address was never provided).
- There is significant online chatter on social media calling out a certain communication, account or Discord server as a scam.
- There is no online chatter pertaining to or confirming a call to action by an unsolicited message/email that urges users to access a site or change contract permissions.
- An identical email is sent out soon after one has been received by a verified NFT marketplace or platform.
- Sites where internal links – to “terms and conditions”, “contact us”, “documentation” or “roadmap”, for instance – do not link to any pages.
- Contract being granted permissions does not have the trading volume that would typically be expected from an NFT project of its size.
- Twitter accounts or Discord servers do not have the number of followers typically expected for the NFT collection or platform.
- An unsolicited NFT has been airdropped into a wallet, claiming that they can be redeemed for rewards on a certain site.
- Apparent prominent celebrities or known influencers – with little previous engagement in crypto – promoting airdrops or new NFT projects.
- Several tweets from numerous different individuals repeating the same or similar advertisement for a certain site
- Sites offer very detailed instructions on how to connect wallets but little other information about their alleged project or other details.
- A Discord server has suddenly brought in a new verification service or tool fulfilling a basic function without any particular explanation or obvious reason

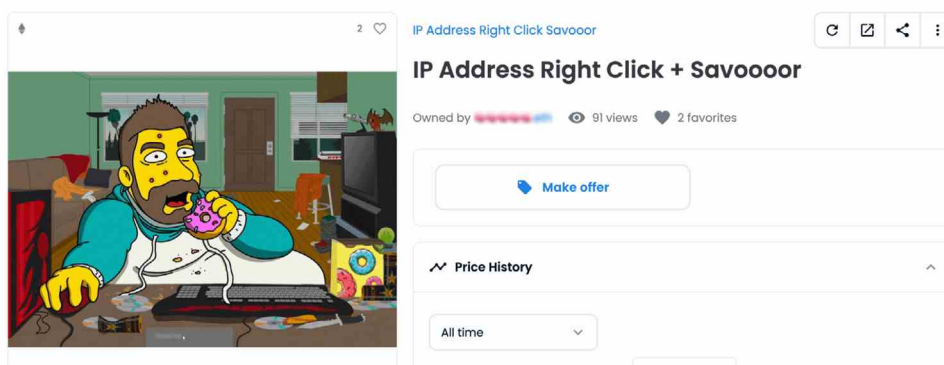
3. “Trojan Horse” NFTs

In September 2021, one victim tweeted that their assets had been possibly stolen after interacting with maliciously-airdropped NFTs.¹⁷ The prospect of scammers being able to steal victims’ assets by sending them malicious NFTs caused concern across the NFT community. After analyzing the victim’s blockchain activity, however, analysts suggested that it was more likely that the true culprit was a typical phishing link.¹⁸

In the same month, cybersecurity firm Check Point identified a vulnerability that allowed NFTs to trigger a malicious pop-up upon interaction, causing the victim to inadvertently give scammers access to other NFTs stored in their wallet. This scam – facilitated through a vulnerability on OpenSea – was patched before its exploitation became mainstream.¹⁹ A similar vulnerability on the Rarible marketplace involving scammers’ ability to embed malicious pop-ups within .SVG images – also identified by Check Point – was patched in April 2022.²⁰

Red Flags & Warning Signs

- Receipt of an unexpected NFT.
- Interacting with an unsolicited airdrop NFT initiates a pop-up.
- The sender of the airdrop does not appear to have any prior trading activity.
- The address of the sender appears to have been created shortly before the airdrop and has only been used to initiate mints and subsequent airdrops of the suspicious NFTs.
- The NFT’s name or collection has not been verified or widely advertised.
- Social media chatter indicates that the NFTs – or the project they seek to impersonate – are malicious.



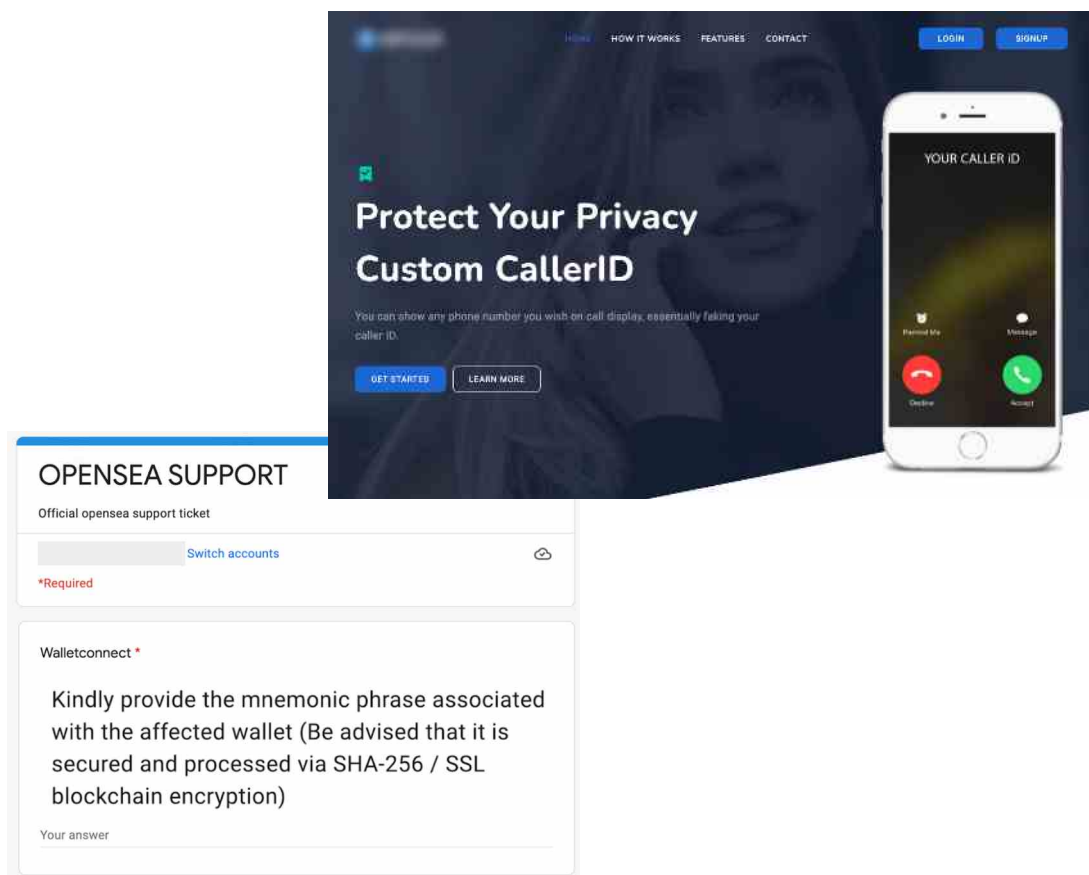
An NFT that can log your IP address if you view it

Trojan NFTs indicate the wider potential for NFTs to contain potentially malicious data or commands. In January 2022, Nick Bax from Convex Labs revealed a proof-of-concept NFT that can log a viewer’s IP address by encoding additional metadata into its animation URL²¹. This is one (arguably harmless) demonstration of how an NFT is not only limited to simple JPEGs – and can potentially facilitate malicious intent.

4. Impersonation Scams

Impersonation scams involve criminals pretending to be support staff of NFT marketplaces or custodial wallet services. Active on social media, scammers prey on individuals publicly complaining about bugs and technical difficulties, encouraging them to make contact via direct message so that their issues can be resolved. Scammers then ask users to provide their wallet seeds, to which victims – believing them to be genuine support staff – will comply.

The year 2022 has also seen the rise of phone scams in the NFT space. Scammers will typically attempt to obtain victims' one-time passwords to access their password repository, which may contain their wallet seed. Scammers may use phone spoofing services to make the entity they are impersonating – such as “Apple Support” – appear on victims' phones when they call. Elliptic's internal analysis has found that one such service has made over \$93,000 in Bitcoin.



A fake OpenSea support Google form, advertised on Twitter asking victims for their seed phrase (left) and a typical phone spoofing tool that scammers use to disguise their phone numbers (right).



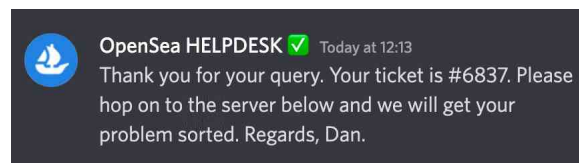
CASE STUDY

August 2021 OpenSea and BAYC Support Scams

On August 24th and 25th 2021, two impersonation support scam incidents drained two victims' wallets out of their NFTs – worth a combined total of \$800,000.

The first impersonated two prominent OpenSea employees, imitating typical customer support processes such as providing support tickets and initiating long waiting times. The victim – initially contacting support to solve a royalty issue – eventually agreed to share their screen. The scammers were able to view the victim's QR code unlocking their wallet and began transferring out their NFTs, while assuring them that their issue was being fixed.

The second involved four fake staff members contacting a victim on a popular collection's Discord server. The scammers ensured a sense of false security through initiating personal and friendly conversation. They then invited the victim to share their screen and update their MetaMask wallet plugin. While doing so, the victim inadvertently shared the QR code for accessing their account, which was then emptied out by the scammers.



A typical example of an impersonation scam on Discord.

Red Flags & Warning Signs

- A user directs the victim to another Discord server.
- Direct messages (DMs) come from individuals claiming to be staff.
- More than one individual takes interest in responding to a particular query made online.
- A victim is asked to share their screen or provide remote desktop access.
- Any request for the user to reveal their seed phrase or wallet access QR codes.
- A caller asks the user to repeat a one-time passcode sent to their phone.
- A one-time passcode sent does not match the reason why support staff are calling.
- Users encouraging victims to contact certain accounts or to visit certain sites to “retrieve their NFTs” or access support – these are typically automated tweets or messages sent in response to victims announcing that they have been scammed.

5. NFT Swap Scams

Besides NFT marketplaces, another way to trade NFTs is through “swap” services, where participants trade their NFTs rather than buy or sell them for cryptoassets. Since May 2021, swap protocols have facilitated over 20,000 NFT trades – worth over \$490 million.²¹

However, deficiencies in such services have resulted in an increase of related theft incidents in 2022. Typical scams involve perpetrators pretending to be traders on NFT-related Discord servers. Proposing an often highly-favorable deal to gauge interest, scammers then invite victims to facilitate the swap using their scam site that seizes their victims’ NFTs.

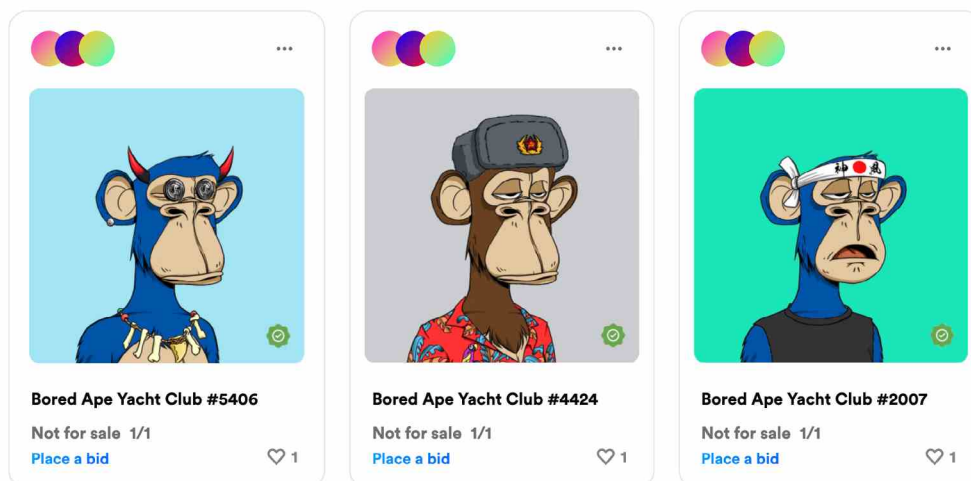


CASE STUDY

NFT Swap Fake Verification Scam

In April 2022, a user agreed to swap one Bored Ape and two Mutant Apes for three Bored Apes in return. The victim used a reputable swapping service, which checks to ensure whether a collection is verified during the swap by visually assigning it a green check mark.

The malicious user minted three fake Bored Ape Yacht Club NFTs with a “verified” mark embedded within the image, ensuring that they looked legitimate during the swapping process. Believing that they were legitimate NFTs, the victim approved the swap and lost NFTs worth \$575,000 to the scammer.²²



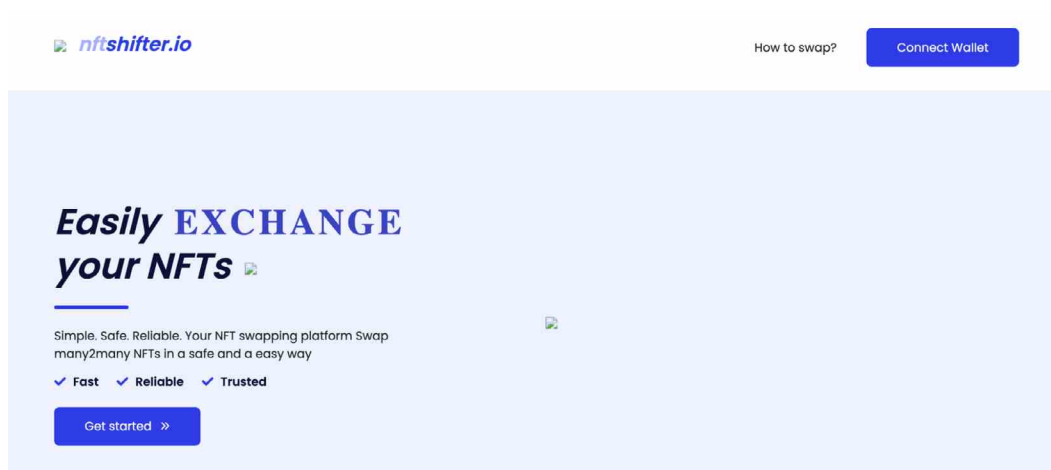
The three scam Bored Ape NFTs – with artificial green tick ‘verified’ marks implanted within the JPEG – seen in the victim’s wallet following the swap.



VeraSwap.io

VeraSwap – or nftshifter.io – was a short-lived scam NFT swapping service active in March 2022. The site encouraged traders to connect their wallet, give access permission to the VeraSwap contract and then select the NFTs they wished to swap. However, the malicious contract instead stole high-value assets from the victim’s wallet and sent it to the scammer.

The scammer’s wallet address appears to have stolen four NFTs from six victims across one week in March, totalling \$200,000 in value. The site has since become inaccessible and the perpetrator has laundered the funds using Tornado Cash.



The VeraSwap site while it was active.

Red Flags & Warning Signs

- Users proposing NFT trades sounding too good to be true.
- Contract of the proposed swap NFTs is not the known contract address of the NFT collection.
- User directs victim to an unknown NFT platform to facilitate a trade.
- User proposes an off-marketplace trade of NFTs to “reduce gas fees”.
- The user proposes a trade of NFTs that they do not have in their wallet.
- The NFTs have a slightly different design to a well-known collection.
- The contract that is to be initiated to swap NFTs is malicious, overtly short or has code that is starkly different to the smart contracts of established swap services.

6. Recovery Scams

Almost all publicly-reported NFT (or other) scams on social media automatically trigger numerous bots that urge the victim to contact some form of entity that can supposedly recover stolen assets. Some scammers may not be bots and instead engage in conversation before inviting the victim to contact a fake recovery expert. All such messages are scams – and seek to defraud the victim further by inciting a ‘pre-payment’ for ‘recovery services’ that are never rendered.



A user satirically 'summons' recovery bots by using several keywords such as 'nft' and 'scam' in a Tweet (top) and typical bots responding to social media theft reports (bottom)

Red Flags & Warning Signs

- A post on social media about NFT scams receive replies – typically within minutes – inviting the victim to direct message or email a ‘recovery expert’ or ‘ethical hacker’
- The recovery experts advertised have names such as @cyber_recovery43 (numbers at the end are used to coordinate banned and active accounts by hackers)
- Emails or fake social media profiles of the experts are anonymous and/or unprofessional (e.g. use an @gmail email address)



User loses \$600 in NFT and Recovery Scam

An NFT holder lost a number of NFTs to a theft incident and contacted a fake recovery scammer on Instagram to assist in retrieving them. Through direct message, the victim agreed payment to recover their stolen NFTs – realising only that it was a scam after the ‘recovery expert’ asked for further payments for ‘continued results’.

The victim claims to have lost around \$600, though whether this is just the payment to the recovery scammer or the combined loss in addition to the NFT theft is unclear. If \$600 was lost just to the recovery scammer, analysis of the presumed theft wallet indicates that the value lost to the recovery scam was potentially more than the value of the stolen NFTs.



The recovery scammer's Instagram profile

7. Marketplace Invite Scams

NFT marketplaces have different rules on accepting sellers to host art on their platforms. Some are invite-only, while others require a certain amount of prior engagement on the platform before being provided with a redeemable “invite code” to sell NFTs.

Scammers have typically exploited such rules to defraud victims. The scammer usually reaches out to individuals on Discord servers or Twitter – offering a code in return for a payment. Once the payment arrives, the scammer disappears. Most marketplaces have a policy of banning any user who advertises an invite-for-crypto deal. Typical offenders on Discord offer to sell invite codes for around \$300-\$500.

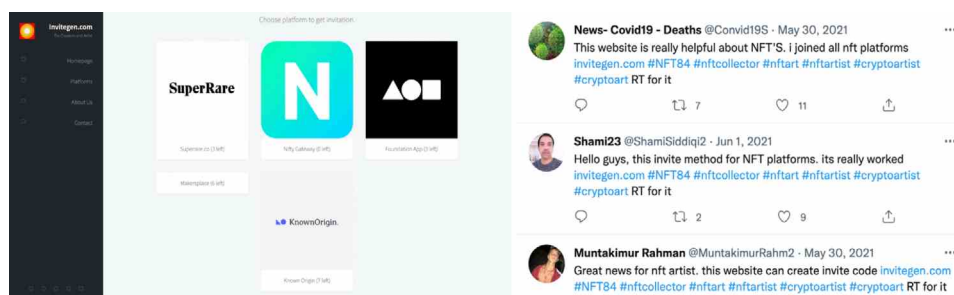


CASE STUDY

Invitegen and the Never-changing “Ethereum Gas Fee”

Invitegen was a scam site active throughout 2021 claiming to sell invite codes for numerous NFT marketplaces. The scammers promised to send an invite code in return for a non-fluctuating “gas fee” of 0.09 Ether (around \$426 at ETH’s all-time high in November 2021), even though codes are not typically delivered on chain and usually consist of a URL. The site was heavily promoted by Twitter and YouTube bots.

The scam Ethereum address has to date received 71 payments worth \$10,500 in total – mostly between December 2020 and November 2021.



The Invitegen platform while it was still active (left) and Twitter users promoting it (right).

Red Flags & Warning Signs

- Any contact made on any platform offering to sell invite codes for money.
- The alleged seller of the invite code has no minting, selling or buying history on the marketplace that they claim to be selling an invite for.
- Contact has been made via a “burner account” – one that has little post history on the social media platform they are making contact through.
- Contact has been made via an account that does not seem to have any NFT-related experience per their previous posts. This could indicate a hacked or purchased account.
- A victim is led to a site that claims to sell invite codes.
- An invite link does not resemble the typical URL for one – for example, Foundation Marketplace invite codes always begin with the foundation.app URL. Any other URL may be a phishing link disguised as an invite code.

8. The Stolen NFT Market

Many seasoned NFT traders utilize bots to detect and automatically purchase any NFTs being listed at competitive prices – typically those at or near floor values. In an attempt to cash-out their stolen assets as quickly as possible, scammers will typically list their stolen NFTs at near floor prices – ensuring their quick purchase by bots. This allows perpetrators to cash out their stolen assets by the time victims have raised the incident with NFT marketplaces and caused the NFTs to be flagged, frozen or delisted.

Stolen NFTs have emerged as a relatively distinct economy of their own. For some NFT traders, they are attractive assets as they can be purchased at low prices and flipped reasonably quickly for profit. However, holding stolen assets runs the risk of restrictions being imposed by NFT marketplaces, vocal social media backlash or legal action. This can, in turn, reduce the demand and ability to trade stolen assets.

There are also indications that unwitting buyers of stolen assets have the tendency to sell them at a loss after becoming aware of their stolen nature. Motivations behind this may include a desire to avoid negative publicity on the vocal online NFT community or dispose of stolen assets as quickly as possible to minimize any inadvertent complicity. Online communities – particularly those of Bored Apes and Mutant Apes – actively observe and call out users interacting with stolen NFTs, urging them to return or sell them back to the victims.



Our friend [@MarkApes](#) had 3 of his Bored Apes stolen today by a fraudster. I'd like to initiate [#BAYCBUYBACK](#) tag with the idea for [@BoredApeYC](#) to buy them back and deliver to the real owner. Can we try to get this to [@yugalabs](#) and [@BoredApeYC](#)? Tweet [#BAYCBUYBACK!](#)

...



1-i bought [#BAYC](#) through [@OpenSea](#) that was all clean from an influencer (he held for 2 days), then it got flagged by OS day after my purchase. OS took 72 hours (after original owner reported) to flag. OS still hasn't replied me, [@Opensea_Support](#) [@dfinzer](#) [@xanderatallah](#) [@BoredApeYC](#)

A stolen NFT buyback campaign (left) and a buyer of a stolen asset discussing their purchase (right).

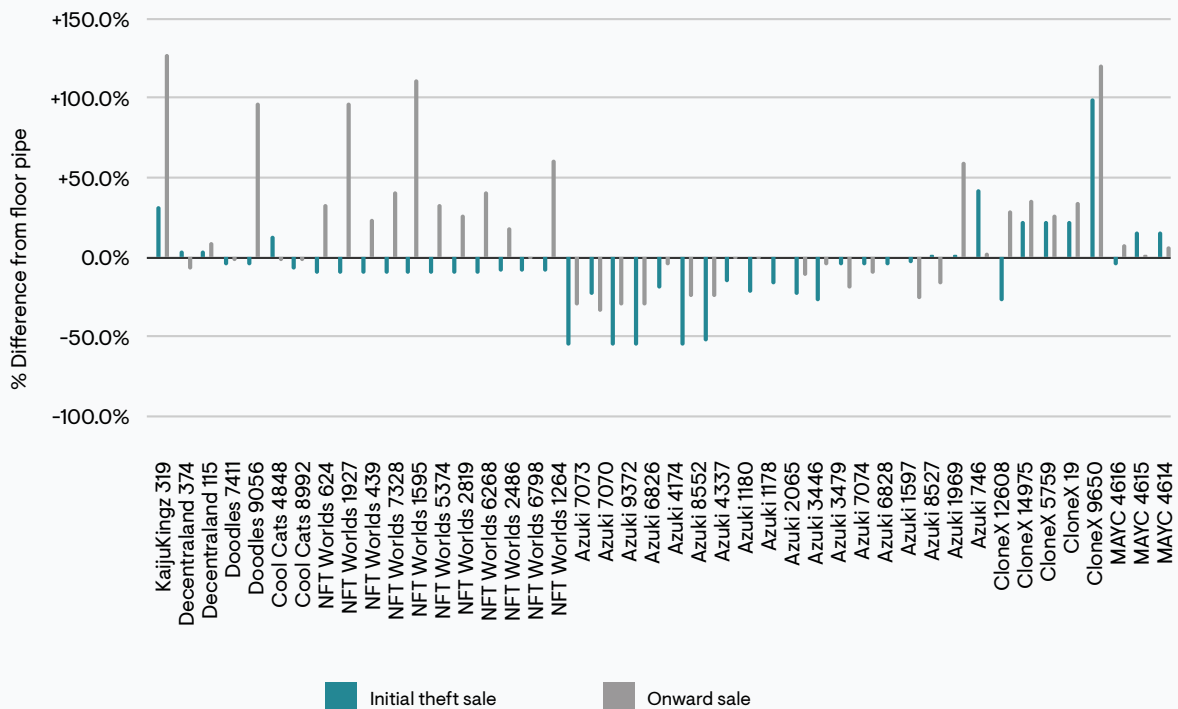


CASE STUDY

The February 20th 2022 Email Phishing Attack and the Stolen NFT Economy

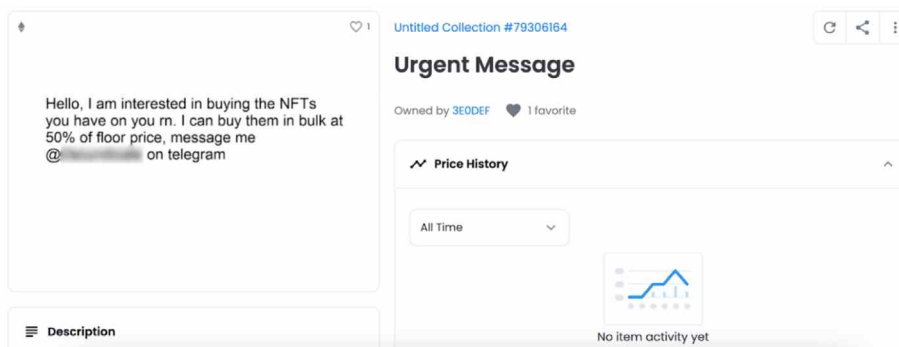
After returning two thirds of the (lower value) NFTs stolen in their phishing attack, the OpenSea contract migration email scammer began selling the remaining assets across three NFT marketplaces. Of the affected NFTs, 45 were purchased and sold by their buyers soon after.

Initial sales of these 45 stolen NFTs fetched the scammer \$1.42 million – 8% lower than their total floor price, which was \$1.54 million. All but 10 of these NFTs were then flipped for a profit by their initial buyers, who raked in a total of \$1.77 million from their sales. The vast majority of these sales happened within five days of the initial theft.



Percentage difference between the floor price (horizontal axis), initial sale amounts by the scammer (blue) and onward sale amounts by the initial buyer (grey).

Further emphasizing the appeal of stolen NFTs to traders wishing to flip them for profit, one user minted an NFT and sent it to the scammer bearing the note: “Hello, I am interested in buying the NFTs you have on you [right now]. I can buy them in bulk at 50% of floor price.” The wallet address minting the NFT had no further interaction with the scammer’s address.



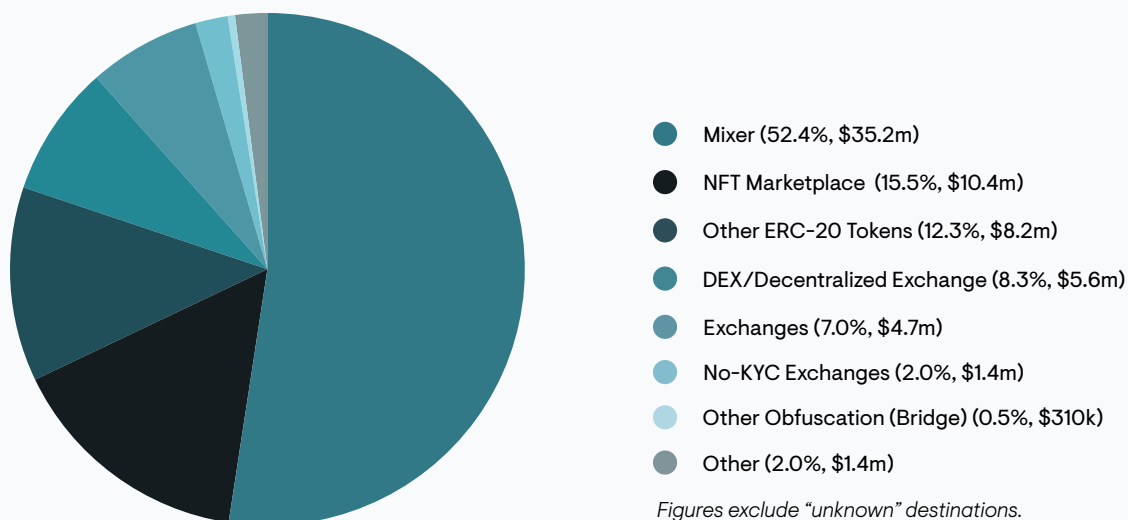
An NFT minted for and sent to the phishing scammer signalling intent to purchase stolen assets.

9. Laundering the Proceeds of Stolen NFTs

The majority of scammers prefer using mixers to obfuscate their proceeds. Based on \$67.1 million of ETH originating from 323 scammer wallets, 52.4% (\$35.2 million) was laundered through Tornado Cash. Despite this, 22.5% (\$15.1 million) was laundered through further interactions with cryptoasset exchanges or NFT marketplaces. Other high-risk obfuscation services such as no-KYC exchanges, bridges and gambling services accounted for 2.5% (\$1.7 million) of preferred laundering destinations.

The exposure of centralized exchanges and marketplaces to scammers' wallets indicates that these criminals still utilize direct non-obfuscated cash-outs. Blockchain analytics tools can assist such entities in managing their risk and exposure to scam proceeds.

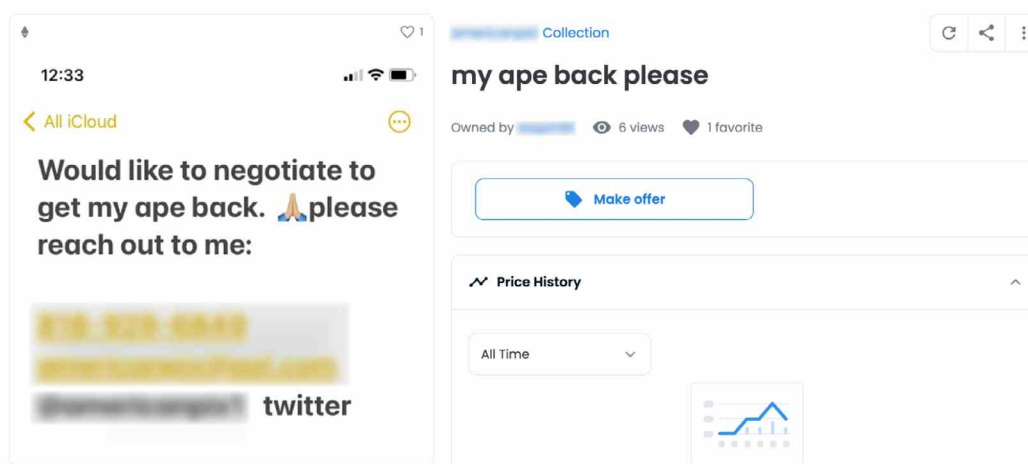
The preferred laundering destination of a sample of 323 scammers attempting to cash out \$67.1 million (ETH) worth of illicit proceeds



9.1 Victim and Marketplace Responses

Different marketplaces will have varying policies for dealing with compromised assets. Most platforms have a “report” function that allows users to notify administrators of thefts. If a report is deemed credible, NFTs will often be flagged, delisted or have their sales or transfers restricted. However, unless an NFT marketplace is highly centralized and takes custody of listed NFTs, the flagging of an NFT by one marketplace will not prevent its sale on another.

One common technique used by scammers to spread the risk of having their stolen assets restricted is to use a variety of marketplaces to sell them off. On occasion, initial buyers of these assets will also sell them on a platform different to the one they made the purchase - both to spread risk and also to potentially obfuscate their transaction trail. Post-theft sale activity will typically encompass a range of marketplaces, swap-trading services and potentially even private sales. This exemplifies the need for industry-wide co-operation in response to NFT thefts.



A victim mints an NFT and sends it to a scammer, inviting them to negotiate the return of their stolen Bored Ape NFT.

Victims have been known to leverage their ability to report and lock stolen NFTs during negotiations with scammers, often offering to buy back their assets at reduced prices. Since scammers risk being banned from major marketplaces and potentially left with unsellable assets should a report be made, this strategy has shown reasonable success in the past.

Highly public campaigns following a theft have occasionally been known to assist the successful return of stolen assets. This is particularly the case if such campaigns are able to block their sale on numerous major NFT marketplaces at once. Doing so leaves the scammers – and any potential onward buyers – with effectively no avenue to sell the stolen assets. This renders their return at a negotiated ransom the only remaining way of making a profit.

On other occasions, communities have attempted to reverse scams through more elaborate techniques. A Discord hack of the Solana-based 'World of Solana' NFT collection in May 2022 was effectively reversed when developers raised the sale royalties of the stolen NFTs from 5% to 98%. This allowed victims to buy back their NFTs once the scammer started attempting to sell them off.²³



CASE STUDY

Three Bored Apes Returned After Successful Twitter Campaign

On October 30th 2021, motivational speaker Calvin Becerra announced that his NFTs – including three Bored Apes – had been stolen in an impersonation scam. The assets were worth approximately \$605,000 in total. He successfully petitioned major NFT platforms such as OpenSea, Rarible and NFT Trader to block the onward sale of the assets, leaving the scammers with few alternative platforms to cash out the NFTs.

Following a week of negotiation and campaigning on Twitter, Becerra's NFTs were gradually returned. However, no detail about negotiations or any "ransom" was disclosed.



Calvin Becerra ✓
@calvinbecerra

UPDATE! @opensea @rarible @NftTrader all have done the RIGHT THING. They all banned my stolen apes from being sold on their sites. No one wants to buy a stolen car, yet alone STOLEN ART! Attention hackers you better start negotiating with me if you want any mor eth. Or none.



7:25 PM · Oct 31, 2021 from Temecula, CA · Twitter for iPhone

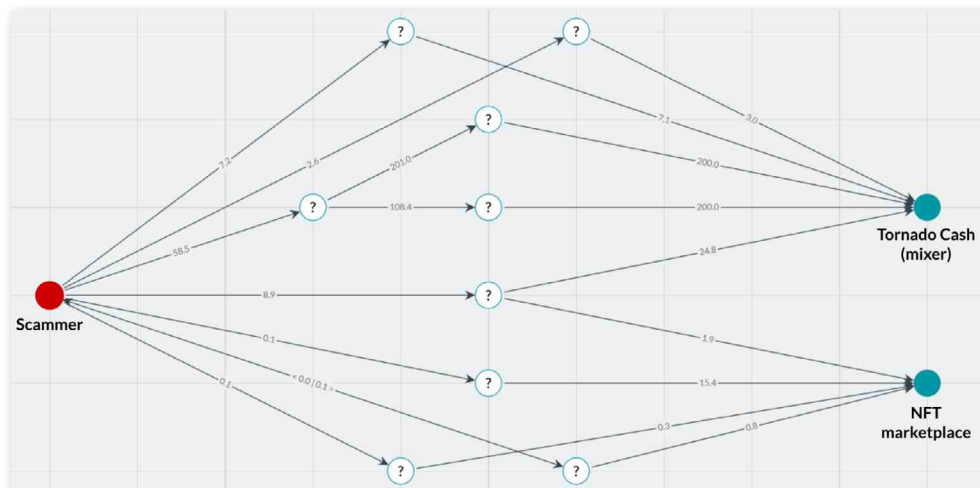


Becerra announces that the stolen Apes had been frozen across three major NFT platforms.

E Using Blockchain Analytics to Mitigate and Reverse Scams

Elliptic actively tracks, verifies and labels addresses implicated in scam reports within its wallet screening and transaction monitoring tools. Scam reports may originate from numerous sources, meaning that NFT marketplaces and cryptoasset exchanges will be alerted and able to block scam addresses identified from different platforms. This is crucial for ensuring that scammers have minimal avenues for cashing out their stolen assets, increasing the incentive – as has previously been observed – to negotiate their return back to victims.

Improving scam response capabilities can have a wider effect of increasing market confidence and dissuading scam attempts – especially if perpetrators observe a reduction in their chances of successfully cashing out.



A scammer who stole \$325,000 worth of NFTs from 29 victims transfers funds through Tornado Cash and by purchasing other NFTs through a prominent marketplace using intermediary hops. Source: Elliptic Investigator.

Elliptic's tracing capabilities also cover illicit and dark web entities, such as stolen data vendors and identity spoofing services, that are often used by more sophisticated scammers to facilitate their illicit activity, such as social media compromises or impersonation scams.

Red Flags & Warning Signs

- A large number of unexpected NFT transfers – not sales – have been made from one account to the same recipient account over a short period of time, which does not have a username, ENS domain or any prior blockchain activity.
- NFTs are marked as “reported for suspicious activity” on OpenSea or the account making the latest transfer is marked as compromised.
- An NFT has been sold in quick succession over several marketplaces and swap services.
- An NFT has been sold at well below the floor price.
- The wallet address of the user receiving several unexpected NFT transfers has previous similar activities on their wallet – a significant number of incoming NFTs all from the same addresses, which may be past victims.
- The suddenly sold NFTs are bought by the same set of users, who may be running bots.
- Funds are going into Tornado Cash shortly after NFTs have been received and sold.
- The suspicious wallet has numerous comments on its blockchain explorer page about being involved in prior hacks or scams.
- A search of the suspicious wallet address on a search engine or social media platforms reveals that it has been implicated in prior hacks or scams.
- A search of the suspicious wallet address on OpenSea returns a “404” error – implying that it has been banned from the platform.
- The suspicious wallet has “meme” transactions going into it by spam wallets. This is particularly common after a major heist, which often sees several spam NFTs or worthless ERC-20 tokens being sent to the scammer’s wallet in denominations – such as “69” or “420” – beloved by the internet’s meme community.

10. The Implications of the NFT Scam Wave

Most scam attempts are easily identifiable and do not claim any victims. However, the abundance of scams across NFT communities has contributed to paranoia, hysteria and extreme caution – known as “fear, uncertainty and doubt” (FUD) – to a level that has the potential to significantly affect traders’ NFT experiences. Users are now almost forced to close their direct messages to protect from spam or even place notices such as “WILL NEVER DM YOU” in their usernames to prevent being impersonated by scammers.

All these precautions have the potential to reduce the accessibility or enjoyment of engaging with NFTs to both new and existing traders. Therefore, user experiences and potential future investment appears to be a key casualty of the NFT scam wave. Through effective wallet screening and transaction monitoring solutions, NFT marketplaces can reduce their risk – and users’ perception of risk – of inadvertently processing stolen assets.

02

Rug Pulls



Ever since the initial coin offering (ICO) craze of 2017-2018, rug pulls have been a consistent issue for cryptoasset investors. Rug pulls are scam projects that encourage investors to buy into the project with fake promises and roadmaps – only to disappear and transfer out all the invested funds when scammers feel they have collected enough money. Their prevalence across the DeFi space has led to a significant rise in investor skepticism towards new projects.

11. Rug Pulls and NFTs

When establishing an NFT project, developers will typically detail their future plans in a roadmap. These normally include future online game development or charity fundraising. NFT projects then hold auctions, presales, mints or airdrop campaigns to raise funds to realize the next stages of their roadmap.

However, a large number of scammers will capitalize on this suspense to encourage investors to “buy in” to their new project, only to steal the funds and shut it down shortly after. To make matters worse, investors will not be able to find the social media accounts of the developers to raise their concerns – they would have all disappeared, leaving no trace of the project.

11.1 Serial Scammers and “Slow” Rugs

Many rug pull perpetrators are serial scammers. After pulling the rug from one project, they will typically start another a number of weeks later. Others prefer “slow rugs”, namely projects that maintain weeks or months of sustained legitimacy before announcing – with some excuse – that the project has shut down.

In some cases, projects may not have started as intentional scams but rather by overreaching developers, who decide that exit scamming is the only way out once they realize that their ambitious roadmaps are unachievable.

11.2 Celebrity Involvement

Celebrity involvement in the NFT space is increasing – with many singers, actors and sports personalities spearheading the creation of their own projects or promoting others. The latter phenomenon is covered in the “wash trading & price manipulation” chapter of this report.

Though public celebrity status and existing wealth would theoretically reduce the feasibility and attractiveness of rug pulls to known personalities, this has not stopped some from being accused of trying. Unable to disappear as anonymous scammers typically would, celebrities have often attempted to justify deserting their projects by citing time constraints, negativity of the community and project failure.



Not Rugging Quietly – the Case of Doodled Dragons

Doodled Dragons was a Solana-based NFT collection of cartoon dragons. Verified on SolSea – the largest NFT marketplace on the Solana blockchain – the project marketed itself as: “A Solana NFT collection which distributes 100% of all profits made straight to charities protecting animals on the brink of extinction.”

However, investors were soon wondering why the project was not honoring its pledge to donate the raised funds. Eventually, the project announced that it would finally be making a promised \$30,000 donation to the World Wide Fund for Nature (WWF). Less than two minutes later, the developers posted an obscene tweet. They stated that their chosen charity would be their bank account instead – signing off with “cya nerds”.



Verified but a rug – the ironic SolScan collection page of the now-exited Doodled Dragons (left) and their rather audacious rug pull tweets.²⁴

Just a month later, in February 2022, the scammers launched another scam Solana NFT project named “Balloonsville”, which made use of paid promotions from known influencers. It then posted a series of tweets criticizing investors for not conducting due diligence before deleting their account. The two rug pulls made the scammers almost \$600,000 combined.



A series of tweets posted by the two rather audacious rug-pulls.²⁵

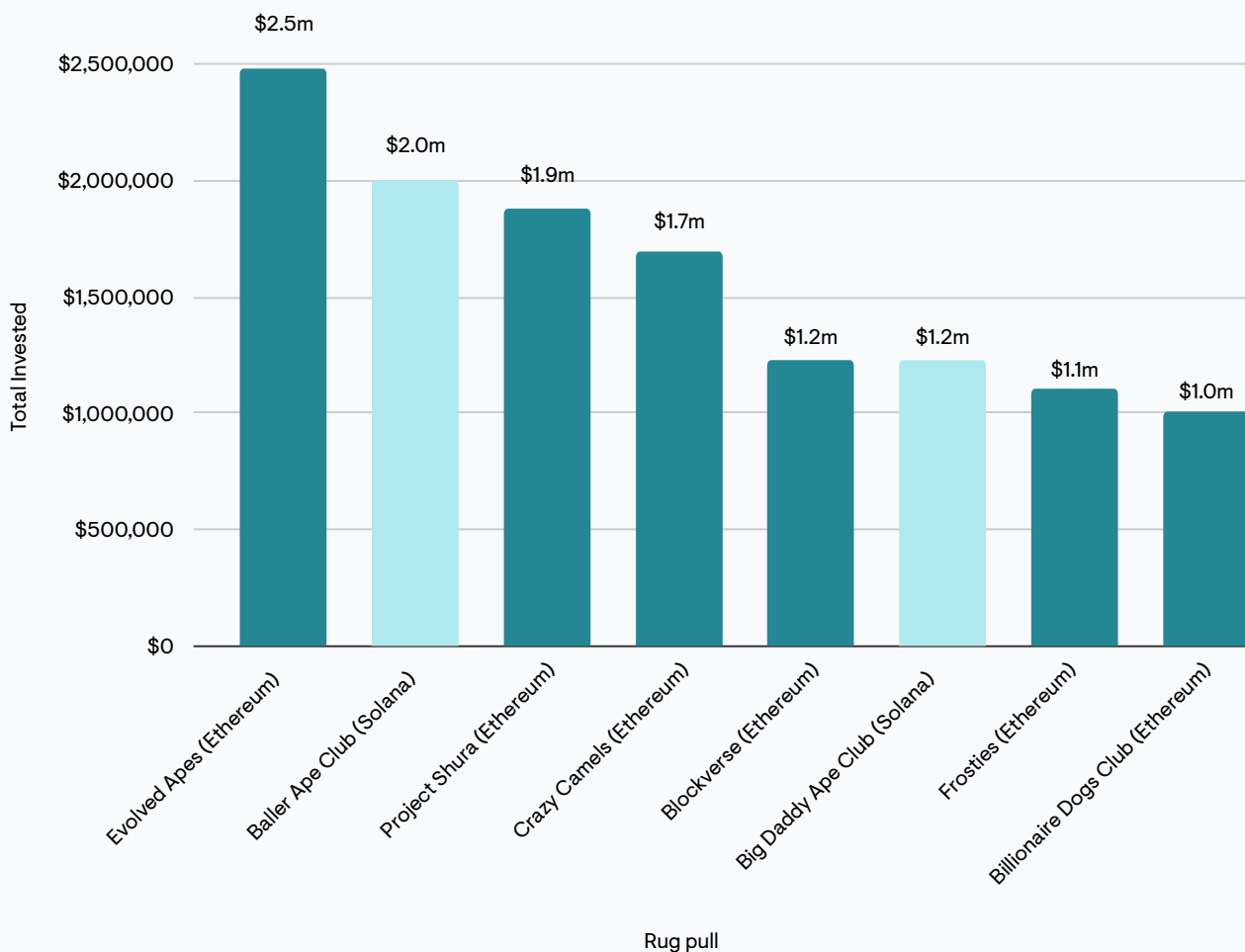
12. Major Rug Pulls

While rug pulls are becoming more common across the NFT community, many do not see a sizable theft of funds. Most developers typically pull the rug after accumulating a few thousand dollars of crypto. However, there have been several notorious rug pulls that have claimed significantly more and are still widely discussed across the NFT community.

The rising interest in web3 and metaverse technologies, alongside the prolonged period of time and resources they require to develop, makes them an easy promise made by scam projects. Many of the major scams seen in the chart below – including Evolved Apes, Blockverse and Project Shura – have promised some form of metaverse or play-to-earn gaming features as part of their sham roadmaps.

Emphasizing the prevalence of serial scammers, both the ‘Big Daddy Ape Club’ and ‘Baller Ape Club’ scams – as well as a smaller scam project called ‘The Werewolf’ – have been attributed to the same individuals.

A non-exhaustive selection of the most expensive (more than \$1 million) confirmed rug pulls (figures correspond to amount raised from investors)

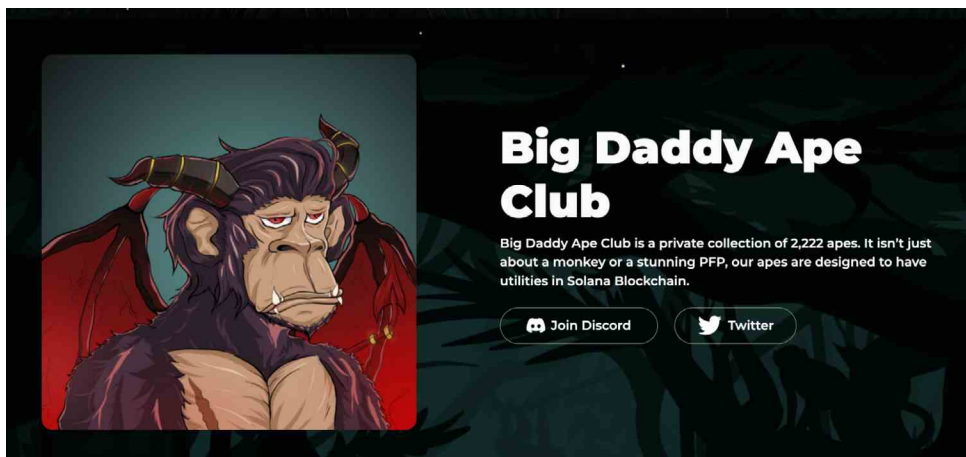




Big Daddy Ape Club – Third Time Luckier?

In January 2022, an NFT project named “Big Daddy Ape Club” was identified with a malicious contract – designed to take 1 SOL (around \$137 at the time) in minting fees without minting any NFTs. The project was verified on Solana-based NFT services, which vastly increased its appeal. The scam made \$1.3 million from 9,041 victims.

The scam was connected to two previous similar scams – namely ‘The Werewolf’ and ‘Baller Ape Club’ – which together made \$3.5 million in total.²⁶ Though this particular case clouds the distinction between a rug pull and a typical phishing, the NFT community has widely labelled it as a rug pull due to its tactics of hyping up interest before abruptly shutting down. A promoter was charged by the U.S. Department of Justice in June 2022 for their role in the scam.



The Big Daddy Ape Club scam site while it was still active (January 2022).

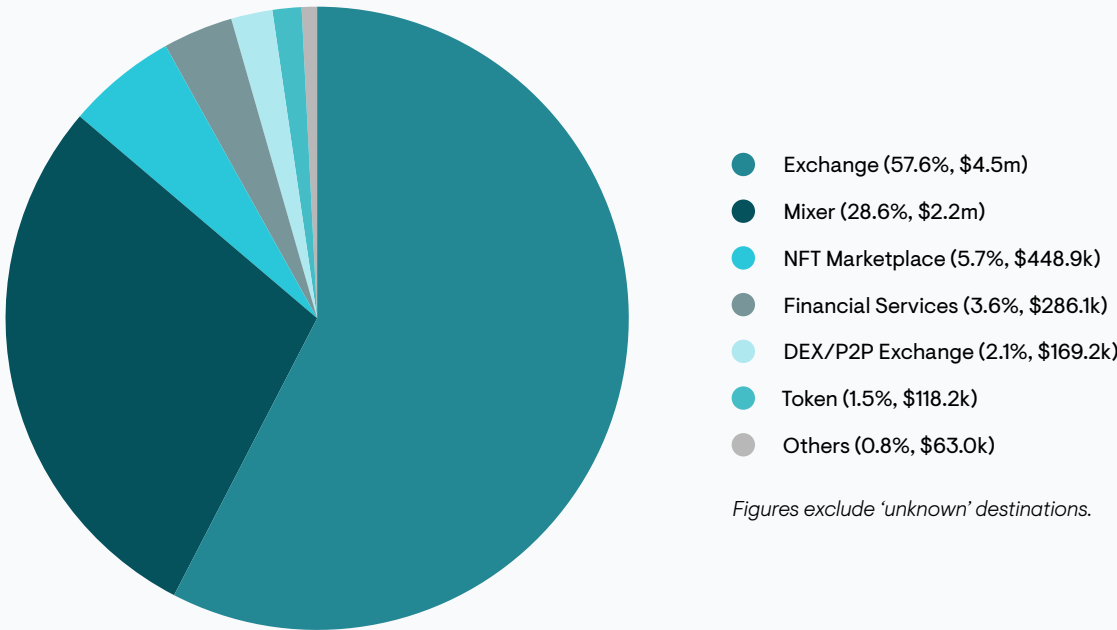
13. Laundering Rug Pull Proceeds

Tracing a sample of \$7.9 million originating from the major Ethereum-based rug-pulls (see previous chart) has shown a clear preference of using centralized exchanges to launder proceeds – accounting for nearly 58% of funds processed. Tornado Cash, meanwhile, accounts for nearly 29%. Some rug pulls have been observed to use more than one laundering method – most commonly a combination of mixers and direct transfers to centralized exchanges.

Scammers’ use of centralized exchanges emphasizes the importance of effective blockchain analytics and transaction monitoring solutions. This is further demonstrated by the successful identification of those allegedly behind the Frosties rug pull – 7% of funds sent to centralized exchanges – and Crazy Camels – 75% to centralized exchanges – which is discussed below.²⁷

Given the transparent nature of NFT project contract addresses, suspicious outflows can be monitored relatively easily. Occasionally, projects have been called out online for unexplainable blockchain activity, such as using investor funds to purchase other NFTs or sending sizeable portions of funds into Tornado Cash. Such activity indicates that investor funds are not being utilised in a manner that would realise the project’s roadmap. Monitoring of active projects’ blockchain activity can therefore provide early warning signs of rug pulls.

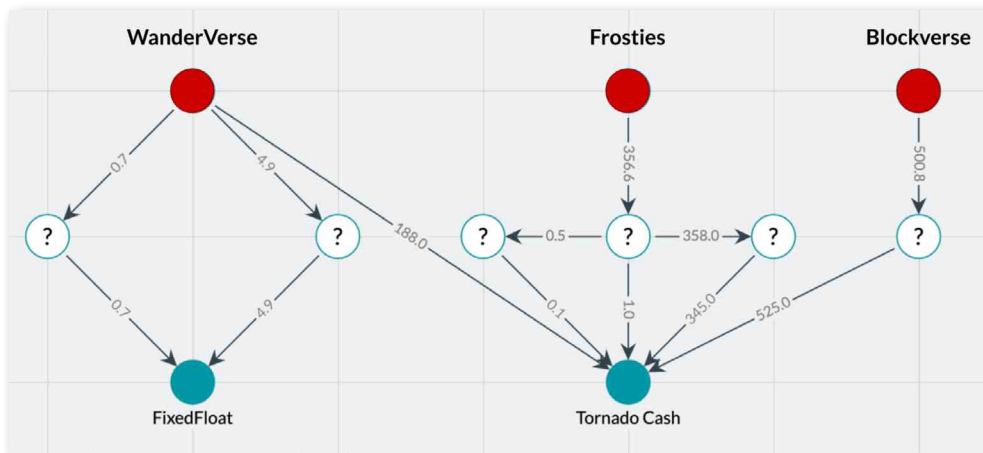
The preferred laundering destination of a sample of six rug pull scammers attempting to cash out \$7.9 million (ETH) worth of illicit proceeds.



Figures exclude 'unknown' destinations.

13.1 Obfuscation Services (Mixers and no-KYC Exchanges)

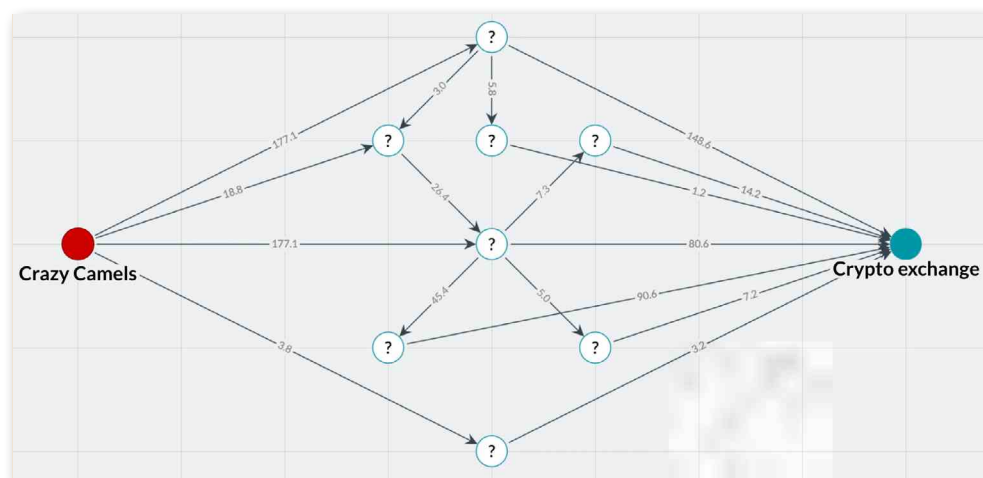
The Elliptic Investigator graph below shows the laundering patterns of three major rug pulls – namely WanderVerse (\$530,000), Frosties (\$1.11 million) and Blockverse (\$1.25 million). The scammers behind all three have opted for relatively simple direct-to-mixer transaction patterns going straight into Tornado Cash and – in the case of WanderVerse – a no-KYC cryptoasset exchange named FixedFloat.



Elliptic Investigator displays the laundering patterns of three major rug pulls.

13.2 Use of Centralized Exchanges

The Elliptic Investigator graph below shows the laundering pattern for the Crazy Camels rug pull, which netted scammers \$1.7 million. The perpetrators opted to directly send their funds to a centralized exchange, utilizing a number of “hops” through several intermediary wallets in a likely attempt to obfuscate their transactions. An online investigation was able to trace these flows allegedly to a French entrepreneur, who was also believed to be behind a number of other rug pulls and suspicious NFT projects.²⁸



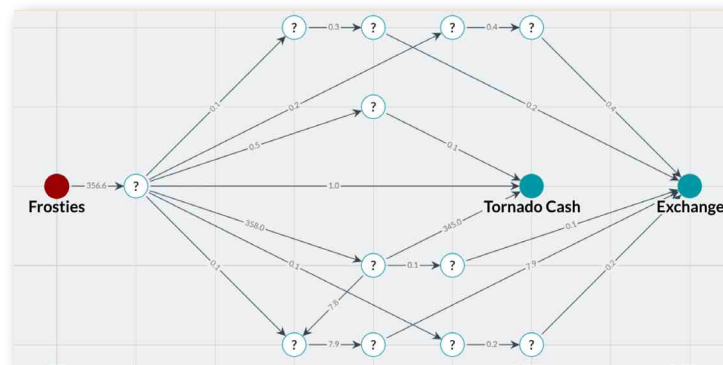
Elliptic Investigator displays the laundering pattern for the Crazy Camels rug pull.



US Investigators Bust the ‘Frosties’ Rug Pull Scammers

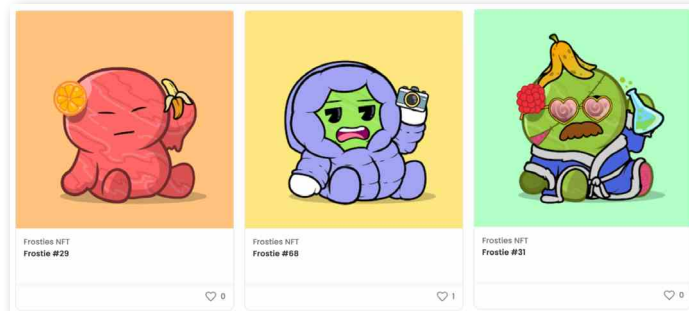
The January 2022 “Frosties” scam NFT project is particularly well known due to its case being potentially the first in the NFT space to lead to real world charges. Made up of 8,888 trendy cartoons, the Frosties website and social media boasted upcoming metaverse capabilities and other such features typical for NFT projects.

Shortly after the NFTs were minted, the project shut down its social media servers and disabled its website, posting one short-lived tweet before its Twitter account was deactivated – reading “I’m sorry”. The project made \$1.1 million in ETH, 94% of which was laundered through Tornado Cash and the remaining 7% through centralized exchanges.



Elliptic’s Investigator shows the Frosties scammers laundering their \$1.1 million rug pull proceeds.

On March 24th 2022, the US Department of Justice announced that two 20-year-old individuals had been arrested in connection to the Frosties rug pull. They faced wire fraud and conspiracy to commit money laundering charges – carrying a sentence up to 20 years in prison.²⁹ Investigators successfully matched their IP addresses to cryptoasset exchange accounts that had received the proceeds of the funds. The pair had been preparing to launch a new \$1.5 million NFT rug named “Embers” just two days after the announcement.



Some of the 8,888 Frosties NFTs.



Blockchain Analytics to Counter Rug Pulls

The use of centralized exchanges to cash out rug pull proceeds remains notable, and it has crucially allowed investigators to make arrests of alleged scammers. Blockchain analytics tools such as Elliptic Lens and Navigator label rug pull addresses, which means that clients will be alerted if the perpetrators attempt to cash out their funds using their services. Investigators can also use Elliptic Investigator – as demonstrated in the cases above – to effectively trace and visualize the laundering patterns and strategies used by suspected scammers.

Much like mitigating general scams, effective screening and monitoring solutions can help increase confidence in the NFT market. They can also help manage reputational risk associated with facilitating the minting and listing of scam collections.

14. Overcoming Rug Pulls

14.1 New Token Standards

A number of smart contract amendments to the ERC-721 token standard – the standard for NFTs on the Ethereum blockchain – have been proposed to make rug pulls more difficult. Many of these involve coding in the possibility of a refund after NFTs have been unveiled post-mint, in case users are dissatisfied with a project.

There are a number of issues with such provisions.³⁰ Firstly, there is the possibility of a time-limited refund does not prevent the possibility of slow rugs. Secondly, it offers little seller security due to delays in their ability to access funds and uncertainty over whether the project will succeed after the refund period ends. It can also inadvertently manipulate floor prices and demand. Buyers can simply refund the NFT as soon as it drops below the mint price, with such an exodus likely causing a quick end to a project.

14.2 Community Responses

In many cases, victims of rug pulls may receive donations of NFTs from influencers or developers of other NFT projects. This has become a way for NFT projects to promote collections and improve their community image.

In other cases, developers may seek to “reboot” or “revitalize” a pulled rug. These initiatives rely on new developers stepping in to make an initial time and monetary investment into continuing the project – assuming also that initial investors place their faith in a reboot.



A Tale of Two (Three?) Kitties – Cool Cats, Cool Kittens and Kitten Coup

“Cool Kittens” was a Solana-based collection of 2,222 NFTs depicting unique cartoon kittens. Though the project acknowledged its similarities to the popular Ethereum “Cool Cats” collection, critics argued that it was pretty much a near-exact copy. Following the mint, the project disappeared – taking with it around \$160,000 worth of investor’s SOL tokens.³¹

However, new developers sought to “reverse the rug”, taking a snapshot of the rug pull’s 2,216 victims to then airdrop new NFTs from a replacement collection named “Kitten Coup”.³² The airdrop and design of the Kitten Coup NFTs were financed by a loan of 40 SOL.



A cute rug pull and an even cuter “reverse rug” – from left to right: The popular Ethereum-based ‘Cool Cats’ collection, the Cool Kittens rug pull and the Kitten Coup counter-rug.

Red Flags & Warning Signs

- The roadmap appears to be plagiarized, vague, overly ambitious or very generic – offering little more than merchandise, a “good community” and charitable donations.
- The project is unoriginal – involving apes, punks or cats, for instance.
- The development team is anonymous, associated with previous failed projects or is lacking in the technical capabilities to actualize what they are promising.
- The development team are evasive when questioned about the details of their roadmap.
- The advertised art or concept appears similar in style to a previous scam NFT project. This was particularly evident with Frosties and Embers – two projects with a highly similar design – as it was with Baller Ape Club and Big Daddy Ape Club.
- The project does not provide any teasers or media content about their project in development – for example, there is no indication that the roadmap is actually being developed.

- The project creators have no prior engagement with NFTs but communicate in a way that indicates clear prior knowledge and industry experience.
- The creators of the project appear to be siphoning funds from the project contract.
- The project appears to be of significantly lower quality than what was promised.
- The development team behind a project blame technical difficulties, “threats”, “negativity”, “heavy criticism” or the community in general for ongoing struggles in a project, but are unwilling to elaborate or give details.
- There are payments being made by the project to known NFT influencers or celebrities who are “shilling” – or promoting – the project shortly before/after they post a promotion, though the influencer has not publicly stated that their promotions are paid for. Like most communities, clarifying whether a promotion is paid is seen as good practice.
- There are no explanations or updates addressing any concerns with a lack of development on a project.
- The project appears to have purchased a social media account with fake followers.



The roadmap of the Baller Ape Club rug-pull, consisting of vague and generic promises.



03

Exploits of
NFT-based
DeFi Protocols
and Sanctions
Risks

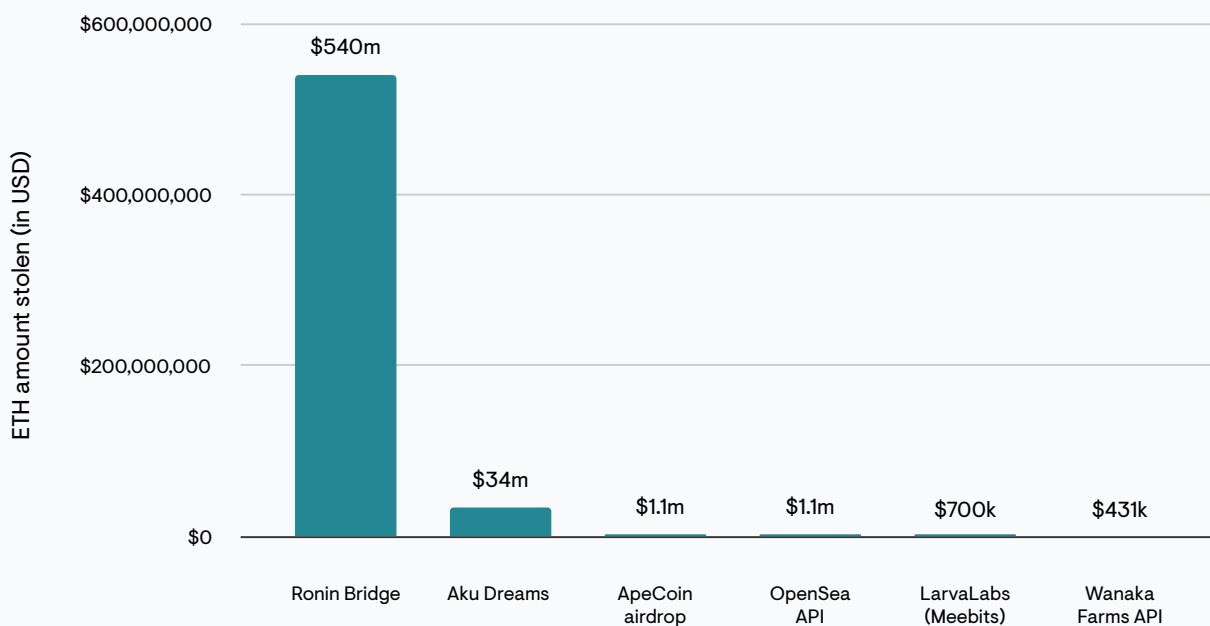
Elliptic’s previous report on [Decentralized Finance \(DeFi\) and DeFi crime \(DeCrime\)](#) has made two things clear. Firstly, the DeFi space – with a total value locked of \$247 billion as of the publication of that report in November 2021 – is growing rapidly in both investors and potential. Secondly, as the investment and potential of DeFi grows, so too does the potential for highly profitable crime.

DeFi protocols – which include many NFT marketplaces and projects – utilize smart contracts to govern their transactions and interactions with investors. While it is considered good practice to thoroughly audit code before it interacts with user funds, there is always potential for a malicious individual to identify a loophole, vulnerability or faulty function within the layers of code necessary for a DeFi platform to run effectively. Elliptic’s DeCrime report makes this issue apparent with just a few statistics:

1. In 2021, an average of one exploit occurred every three days.
2. A typical exploit stole an average of \$16 million, for a total of \$1.9 billion in 2021.
3. The total loss to the DeFi industry from these exploits in 2021 was \$12 billion.

NFT-based DeFi services are not immune from these issues and have on occasions been at the forefront of attacked services. Perhaps the most notable – the \$540 million heist of Axie Infinity’s Ronin Bridge by North Korea’s Lazarus Group – also highlights the growing threat of sanctioned entities and state-sponsored cybercrime vulnerabilities of NFT-based platforms.

A selection of the exploits discussed in following case studies



(ordered by amount lost)

15. Code Exploits

Code exploits allow hackers to take advantage of a flaw in a protocol's smart contract to transfer funds to their own wallets. Examples include the manipulation of price oracles, incorrectly coded functions or logical flaws.

Code exploits do not necessarily involve NFTs themselves, but rather the underlying smart contracts that govern the operation of their affiliated protocol or platform. Nevertheless, there have been cases where NFT projects themselves have involved flawed code. Such flaws may affect the quantity and nature of the NFTs minted and – depending on the nature of the exploit – cause a wider fluctuation in the affected asset's floor price.

On most occasions, smart contracts affected by exploits are unaudited and unchecked for potential bugs. However, audited smart contracts may still suffer exploits – especially if there have been changes to the code since the audit due to governance votes or bug fixes.



CASE STUDY

Choose Your Meebit

“In May 2021, the creators of CryptoPunks (LarvaLabs) introduced Meebits – a collection of 20,000 3D NFTs. Similar to CryptoPunks, each Meebit is unique and has characteristics that affect their price depending on how rare those characteristics are across the other Meebits.

However, the Meebit NFT contract had a flaw that allowed investors to revert their minted Meebit and try again, which allowed exploiters to “brute-force” several mints to obtain the rarest Meebits. Malicious contracts were deployed to automatically detect if a Meebit was particularly rare – and if not, to revert it and re-mint another one.

One user was identified to have minted a particularly rare Meebit using the exploit, selling it for 200 ETH, which was around \$580,000 – 40x the floor price.



A particularly rare Meebit, minted and then sold for 200 ETH through this exploit.



A Mathematical Flaw Locks \$34 Million... Forever

In April 2022, the Aku Dreams project launched its NFT collection “Akutars”. However, exploiters found that they could block refunds from user bids due to faulty code – with one “white hat” hacker initiating and then voluntarily removing the block with the following on-chain message.

```
Well, this was fun, had no intention of actually exploiting this lol. Otherwise I wouldn't have used coinbase. Once you guys publicly acknowledge that the exploit exists, I will remove the block immediately. – USER221
```

A message by a “white-hat” exploiter that blocked and then voluntarily unblocked refunds for bids on Aku Dreams NFTs.

However, the contract included a far more fatal error in its code, intending to prevent refunds from being processed if a withdrawal was attempted before all refunds were processed. The code included a flawed function to calculate the number of NFTs minted, as it did not take into account transactions with multiple mints. This meant that the number of NFTs minted was always below the total number of bids – causing the function to lock \$34 million of raised funds in the contract forever.³³



Aku 🌟 **Akutars**
@AkuDreams



3. However, the refunds to passholders of .5ETH per bid have not yet been issued. An unfortunate byproduct of #2 (partial refunds before ALL refunds were issued) is that the contract has locked remaining funds. We will never be able to access them.

2:40 am · 23 Apr 2022 · Twitter Web App

Aku Dreams developers admit that funds are locked forever and resolve to repeat the mint with a new contract.

15.1 Code Exploits of NFT Marketplaces

NFT marketplaces may range from entities which are highly centralized – they store NFTs and ownership information off-chain unless a user seeks a withdrawal – or decentralized, which are governed by smart contracts.

As with other decentralized applications, smart contract-based marketplaces are prone to code exploits. These can place NFTs stored in escrow by marketplaces at risk, or initiate unintentional listings, transfers or purchases. Fortunately, confirmed instances of marketplace code exploits remain small.

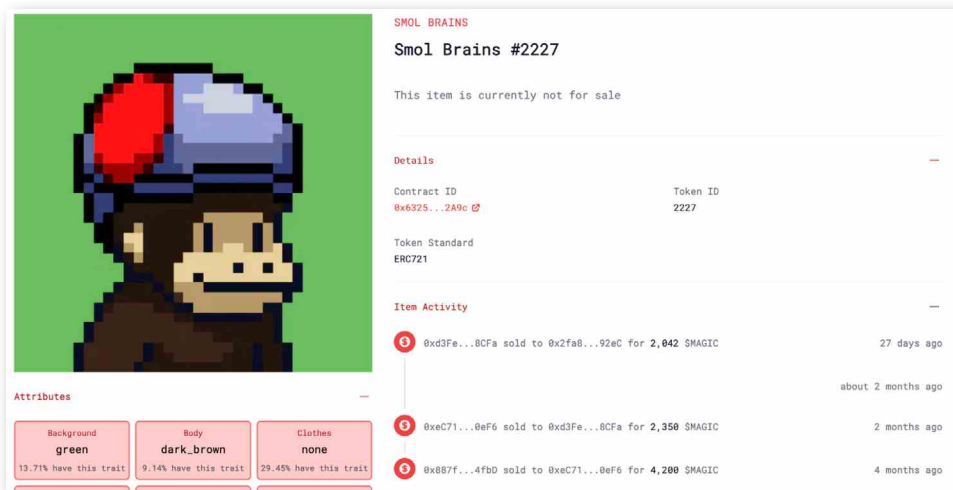


CASE STUDY

TreasureDAO on the Arbitrum Blockchain

Treasure Marketplace – an NFT and metaverse gaming platform on the Arbitrum blockchain – suffered an exploit in March 2022 after several hackers successfully found a way to purchase NFTs for free. The marketplace smart contract check to ensure that the requested quantity of NFTs was above zero failed, resulting in exploiters still managing to purchase NFTs (for \$0) when setting the quantity to buy to 0. A total of 154 NFTs were purchased using this exploit, of which nearly all were returned after a fix for the issue was announced.³⁴

At around the same time, a similar exploit was identified on WolfDotGame, an NFT gaming platform with an integrated marketplace that bore code similarities with TreasureDAO. Three NFTs were purchased for free in this way.³⁵



One NFT that was affected by the exploit on the TreasureDAO marketplace.³⁶ The exploit transaction under 'Item Activity' has been wiped and is only identifiable from an "about two months ago" notice.

16. Social Engineering and Private Key Compromises

In many cases, DeFi platforms may be “decentralized” to an extent but still provide certain rights and trust to developers to alter smart contract codes. In many cases, this is to ensure that any vulnerabilities are patched effectively without waiting for approval by a consensus of users. However, such privileges have been abused for rug pulls and making large withdrawals.

To access developer privileges, scammers need their private keys. In most cases, these are obtained through social engineering efforts that culminate in developers inadvertently revealing them to exploiters. Many of these social engineering tactics may be similar to those used by phishing or impersonation scammers (see section 1). Across 2020 and 2021, private key compromises resulted in the theft of \$260 million – across both fungible and non-fungible DeFi protocols.³⁷

The following case study details Axie Infinity’s Ronin Bridge exploit – the second largest crypto theft to date. The scale of this event exemplifies the increasing risk of NFT platforms with large amounts of liquidity being exposed to sanctioned entities and state-sponsored cybercrime. Arguably, based on a comparison of financial loss, this is one of the most serious financial crime threats to NFT-based platforms and services – exemplifying the need for effective sanctions screening solutions and cybersecurity auditing procedures.



Using Elliptic to Manage Sanctions Risks

Our wallet screening solution Elliptic Lens and transaction monitoring solution Elliptic Navigator allow you to screen against the sanctions list to ensure you avoid dealing with blocked entities and addresses – and check if a wallet possesses any funds originating from them. Elliptic Investigator can be used to easily plot wallet movements originating from sanctioned addresses. This ensures that NFT-based services remain safe from processing any malicious NFT purchases from sanctioned individuals and entities.

You can also download [Elliptic’s 2022 Guide to Sanctions Compliance in Cryptocurrencies](#) for case studies and examples of how to use blockchain analytics for OFAC compliance.



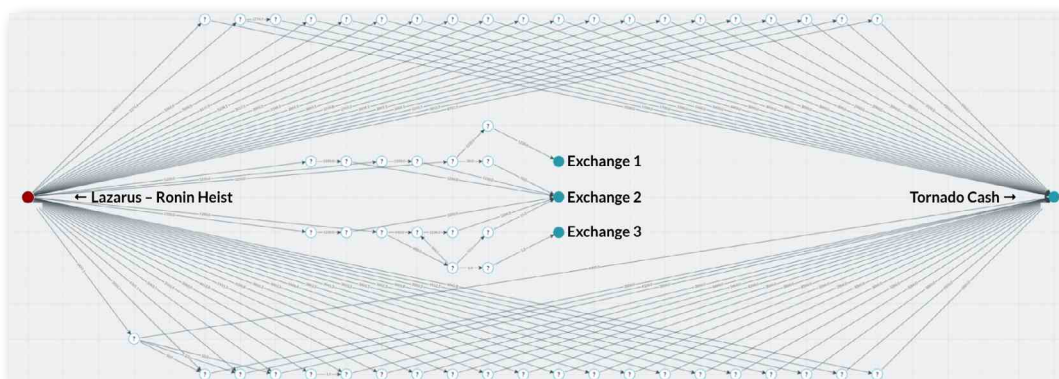
Axie’s Ronin Bridge: the Second Largest Crypto Theft to Date

Ronin is a “sidechain” of Ethereum designed by Sky Mavis – the creators of the popular NFT game Axie Infinity – to process transactions faster. The need for a sidechain emerged due to transactions on the Ethereum network being of an insufficient speed to power the game.

To improve the speed of Axie Infinity-related transactions, the Ronin chain uses a “proof of authority” model instead of miners to secure the network and approve transactions. For a transaction to be approved, a consensus of five of nine “validator nodes” on the chain would be needed. Since four of the nine validators were owned by Sky Mavis and a fifth was Axie DAO, Ronin was effectively a centralized chain.

On March 29th, North Korea’s Lazarus Group managed to use social engineering techniques to gain control of five of the nine validators. It used its control of transactions to approve the theft of 173,600 ETH and 25.5 million USDC from the Ronin Bridge – a cross-chain bridge that allows players to exchange their ETH to Axie Infinity tokens.³⁸ Valued at \$540 million at the time of the hack, the theft is the second largest ever crypto theft at the time. The exploit came during reports of increased nuclear activity by North Korea, which was allegedly due to carry out another missile test shortly after the Ronin heist.

The attackers initially began laundering the funds through three centralized exchanges – switching to Tornado Cash soon after. The US Treasury imposed sanctions on the initial exploiter address and later seven other addresses that were sending funds to Tornado Cash.



Elliptic Investigator shows the initial Lazarus Group exploit address laundering funds through Tornado Cash and three centralized exchanges. Situation current as of May 16th 2022.

17. Airdrop Exploits

Occasionally, an existing NFT project may attempt to sustain its hype or drive up NFT prices by initiating an airdrop for more project rewards to their community. They tend to work by taking a “snapshot” – a record of who owns what or how many tokens at a given point in time – and then distributing the new cryptoassets accordingly. NFT-specific airdrops may work on a “tokens-per-NFT” basis. These allow users to claim an airdrop based on their ownership of an NFT within a specific collection.

Depending on how they are coded or organized, exploiters may find ways to participate in airdrops to which they are not entitled or claim more tokens/NFTs than intended. Botched airdrops are common across the wider cryptoasset space and are not limited to NFTs.



CASE STUDY

ApeCoin Vulnerability Nets Bot \$1.1 Million in Just One Transaction

In March 2022, Yuga Labs launched an airdrop for ApeCoin, which could be redeemed by owners of Bored Ape NFTs. On March 17th, an exploiter utilized a flash loan to borrow five Bored Apes that had been locked into a platform that provides liquidity for non-fungible assets. These apes had not yet been redeemed for their ApeCoins, meaning that the exploiter could call the ApeCoin contract and net over 60,000 \$APE from them before returning the NFTs – all within the same transaction.

The obtained ApeCoin also consisted of a sixth Bored Ape NFT that the exploiter purchased in order to cover the transaction fee of the flash loan. This sixth NFT was locked into NFTX to receive ERC-20 tokens, some of which were used to pay off the loan while the rest were sold for 14.152 ETH.

The obtained ApeCoin and ETH at the time of the transaction was worth \$1.1 million.



The Etherscan transaction details show how an airdrop can be exploited in one single transaction.

18. API Exploits

Though NFT platforms may interact with blockchains through highly technical smart contracts, most will combine this with a more user-accessible interface – or ‘front-end’. This ensures that users can initiate transactions – be it purchases, listings, transfers or bids – through an easy-to-understand and navigable website, mobile application or other such interface.

In most cases, the transactions initiated through the front-end user interface will be communicated and executed on the NFT platform’s smart contract through an API. While instances of API exploits have not been numerous, it is worth noting that they may harbor vulnerabilities. These may arise from time delays in communicating frontend interactions to the smart contract, or functioning in a manner that is not apparent on a platform’s frontend.

Red Flags & Warning Signs

- The DeFi protocol does not have audited smart contracts.
- The DeFi protocol has a previous audit that occurred before smart contract code changes.
- The DeFi protocol has been targeted successfully by one or many white hat hackers – exposing particularly faulty code.
- The DeFi protocol has an anonymous developer team with unclear technical capabilities.
- The DeFi protocol has a particularly heavily “doxxed” developer team that does not display a general level of operational security during their public and social media engagements – exposing numerous potential avenues for social engineering.
- The DeFi protocol is highly centralized and can potentially be hacked by obtaining one or few private keys from developers. These are also high risk for rug pulls.
- An audit has found vulnerabilities in a smart contract but there is no indication that developers have patched them, or there is online chatter about fixes not being conducted properly.



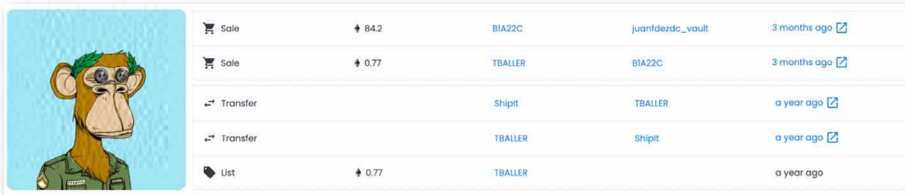
OpenSea's Backend API Exploit – Invisible Listings and Front Runners


To bypass transaction costs – “gas fees” – on the Ethereum blockchain, users of NFT marketplace OpenSea wishing to cancel their listings would often transfer their listed NFT to another wallet owned by them and then send it back to their original wallet. On OpenSea’s website, this would make it appear as if the listing had been canceled. However, that listing – having not been canceled properly – would still be active on the marketplace’s backend API.

In January 2022, users of this free listing cancellation technique found that their NFTs were being sold for extremely low prices without any initiation. It transpired that some exploiters had discovered that listings from a long time ago – when most NFTs were worth much less – were still active due to not being canceled properly. They had initiated them and purchased these NFTs for a fraction of their current prices.

Users were advised to check their active listings on the API and cancel any unwanted ones that were still active. However, bots then began identifying listing cancellation transactions on-chain and “front-ran” them by paying higher transaction fees – scooping up their NFTs using the same exploit before their listing could be canceled.

One of the most prolific exploiters of this vulnerability paid \$133,000 to purchase seven NFTs, before quickly selling them on for \$934,000 – a profit of \$801,000.



	🛒 Sale	↑ 84.2	BIA22C	juanfdezde_vault	3 months ago
	🛒 Sale	↑ 0.77	TBALLER	BIA22C	3 months ago
	↔️ Transfer		Shipit	TBALLER	a year ago
	↔️ Transfer		TBALLER	Shipit	a year ago
	📄 List	↑ 0.77	TBALLER		a year ago

A series of OpenSea transactions for Bored Ape #9991. The bottom three demonstrate a botched attempt to cancel a listing for free. The second-top shows an exploiter calling the older listing to buy the ape for 0.77 ETH – a fraction of its market value – and then flipping it (top transaction) for 84.2 ETH. By this time, the floor price for Bored Apes was 87.7 ETH (\$214,000).

04

Market Manipulation & Wash Trading

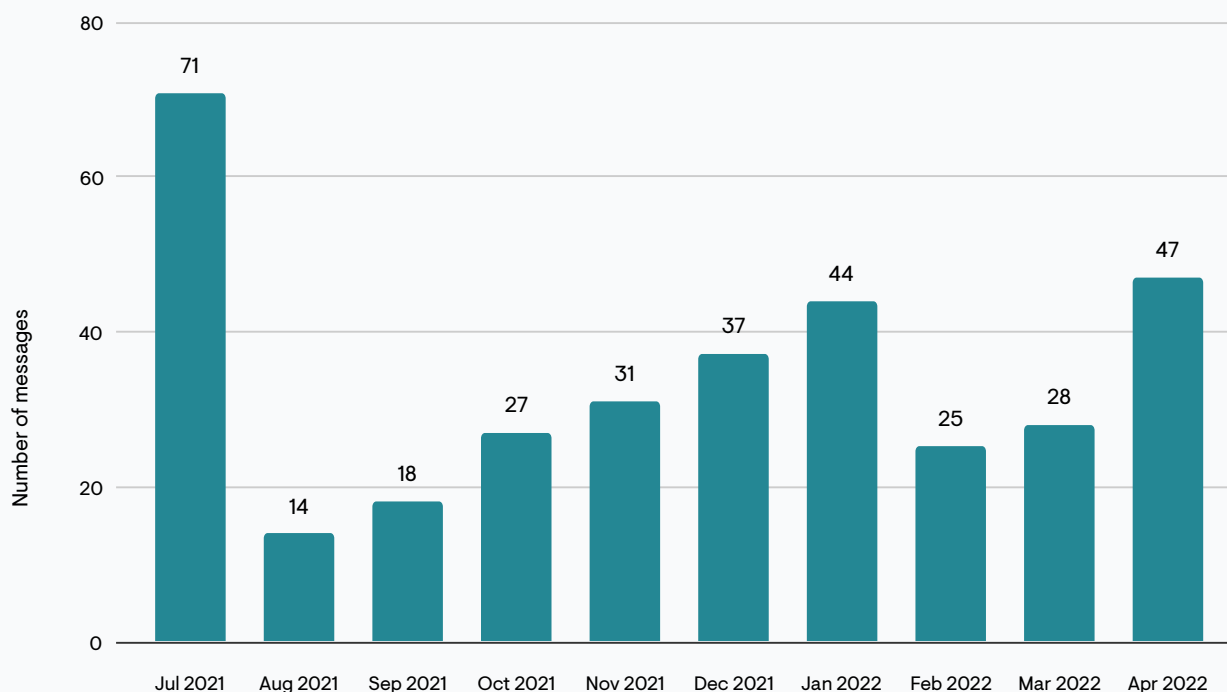


Price – or market – manipulation corresponds to any form of artificially engineered action that dramatically affects the supply or demand of a security.³⁹ Wash trading is a more specific form of market manipulation, where an individual sells their own assets to themselves for artificially inflated or deflated prices. Studies estimate that around 2% of all NFT-related trading involve wash trades.⁴⁰

Manipulating the NFT market can have a number of objectives. If a wash trader sells their assets to themselves for deliberately undervalued amounts, it could indicate an attempt to report a loss for tax purposes. If they deliberately overvalue their assets, it is indicative of an attempt to drive up the perceived value of their NFTs so that they can sell them to others for higher prices. Since all past sales and sale amounts are recorded on marketplaces, unsuspecting buyers may falsely interpret the artificially inflated sales as an indication that the NFT is worth more than it actually is and make a higher bid for the NFT.

The NFT market – being heavily dependent on community engagement and influencer skills to determine prices – is particularly susceptible to manipulation. Wash trading activity is also reasonably simple to disguise; manipulators can use multiple seemingly unrelated wallets to buy and sell their own NFTs, financing each of them for different sources. The caveat, however, is that the practice may not always result in a profit – particularly if NFT traders are aware of the red flags of this type of activity.

Activity on Rarible Marketplace’s Discord “Report Wash Trades” channel based on the number of messages sent per month.



Not all messages correspond to a report of wash trading – some may be replies to or discussions about reported cases

19. Typical Wash Trading Activities

Typical wash trades involve a rapid sequence of transactions without taking market risk. Probably the simplest form of wash trading involves one address rapidly reselling an NFT at a much higher or lower price than what was purchased for.

More sophisticated cases use multiple addresses, which may belong either to the same user or to close associates. These addresses perform a series of fast transactions that close a cycle. For instance, address A may sell an NFT to address B, which rapidly re-sells it back to A. Similarly, A may sell an NFT to B, who sells it to “C”, who closes the cycle by selling it back to A.



CASE STUDY

Trader Performs Fast Re-sales Losing More Than 50% Each Time

In less than twelve hours, a user – Wallet A – bought five Axie Infinity “Terminator” NFTs for a total price of over \$4,000 and sold all five of them for less than \$2,000 – losing 50% of the capital invested. None of these five NFTs have been re-sold since. The user did, however, mint other NFTs in the Fox Game Official collection and then transferred them to other users, who then sold the NFTs for a profit of a few thousand dollars.

Elliptic internal analysis shows that the user has a high incoming exposure to the Axie-Ronin Bridge and a high outgoing exposure to Tornado Cash.

Transaction Type	NFT Name	Price (ETH)	Price (USD)	Quantity	Buyer	Seller	Time
Sale	Axie Infinity Terminator	0.139	\$318.92	1	Wallet A	Wallet F	a year ago
Sale	Axie Infinity Terminator	0.351	\$806.36	1	Wallet E	Wallet A	a year ago
Sale	Axie Infinity Terminator	0.141	\$324.54	1	Wallet A	Wallet D	a year ago
Sale	Axie Infinity Terminator	0.3	\$689.59	1	Wallet B	Wallet A	a year ago
Sale	Axie Infinity Terminator	0.3	\$689.59	1	Wallet B	Wallet A	a year ago
Sale	Axie Infinity Terminator	0.143	\$328.42	1	Wallet A	Wallet C	a year ago
Sale	Axie Infinity Terminator	0.379	\$670.34	1	Wallet B	Wallet A	a year ago
Sale	Axie Infinity Terminator	0.317	\$729.72	1	Wallet B	Wallet A	a year ago

Sample of Axie Inficity trades for Wallet A, as shown on OpenSea – Wallet IDs have been obfuscated.

19.1 Publicity Wash Trades

In some cases, wash trades are more public and designed to motivate chatter on social media rather than facilitate underhand profits. The vanity of an NFT – a concept highly valued by the community and often linked to increasing asset price – is considered to rise if the asset is being frequently discussed online. In cases where such vanity is generated through notable trades, users can drive up the perceived prestige, demand and therefore price for onward sales.



CASE STUDY

Owner of a CryptoPunk Sells it For a Record \$532 Million – to Themselves

A seller took out a flash loan – a loan that must be repaid within one block transaction – and purchased their own Cryptopunk #9998 for \$532 million using a new wallet. The new wallet then sent the cryptopunk back to their original wallet, meaning that no overall transfer of any assets was initiated. The previous sale price of the Punk was \$265,000, while the floor price of Punks at the time was \$377,000. The activity only served to break the record for the most expensive NFT ever sold and record a 124,457 ETH transaction for the Punk on-chain.

Speculators have suggested that the activity was an attempt by the owner to gauge interest and drive up the price for their NFT. Larva Labs – the creators of CryptoPunks – deleted the transaction from their on-site transaction explorer, while the event is not considered by any major entity to be in the list of top NFT sales. The Punk has – to date – not been sold.

↔ Transfer		Wallet C → Wallet A	6 months ago 🔗
🛒 Sale	124,457.0675	Wallet B → Wallet C	6 months ago 🔗
↔ Transfer		Wallet A → Wallet B	6 months ago 🔗

The trade – initiated by Wallet A – as shown on OpenSea, demonstrating the 124,457 ETH (\$532 million) sale. Wallet IDs have been obfuscated.

19.2 Wash Trading to Manipulate Rewards

Numerous NFT projects and marketplaces utilize incentive programs to entice more users. In many cases, these come in the form of token rewards when NFTs are staked, swapped or traded on their platform. In the event that these rewards are linked to trade volume, traders may deliberately overvalue their NFT sales to maximize reward claims.

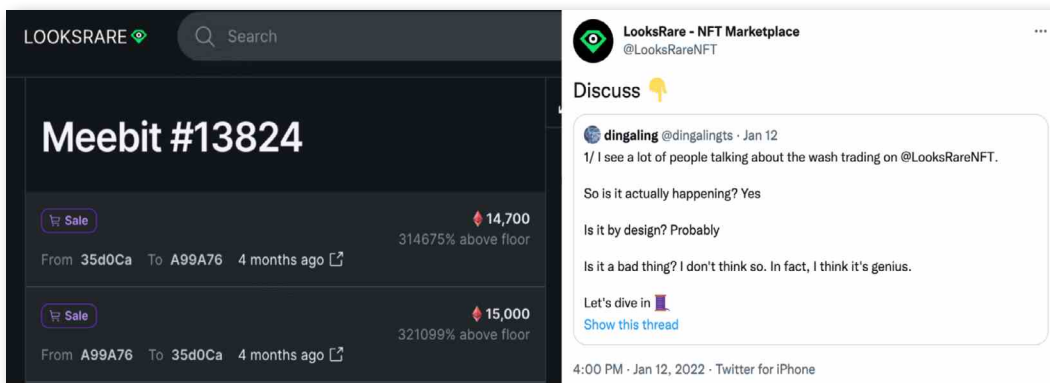


Wash Trades on New NFT Marketplace Reaches an Alleged 95%

In January 2022, new NFT marketplace LooksRare initiated a new system, giving traders \$LOOKS tokens for selling NFTs on LookRare. Over a number of phases, the marketplace would distribute a certain amount of tokens each day to traders, based on their contribution to the total daily trading volume. The marketplace charged a flat 2% trading fee – plus gas fees – to accumulate these rewards.⁴¹

This led to numerous users selling NFTs with no royalties – such as Meebits or “Loot” – between their own wallets at massively inflated prices. They hoped that this would lead to enough \$LOOKS token rewards – worth \$6.70 each at their all-time high on January 20th – to cover and make a profit from their 2% trading fee and gas fees.

Estimates suggested that 95% (\$18 billion) of LooksRare trading in April 2022 amounted to wash trades⁴² as well as 22% of all overall trades involving Meebits – in stark contrast to the 0.5%-2.5% observed across other major collections.⁴³ Though this led to criticism, one influencer suggested that the rewards system was “genius” and that wash trading “may be part of the necessary steps to provide a better platform for the community”.⁴⁴



Meebit #13824, with trades of up to \$50.6 million (321,099% above floor price) (left) and LooksRare encouraging a Twitter discussion on the merits of the rewards scheme (right).

20. Extortion, Blackmail and Deliberate Underselling

As with any group, in the NFT community there are often disagreements, personal vendettas and grudges – particularly between prominent influencers or NFT developers. In many cases, disputes arise from profit or promotional agreements not being met and arguments over project directions. These typically involve an influencer blackmailing a project, threatening to post negative social media posts about them and drive down the price if their demands are not addressed.

In a similar manner to extortion, malicious traders have also been found to deliberately purchase and undersell NFTs below their floor price to undervalue that collection and decrease investment.



CASE STUDY

An NFT Promoter Attempts to Crash Two NFT Projects

Throughout 2021, an NFT influencer with over 10,000 followers on Twitter allegedly threatened two NFT projects by posting tweets inciting “fear, uncertainty and doubt”. The disputes – screenshots of which were later made public – originated from Discord chats with the NFT developers, who sought to distance the influencer from the projects. The influencer – who was also accused of not disclosing the fact that they had been paid to promote a number of other projects – later removed the tweets. Neither project saw a significant change in floor prices throughout the ordeal.⁴⁵

21. Use of Celebrity Endorsements to Raise Prices

NFT projects have been known to pay for celebrity endorsements, helping to massively increase their price due to a surge in demand. However, depending on their agreement, it is likely that the celebrity has no actual involvement in the project and will remove their endorsement after a certain period of time.

Celebrities who have promoted a number of different NFT projects include Floyd Mayweather Jr., who earlier in 2018 forfeited \$600,000 to the US Securities Exchange Commission (SEC) for failing to declare promotional payments from initial coin offerings.⁴⁶



Lil Uzi and Eternal Beings

In September 2021, popular rapper Lil Uzi advertised a Solana-based NFT project named Eternal Beings to his nine million followers. All 11,111 NFTs – resembling cartoon aliens – sold out, with Lil Uzi deleting his tweets soon after. The price of the project then crashed down below its mint price (2.5 SOL), trading at around 0.4 SOL.

Although the project insisted that Lil Uzi remained committed to the project, investors nevertheless accused developers of profiting from the inflated price. The developers then promised a poorly-executed “Baby Uzi” airdrop to quell dissent. By October 2021, the project’s Discord server had disappeared and their Twitter had been suspended.



A selection of “Eternal Beings”.

22. “Sweeping the Floor” to Drive up Prices

NFT project developers are often observed to “sweep the floor” of their collections to drive up demand. This activity receives a mixed reception across the NFT community, as it is seen as a manipulative tactic to incite the interest of bots looking for and automatically executing good deals. After detecting a rising floor price, bots typically begin purchasing other higher value NFTs in the same collection. Proponents, however, defend it as revitalizing struggling projects.

In some cases, however, sweeps can be accompanied by other deliberately manipulative tactics. This can involve the use of anonymous wallets to sweep NFTs to give the illusion that buyers – rather than the project developer – are behind the purchases.



Developer Uses Burner Wallet to Sweep the Floor of Their Own Collection

In March 2022, the developer behind “Head Dao NFT” used a burner wallet to purchase 64 NFTs from their own collection – before advertising a 60% rise in the floor price on Twitter. The tweet implied that “people” – rather than the developer – had been behind the sweep.

Respondents quickly deduced that the burner wallet was owned by the developer, which the developer then allegedly admitted – implying that they were not aware of the manipulative nature of their activity. The NFT project did not see a significant spike in prices or trading volume following the sweep.



The project's Twitter feed announcing the sweep and rise in floor price (left), and OpenSea purchases showing Head Dao NFTs being bought by the developer's burner wallet (right).

Red Flags & Warning Signs

- Wallets engaging with the transactions with each other are financed by the same wallet.
- NFTs are being sold at significantly above or below their floor or recent sale prices – often in rapid succession.
- The wallet has no sign of interaction with the community/game of the NFT they are buying/selling.
- The same wallets re-emerge in the chain of sales/transfers of the same NFT over time.
- An NFT influencer – known for their controversial involvement in different projects – abruptly withdraws support from a project.
- An NFT project is known to have disagreements within its development team.
- A celebrity promotes an NFT collection despite not being actively involved and without disclosing whether the promotion is paid.
- An NFT project with many transactions/sales that is not supported by any relevant social community.
- An NFT marketplace offering unusually high rewards.



05

Money
Laundering

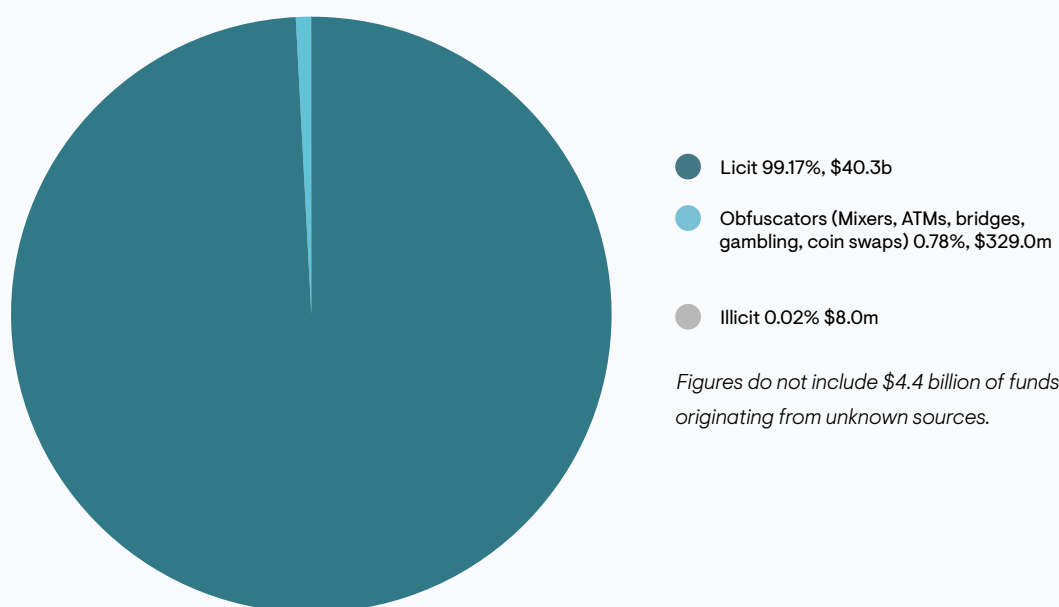
Perhaps one of the major arguments made by skeptics of NFTs and metaverse technologies is that they are – allegedly – highly susceptible to money laundering. Swathes of news articles, blogs and other online content paint a relatively alarmist picture, which inclines readers to believe that the NFT space is rife with money launderers and tax evaders. However, much of this content lacks any specific examples or evidence to back up these claims. To comprehensively evaluate the use of NFTs for money laundering, this section uses Elliptic’s internal data to conduct the most in-depth quantitative assessment of these claims so far.

Analyzing 17 million Ethereum transactions between Q4 2017 and Q1 2022 going into 22 NFT marketplaces, four NFT-based games or metaverse platforms and two NFT swap services, our data explores their exposure to funds originating from both illicit and licit activities.⁴⁷

As with any medium that can be used to store, trade or exchange illicit value, our investigations confirm that NFTs have been purchased with illicit proceeds. Confirmed illicit entities holding NFTs range from US Treasury-sanctioned crypto exchange Chatex to tax fraudsters arrested in the UK. Having investigated the latter, the UK Revenue and Customs authority (HMRC) conducted the first ever publicly-announced government seizure of NFTs in February 2022.⁴⁸

However, the results do indicate that any illicit financial flows into NFT platforms or marketplaces represent a small proportion of overall NFT-related trade activity. NFT-based money laundering, while existent, is by no means occurring at an endemic level. Reasons for why this might be are explored towards the end of this chapter.

Level of exposure of NFT-based services to funds from different origins



23. Illicit Financial Flows into NFT Platforms and Marketplaces

The following analyses identify illicit funds going into a selected number of popular NFT platforms and marketplaces. Offenders will rarely send the proceeds of crime directly to an NFT service – aware that such movements can be easily traced. The data accounts for this by taking into account funds originating from several “hops” away – being transferred into NFT-based entities over a series of transactions involving intermediary wallets. Charts in this section do not include funds originating from unknown sources, and consider Tornado Cash (sanctioned by the U.S. Treasury in August 2022) as a mixer due to the timescale of transactions analyzed.⁷

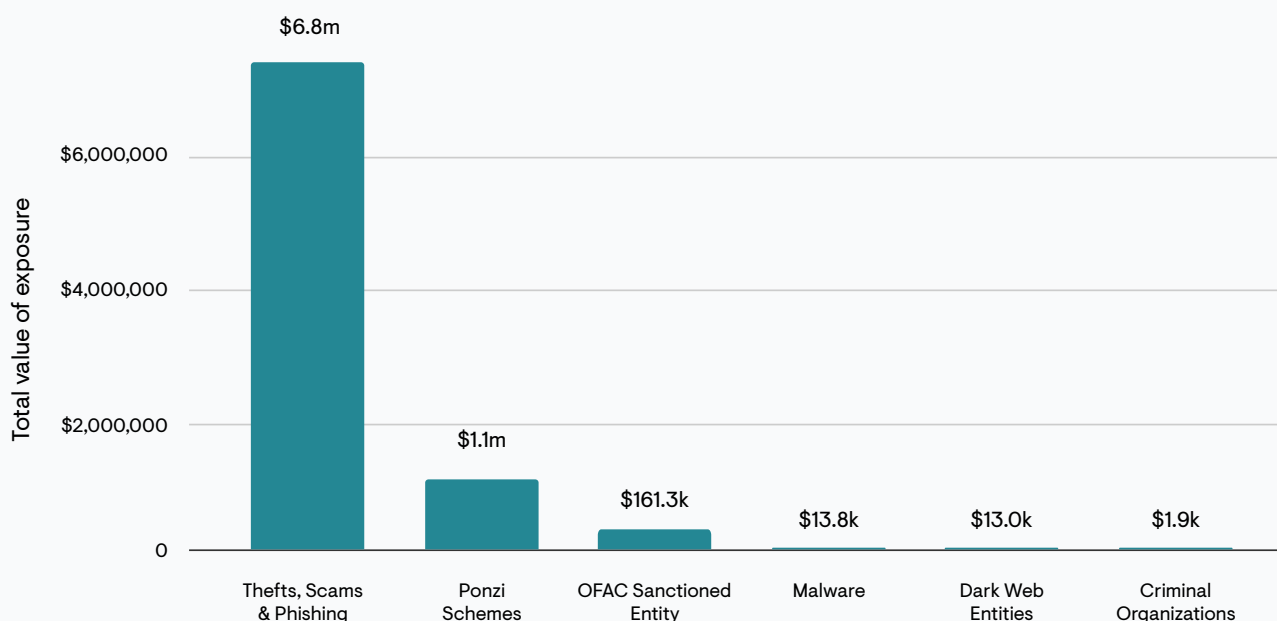
23.1 Illicit Sources

Of the almost \$8.1 million identified illicit funds flowing into NFT services, almost all originate from thefts, scams, phishing or ponzi schemes. Thefts, scams and phishing-related transactions are likely to involve the theft of NFTs in the first place (see chapter 1) – increasing the chances of subsequent NFT marketplace transactions to cash out and launder these stolen assets.

The considerable amount of funds originating from ponzi schemes likely represents cryptoasset traders diversifying their portfolios by investing in NFTs and other investment opportunities, with the chance that one of those turns out to be a ponzi scheme. This may not equate to laundering of proceeds, as these funds likely originate from cash-outs by unsuspecting investors.

Funds flowing from other illicit activities, such as malware, dark web services and criminal organizations remained relatively minimal. Together, these activities constituted around \$30,000 of proceeds flowing into NFT services.

Exposure of selected NFT platforms to ETH originating from illicit sources (Q4 2017 – Q2 2022)



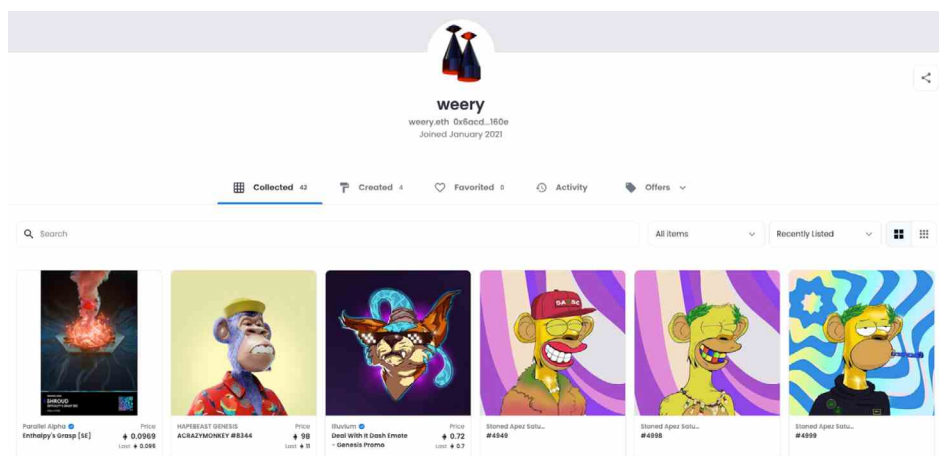


US Treasury Sanctions Money Laundering Crypto Addresses Holding NFTs

Chatex was a cryptoasset exchange registered in Latvia that was accused by the US Treasury of facilitating the laundering of ransomware and darknet market proceeds. The exchange was tied to SUEX, another Russian-based exchange that shared the same founder. SUEX became the first cryptoasset exchange to be sanctioned by the US Office of Foreign Assets Control (OFAC) on September 21st 2021. Chatex became the second on November 8th 2021.⁴⁹

One of the sanctioned Ethereum Chatex addresses contained 42 NFTs, of which one was purchased just 90 minutes after sanctions were announced. Based on prior sale and listing prices, the NFTs were worth approximately \$531,600 in total at the time of sanctions, though only had a confirmed value of \$58,000 based on previous sales. The address also had the Ethereum Naming Server (ENS) domain weery.eth. OpenSea blocked the address's account and delisted its NFTs, though they are visible on non-US-based NFT marketplaces.

This marked the first time that NFTs became involved in international sanctions due to their possession by criminals accused of laundering cybercrime proceeds.

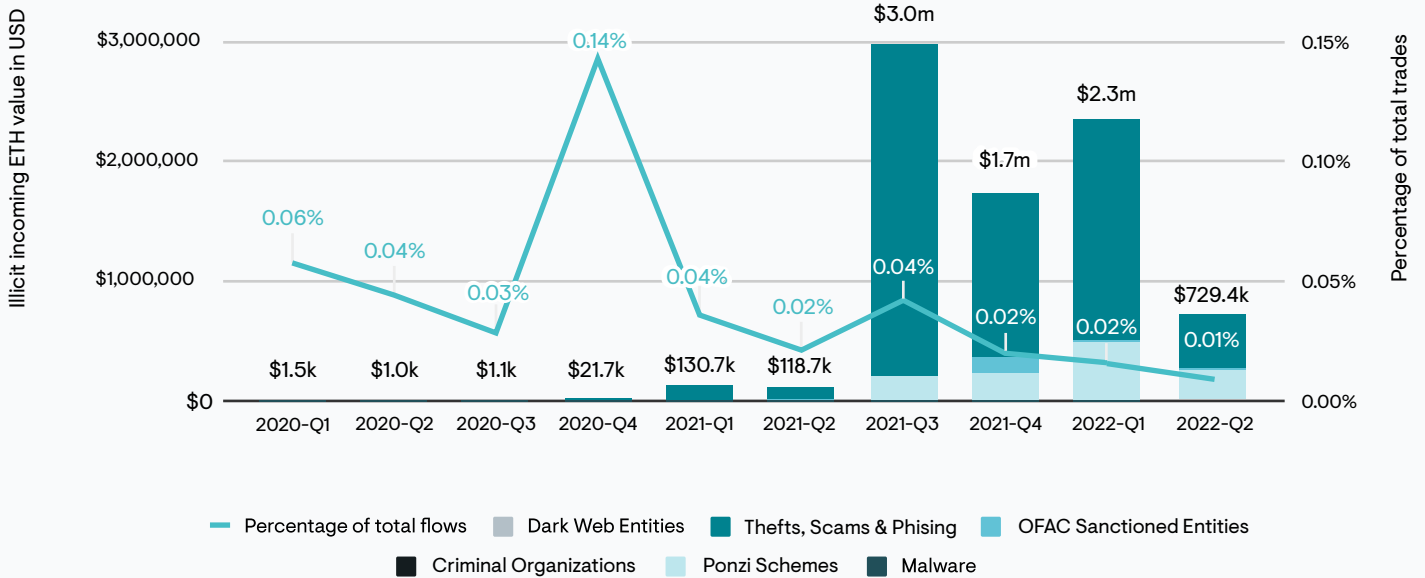


Weery.eth's NFT collection shown on OpenSea before being blocked.

The exposure of NFT platforms to illicit funds increased substantially in 2021. Thefts, scams, phishing and ponzi schemes accounted for effectively the entirety of this increase. However, in proportion to the total funds flowing into NFT platforms – excluding unknown sources – the amount originating from illicit sources showed an overall decrease.

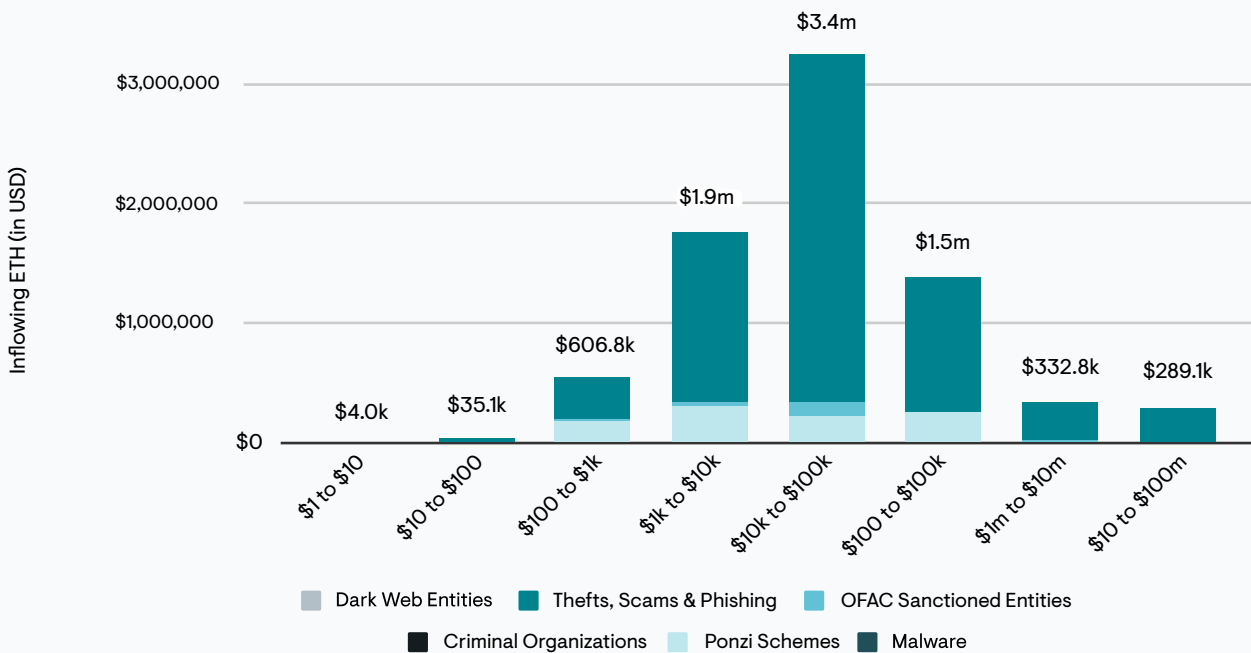
Though the second quarter of 2022 was the fourth highest quarter on record for illicit incoming flows – with over \$0.7 million originating from criminal sources – it had the lowest proportion of illicit to overall incoming flows since Q1 2020, at 0.01%.

Exposure from illicit sources (bars) and percentage of funds originating from illicit sources compared to all sources excluding unknown (line) since Q1 2020.



Of transactions to NFT platforms that included illicit funds, 92% were worth less than \$1 million, while almost 61% involved amounts between \$10,000-\$100,000. These transactions may not consist of just illicit funds alone and can involve “mingled” funds, with only a proportion of them being from illicit sources. The chart below shows the amount of illicit funds reaching NFT platforms by overall transaction amount.

Volume of funds originating from illicit sources laundered through transactions with NFT platforms by overall transaction amount (Q4 2017 – Q2 2022).



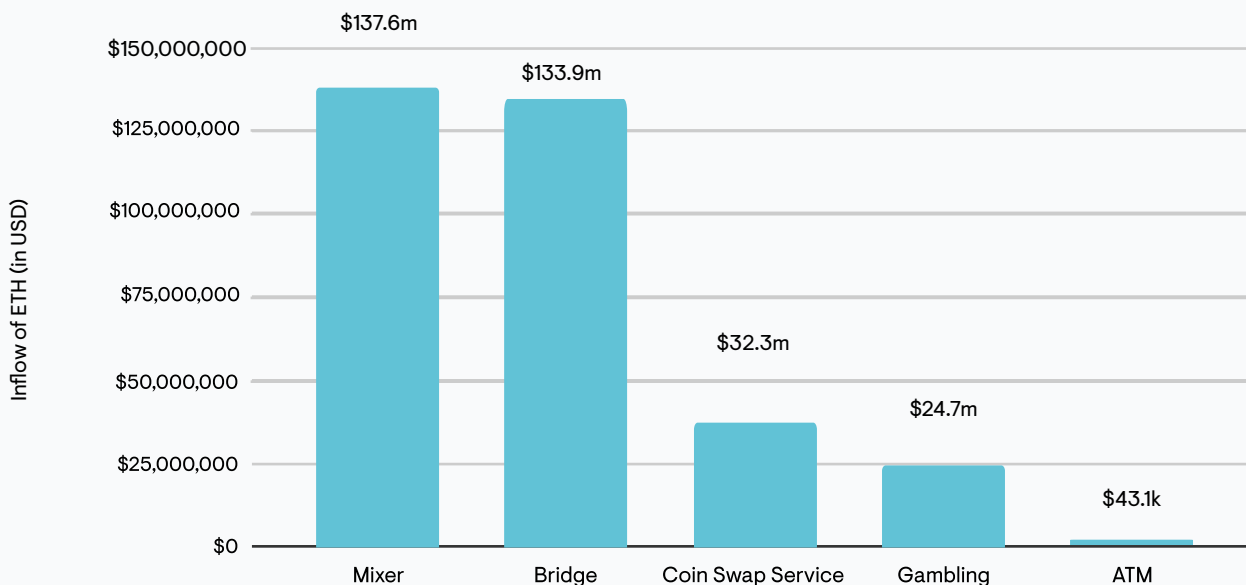
For example: if a \$512 transaction consists of \$23 traced to illicit origins, then \$23 will be added to the “\$100 to \$1k” bar.

23.2 Obfuscated Sources

In reality, launderers seldom transfer funds to a centralized or semi-centralized platform or marketplace without obfuscating their illicit proceeds first. Obfuscation services range from mixers – such as the now sanctioned entity Tornado Cash – to no-KYC coin swap exchanges, cryptoasset ATMs or gambling services. For criminals, these services allow them to disassociate themselves from their original profit-generating illicit activity and break their transaction trail.

The exposure of these services to NFT platforms and marketplaces are comparatively higher than the exposure of direct illicit activity. However, the use of such services prior to trading NFTs still remains low overall. Funds originating from mixers – predominantly Tornado Cash – contributed \$137.6 million to these

Exposure of NFT platforms to ETH originating from obfuscating sources (Q4 2017 – Q2 2022).

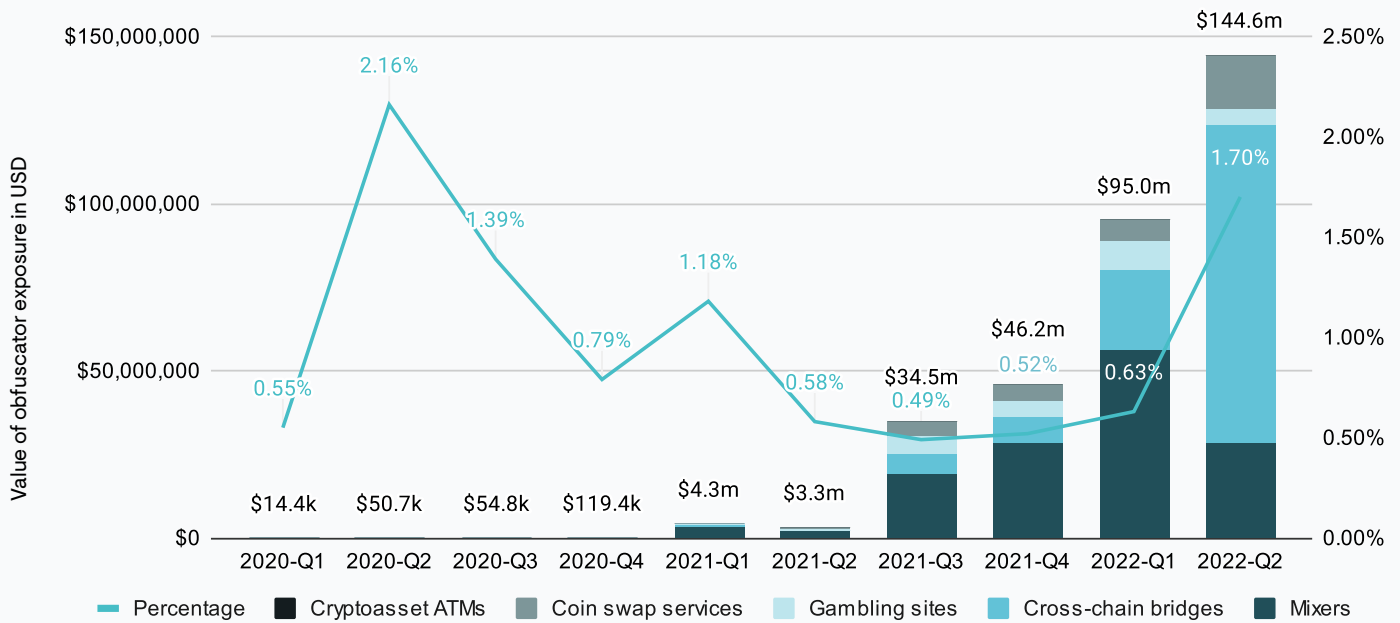


platforms, accounting for 0.34% of all identified transactions (excluding unknown).

The use of such services does not imply an intention to conceal illicit activity. From protective privacy to online gambling, these services also have legitimate and legal uses based on jurisdiction. Much of these figures may therefore reflect legitimate activity.

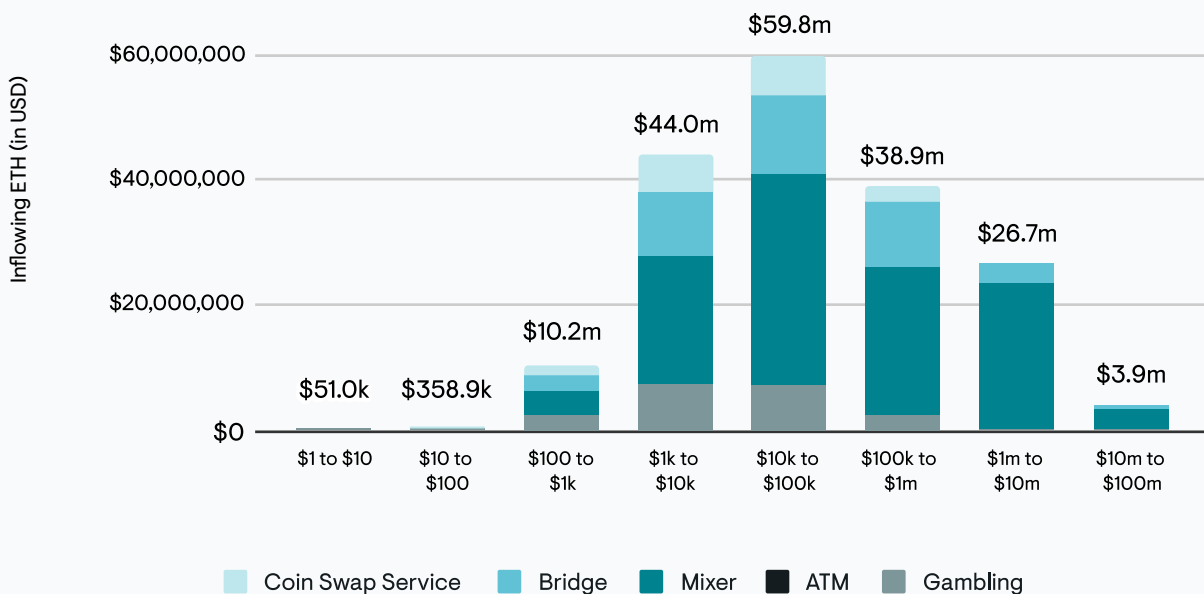
Over time, the trends initially mirrored that of funds from illicit origins. Namely, funds originating from obfuscators increased over the latter half of 2021 in line with growing interest in NFTs. However, counter to the subsequent decrease of illicit flows in 2022, incoming funds from obfuscators increased substantially in Q1 and Q2. In particular, the use of cross-chain bridges in Q2 2022 overtook that of mixers. As a proportion of total incoming flows, obfuscated funds nearly trebled from Q1 to Q2 2022, increasing from 0.6% to 1.7%.

Exposure from obfuscating sources (bars) and percentage of funds originating from obfuscating sources compared to all sources excluding unknown (line) since Q1 2020.



Typical transaction volumes into NFT platforms that involve funds originating from obfuscators are comparatively higher than funds originating from illicit sources. For higher transaction volumes, mixers and cross-chain bridges are the preferred obfuscators. Smaller transactions ranging from \$100-\$10,000 see a comparatively greater use of gambling and coin swap services.

Volume of funds originating from obfuscating sources laundered through transactions with NFT platforms by overall transaction amount (Q4 2017 – Q1 2022).

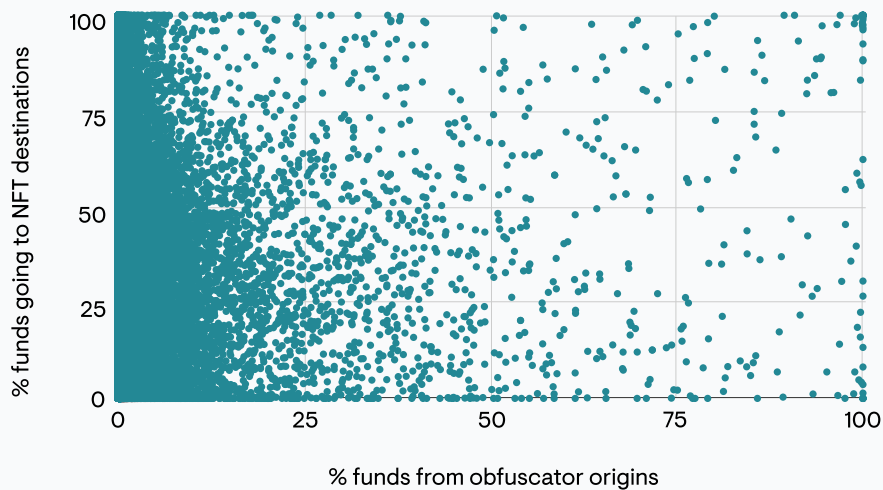
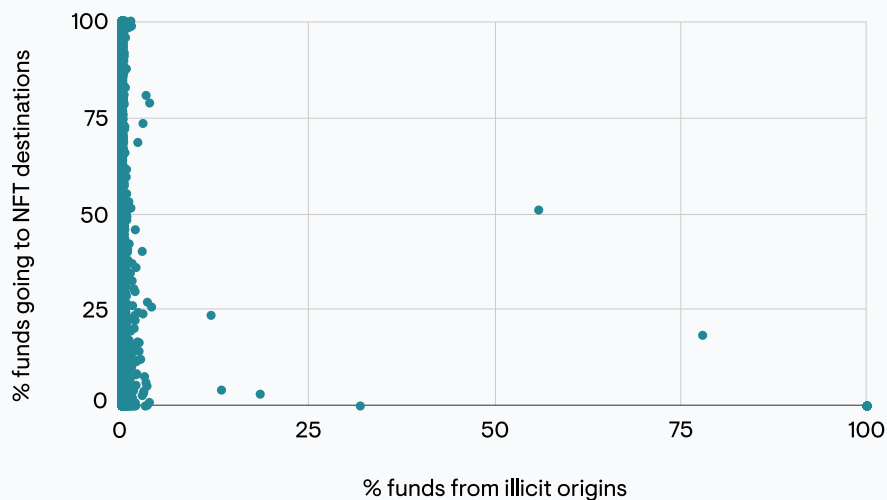


24. NFT-based Money Laundering in Perspective

An analysis of more than 60,000 Ethereum wallets interacting with the smart contracts of the 10 top NFT projects by trading⁵⁰ volume exemplifies the above trends. Wallets with a high percentage of illicit funds tend to send only minimal funds into NFT contracts. Ethereum wallets of top NFT projects were selected because they denote assets with highest values – making them attractive for criminals seeking to justify their funds.

For obfuscation services, wallet interaction patterns are more varied – showing a preference for an initial layer of obfuscation before interacting with NFTs. However, the number of wallets with (nearly) 100% of funds originating from obfuscation services that then send (nearly) all of these funds to NFT platforms or marketplaces still remains relatively minimal.

Wallets based on percentage of funds incoming from illicit (top) or obfuscation (below) sources, compared to percentage of funds going into collections' smart contracts.



For wallets to be highly suspicious, they would have to appear in the top right corner.

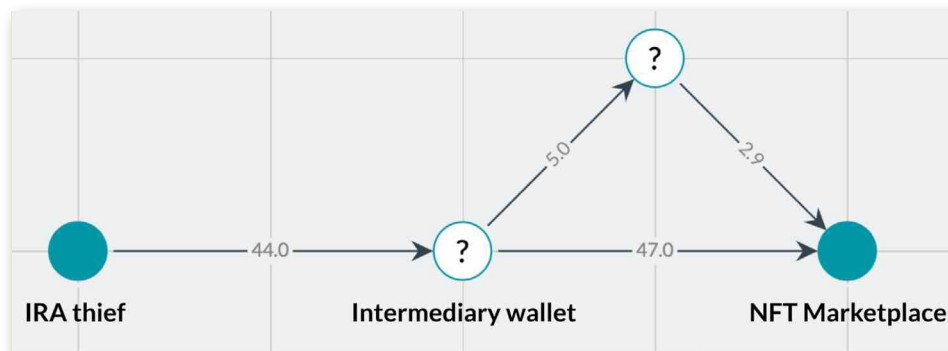


IRA Theft and Suspected NFT-based Money Laundering

In 2018, a theft of \$442,000 occurred from a cryptoasset-based individual retirement account (IRA) provider, of which \$78,000 was in ETH. Across four separate transactions, 44 ETH – now worth \$157,000 due to ETH’s appreciation in value since 2018 – was sent by the thief to an intermediary wallet over four transactions. The last two – on April 4th and April 9th 2022 – were for 10 ETH and 23 ETH respectively.

On the same day of each of these transactions, the intermediary wallet purchased NFTs equivalent to these transacted Ether amounts. For example on April 9th, the user purchased a CloneX NFT for exactly 23 ETH seven minutes after receiving 23 ETH from the thief’s wallet. The user has also transacted with NFTs during other dates, beginning on November 17th 2021 – just a week after another 5 ETH was transferred to them from the thief.

The account – accumulating numerous low-value and mid-value NFTs without selling any – appears to be undergoing a form of “structuring”, namely spreading value across assets to disguise their illicit origin. As of May 6th 2022, the account had collected 34 NFTs.



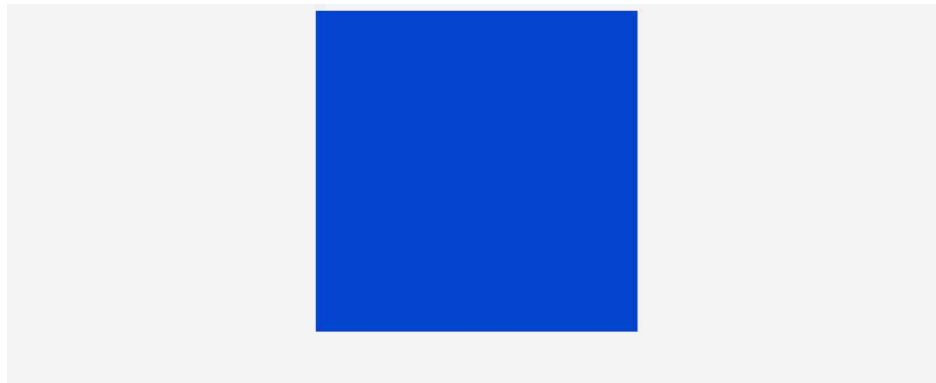
Elliptic Investigator chart showing the thief’s laundering pattern.

25. Explaining the Nexus Between NFTs and Money Laundering

Typology 1:

Digitally-enhanced Trade-based Money Laundering

NFTs are seen as attractive for money laundering because of their easily manipulable prices. Ultimately, with most NFTs consisting of cartoon, computer generated JPEGs, one could argue that they are effectively worthless. With a strong community and high demand, however, NFTs in certain collections can sell for millions. Though rarity, online popularity and use cases influence price, the effect of these determinants can still be unclear for less-well-known NFTs in particular. An NFT could therefore sell for \$1 or \$100,000 without any suspicion either way.



Untitled

Minted on Mar 25, 2021

Is it worthy? An “untitled” NFT of a blue square once sold for over \$10,000.

Their price manipulable nature makes NFTs an attractive asset to conduct “trade-based money laundering” (TBML), a well-known method of transferring illicit funds between accomplices while disguising them as proceeds of trade. In a typical TBML scheme, two illicitly established companies initiate a fraudulent trade deal, massively over- or under-stating the price, quantity or quality of the assets being traded. A fraudulent invoice is issued, allowing the recipient of the goods to either overpay or underpay depending on which way the funds are flowing. The result is that illicit funds are transferred and invoiced under the guise of a trade deal.

TBML works well with easily price- or quantity-manipulable assets, such as luxury items and – theoretically – NFTs. NFT insight platforms do, however, provide indicators of floor and average prices for many well-known collections – helping somewhat to determine approximate values. These are less prevalent for one-off NFTs or those from more obscure collections.

Typology 2:

Justifying the Source of Illicit Wealth Through NFTs

The manipulable nature of NFT prices can also theoretically help criminals justify their illicit proceeds to tax authorities, with the claim that they were made through legitimate NFT trading. Without the ability to evaluate the objective price of the suspect's NFTs, tax authorities may have difficulty determining whether their justification is legitimate.

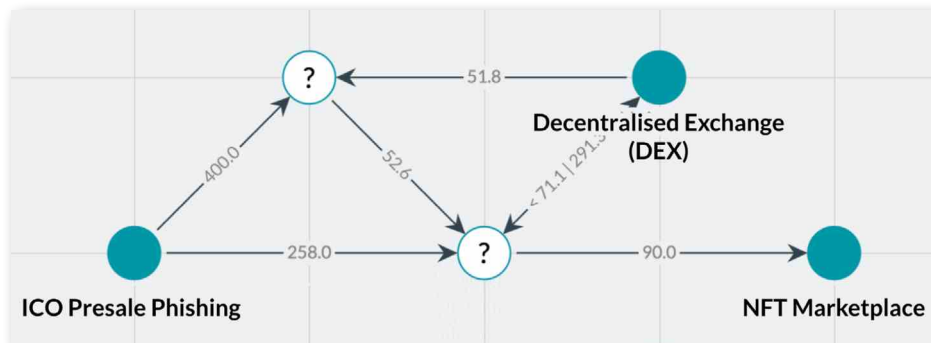


CASE STUDY

(Possibly) Purchasing a Bored Ape to Legitimize Illicit Income

During the initial coin offering (ICO) craze of 2017-18, a phishing scam impersonating an ICO for a blockchain-based digital identity company accumulated \$2.9 million ETH. In May 2021, \$1.2 million of these funds were sent to an intermediary wallet, which also received and sent a sizable amount of funds from/to the decentralized exchange UniSwap.

On January 28th 2022, \$435,000 of these funds from the intermediary wallet were used to purchase a Bored Ape NFT. Being the most expensive NFT collection at the time, Bored Apes are a high-value and low-risk asset – potentially attractive for storing and justifying illicit funds.



Elliptic Investigator chart showing the thief's laundering pattern – including sending funds to a DEX and purchasing the Bored Ape from an NFT marketplace.

25.1 Drawbacks to Using NFTs for Money Laundering

Skeptics of NFTs often point to their price manipulable nature. While this does theoretically make them a TBML risk, NFTs also have features that make them particularly unattractive to money launderers. Perhaps the most prominent is that they are one of the most transparent assets on a blockchain. For almost any NFT, its page on a marketplace or blockchain explorer can provide a complete history of the sales, transfers, listings, bids and any other actions throughout its existence. Links to related transactions and buyers/sellers' wallets can provide further insight into other activity by trading parties. This transparency – which makes NFT tracing easy for investigators – is undesirable for launderers, for which anonymity is key.

Scientific theories of financial crime characterize it as an inherently rational process⁵¹ – offenders will aim to select the lowest effort, lowest risk and most efficient way of laundering funds. Without compelling reasons, they will avoid switching to any new or untested methods. While established means of laundering cryptoassets through privacy coins and mixers continues to work, the rational incentive for launderers to use NFTs arguably remains low.

26. NFT-based Terrorist and Extremist Financing

Commentary has also been made on the potential for terrorist financing to occur through NFTs. Although organizations such as al-Qaeda, ISIS and Hamas have all engaged with cryptoasset-based financing, Elliptic's internal analysis suggests that campaigns have been low-scale and sporadic. These organizations mostly operate in areas where even internet access – let alone cryptoasset exchanges, ATMs and crypto-accepting vendors – is scarce. The risk of cryptoasset-based terrorist financing extending to NFTs, therefore, remains low.

Far-right extremist influencers – who ideologically associate with the ideals of privacy and decentralization – have comparatively used cryptoassets for fundraising to a greater extent. Elliptic has observed low-level purchases of NFTs by wallets partially funded by extremist donations to far-right video hosting platforms.

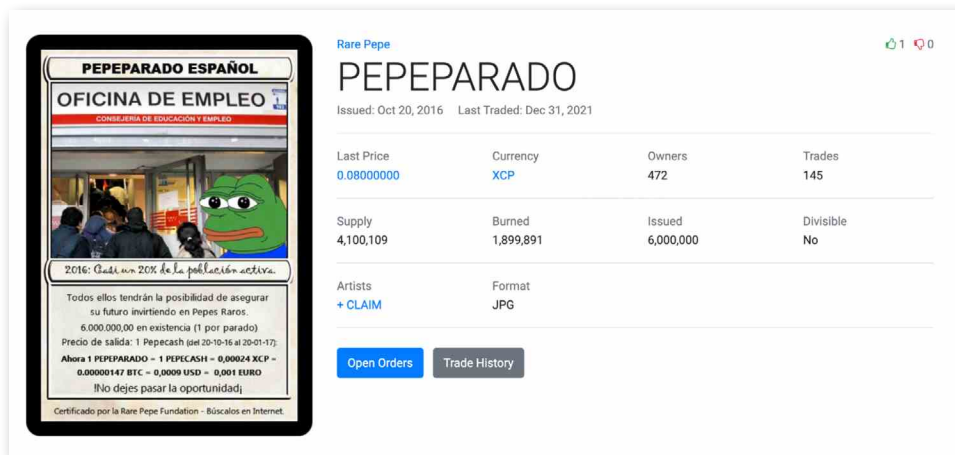
There have been occasional instances where pro-Russian separatist forces in Eastern Ukraine have turned to NFTs to raise funds for their military activities. Due to the Russian government's restrictions on cryptoassets, these efforts have not been as prolific as the crypto fundraising campaigns initiated by the Ukrainian Government. NFT marketplaces have often taken steps to delist any collections they find to be raising funds for Russia's invasion of Ukraine or occupation of Donbas, further limiting their success.



Donations to Far-Right Include “Rare Pepe” Bitcoin Crypto Art Holder

“Rare Pepe” – one of the earliest crypto art collections in existence – began trading on the Bitcoin Blockchain “Counterparty” protocol in the 2010s. This was one of the most well-known predecessors to NFTs and was somewhat co-opted by the extreme right as a symbol of white supremacy at the same time, though this subsided in the late 2010s after legal action by Pepe the Frog’s creator.

In December 2020, an anonymous donor based in France made headlines for donating over \$500,000 in Bitcoin to known far-right individuals and entities. One such donation of \$9,400 was made to an anonymous holder of a Bitcoin-based Rare Pepe crypto collectible. This example is notably the only case involving a Bitcoin-based non-fungible asset in this report.



The ‘Rare Pepe’ collectible owned by the Bitcoin address that received the donation.



Using Elliptic to Screen NFT Purchases Against Money Laundering and Terrorist Financing Risks

Both Elliptic Lens and Navigator provide insights into the illicit activity exposure of a wallet or transaction respectively. Our tools also trace activity from obfuscating services such as mixers, gambling services, no-KYC “coin swap” exchanges and other sources that may be of concern to NFT-based service providers. Customers will be able to check whether – and the extent to which – wallets used to purchase NFTs are funded by illicit activity, terrorist/extremist entities or obfuscators of concern.

Our exposure data can also easily be used to plot and investigate suspected money laundering or terrorist financing activity attempting to interact with NFTs as part of their scheme – as demonstrated in the various case studies explored in this chapter. Elliptic Investigator also gives customers the ability to visualise and automatically plot exposure – vastly increasing the speed and efficiency of conducting these investigations.

Together, Elliptic’s blockchain analytics solutions can provide NFT-based service providers and investigators the appropriate tools and insights to manage both financial and reputational risks.

The background features a dynamic, glowing blue stream of particles or data points that flows from the top right towards the bottom right, creating a sense of movement and digital connectivity. The particles are small and densely packed, forming a ribbon-like structure that tapers as it moves.

06

Global
Regulations
and Policy
Outlook

27. Categorizing NFTs

One of the most challenging aspects of the NFT regulatory space is appropriately classifying NFTs and determining the regulatory regime most applicable to a given offering. The regulatory requirements attendant to each potential categorization of NFTs are often disparate and sometimes contradictory. The way in which a given NFT is classified may vary based not only on the structure of the NFT itself, but on the jurisdiction in which it is offered, held, or traded. By examining the unique characteristics of each potential NFT regulatory regime, the risks and relevant controls springing from each may be appropriately assessed and accounted for by owners, issuers, exchangers, and custodians.

28. US Regulatory Oversight

28.1 NFTs, the Traditional Art Market and Financial Crime

There are many similarities between potential money laundering and sanctions evasion typologies in the traditional art market and the world of NFTs. Though certain NFTs have various utility functions, many are prized for their artistic design and provenance and may be considered “art-like”. While US controls and regulations in this space have historically been lax, regulators there have recently suggested reforms to bring their regime in line with their counterparts in Europe.

In a report authored in July 2020 – titled “The Art Industry and US Policies that Undermine Sanctions” – the Senate Permanent Subcommittee on Investigations noted that the “art industry is considered the largest, legal unregulated industry in the United States”. This is of particular note given that the US market represents about “\$28.3 billion, or about 44 percent of global art sales”.⁵²

Accordingly, in 2020, the United States Department of the Treasury’s Office of Foreign Asset Compliance (OFAC) issued pertinent guidance called “Advisory and Guidance on Potential Sanctions Risks Arising from Dealings in High-Value”. It clarified that:

OFAC encourages companies to implement a risk-based compliance program to mitigate exposure to sanctions-related violations [...]. Art galleries, museums, private collectors, auction companies, agents, brokers, and other participants in the art market who may face exposure to transactions involving blocked persons should assess the risks they may face and consider implementing measures reasonably designed to reduce such risks, including by conducting risk based due diligence, as appropriate.⁵³

Though the nomenclature may differ, in most instances there are such entities facilitating activity within the NFT sector. These parties should be prepared to limit access to their digital goods to only those persons not associated with sanctions restrictions or broader financial crime concerns. This is a particularly salient point when considering the pseudo-anonymity provided by transactions executed on the blockchain. Corporate beneficial ownership, identity of donors/beneficiaries/trustees of trusts, and other control persons may not be available, and so an enhanced degree of scrutiny must be applied to counterparties to identify instances of identity obfuscation and illicit and/or suspicious activity.

Requirements reach even further under the Anti-Money Laundering Act of 2020 (AML Act) – implemented as part of the National Defense Authorization Act. Though this law does not specifically apply to the art market, it does require that dealers in antiquities be classified as financial institutions and bear the responsibility of implementing adequate anti-money laundering (AML) and know-your-customer (KYC) programs.⁵⁴ Though these requirements do not currently apply to the traditional art and/or NFT markets in the strict sense, implementing these policies, procedures and controls will ensure that entities in this space will be prepared for when regulations are inevitably applied to these sectors.

What then, does this mean for art-like NFTs? Practically, issuers and intermediaries acting in the NFT space should ensure that they know the identities of those parties to whom they are distributing digital goods and should surveil the ecosystems that they operate. This is to ensure that customers and counterparties do not represent significant sanctions risk and are not being used for the purpose of laundering money.

Equally important is differentiating activity that is truly decentralized against that which operates through a centralized third-party intermediary. If persons – legal or natural – are connecting independent of any service or platform and engaging in peer to peer exchanges of cryptoassets for NFTs, fiat money for NFTs, or NFTs for other NFTs, it's unlikely that any strict regulatory requirements related to the implementation of an AML or KYC program will ever apply, though OFAC sanctions restrictions remain pertinent. If, however, there is some central entity – be it a decentralized protocol, company, not-for-profit corporate entity – it is likely that functional regulators will seek to leverage their intermediation and control to prevent the proliferation of financial crime. Protest though they may, it is unlikely that such entities – or pseudo-entities – will be able to escape the ambit of regulatory authorities through claims of decentralized governance and “software only” functionality. Ultimately, there is often some responsible party who owns or maintains the portal through which the exchange of NFTs is effectuated.

28.2 NFTs as Securities

Aside from concerns related to financial crime, a key question related to the regulation of NFTs has been whether or not they may represent investment contracts, and therefore regulated securities. In the US, the Securities and Exchange Commission (SEC) has reportedly begun to investigate this issue – allegedly having sent subpoenas to NFT industry participants.⁵⁵ Particular interest has apparently been taken in whether or not NFTs are being used to raise funds in a manner akin to an initial public offering, and whether fractionalized NFTs are being structured and exchanged in a manner materially similar to financial instruments.

The determination as to whether an NFT might represent a security primarily hinges on the applicability of the Securities Act of 1933, as interpreted in the 1946 Supreme Court decision, *SEC v. WJ Howey Co.* This case gave rise to the “Howey Test”, which enumerates the factors that must be taken into consideration when determining whether a security may exist. The Howey Test finds that an investment contract – and therefore a security – exists when there is:

a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the effects of the promoter or a third party.⁵⁶

The applicability of this test to the digital asset sector has been clarified – to some degree – by the SEC in their guidance document “Framework for ‘Investment Contract’ Analysis of Digital Assets.”⁵⁷ Though the first two prongs of the Howey Test, namely (1) the investment of money and (2) in a common enterprise, are clear, there is considerably more consternation with regard to the third. Indeed, identifying when a person may “expect profits solely from the effects of the promoter or a third party” in the digital asset – including NFT – sector has proven challenging for even the SEC itself. Because of this difficulty, the regulator has provided several potential factors that may, in totality, indicate that the last prong of the Howey Test may be satisfied, though no single factor may be dispositive of whether or not a security exists. Notably, the SEC states that:

A purchaser may expect to realize a return through participating in distributions or through other methods of realizing appreciation on the asset, such as selling at a gain in a secondary market. When a promoter, sponsor, or other third party (or affiliated group of third parties) (each, an “Active Participant” or “AP”) provides essential managerial efforts that affect the success of the enterprise, and investors reasonably expect to derive profit from those efforts, then this prong of the test is met.⁵⁸

The key questions to be asked in making this determination are clearly outlined by the SEC. Specifically:

- Does the purchaser reasonably expect to rely on the efforts of an AP?
- Are those efforts “the undeniably significant ones, those essential managerial efforts which affect the failure or success of the enterprise” – as opposed to efforts that are more ministerial in nature?⁵⁹

While the Commission states that the list of factors that they provide in answering these questions should not be considered limiting, and that other relevant factors may exist, they nonetheless lay out key points of consideration that should be taken into account when determining whether the expectations of profit from an enterprise rely on the efforts of a third party to a large enough extent to as to meet that prong of the Howey Test. Specifically, they recommend that the following situations should be identified:

- An AP is responsible for the development, improvement (or enhancement), operation, or promotion of the network, particularly if purchasers of the digital asset expect an AP to be performing or overseeing tasks that are necessary for the network or digital asset to achieve or retain its intended purpose or functionality [...].
- There are essential tasks or responsibilities performed and expected to be performed by an AP, rather than an unaffiliated, dispersed community of network users (commonly known as a “decentralized” network).
- An AP creates or supports a market for, or the price of, the digital asset. This can include, for example, an AP that: (1) controls the creation and issuance of the digital asset; or (2) takes other actions to support a market price of the digital asset, such as by limiting supply or ensuring scarcity, through, for example, buybacks, “burning,” or other activities.
- An AP has a lead or central role in the direction of the ongoing development of the network or the digital asset. In particular, an AP plays a lead or central role in deciding governance issues, code updates, or how third parties participate in the validation of transactions that occur with respect to the digital asset.
- An AP has a continuing managerial role in making decisions about or exercising judgment concerning the network or the characteristics or rights the digital asset represents [...].

- Purchasers would reasonably expect the AP to undertake efforts to promote its own interests and enhance the value of the network or digital asset [...].
- In evaluating whether a digital asset previously sold as a security should be re-evaluated at the time of later offers or sales, there would be additional considerations as they relate to the “efforts of others,” including but not limited to:
 - Whether or not the efforts of an AP – including any successor AP – continue to be important to the value of an investment in the digital asset.
 - Whether the network on which the digital asset is to function operates in such a manner that purchasers would no longer reasonably expect an AP to carry out essential managerial or entrepreneurial efforts.
 - Whether the efforts of an AP are no longer affecting the enterprise’s success.⁶⁰

Under this analysis and utilizing these factors, it is unlikely that most NFTs would be found to be securities. Though there may be an expectation that profits may be realized from the purchase and sale of the NFT, it is unlikely that there is some ongoing business concern or “common enterprise” that would necessitate the application of securities laws under the existing regulatory framework.⁶¹ That is not to say, however, that no such instance may exist. Indeed, the aforementioned fractionalized NFTs provide a strong basis from which one may conclude that a security may exist. It’s previously been noted that:

[M]ultiple investors could buy portions of an NFT. In fractionalized transactions, no singular owner owns the digital asset. Fractionalization could also apply to a bucket of NFTs. Such platforms begin to resemble more traditional securities, as an Active Participant may play a “managerial” or “lead or central role” in validating transactions regarding the digital asset. SEC Commissioner Hester Pierce has hinted that some of these transactions could fall within the SEC’s jurisdiction and has suggested that the agency should be offering guidance to investors and innovators within the space. Moreover, as discussed, digital assets that trade on a secondary market or are expected to in the near future are more likely to provide users with a reasonable expectation of profits, and therefore, more likely to be an investment contract.⁶²

As with many aspects of the digital asset space, there is still much regulatory uncertainty and many unique risk attributes to be considered when evaluating whether a particular NFT may be a security. The important thing to remember, though, is that although it may be unlikely that a given NFT is representative of an investment contract, it is absolutely possible. Issuers, buyers, sellers, and intermediaries must obtain well-informed guidance to ensure that they do not inadvertently facilitate an impermissible offering or exchange of a regulated financial instrument.

29. Regulatory Treatment of NFTs by Geography

APAC

In general, for countries in the Asia-Pacific, there is no specific legislation regulating non-fungible tokens (NFTs) that are unique representations of ownership and do not have investment or payment purposes. Even in countries that regulate cryptoassets, NFTs are usually viewed differently from other cryptoassets due to their non-fungible nature.

Nonetheless, depending on their characteristics and the countries they are being traded in, certain types of NFTs may be subject to prevailing laws and regulated as cryptoassets or other forms of financial instruments. For example, in Thailand, if an NFT determines the rights of an investor in a project or a business, or the rights of a person to acquire goods, services or any other predetermined right, it will be deemed as a “digital token” and regulated accordingly as a cryptoasset.

Similarly, if a scheme involving NFTs purports to generate investment returns – which could be considered as a type of security under the Howey Test – the Philippines may view such schemes as public offerings of securities and the said NFTs as securities under its regulatory ambit. In other countries like Hong Kong, Japan and Australia, if NFTs are structured in a certain manner – such as collective investment schemes where profits are distributed to NFT holders – they could be regulated as securities under the relevant financial services laws.

In other words, the regulatory treatment of NFTs in the Asia-Pacific depends on the country where they are being traded, the legislation in place, the nature of the tokens and their functions in practice. Regardless of their current regulatory status, companies offering NFTs or facilitating NFT transactions should be cognizant of anti-money laundering and counter-terrorism financing (AML/CFT) risks. Given the burgeoning interest in NFTs among investors and regulators, such businesses may eventually be required to comply with AML/CFT regulations in the countries they operate.

To further illustrate the differences in regulatory treatment of NFTs in the Asia-Pacific, we will examine three major jurisdictions as below:

China

As cryptoasset trading is banned in China, NFTs that are minted on Ethereum or other public blockchains are not traded in any open marketplaces in the country. However, NFTs do exist in a limited way as “digital collectibles” that are often issued by Chinese tech companies to prove ownership and authenticity of creative works like songs and art, or real-life objects with significance. These digital collectibles are minted on permissioned blockchains managed by the tech companies themselves and often sold on their own channels – such as Ant Group’s Topnod and Tencent’s Huanhe – where secondary trading is not allowed. There are also companies such as Bigverse that use technology based on side chains of public blockchains

like Ethereum and support the trading of digital collectibles. Others may leverage China's state-backed NFT infrastructure called a Blockchain Services Network Distributed Digital Certificate (BSN-DDC), which integrates 10 public blockchains in a way very different from their original versions and works effectively like a permissioned blockchain.

On April 13th 2022, the National Internet Financial Association of China, the China Banking Association and the Securities Association of China – which counts as members almost all Chinese banks, brokers and fintech firms – released a joint statement with guidance for members on NFTs that includes not offering centralized NFT trading platforms, not investing directly or indirectly in NFTs, and not using cryptoassets like Bitcoin in their transactions of NFTs. Given their influence, the joint statement by these three industry associations to prohibit the speculation and trading in NFTs is a clear indication of China's attitude toward them.

Singapore

In Singapore, NFTs are currently not regulated, given the nature of most NFTs whose underlying assets are mainly digital art and other collectibles. Nonetheless, the Monetary Authority of Singapore (MAS) – the country's financial services regulator – has routinely warned consumers through advisories against investments in cryptoassets, including NFTs, as they are deemed not to be suitable for retail investors. Its regulatory stance towards NFTs may also change in the future as it continues to monitor developments in the space.

On February 15th 2022, the MAS further clarified in Parliament in response to a question on the regulation of NFT activities that it “does not and cannot possibly regulate all things or products that people choose to invest their money in”.⁶³ Instead, it considers the substance of an asset when assessing whether a product or activity should come under the MAS's regulatory remit. For example, should an NFT possess characteristics of a capital markets product – such as being structured to represent rights to a portfolio of listed shares – it will be subject to the regulatory requirements under the relevant legislation.

India

There are currently no laws and regulations governing cryptoassets in India. It is also not illegal to trade in them.

However, cryptoasset trading is subject to government scrutiny in the form of taxation. First, from April 1st 2022 onwards, a 30% capital gains tax is levied on the sale of cryptoassets with deduction only allowed for the cost of acquisition of the cryptoassets. Second, from July 1st 2022 onwards, a 1% tax deductible at source (TDS) will be imposed on all transfers of cryptoassets above a certain size. These taxes also apply to NFTs, which are otherwise not regulated in India.

Europe, Middle East, Africa

Similar to APAC, most EMEA jurisdictions, even where they do have cryptoasset regulations, will not have separate NFT regulation. However, most jurisdictions that have cryptoasset regulation will take account or address the FATF's recent Updated Guidance for a Risk-based Approach to Virtual Assets and Virtual Asset Service Providers and will consider the nature of NFTs.

It is worth bearing in mind that most jurisdictions with developed financial services regulatory frameworks will treat fractionalized NFTs as a collective investment scheme/fund, and will likely fall into more traditional financial services fund regulation. Some jurisdictions, such as the European Union area and the Dubai International Financial Centre (DIFC) in the United Arab Emirates (UAE) – regulated by the Dubai Financial Services Authority (DFSA) – are likely to make this clear in their upcoming cryptoasset regulatory framework.

Furthermore, the DIFC is considering going beyond FATF and proposing that NFT creators and service providers be subject to AML/CFT requirements – including having to carry out business risk assessments and customer due diligence (CDD).

30. FATF Guidance

The Financial Action Task Force (FATF) is a supranational coordinating organization providing recommendations on financial crime rules and regulations. It has published several rounds of guidance related to the cryptoasset – what it calls “virtual asset” – sector.

In their latest revision of this guidance, FATF directly addressed NFTs for the first time. FATF declined to apply their general recommendations to virtual asset, stating that:

Digital assets that are unique, rather than interchangeable, and that are in practice used as collectibles rather than as payment or investment instruments, can be referred to as non-fungible tokens (NFT) or crypto-collectibles. Such assets, depending on their characteristics, are generally not considered to be VAs under the FATF definition.⁶⁴

The rationale here is sensible, insofar as virtual asset recommendations from FATF spring from their utility as forms of payment intermediation, value transfer, and investment. NFTs, though valuable, are, quite by design, not typically interchangeable in a manner similar to cash or other types of payment – such as so called “cryptocurrencies” – and are not inherently designed to be tools of speculative investment. Indeed, the core value proposition offered by many prominent NFT creators is artistic, providing interesting and innovative digital art design. The value of these NFTs derived from their aesthetic worth, with any speculative investment potential occurring only as a secondary effect, attendant to the artistic joy coming from the token.

In practice, however, it has become increasingly clear that many NFTs are not purchased with artistic worth as the primary driver. These tokens have, instead, become valuable tools of investment and commerce, serving as stores of value and speculative instruments that are bought and sold with the intention of achieving pecuniary gain. FATF anticipated this eventuality, and noted in their guidance that:

Some NFTs that on their face do not appear to constitute VAs may fall under the VA definition if they are to be used for payment or investment purposes in practice. Other NFTs are digital representations of other financial assets already covered by the FATF Standards. Such assets are therefore excluded from the FATF definition of VA, but would be covered by the FATF Standards as that type of financial asset.

Given that the VA space is rapidly evolving, the functional approach is particularly relevant in the context of NFTs and other similar digital assets. Countries should therefore consider the application of the FATF Standards to NFTs on a case-by-case basis.⁶⁵

This representation is interesting for three main reasons. First, it immediately calls out that NFTs that are leveraged for “payment or investment purposes” may, in fact, fall under the FATF guidance and be responsible for all financial and economic crime-related controls recommended by the organization. Secondly, FATF is clearly aware that certain NFTs may represent an interest in another type of regulated financial instrument covered by non-virtual asset FATF guidance. This underscores the fact that simply transforming the medium of exchange and representation of a type of financial good to a digital

token does not change the principles of control and regulation that may apply, and does not alleviate the responsibilities of the issuers, exchangers, and intermediaries involved in the sector. Lastly, FATF acknowledges the rapidly developing nature of the sector and affirms that a regulatory assessment of NFTs should occur on a case by case basis. This is entirely appropriate, as there is a tremendous degree of variation in the types and functions of NFTs available today. Trying to fit all of these disparate tokens and use cases into a single box would be untenable, and a tailored approach is necessary in order to effectively regulate the space and prevent the proliferation of financial crime.

31. Market Manipulation

There has been a great deal of consternation related to the potential for market abuse and manipulative activity in the NFT sector. Previously, there had been little guidance as to how extant securities and financial crime laws might be applied to the space, however that changed dramatically in June 2022. Though there is no specific statute prohibiting market abuse in NFTs, the U.S. The Attorney's Office for the Southern District of New York has made clear that existing wire fraud laws (under the concept of defrauding the market) may well be applied to markets involving non-fungible tokens.

The case in question involves a former employee of the well-known NFT marketplace OpenSea, who is alleged to have committed insider trading by leveraging material non-public information, obtained as a result of his employment, to profit from the purchase and sale of NFTs.

According the U.S. Attorney's press release:

As part of his employment, [the individual in question] was responsible for selecting NFTs to be featured on OpenSea's homepage. OpenSea kept confidential the identity of featured NFTs until they appeared on its homepage. After an NFT was featured on OpenSea's homepage, the price buyers were willing to pay for that NFT, and for other NFTs made by the same NFT creator, typically increased substantially.

From at least in or about June 2021 to at least in or about September 2021, [the individual] used OpenSea's confidential business information about what NFTs were going to be featured on its homepage to secretly purchase dozens of NFTs shortly before they were featured. After those NFTs were featured on OpenSea, CHASTAIN sold them at profits of two- to five-times his initial purchase price. To conceal the fraud, CHASTAIN conducted these purchases and sales using anonymous digital currency wallets and anonymous accounts on OpenSea.⁶⁶

The individual in question is charged with one count of wire fraud and one count of money laundering, each of which carries a maximum sentence of 20 years in prison.



Conclusions & Recommendations

Summary

Interest in NFTs has surged across 2021-22 and continues to rise as metaverse-related content develops. They are a technology that is here to stay – offering immersive new experiences throughout virtual worlds, online communities and royalties-based industries. However, as interests, applications and usage of NFTs rise, so will threat actors seeking to exploit and financially benefit from the vulnerabilities they offer.

As with many crimes, the perceived chances of NFT-based crime occurring is higher than it actually is. In the case of thefts, scams, rug pulls and money laundering considered in this report, this is very much evident – having inflicted a noticeable level of paranoia, cautiousness and fear across NFT communities. Elliptic's data-driven analysis has found that the true instances of these crimes account for a small proportion of NFT-related trade.

There is, however, room for criminals to increase the ingenuity of their methods, threatening to overturn these findings. Already, phishing scams are being increasingly complemented with sophisticated social media takeovers, phone scams, API exploitations, malicious airdrops and other more sinister activities. This has culminated in April 2022 – the most recent month tracked by this report – being the costliest on record in terms of number and value of NFTs stolen. The responsibility therefore lies on everyone engaging in the NFT space – regulators, marketplaces, project developers, NFT traders and influencers – to motivate safe and secure development of this technology.



Using Elliptic's Transaction Monitoring, Wallet Screening & Blockchain Forensics Tools to Combat NFT-based Financial Crime

Elliptic's wallet screening tool Lens and transaction monitoring tool Navigator can be used to check the exposure of blockchain actors to various different types of NFT-based financial crime risk. These include tracing funds originating from NFT scams or phishing, obfuscators, sanctioned entities and other types of illicit activity (including but not limited to dark web marketplaces, terrorism, CSAM and ransomware). NFT-based platforms and services will therefore be able to utilize our services to ensure they are not processing high-risk transactions or inadvertently facilitating the laundering of illicitly obtained assets.

Elliptic Investigator further allows our clients to visualize incoming blockchain transactions – particularly based on their exposure to risk. Investigator integrates our wallet screening tool Lens to provide clients a quick way of plotting the source and destination of funds of a particular wallet of interest – allowing seamless and effective investigations into suspected NFT-related illicit activity.

You can visit our site www.elliptic.co for more information about our tools and to contact us for a demo.



KEY CONTROLS:

Recommendations for NFT Marketplaces & Cryptoasset Exchanges

- Maintain compliance with sanctions by using blockchain analytics to screen for potential interactions with sanctioned addresses.
- Maintain co-operation between marketplaces, blockchain analytics companies and cryptoasset exchanges to effectively share details of wallets involved with NFT-based illicit activity.
- Block stolen assets or scammer accounts as soon as a credible scam report is received.
- Create a public blocklist of all NFTs and accounts involved with illicit activity.
- Ensure that your customer support and scam reporting policies are clear and effective.
- Regularly check for any data breaches or sale of users' data online.
- Ensure all smart contracts used (including of listed NFTs) are audited.
- Monitor for clear theft behavior – for example, the sudden transfer of a user's assets to a single wallet, followed by their immediate sale for below the floor price.
- Check NFTs being minted on your platform to ensure that they are genuine.
- Consider avoiding the use of links in your emails or communications to users whenever possible and advise clearly that this is your policy.
- Encourage multi-factor authentication on all your registered user accounts to prevent malicious access of accounts.

Recommendations for regulators

- Apply concepts derived from the traditional art and securities regulatory worlds to NFTs, so as to promote predictability and consistency.
- Require centralized third-party intermediaries dealing in NFTs to implement adequate AML and KYC programs.
- Provide ongoing advisory guidance in order to clarify regulatory expectations based on new technological developments.
- Promote innovation by tailoring regulatory guidance to address relevant financial crime risks without inhibiting market development.
- Work with supranational coordinating bodies to create an internationally consistent NFT regulatory regime.
- Clarify the applicability of tests and standards used to determine the regulatory status of an NFT (is it a security, artwork, or something else entirely?).
- Partner with industry participants to develop technologically appropriate controls, to prevent illicit activity such as money laundering and sanctions evasion.

Recommendations for NFT traders

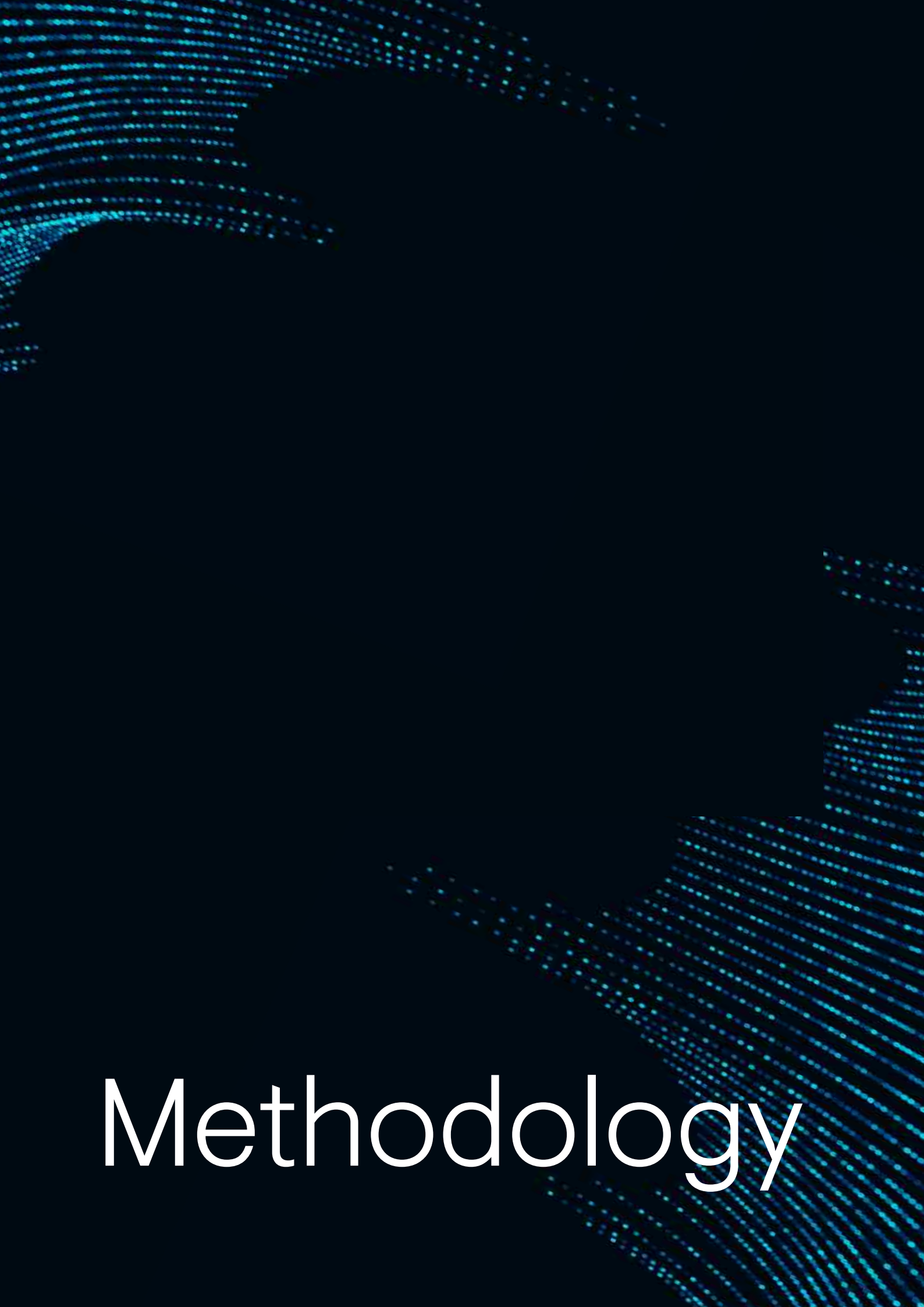
- Use a hardware/cold wallet to store your NFTs.
- Do your own research about a project and its genuinity before investing.
- Do not simply trust any unsolicited direct messages inviting you to participate in a project.
- Check and re-check URLs of NFT-related projects or services to ensure that they are that of the genuine website.
- Ensure that any swaps you initiate occur with individuals who actually own the NFTs they claim to be trading with you. This can be done through checking the user's wallet contents on their profile on an NFT marketplace or a block explorer.
- Do not trust vague or clearly plagiarized roadmaps.
- Do not fall victim to "fear of missing out" - FOMO.
- Always be aware of the customer support policies of NFT marketplaces and only contact them in the way that is advised.
- Enable two-factor authentication and never give your one-time passcode, passwords or private keys to anyone.
- Refrain from interacting with any unexpected airdropped NFTs, especially if they lead to a pop-up or a site that encourages you to connect your wallet to redeem them.
- Do not accept unsolicited invites to Discord servers.
- Do not trust Twitter bots or over-aggressive shilling.
- Remember that celebrity promotions do not mean that it is a legitimate project.

Recommendations for NFT influencers

- Do your own research before promoting any NFT project.
- Advertise transparently any paid partnerships you have with projects you promote.
- Call out and report to your relevant police/financial authority anyone attempting to extort you or colleagues with a threat of manipulating demand or floor prices.
- Encourage caution to your followers in terms of interacting with unsolicited direct messages, dubious URLs or projects inciting "FOMO".
- Check your local laws on what you can and can't promote regarding NFTs.
- Ensure your social media accounts have multi-factor authentication enabled.
- Be extremely cautious of unsolicited messages via email or other forms of contact you have open for collaborators.
- Never have any wallet login-related information (including QR codes) anywhere on your screen while you are streaming.
- Remember that celebrity promotions do not mean that it is a legitimate project.

Recommendations for Project Developers

- If you can, be transparent about your identity, credentials and involvement with past projects (e.g. public link to your CV, and to your GitHub page). If you prefer to remain anonymous, try to be clear about why.
- Ensure all links and Discord invite URLs are constantly up to date on all social media.
- Look out for and alert your followers as soon as possible if a scam campaign is impersonating your project or targeting your community.
- Frequently post updates as you continue to progress on your roadmap.
- Develop an effective customer support and scam reporting mechanism.
- Audit all external tools and bots you use (e.g. for Discord) and keep them up to date.
- Use multi-factor authentication on all your admin accounts and social media.
- Refrain from aggressive shilling, unsolicited airdrops or use of Twitter bots.
- Register domains that are similar to your official website if possible (e.g. .io, .com, .co, etc) so that phishing attempts cannot use them.
- Ensure any smart contracts you use are audited or follow a well respected standard.
- Do not plagiarize other projects.
- Actively deploy team members to detect, follow up on and take down phishing attempts and scammers.



Methodology

Thefts & Scams

NFT theft and scam data was collected through open-source research over social media sites. To be included in the figures present in chapter 1, an NFT must have been:

1. Reported stolen by its owner or a known associate on social media.
2. Clearly show a pattern of theft based on Ethereum transactions:
 - a. Successive transfers of all NFTs from a single victimized wallet to another address, typically without a username, or
 - b. Successive sales of NFTs directly from a victimized wallet – typically for amounts below the floor price – followed by a transfer of the accumulated ETH to another address.
3. Be stolen through transactions occurring between July 1st 2021 and July 31st 2022.

NFTs being marked as blocked or stolen on marketplaces is not necessarily indicative of stolen assets. This is therefore not used as a sole determinant of thefts in themselves – but such flags can corroborate external reports of theft.

To calculate the price of stolen assets, the average price of that NFT collection at the time of theft is considered. This figure is corroborated across a number of sources and was not available for all assets – particularly lower priced ones or one-off NFTs not part of any collection. These prices also do not account for the rarity of the specific NFTs that were stolen.

All the identified scammer wallets have been labeled in Elliptic’s wallet and transaction screening tools and can be traced by our clients.



All data analysis of thefts and scams occurred before the sanctioning of Tornado Cash by the US Treasury on 8th August 2022. Tornado Cash therefore falls under the designation of a mixer’ for all data analysis.

Money Laundering

Illicit Flow to NFT Platforms

Using Elliptic Navigator, we assessed illicit financial flows by screening 17 million incoming transactions to NFT platforms. All transactions occur on the Ethereum blockchain between the last quarter of 2017 and first quarter of 2022 (inclusive). The NFT platforms analyzed for this report included 22 NFT marketplaces, four NFT-based games or metaverse platforms and two NFT swap services. Elliptic Navigator identified the breakdown of licit, obfuscating, and illicit exposure of each analyzed transaction, as well as the portion of it that is “unknown” because these wallets are not labeled on our tools.

NFT-based Money Laundering

We assessed NFT-based money laundering of 60,000 wallet addresses using Elliptic Lens. The tool offers the risk exposure of all incoming and outgoing values of an address.

The 60,000 selected addresses have sold, bought, or transferred at least one NFT in the top NFT collections at the time of analysis. The addresses may: (i) trade with more than one NFT collection, (ii) trade with other less major NFT collections, and (iii) perform other transfers in the Ethereum blockchain. Collected data are then parsed and aggregated results by category are considered for the purposes of the report.

Limitations and Considerations

Data collection took place between March and April 2022 and its results reflect the coverage at that time. Exposure – and consequently our results – will change over time as new labels are introduced in our products.

Our analysis has not encompassed all aspects of financial crime. Specifically, we have mentioned but have not attempted to quantify NFT-based tax evasion or market manipulation.



All data analysis of thefts and scams occurred before the sanctioning of Tornado Cash by the US Treasury on 8th August 2022. Tornado Cash therefore falls under the designation of a mixer’ for all data analysis.

Glossary



Address

A cryptoasset address is a unique identifier that serves as a virtual location where a cryptoasset can be sent. The address can be freely shared with others to facilitate transactions.

Airdrop

An airdrop is where a project will give tokens – most often directly related to the project – to members in the community in order to entice them to use the project’s product/service. The amount of tokens someone receives may be proportional to their other activity on the project or the same number for all.

Blockchain

A blockchain is the transaction database shared by all nodes participating in a specific cryptoasset network. A full copy of a network’s blockchain contains every transaction ever executed in the asset. It was first introduced in the Bitcoin whitepaper published in October 2008 as the underlying protocol to allow truly peer-to-peer transactions.

Coin swap service

A usually non-transparent online service that allows users to swap their cryptoassets without verifying their identity or opening an account. Many of these services are typically based in Russia or Iran.

Cryptoasset

A cryptoasset is a digital asset that is secured with cryptography and where transactions are distributed and validated by a decentralized set of participants, and recorded on a public ledger known as a blockchain.

Cryptocurrency

The term “cryptocurrency” can be used as an umbrella term for virtual forms of money, but is generally used when talking about assets which are supported by a blockchain like Bitcoin (BTC). Cryptocurrencies are not issued or controlled by any government or other central authority. They exist on peer-to-peer networks of computers running free, open-source software. Generally, anyone who wants to participate by owning, sending or spending can do so. The term “crypto” is often used when speaking and writing.

Dark Market

Dark markets are marketplaces available on the dark web which allow users to sell a range of goods and services. However due to the largely anonymous nature of the dark web, many of the items for sale are illicit.

Decentralized

Where no central counterparty has unilateral control of a system and consensus across participants is required to effect changes.

Decentralized Finance (DeFi)

Decentralized Finance (DeFi) is a peer-to-peer, decentralized, censorship-resistant financial system. Common DeFi applications include crypto wallets, lending, borrowing, spot trading, margin trading, interest-earning, market-making, derivatives, options and more.

Digital Land

A virtual representation of real estate in the metaverse. This can be undeveloped or built on, and it’s possible to own a single piece of land, multiple pieces of land or a group of land together.

Discord

A secure mobile and web based messaging platform with end-to-end encryption.

Ethereum

The Ethereum blockchain is a network with the ambition of being a decentralized world computer. As such, it offers a more function rich protocol than the Bitcoin blockchain and allows users to transfer the native asset Ether (ETH) as well as creating smart contracts and tokens, or creating more complex decentralized applications (DApps). Ethereum was launched in 2015 and its co-creator Vitalik Buterin is a well known individual in the blockchain world – often speaking at conferences and being active in the space.

ERC20

ERC-20 is a technical standard for the implementation of tokens on the Ethereum blockchain, although it has also been adopted by other compatible blockchains. The rules within the standard include how tokens are transferred between addresses and how data within each token is accessed. Tether (USDT) is a well-known example of an ERC-20 token and many more can be tracked online.

Flash Loan

A flash loan is a means of borrowing funds – typically used for arbitrage – that must be repaid within the same block. However, there have been recent examples where flash loans have been used nefariously to steal funds and exploit smart contracts.

Giveaway Scam

A type of scam where the bad actor pretends that they will send cryptoassets to anyone who sends a small amount to them. The offer is usually that the person will receive a multiple of the amount they send.

Initial Coin Offering (ICO)

A fundraising technique popular in 2017 and 2018 where cryptocurrency projects raised money by selling tokens relating to their project.

Know Your Customer

Know-your-customer (KYC) standards help protect the financial services industry against fraud, money laundering, corruption and terrorist financing. They involve the checking and verifying of a client's identity both at the onboarding stage and as part of continuing obligations.

LooksRare

A marketplace selling non-fungible tokens.

Malware

Malicious software which bad actors will look to deploy onto a target's computer with the aim of stealing sensitive information.

Metamask

A popular in-browser crypto wallet where cryptoassets can be sent, received and stored. For many crypto applications and services, users must connect via their metamask to access the functionality.

Minting Contract

The smart contract which creates new tokens, fungible or non-fungible, for a project.

Non-Fungible Tokens (ERC721/ERC1155)

A non-fungible token (NFT) is a kind of cryptoasset that records ownership of a digital item and unlike cryptoassets such as Ether (ETH) and Bitcoin (BTC), is not mutually interchangeable. Each NFT is a unique asset in the digital world and can be bought and sold like any other item.

NFT Collection

A set of NFTs minted using the same smart contracts. Over time, the smart contract of reference of an NFT collection may change due to improvements or changes in the protocol.

NFT Marketplace

A marketplace where users can buy, sell and browse non-fungible tokens.

Office of Foreign Assets Control (OFAC)

The Office of Foreign Assets Control (OFAC) of the US Department of the Treasury administers and enforces economic and trade sanctions based on US foreign policy and national security goals against targeted foreign countries and regimes, terrorists, international narcotics traffickers, those engaged in activities related to the proliferation of weapons of mass destruction, and other threats to the national security, foreign policy or economy of the United States.

OpenSea

The leading marketplace selling non-fungible tokens.

Phishing

Where illicit actors will send emails pretending to be from recognized companies or senders in the hope of tracking the recipient to share personal or sensitive information.

Profile Picture Projects (PFPs)

A collection of non-fungible tokens – often 10,000 – where each avatar has a combination of unique attributes. These images are usually from the shoulders up and usually resemble humans or animals. Owners use these as their profile picture on social media platforms for cultural kudos.

Rug Pull

Where a project will raise capital and then disappear with the money before delivering any roadmap promises.

Shilling

Act of promoting a project without disclosing that their promotions are paid for.

Smart Contract

A smart contract is a computer program or a transaction protocol which is intended to automatically execute, control or document legally relevant events and actions according to the terms of a contract or an agreement. It was initially conceived by Nick Szabo in 1998 and later implemented on blockchains such as

Ethereum.

Token

The term token refers to a programmable unit of value which is recorded and transferred on a blockchain. However, it is distinct from the native asset which is the cryptocurrency created by the protocol and used to pay fees, created as a block subsidy or used in the consensus protocol. The most popular token standard is ERC-20 on the Ethereum blockchain. Tether (USDT) is an example of a token on the Ethereum blockchain. Ether (ETH) is the native asset of Ethereum.

Wallet

A wallet is a collection of cryptoasset addresses and the corresponding private keys. They allow cryptoassets to be stored, keeping them safe and accessible. They also allow you to send, receive, and spend cryptoassets. Wallets can be self-hosted (where you retain control of the private keys) or hosted (where a custodian stores the private keys on your behalf).

Wearables

Wearables are clothing and accessories for avatars in the metaverse.

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About Elliptic

Elliptic is the global leader in cryptoasset risk management for crypto businesses and financial institutions worldwide. Recognized as a WEF Technology Pioneer and backed by investors including Evolution Equity Partners, SoftBank Vision Fund 2 and Wells Fargo Strategic Capital, Elliptic has assessed risk on transactions worth several trillion dollars, uncovering activities related to money laundering, terrorist fundraising, fraud, and other financial crimes. Elliptic is headquartered in London with offices in New York, Singapore, and Tokyo. To learn more, visit www.elliptic.co and follow us on [LinkedIn](#) and [Twitter](#).

Bad actors continue to find new ways to support their criminal activities. Between editions of this report you will find the latest insights and trends around money laundering and terrorist financing using cryptoassets in the metaverse on

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