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Non-fungible Content

NFTs and Content Management

Josh Anderson
June 2, 2022

Who I Am

- Not a shill; unaffiliated with any NFT or crypto projects
- Involved with crypto since 2014
- Associate Information Architect at Precision Content
- Master of Information from the University of Toronto

Agenda

- What are NFTs?
- Buying and selling NFTs
- Publishing NFT content
- IPFS and a new (old) paradigm for content
- Getting started

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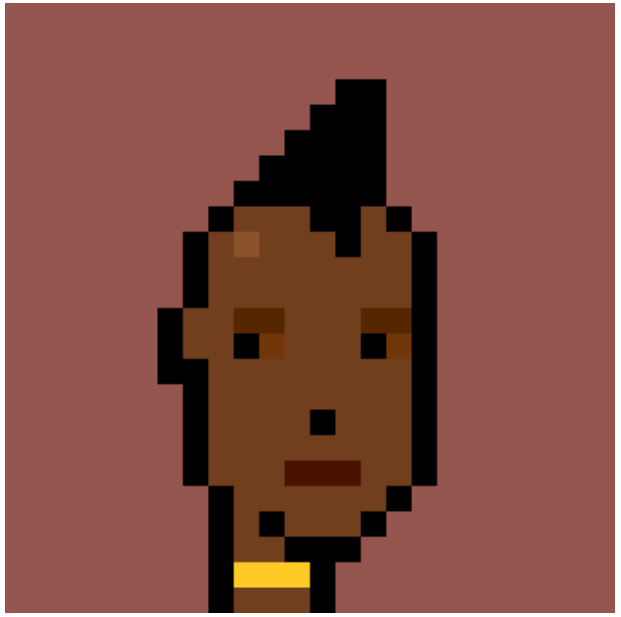
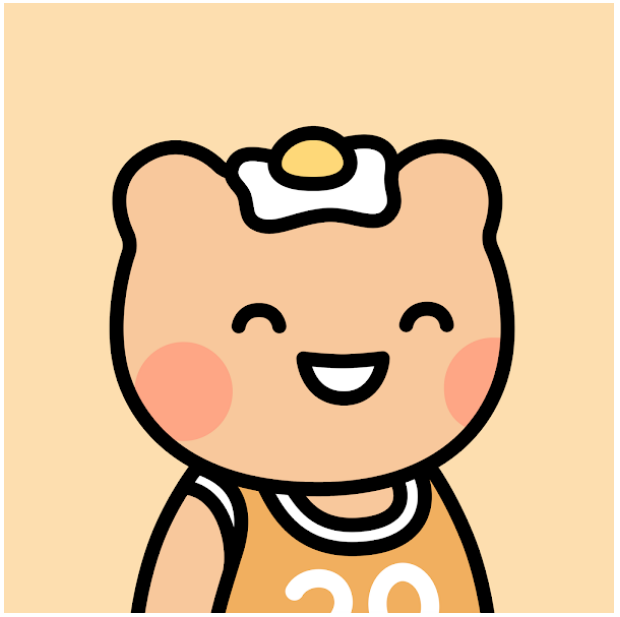
What are NFTs?

What is an NFT?

- Acronym for “non-fungible token”
- A unique and immutable token on a blockchain that references some data. This can be used to prove ownership of a digital asset.
- Common NFT asset classes include:
  - Digital art/collectibles
  - Name services
  - Gaming

Digital art/collectibles

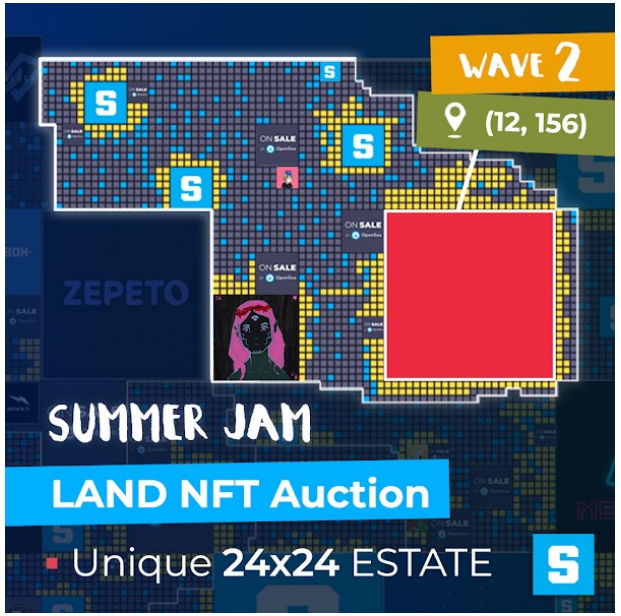





Sources: https://tinyurl.com/t7mkdwna, https://tinyurl.com/zck9ztsn, https://tinyurl.com/2p8nyzh2, https://tinyurl.com/3dbrc8jb

Name services

Sources: https://tinyurl.com/6ad8rm96, https://tinyurl.com/58ascbp9, https://tinyurl.com/2p8aupdr, https://tinyurl.com/2p8bv7y3

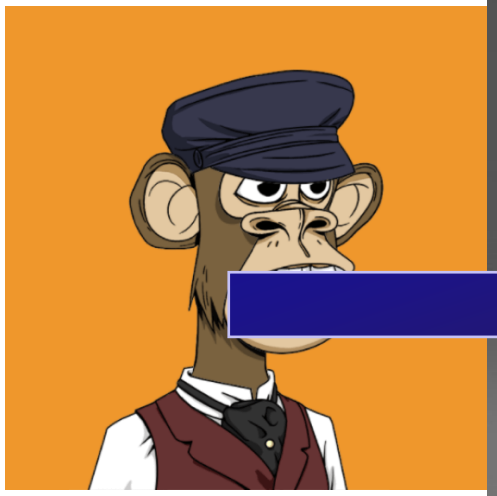
Gaming



Sources: https://tinyurl.com/2a27cj7x, https://tinyurl.com/2tbvv4au, https://tinyurl.com/d37yja5f, https://tinyurl.com/4d4k7bm4

The unbundling of media

- Smaller, nimbler IP enables creative reintegration - “Legos” of composable media.



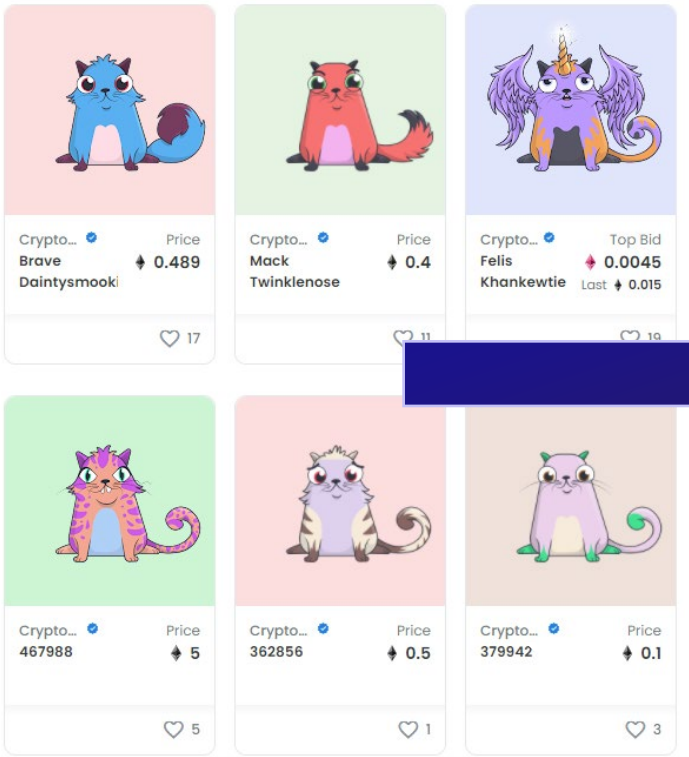
Bored Ape #1798

“Jenkins the Valet”

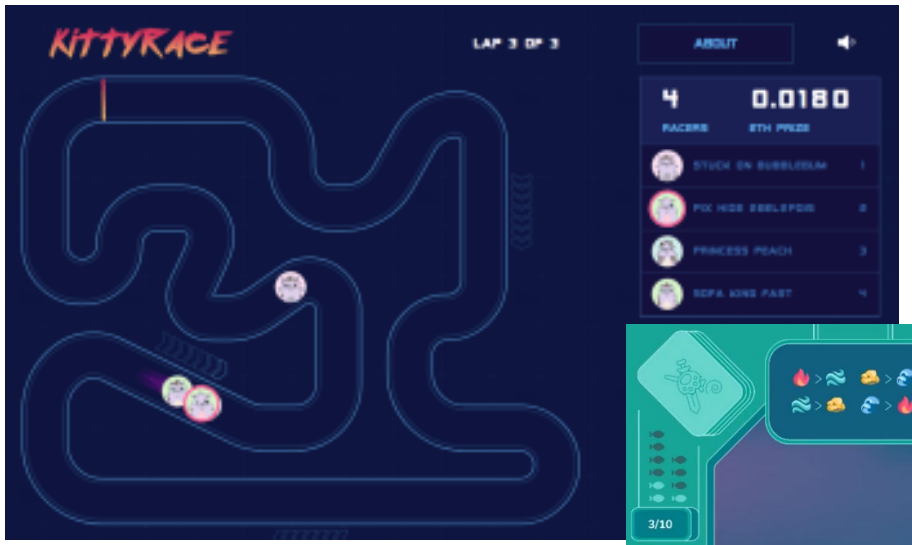
Sources: https://tinyurl.com/3wmuf8jn, https://tinyurl.com/yc7uv83f, https://tinyurl.com/mr4bmupn, https://tinyurl.com/3kmmcyme

The unbundling of media

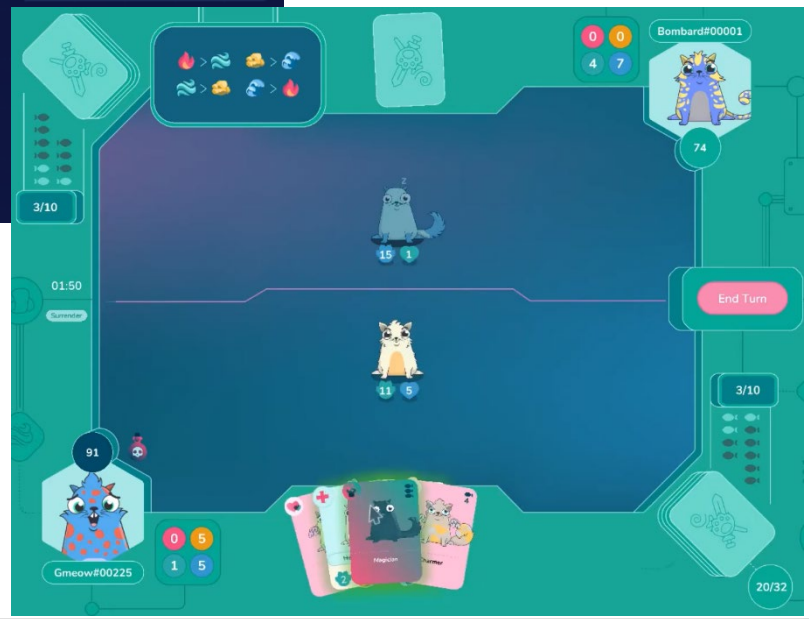
- Smaller, nimbler IP enables creative reintegration - “Legos” of composable media.



CryptoKitties



KittyVerse



Sources: https://tinyurl.com/4d2mpebu, https://tinyurl.com/2p98379p, https://tinyurl.com/2tdnrkuy, https://tinyurl.com/y84n3rx4

Creative NFT projects by writers

- *The Chaintale*
  - Buying the latest NFT in the series gives you the right to author the next installment
- *CPT-415*
  - Novel where each individual page is sold as an NFT
  - The next page of the novel becomes available when the previous page is sold
- *DECADE*
  - Avant-garde novel presented as a GIF of every page in order
  - Sold for 5 ETH ($7,569.50 USD at the time)

Sources: https://tinyurl.com/3jy47t77, https://tinyurl.com/43ay9zcd, https://tinyurl.com/3h9zv8u5

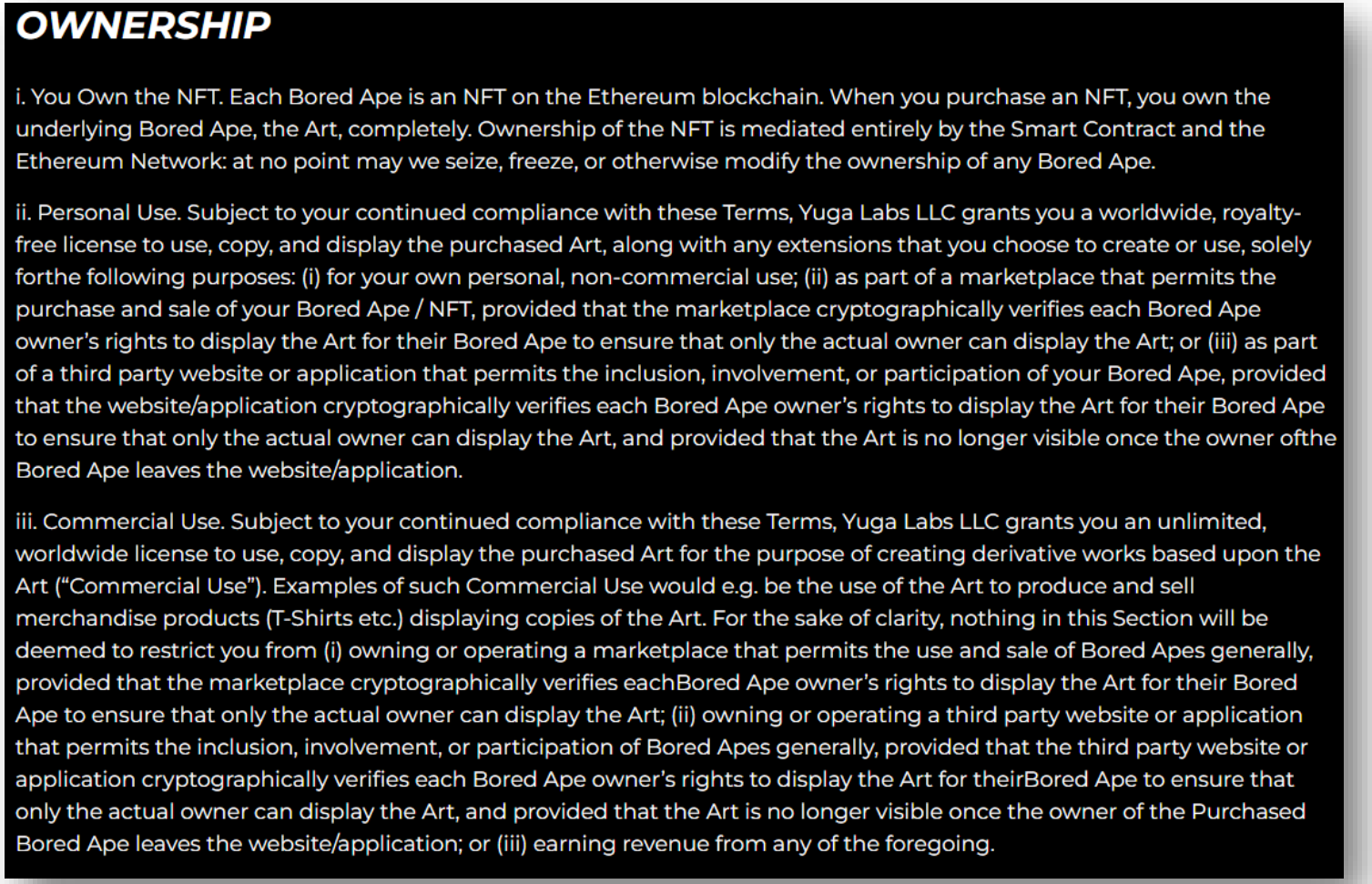
Ways content authors can make money with NFTs

- Sell work directly as NFT(s)
- Encode royalties into NFT
- Allow audience to invest in creators. Investors get dividends on published work.
- Sell subscription access keys as NFTs

Source: https://tinyurl.com/29p5wer9

Not all NFTs grant copyright

- NFT ownership does not necessarily indicate copyright ownership
- It's up to creators to clearly state their terms
- There's no guarantee they'll follow through on their promise



OWNERSHIP

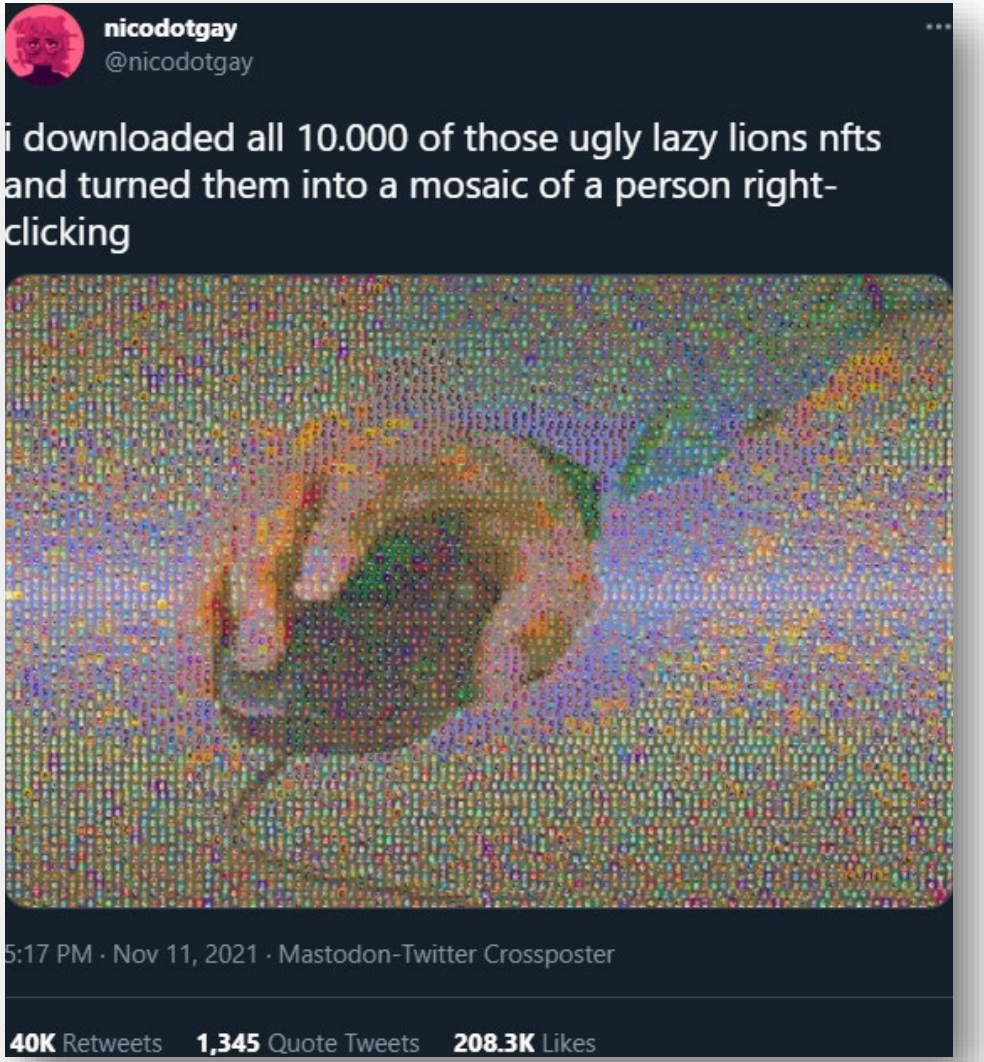
i. You Own the NFT. Each Bored Ape is an NFT on the Ethereum blockchain. When you purchase an NFT, you own the underlying Bored Ape, the Art, completely. Ownership of the NFT is mediated entirely by the Smart Contract and the Ethereum Network: at no point may we seize, freeze, or otherwise modify the ownership of any Bored Ape.

ii. Personal Use. Subject to your continued compliance with these Terms, Yuga Labs LLC grants you a worldwide, royalty-free license to use, copy, and display the purchased Art, along with any extensions that you choose to create or use, solely forthe following purposes: (i) for your own personal, non-commercial use; (ii) as part of a marketplace that permits the purchase and sale of your Bored Ape / NFT, provided that the marketplace cryptographically verifies each Bored Ape owner's rights to display the Art for their Bored Ape to ensure that only the actual owner can display the Art; or (iii) as part of a third party website or application that permits the inclusion, involvement, or participation of your Bored Ape, provided that the website/application cryptographically verifies each Bored Ape owner's rights to display the Art for their Bored Ape to ensure that only the actual owner can display the Art, and provided that the Art is no longer visible once the owner ofthe Bored Ape leaves the website/application.

iii. Commercial Use. Subject to your continued compliance with these Terms, Yuga Labs LLC grants you an unlimited, worldwide license to use, copy, and display the purchased Art for the purpose of creating derivative works based upon the Art ("Commercial Use"). Examples of such Commercial Use would e.g. be the use of the Art to produce and sell merchandise products (T-Shirts etc.) displaying copies of the Art. For the sake of clarity, nothing in this Section will be deemed to restrict you from (i) owning or operating a marketplace that permits the use and sale of Bored Apes generally, provided that the marketplace cryptographically verifies eachBored Ape owner's rights to display the Art for their Bored Ape to ensure that only the actual owner can display the Art; (ii) owning or operating a third party website or application that permits the inclusion, involvement, or participation of Bored Apes generally, provided that the third party website or application cryptographically verifies each Bored Ape owner's rights to display the Art for theirBored Ape to ensure that only the actual owner can display the Art, and provided that the Art is no longer visible once the owner of the Purchased Bored Ape leaves the website/application; or (iii) earning revenue from any of the foregoing.

Source: https://tinyurl.com/mr29e7px

“Right-clickers”



Sources: https://tinyurl.com/3fab2vnp, https://tinyurl.com/2vhbsv2x

Right-clickers miss the point

"**The more a file is shared and seen online, the more cultural value it accrues**. Consider the mass production of posters and t-shirts of Warhol imagery. With increase in notoriety, the concept of owning the canonical work becomes more thrilling, and more a marker of social status."

Jesse Walden, "NFTs Make the Internet Ownable"

Sources: https://tinyurl.com/pkysc8av, https://tinyurl.com/2tvwfyw4, https://tinyurl.com/ycxr5ahr, https://tinyurl.com/rrvjrt8j

NFTs = legitimacy

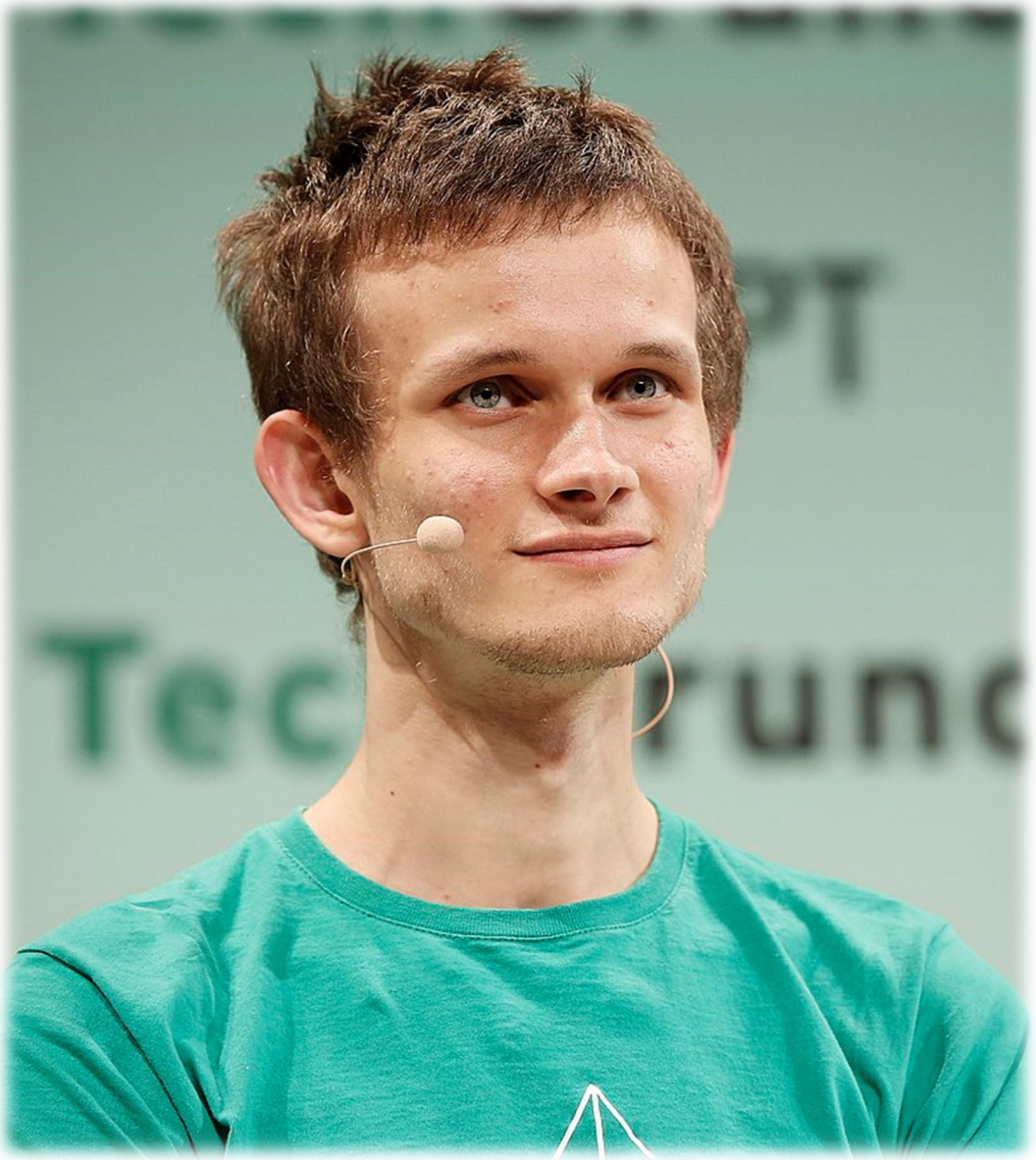
“Why is it that Elon Musk can sell an NFT of Elon Musk's tweet, but Jeff Bezos would have a much harder time doing the same?

“Elon and Jeff have the same level of ability to screenshot Elon's tweet and stick it into an NFT dapp, so what's the difference?

“To anyone who has even a basic intuitive understanding of human social psychology (or the fake art scene), the answer is obvious: Elon selling Elon's tweet is the real thing, and Jeff doing the same is not.

“Once again, millions of dollars of value are being controlled and allocated, not by individuals or cryptographic keys, but by **social conceptions of legitimacy**.”

Vitalik Buterin, “The Most Important Scarce Resource is Legitimacy”



Sources: Image from Wikipedia entry for Vitalik Buterin. (CC BY 2.0), https://tinyurl.com/bddfr2uc

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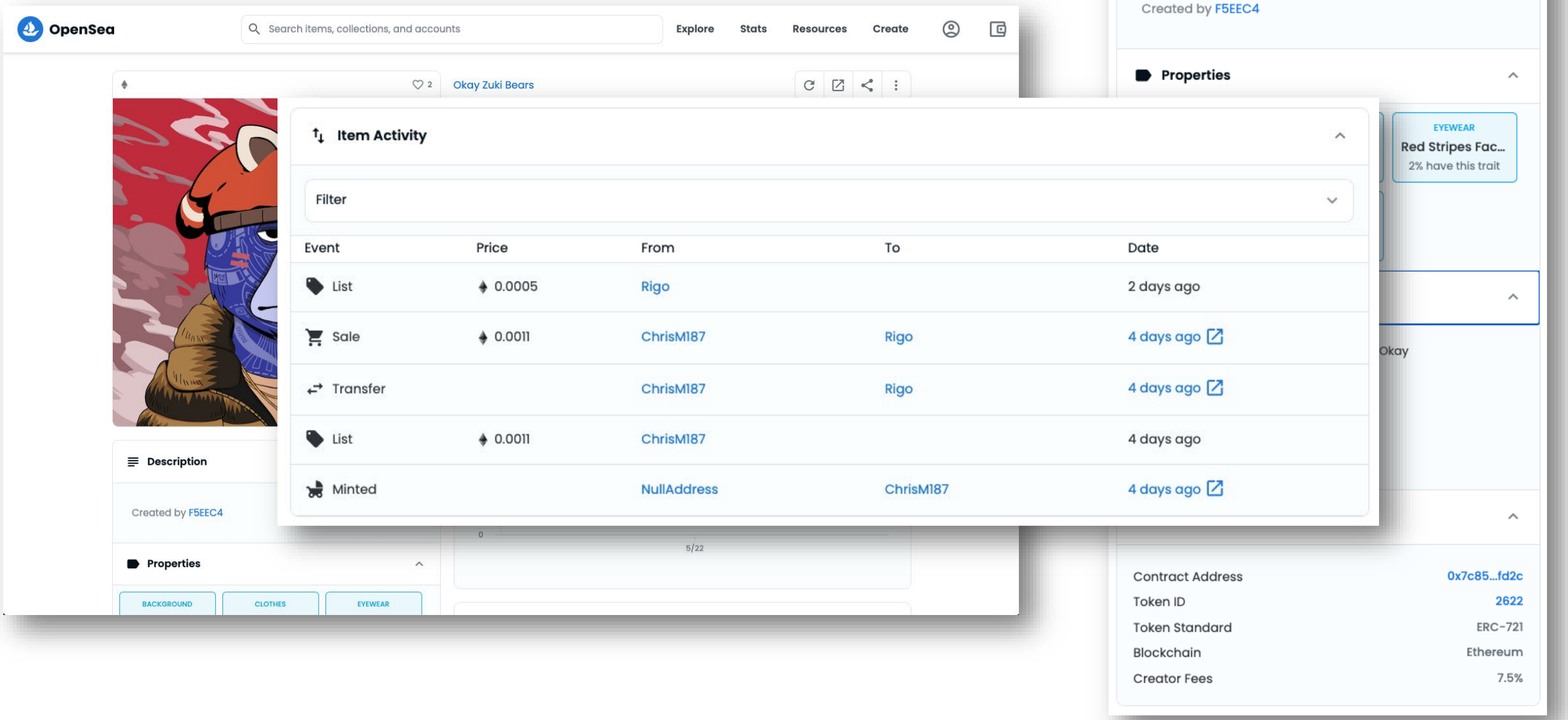
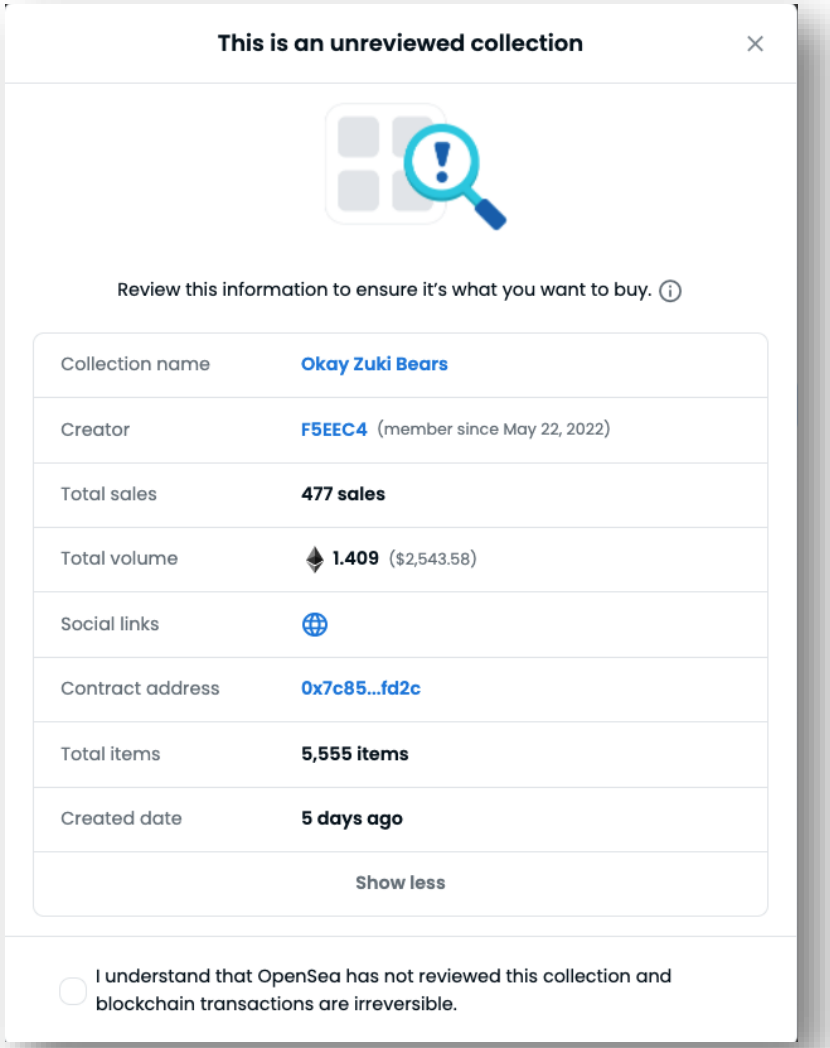
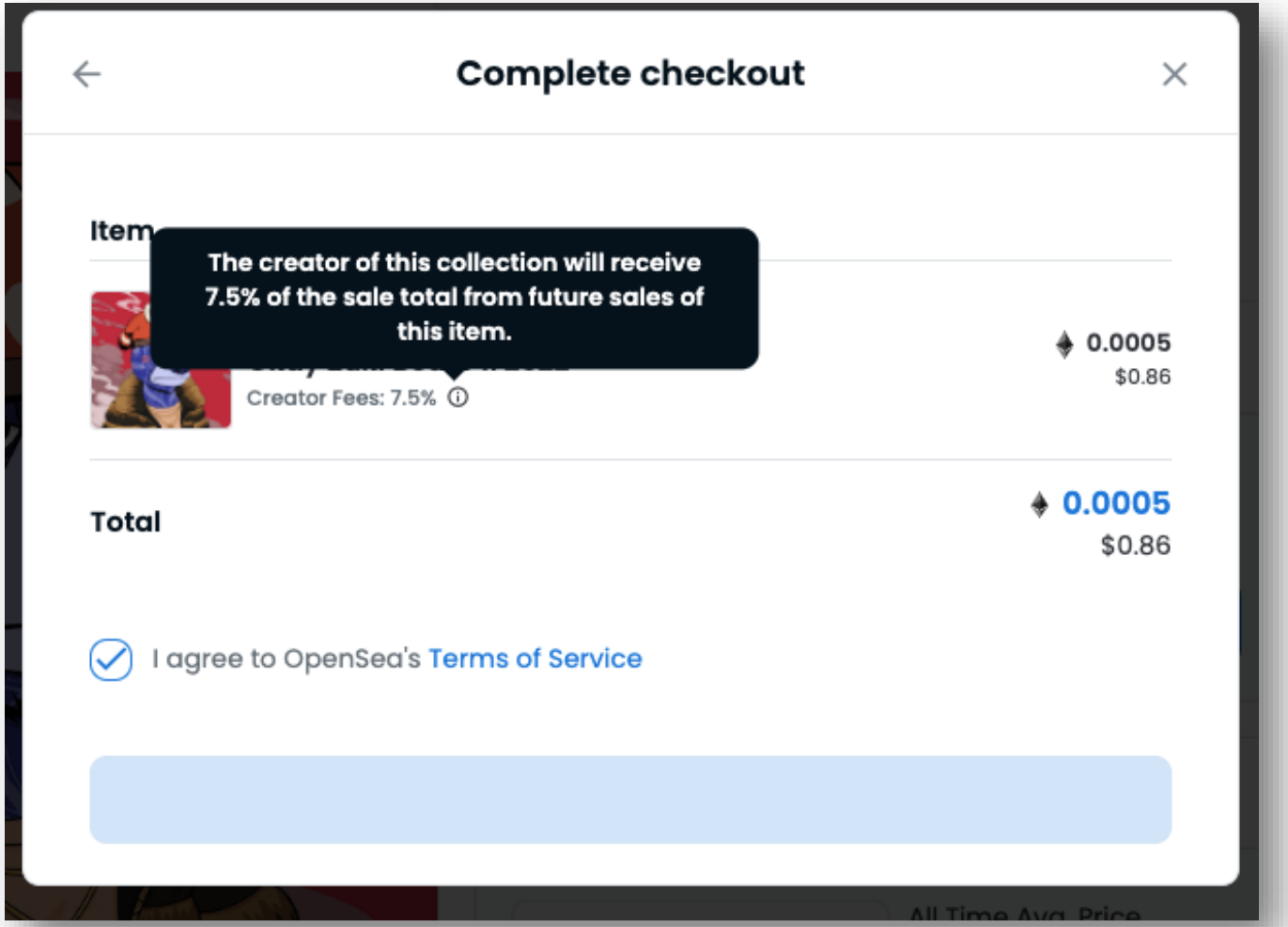
Buying and selling NFTs

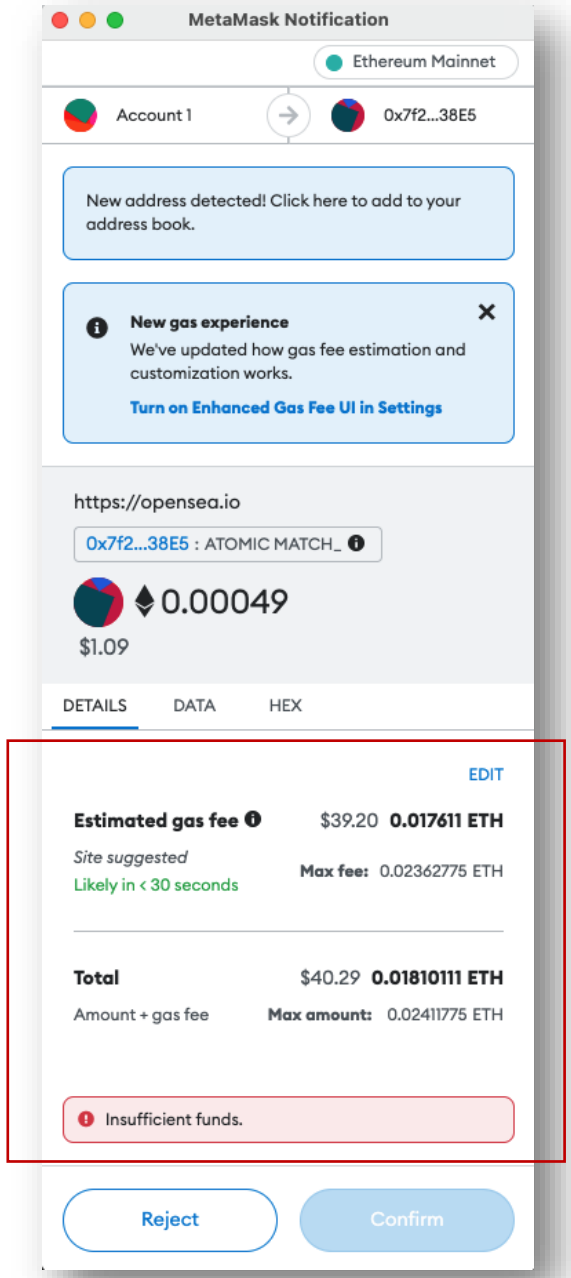
Buying an NFT

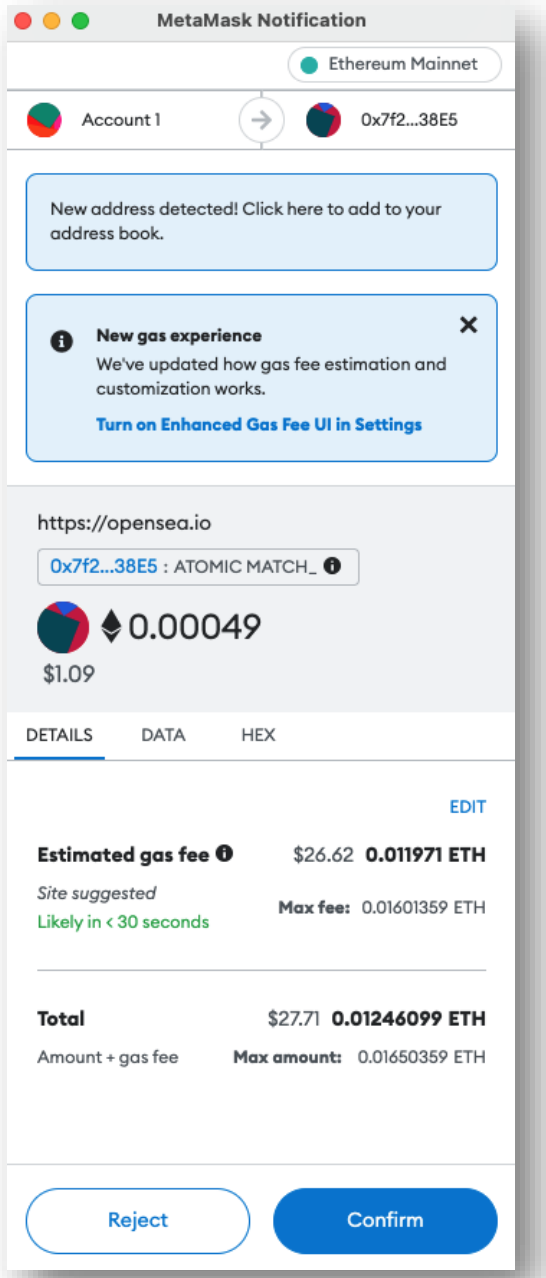


Buying an NFT

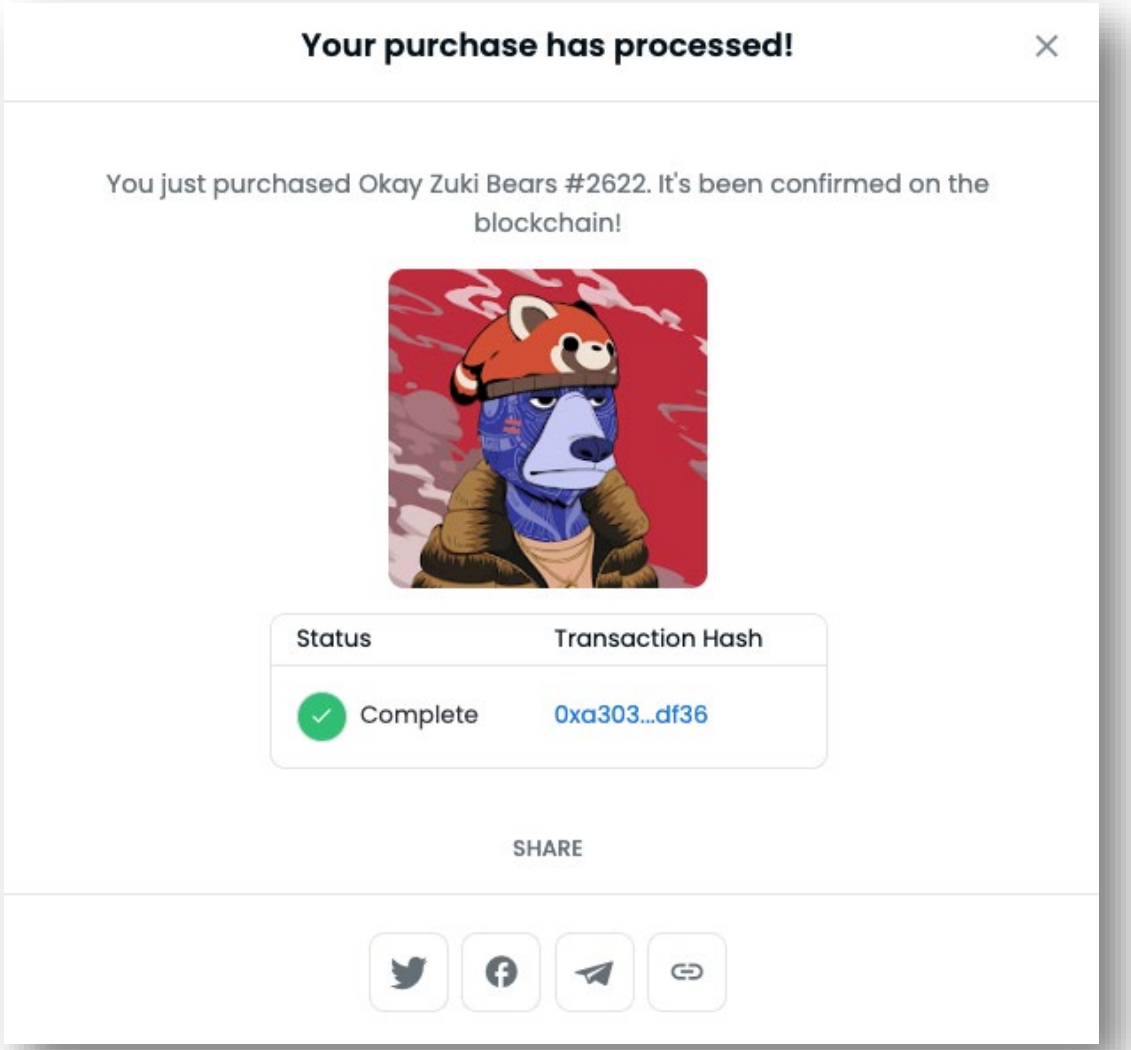





MetaMask Notification
Ethereum Mainnet
Account 1
0x7f2...38E5
New address detected! Click here to add to your address book.
New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings
https://opensea.io
0x7f2...38E5 : ATOMIC MATCH_
0.00049
$1.09
DETAILS
DATA
HEX
EDIT
Estimated gas fee
$39.20 0.017611 ETH
Site suggested
Likely in < 30 seconds
Max fee: 0.02362775 ETH
Total
$40.29 0.01810111 ETH
Amount + gas fee
Max amount: 0.02411775 ETH
Insufficient funds.
Reject
Confirm


MetaMask Notification
Ethereum Mainnet
Account 1
0x7f2...38E5
New address detected! Click here to add to your address book.
New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings
https://opensea.io
0x7f2...38E5 : ATOMIC MATCH_
0.00049
$1.09
DETAILS
DATA
HEX
EDIT
Estimated gas fee
$26.62 0.011971 ETH
Site suggested
Likely in < 30 seconds
Max fee: 0.01601359 ETH
Total
$27.71 0.01246099 ETH
Amount + gas fee
Max amount: 0.01650359 ETH
Reject
Confirm

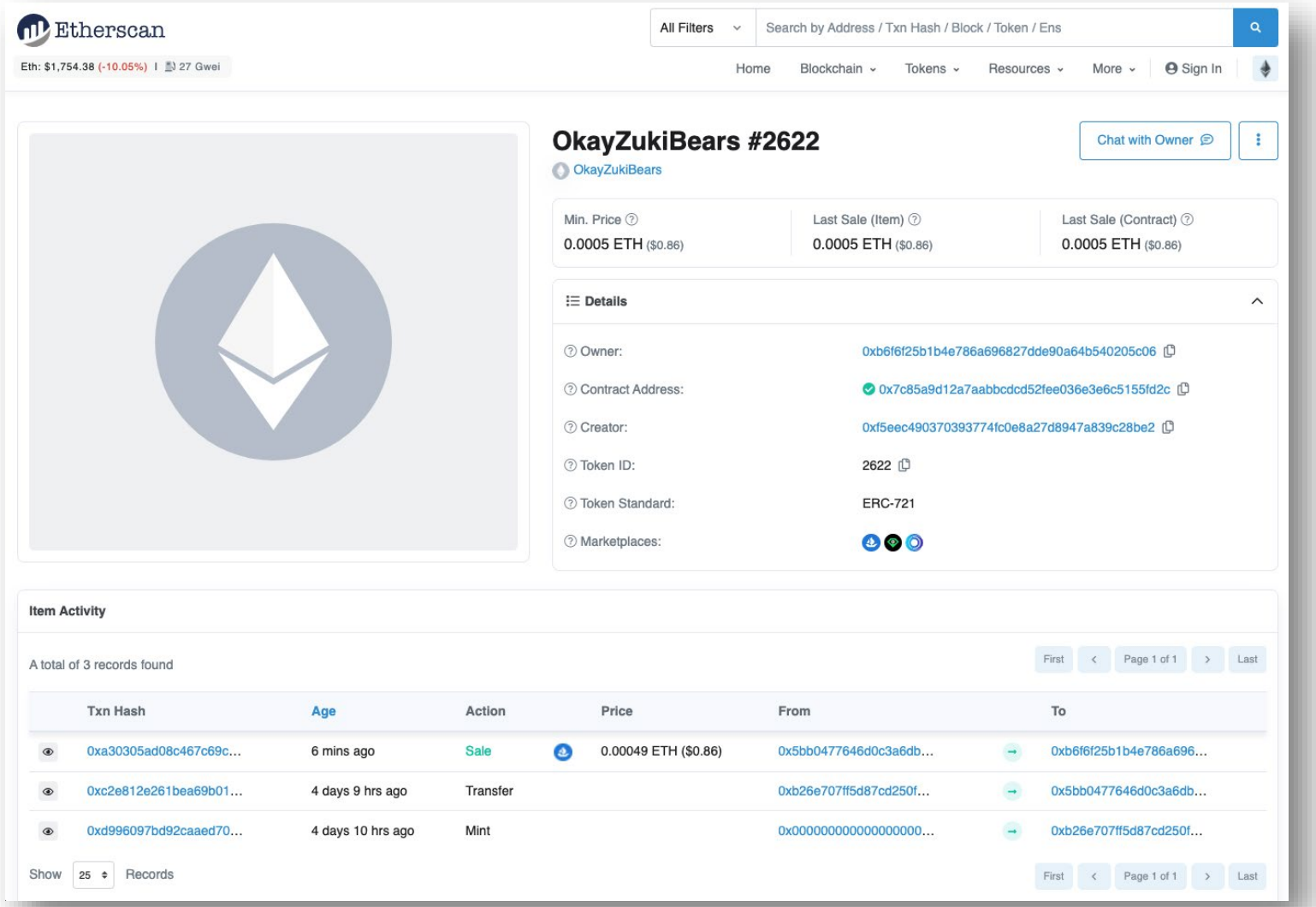
Buying an NFT



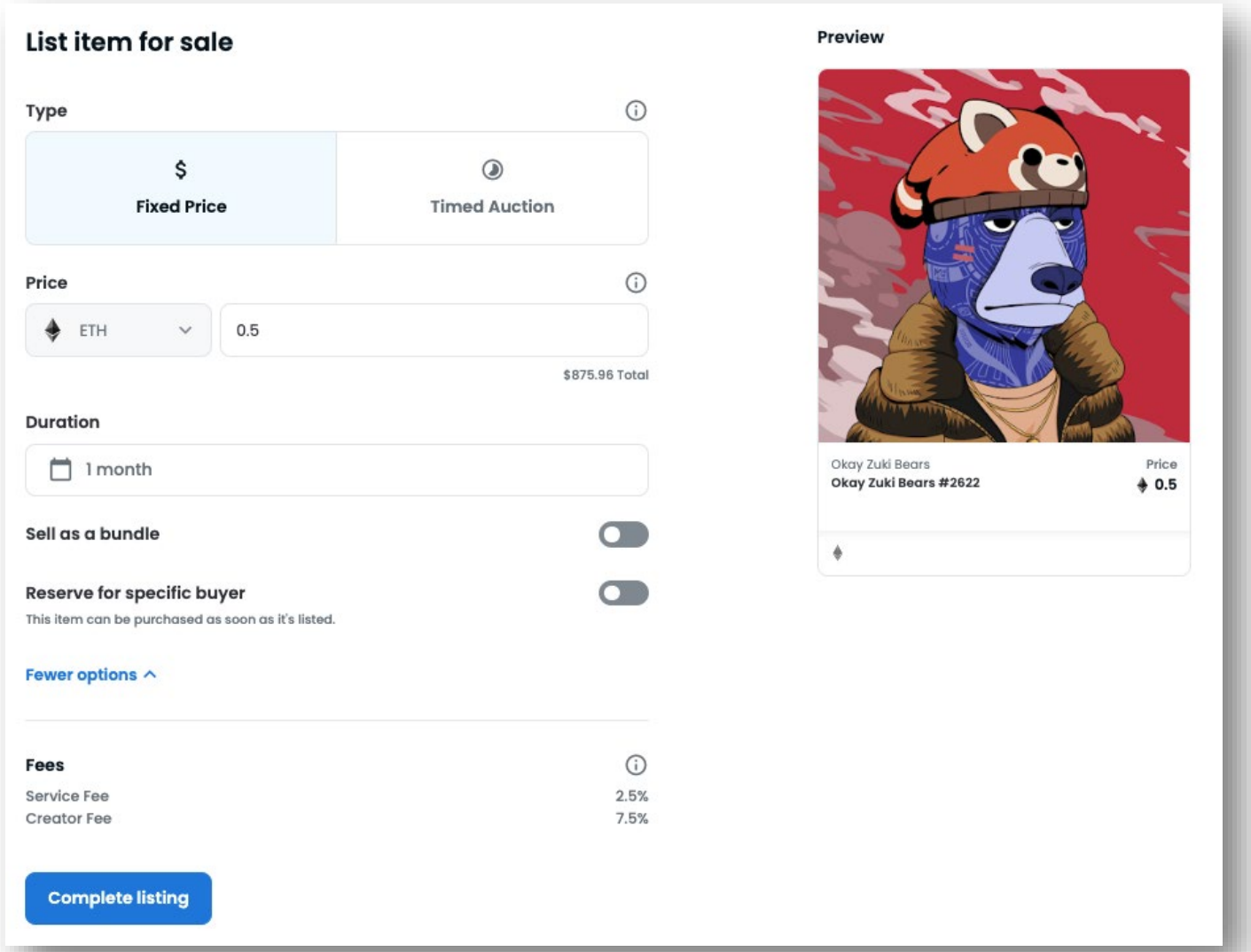
Buying an NFT

The record of ownership now permanently lives on the Ethereum blockchain:

https://etherscan.io/nft/0x7c85a9d12a7aabbcdcd52fee036e3e6c5155fd2c/2622



Selling an NFT



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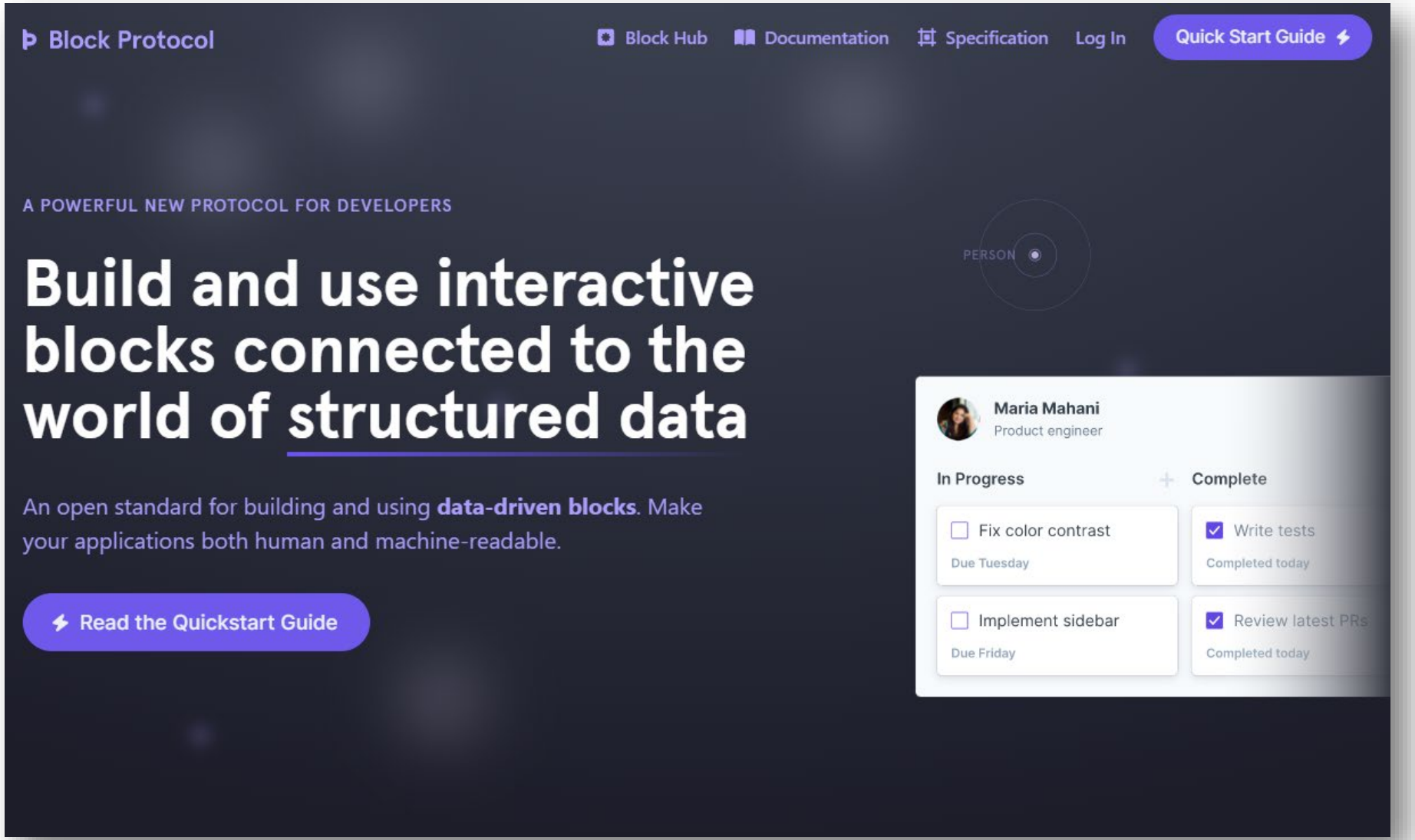
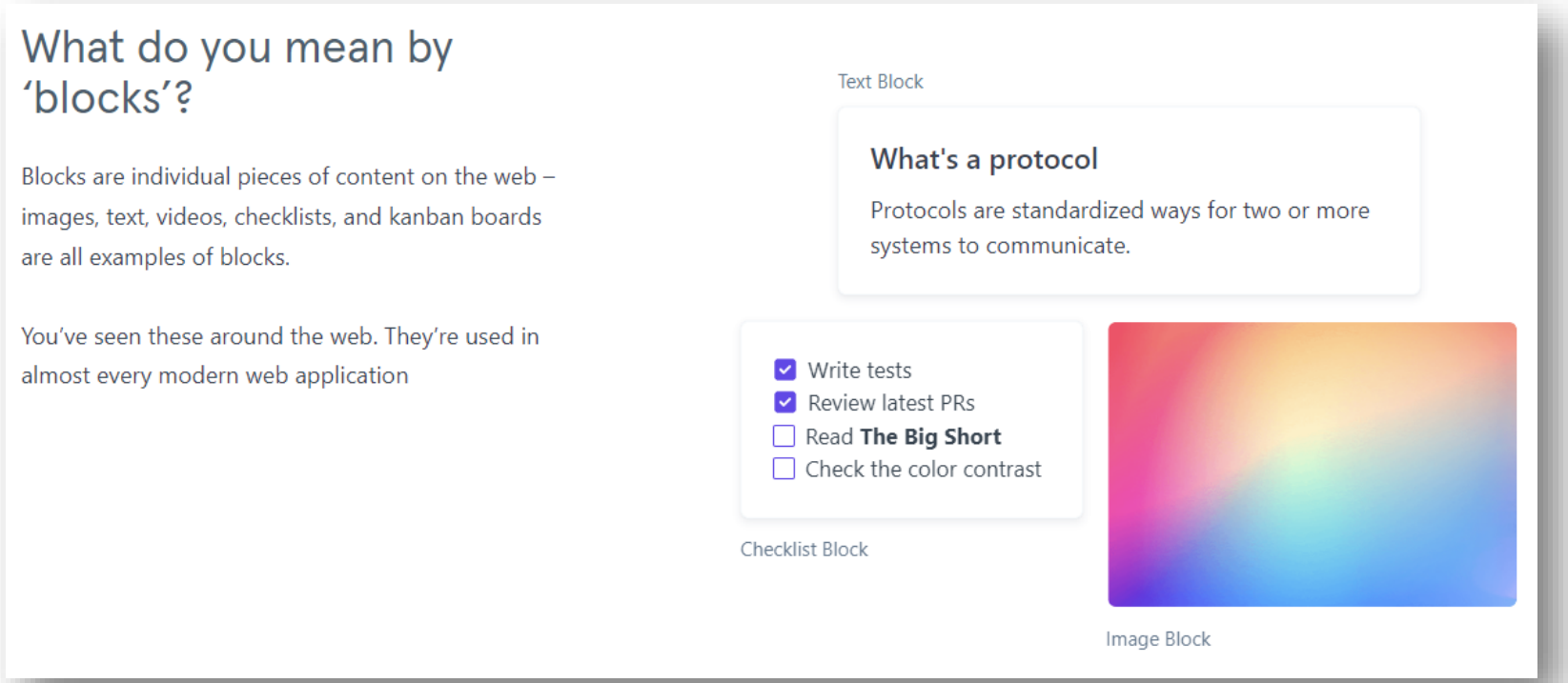
Publishing NFT content

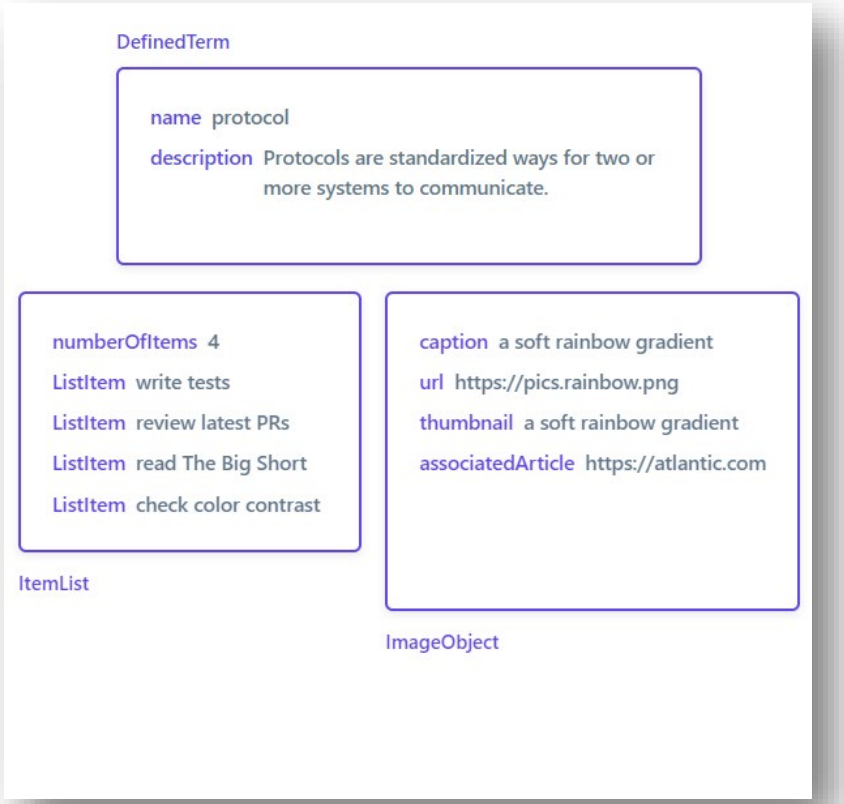
Block Protocol



Source: https://blockprotocol.org

Block Protocol

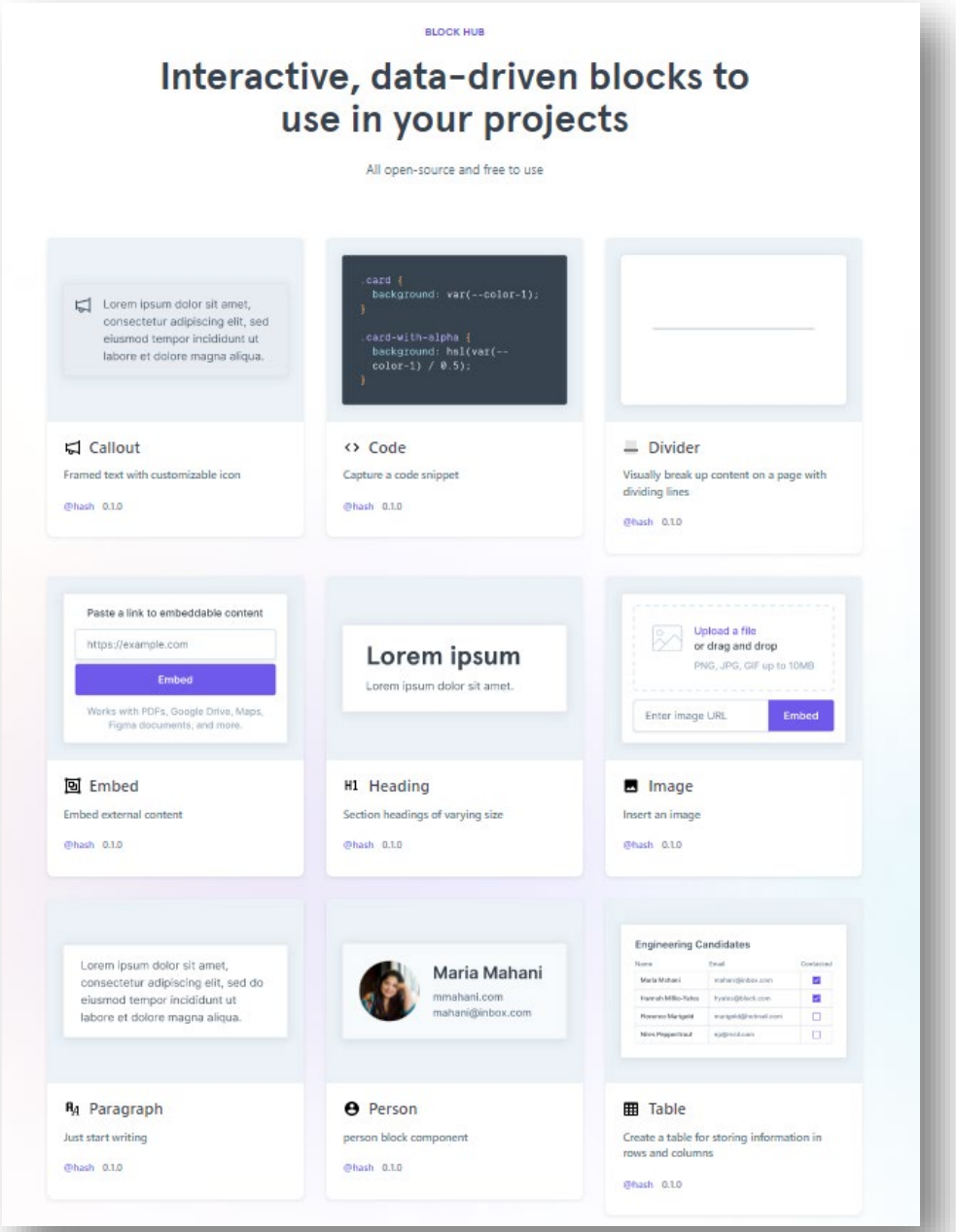




Source: https://blockprotocol.org

Block Protocol

- The Block Protocol is a new, in-progress protocol supported by the company Hash.ai
- It is easy to imagine a block that embeds NFTs
- Eventually entire websites may be cobbled together from a series of blocks



Source: https://blockprotocol.org/hub, https://hash.ai/

NFT Embeds

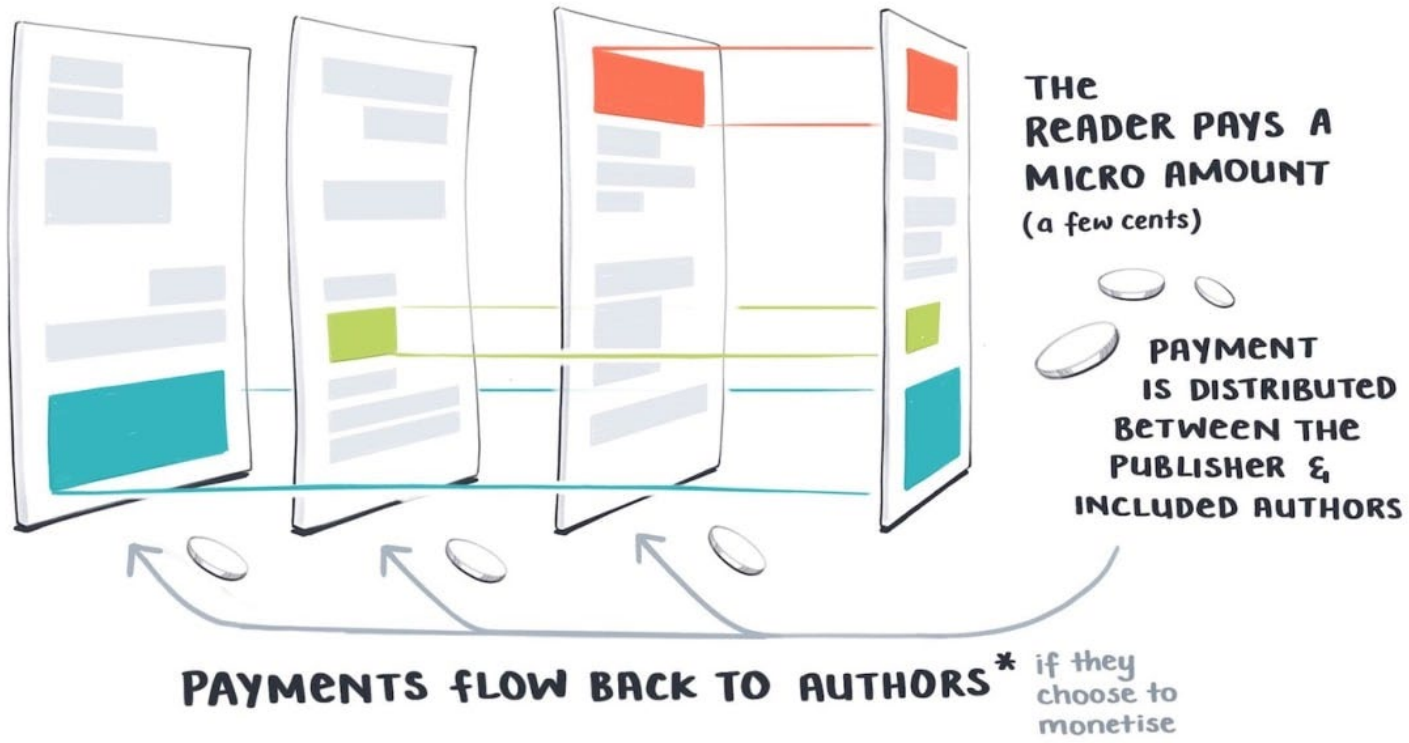


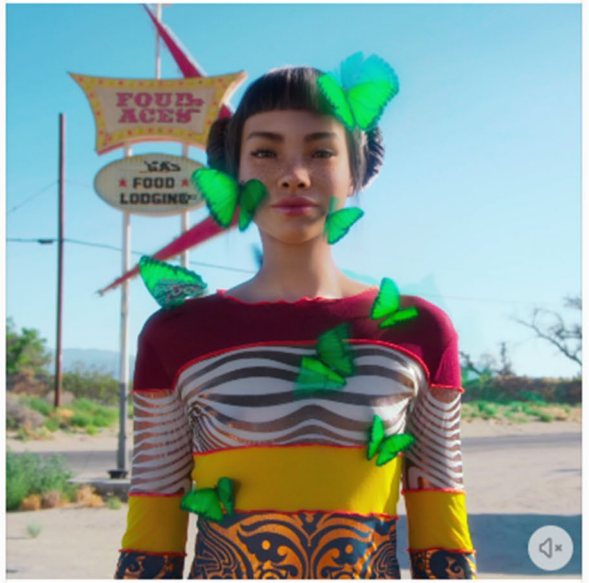
Illustration of transclusion/transcopyright by Maggie Appleton

NFT Embeds

Embed an NFT by creating a link. Prefix the URL with the `ethereum://` protocol, followed by the `address/id`. Currently supports a images, audio, video, and text embeds. Mirror currently supports EthBlock.art, Foundation, Rarible, SuperRare and Zora.

```
[NFT Example](ethereum://0xb932a70a57673d89f4acffbe830e8ed7f75fb9e0/16297)
```

lilmiquela NFT



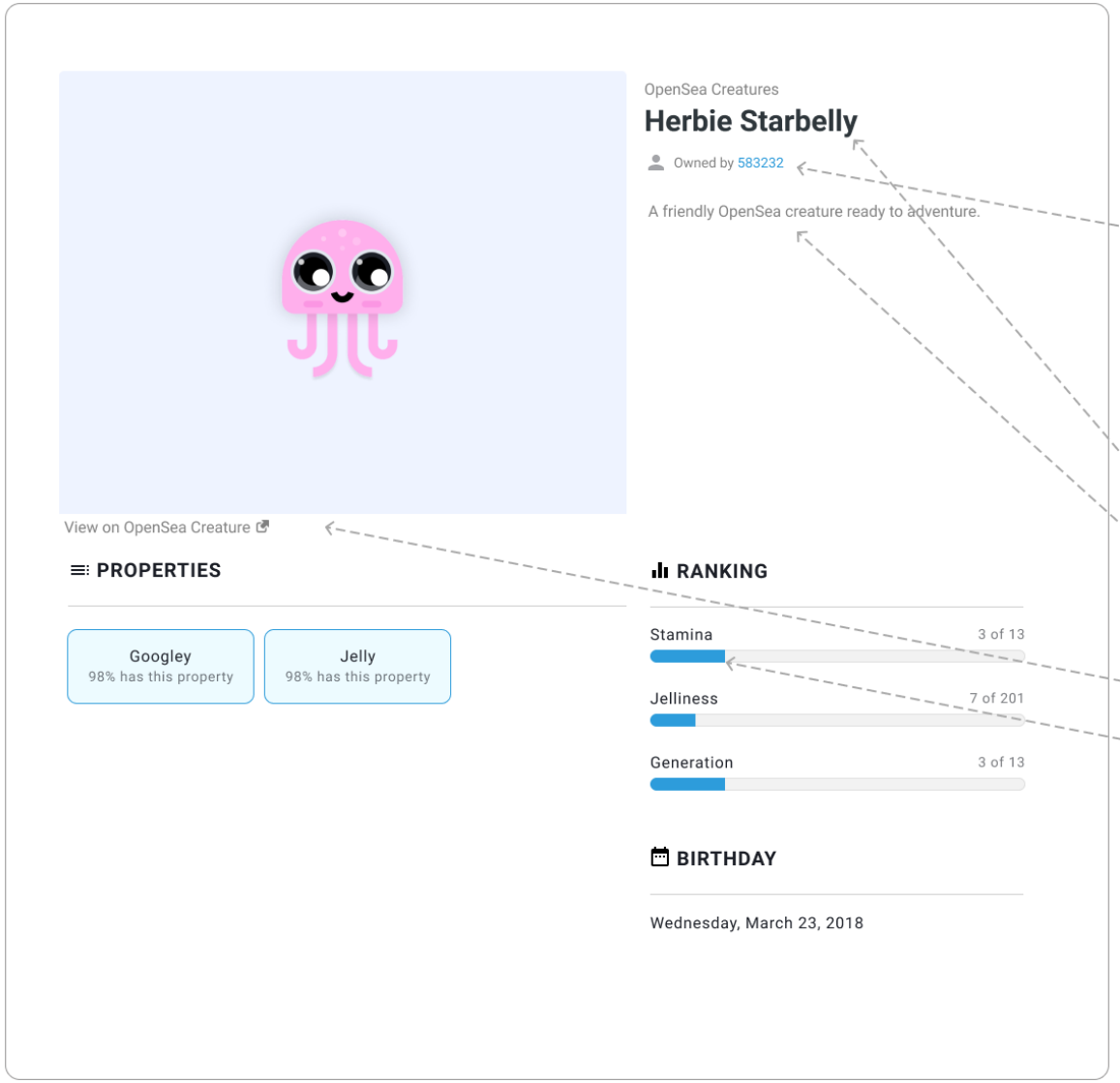
Collected by 0x1C05...53CF47

Rebirth of Venus Old systems, identities and rules no longer need to bind us. If we decide something has value or a story meaning, then it does. My piece is a meditation on that feeling of throwing skepticism to the wind and accepting endless potential outcomes, realities and truths. - $MIQ

11/17/20 SuperRare↗

Sources: https://tinyurl.com/y9zybeds, https://tinyurl.com/u2cnd8xv

What is an NFT... *really*?



ERC721 Contract

```
pragma solidity ^0.5.0;

contract Creature is ERC721 {
  function ownerOf(tokenId) returns address
  function tokenURI() returns string;
}
```

Metadata

```
{
  "name": "Herbie Starbelly",
  "description": "A friendly OpenSea creature ready to adventure.",
  "external_link": "https://openseacreatures.com/1234"
  "traits": [
    {
      "trait_type": "Stamina",
      "value": 3
    },
    {

    }
  ]

}
```


Source: https://tinyurl.com/yc7wuszf

What I actually bought

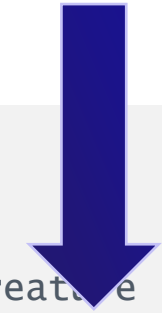

```
{
    "name": "Okay Zuki Bears #2622",
    "image": "https://gateway.pinata.cloud/ipfs/QmPCnf9qasRYdhwc6xjL7m1gceVSA3ZUVrR5LvY6ZxuKEW/2622",
    "attributes": [
                    {
                        "trait_type": "Background",
                        "value": "Smoke"
                    },
                    {
                        "trait_type": "Fur",
                         "value": "Blueprint"
                    },
                    {
                        "trait_type": "Eyewear",
                        "value": "Red Stripes Face Paint"
                    },
                    {
                        "trait_type": "Hat",
                        "value": "Red Panda Beanie"
                    },
                    {
                        "trait_type": "Clothes",
                        "value": "Fur Coat"
                    }
                ]
}
```


https://opensea.mypinata.cloud/ipfs/QmW7dYNeXPpAQqa4zwUDCi9ebZ1q3oYUDyvqj5nrn75GBE/2622

NFTs expose a problem with HTTP

```
{
  “name": “Herbie Starbelly",
  “description": “A friendly OpenSea creature ready to adventure",
  "image": "https://storage.googleapis.com/opensea-prod.appspot.com/puffs/3.png"
}
```

An HTTP URL, pointing to a location where the content is stored.



```
{
  “name": “Herbie Starbelly",
  “description": “A friendly OpenSea creature ready to adventure",
  "image": "ipfs://QmTy8w65yBXgyfG2ZBg5TrfB2hPjrDQH3RCQFJGkARStJb"
}
```

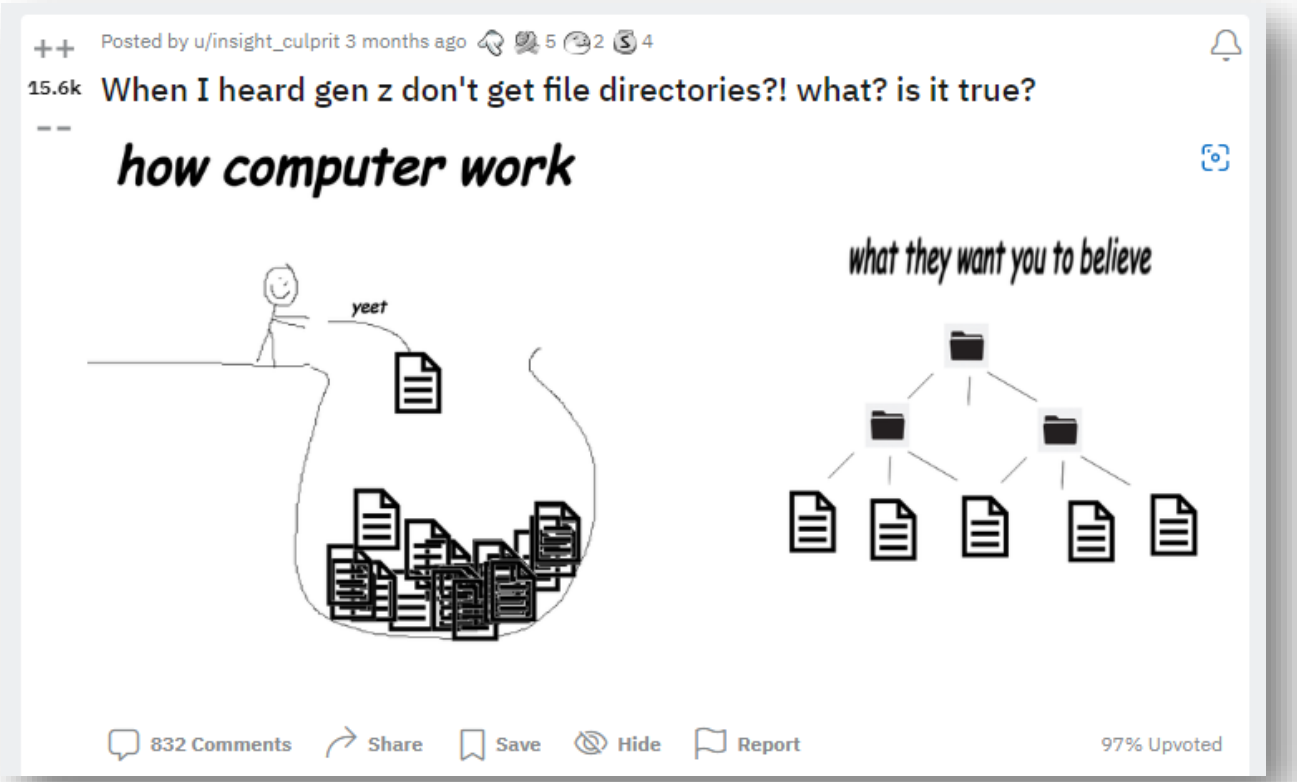
An IPFS URI, referencing a hash of the content.

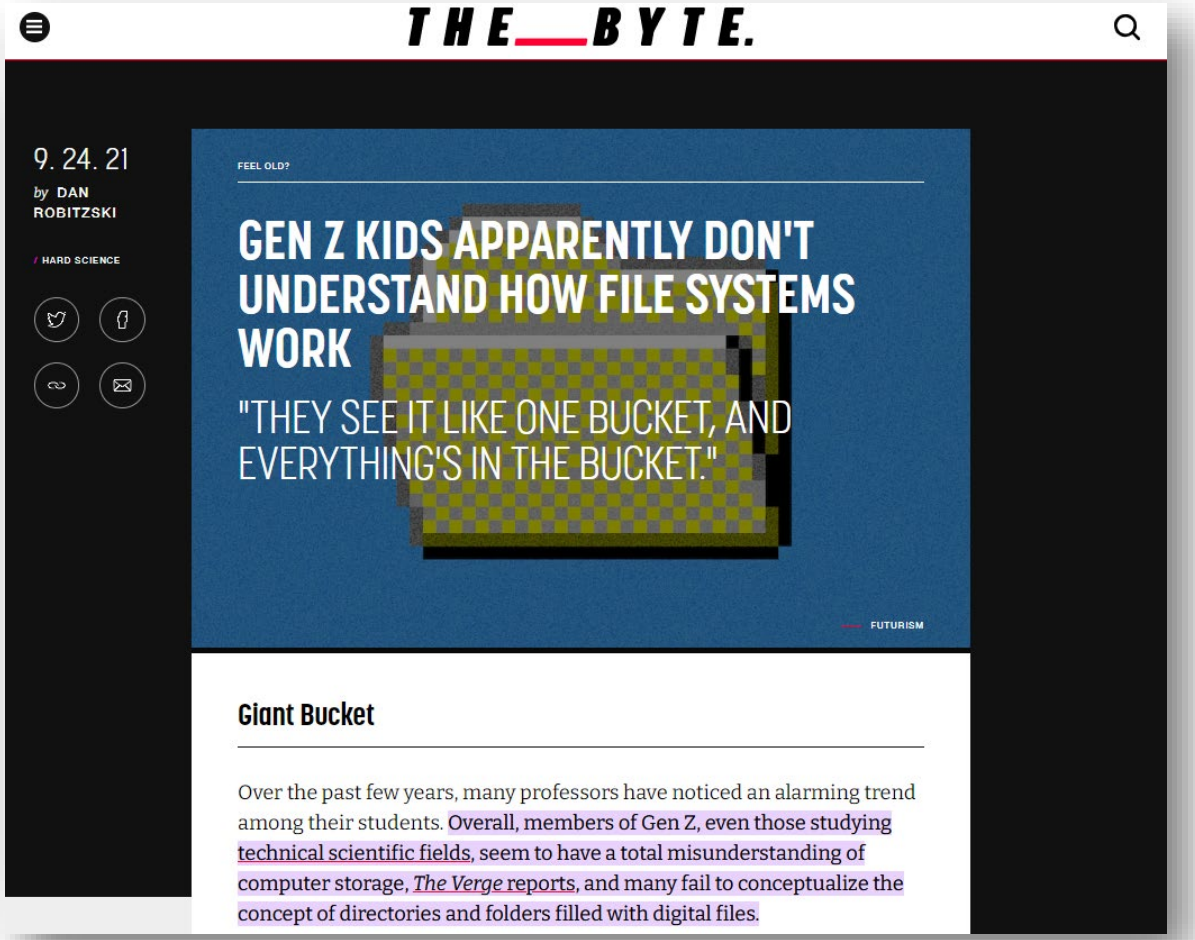
Source: https://tinyurl.com/yc7wuszf

HTTP vs. IPFS

	HTTP	IPFS
Full name	Hypertext Transfer Protocol	InterPlanetary File System
Approach	Client-server	Peer-to-peer
Links are…	liable to break.	permanent.
Changing the content…	has no effect on the URL.	completely changes the hash.
Data fetched from…	the host server.	the nearest peer that has a copy.
Addressing	Location-based	Content-based
Sample address	`https://storage.googleapis.com/opensea-prod.appspot.com/puffs/3.png`	`ipfs://QmTy8w65yBXgyfG2ZBg5TrfB2hPjrDQH3RCQFJGkARStJb`

IPFS more closely aligns with Gen Z's mental model of file storage





Source: https://tinyurl.com/2wcfh8zk, https://tinyurl.com/ydywmvyh

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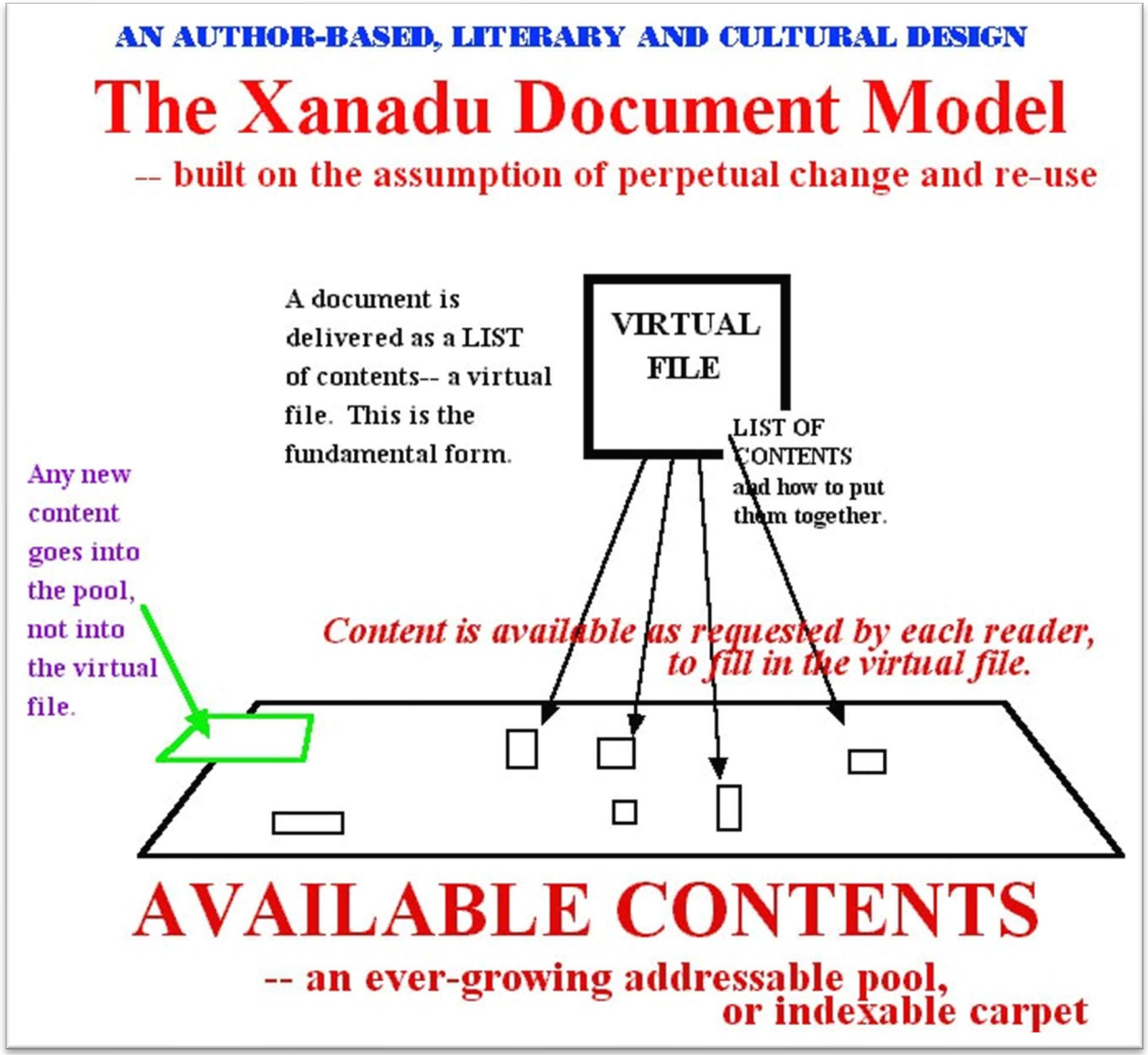
IPFS and a new (old) paradigm for content

Ted Nelson

- Information technology pioneer
- Founded the first hypertext project, Project Xanadu®, in 1960
- Envisioned a “Docuverse” of interconnected electronic documents
- One of the inspirations for Tim Berners-Lee’s World Wide Web

Project Xanadu and the Docuverse

- Described by designer Maggie Appleton as a "universe of multi-linked, version-controlled nodes of remixable micro-content"
- Unique permanent addresses for immutable content
- Transclusion rather than linking
- Rightsholders of content attributed and paid via "transcopyright"



Sources: https://tinyurl.com/mu22ymfc, https://tinyurl.com/mk8d89sw

Micropayments for Web content

10.4.1 400 Bad Request

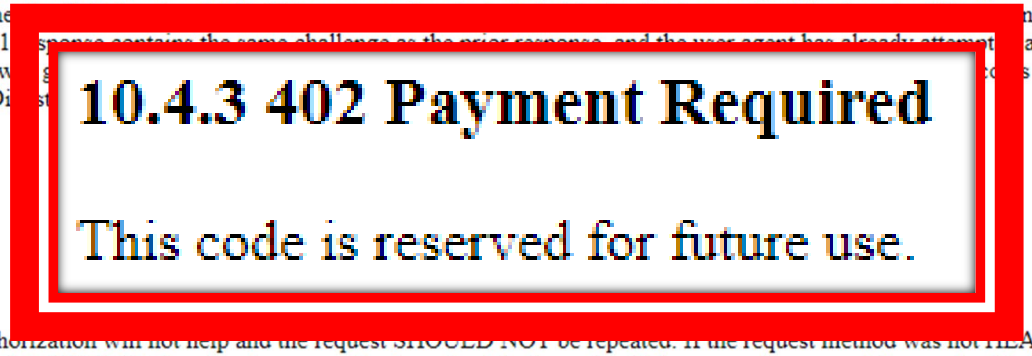
The request could not be understood by the server due to malformed syntax. The client SHOULD NOT repeat the request without modifications.

10.4.2 401 Unauthorized

The request requires user authentication. The response MUST include a WWW-Authenticate header field (section 14.47) containing a challenge applicable to the requested resource. The client MAY repeat the request with a suitable Authorization he… …nse indicates that authorization has been refused for those credentials. If the 401 … …authentication at least once, then the user SHOULD be presented the entity that w… …s authentication is explained in "HTTP Authentication: Basic and Di…

10.4.3 402 Payment Required

This code is reserved for future use.



10.4.4 403 Forbidden

The server understood the request, but is refusing to fulfill it. Authorization will not help and the request SHOULD NOT be repeated. If the request method was not HEAD and the server wishes to make public why the request has not been fulfilled, it SHOULD describe the reason for the refusal in the entity. If the server does not wish to make this information available to the client, the status code 404 (Not Found) can be used instead.

10.4.5 404 Not Found

The server has not found anything matching the Request-URI. No indication is given of whether the condition is temporary or permanent. The 410 (Gone) status code SHOULD be used if the server knows, through some internally configurable mechanism, that an old resource is permanently unavailable and has no forwarding address. This status code is commonly used when the server does not wish to reveal exactly why the request has been refused, or when no other response is applicable.

10.4.6 405 Method Not Allowed

The method specified in the Request-Line is not allowed for the resource identified by the Request-URI. The response MUST include an Allow header containing a list of valid methods for the requested resource.

10.4.7 406 Not Acceptable

A list of HTTP error codes from W3.org.

Source: https://tinyurl.com/48vb3bz7

Early attempts at micropayments on the Web

- In 1999, IBM and Compaq pushed for a Web micropayment standard
  - They wanted hypertext markup for micropayment links
  - IBM proposed that the cursor would change to a dollar sign ($) when users hovered over such content
- Micropayments never caught on, due in part to high credit card processing costs ($0.45 fee for $1 transaction)

Source: https://tinyurl.com/bddj68kd

What's so great about micropayments, anyway?

- The idea was that micropayment revenues would let sites focus on quality content generation rather than advertising income
- Users can pay creators directly without needing to pay fees to (or trust) a third party. Potential for new business models.
- Royalty logic embedded in the content itself would ensure rightsholders are compensated no matter how the content is reused
- Micropayments were always envisioned as optional

Old paradigms for hypertext content are new again

Idea	Pre-Web	Web 3.0
Ever-growing global pool of immutable, addressable content	Docuverse	**Interplanetary File System**
Rightsholders paid whenever their content is reused	Transcopyright	**NFT-encoded royalties and cryptocurrency micropayments**
Content is referenced, not linked	Transclusion	**NFT embeds of IPFS-hosted content**
“Atoms” of content remixed and rearranged into documents	Compound documents	**Microcontent**

Microcontent

Is content that is

- about one primary idea, fact, or concept
- easily scannable
- labelled for clear identification and meaning, and
- appropriately written and formatted for use anywhere and any time it is needed

It’s not microcontent just because it’s small.

Four principles of intelligent microcontent

1. **Focus**
   Limit microcontent to a single subject.

2. **Function**
   Classify microcontent to identify intended user response.

3. **Structure**
   Use predictable patterns and language.

4. **Context**
   Make microcontent easily relatable to other content.

NFT, IPFS, and Web 3.0 implications for content

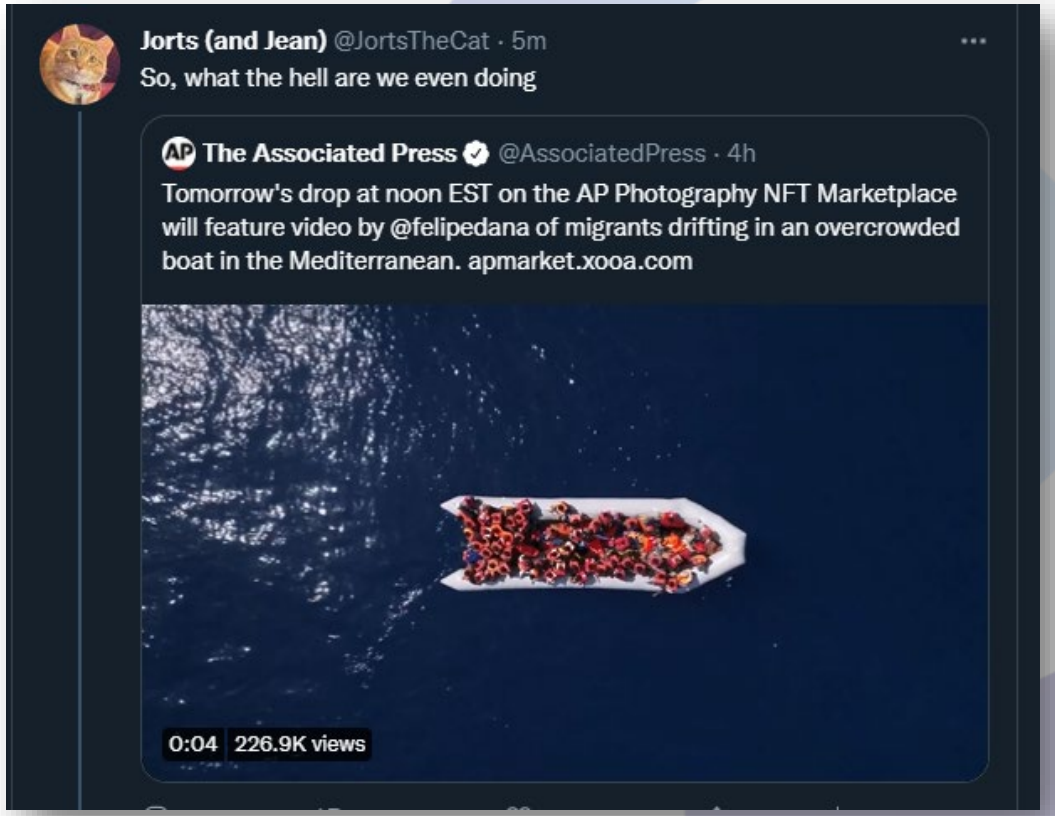
- Content will be more transparent than ever
  - Previous versions of a piece of content will likely continue to exist in others' IPFS nodes.
  - Content-based addressing means changes won't go unnoticed.
  - Transclusion means the original context will always be readily accessible.
- The unbundling of media means your content will be remixed in ways you can't anticipate
  - But it's possible to collect micropayment royalties
  - New business models emerge
- More than anything, NFTs = legitimacy
  - Users may come to expect content to be cryptographically verified by its creator(s)
  - NFTs might be an antidote to deepfakes

Open questions

- How will blockchain UX be improved?
  - Currently they are slow and incredibly expensive to use
  - Sidechains or non-ETH coins may be superior
- To what extent will users come to expect NFT-enabled verification of content?
  - How much will users care that something digital is “legit”?
- How will we live up to the promise of decentralization?
  - OpenSea, Rarible, and other major NFT marketplaces and platforms are still centralized
  - They may eventually be turned into decentralized autonomous organizations (DAOs)
- What business models will be enabled by frictionless, peer-to-peer micropayments?
  - Will advertisement-based revenue models for written content become obsolete?
  - Royalties are not actually part of the ERC-721 specification
- How can we prevent blockchains from consuming absurd amounts of energy?
  - Proof-of-stake > proof-of-work

What should you do about all this?

- Embrace remix culture
  - Use microcontent architectures and writing standards so that your text-based content stays modular
- Cultivate your community
  - Community management roles may become more important than sales and marketing roles
- Don’t rush. Continue learning.
  - NFTs are in their infancy
  - Many companies’ forays into NFTs have been poorly received
  - Don’t sell JPEGs; lay the foundations for community-driven platforms



Source: https://tinyurl.com/3thp9459

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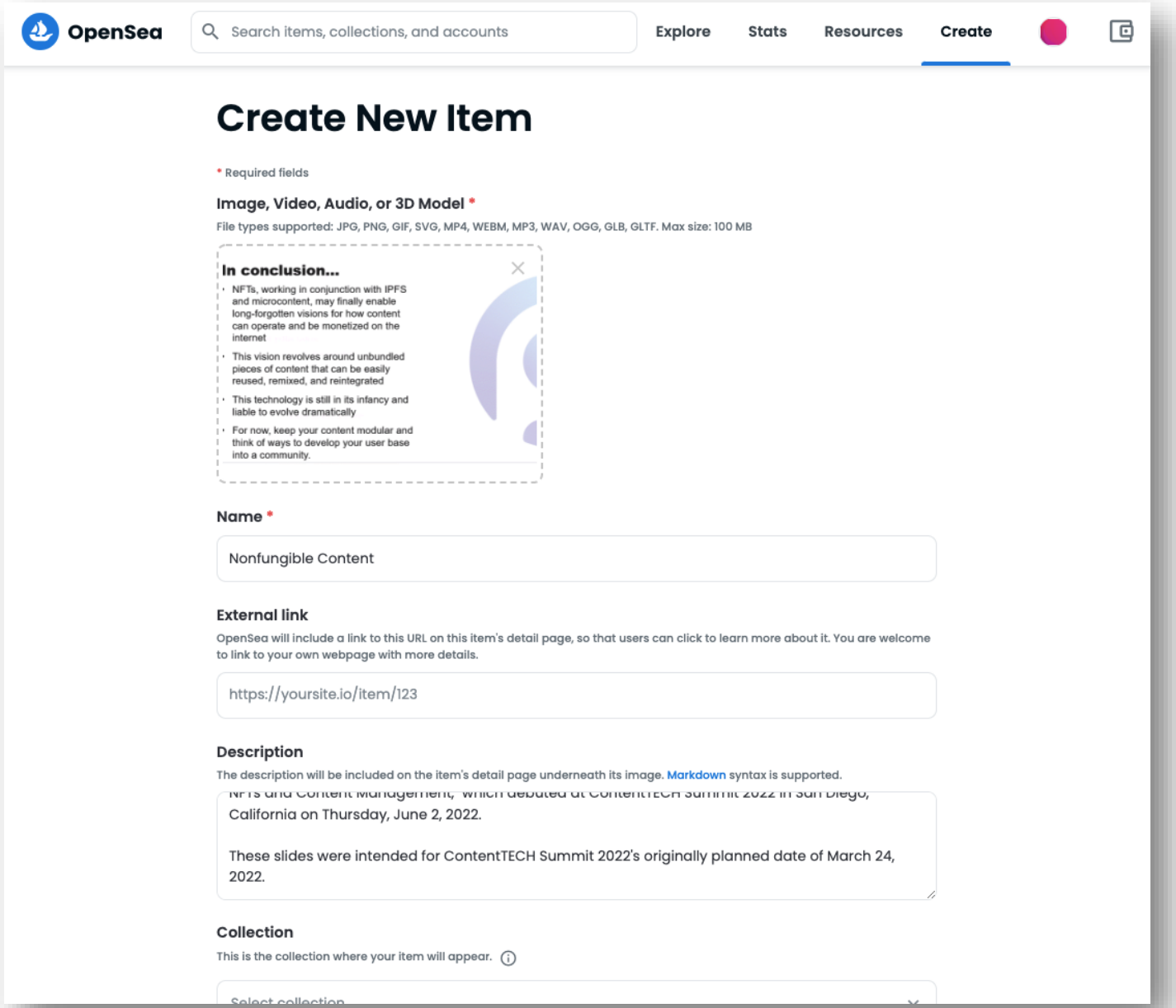
Getting started

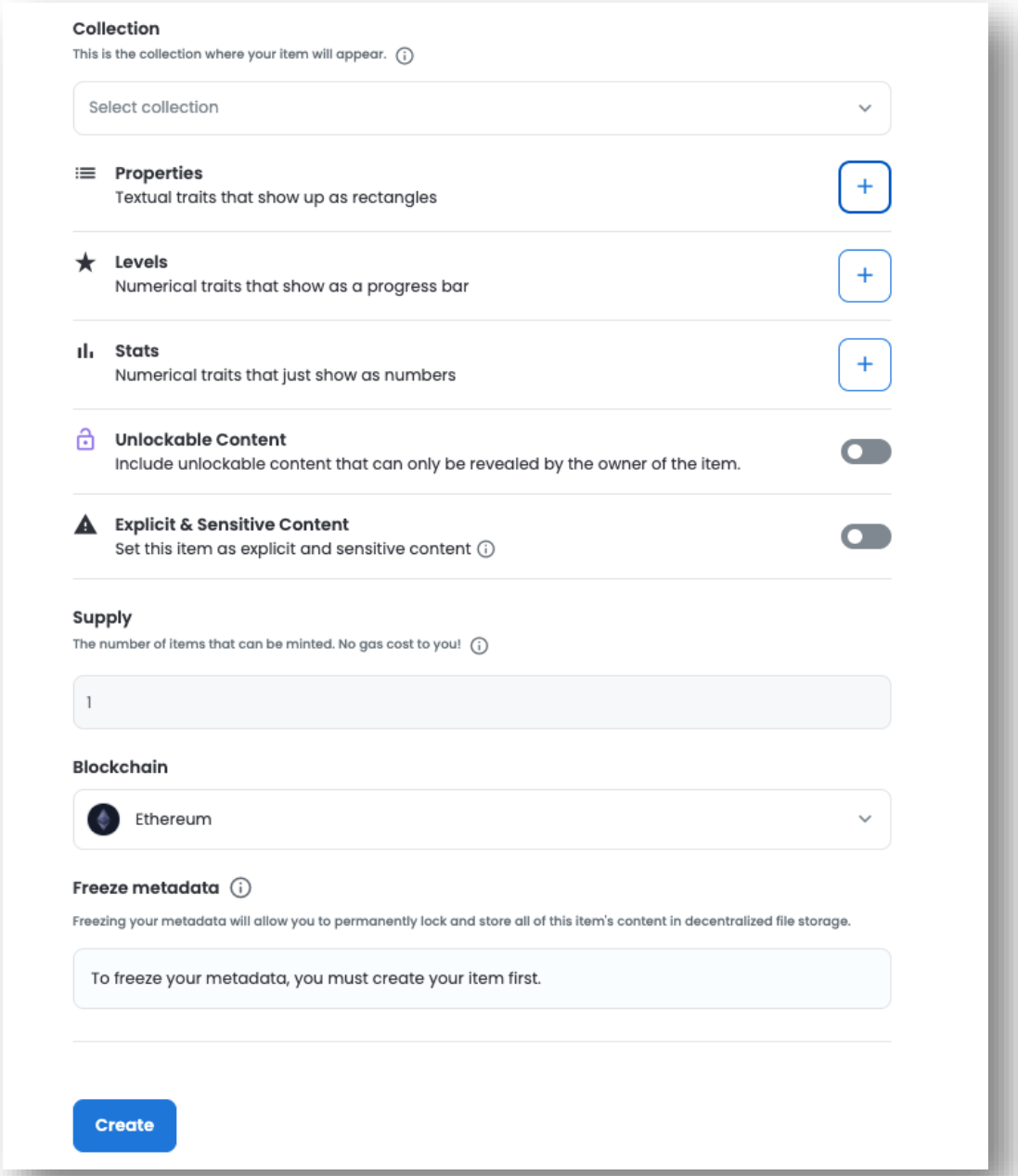
Creating an NFT

- Go to https://opensea.io
- Connect your wallet (e.g., MetaMask)
- Click "Create"
- Upload file

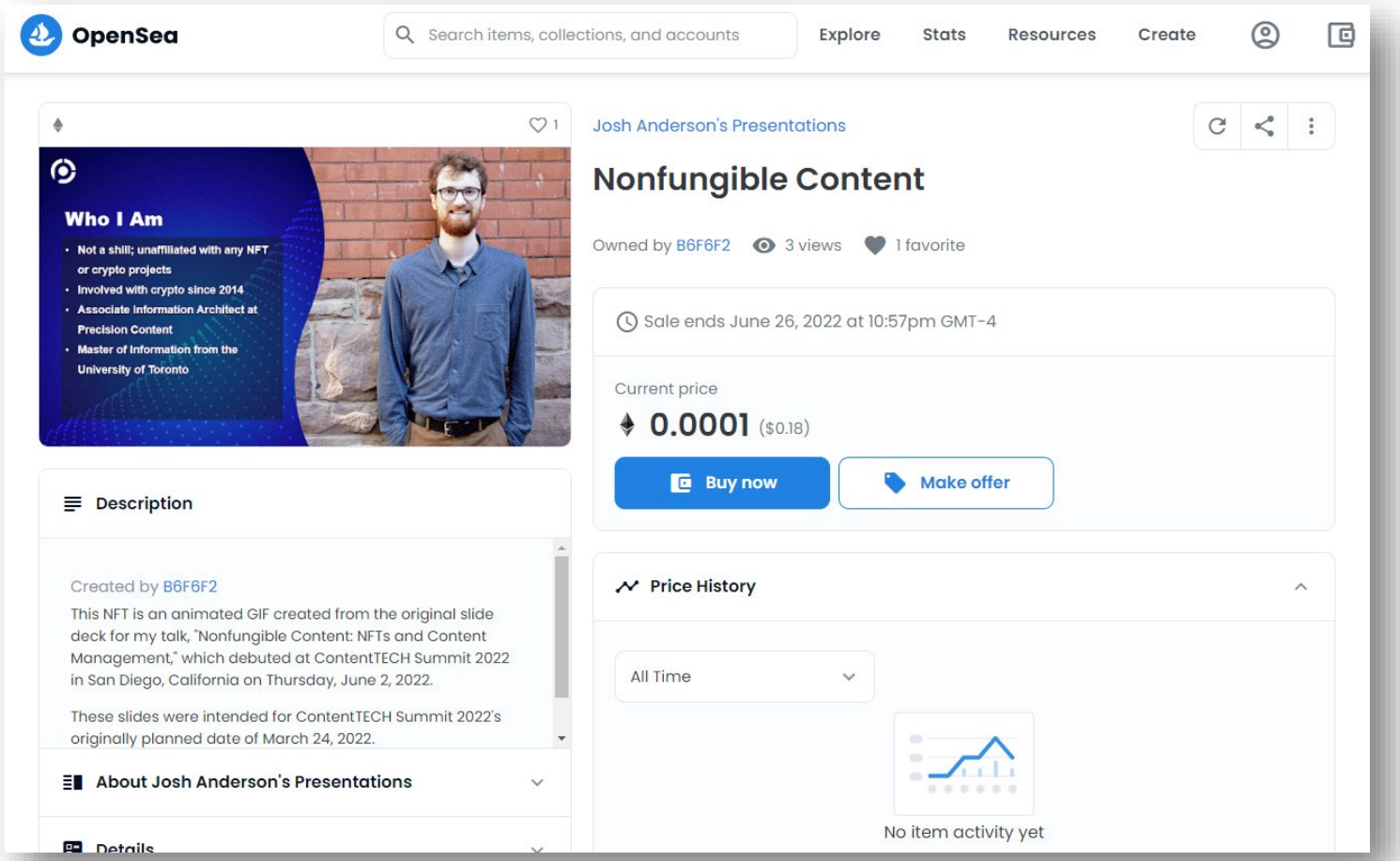


Creating an NFT

- Name
- External link
- Description
- Collection
- Properties
- Levels
- Stats
- Unlockable content
- Explicit filter
- Supply
- Blockchain
- Freeze metadata



My NFT



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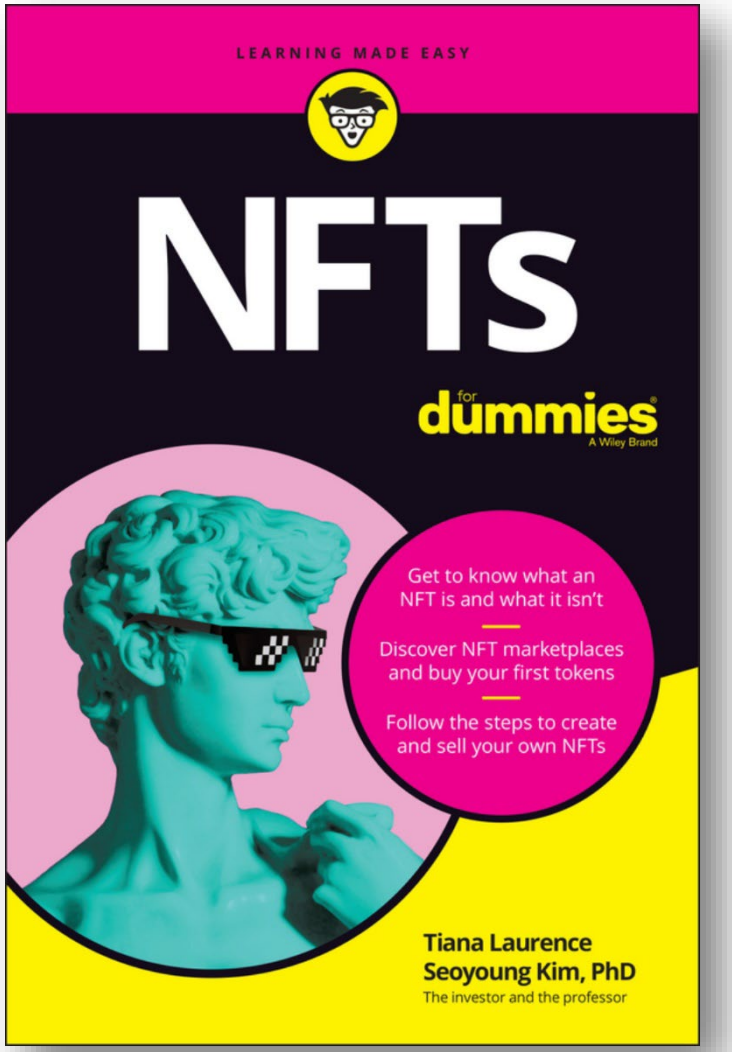
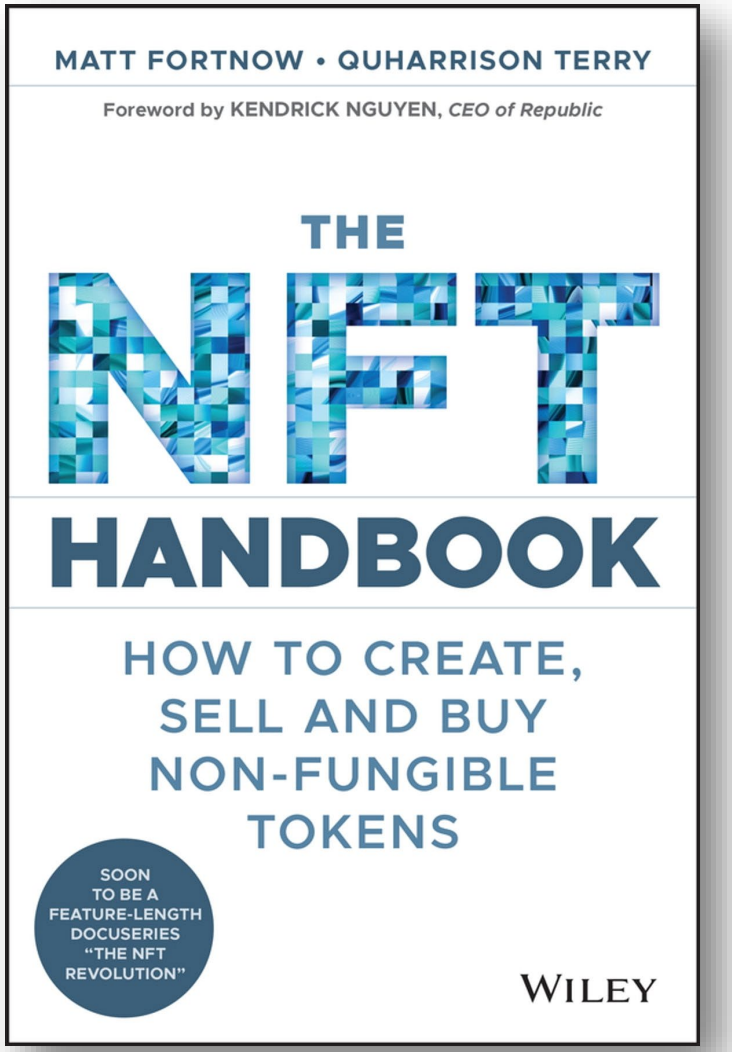
Only 0.0001 ETH ($0.18)!

https://tinyurl.com/ykrfajbm

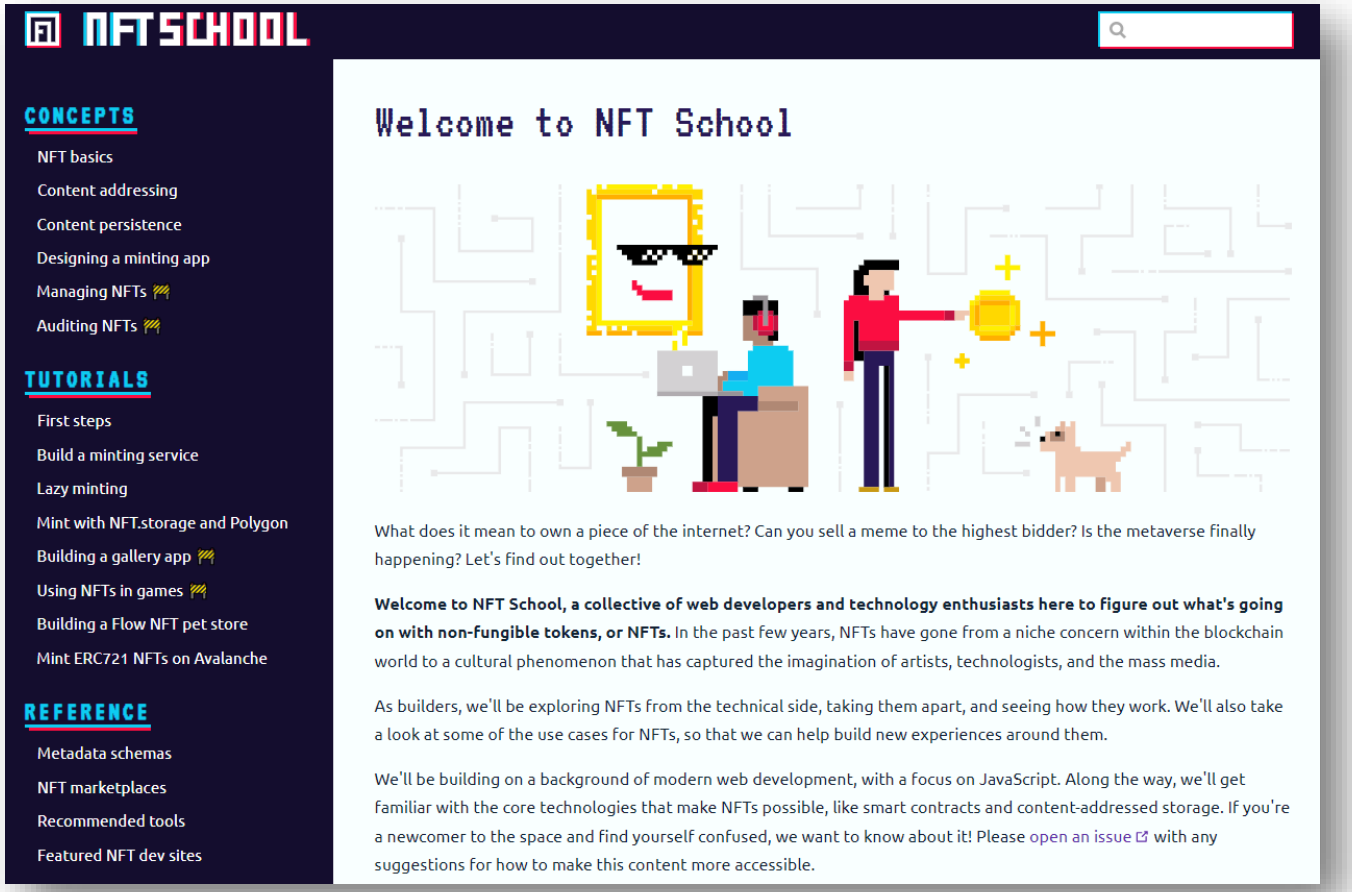
https://opensea.io/assets/ethereum/0x495f947276749ce646f68ac8c248420045cb7b5e/82757255498936747970608740099525853203281817683865661120842699153106173689857

Recommended NFT resources

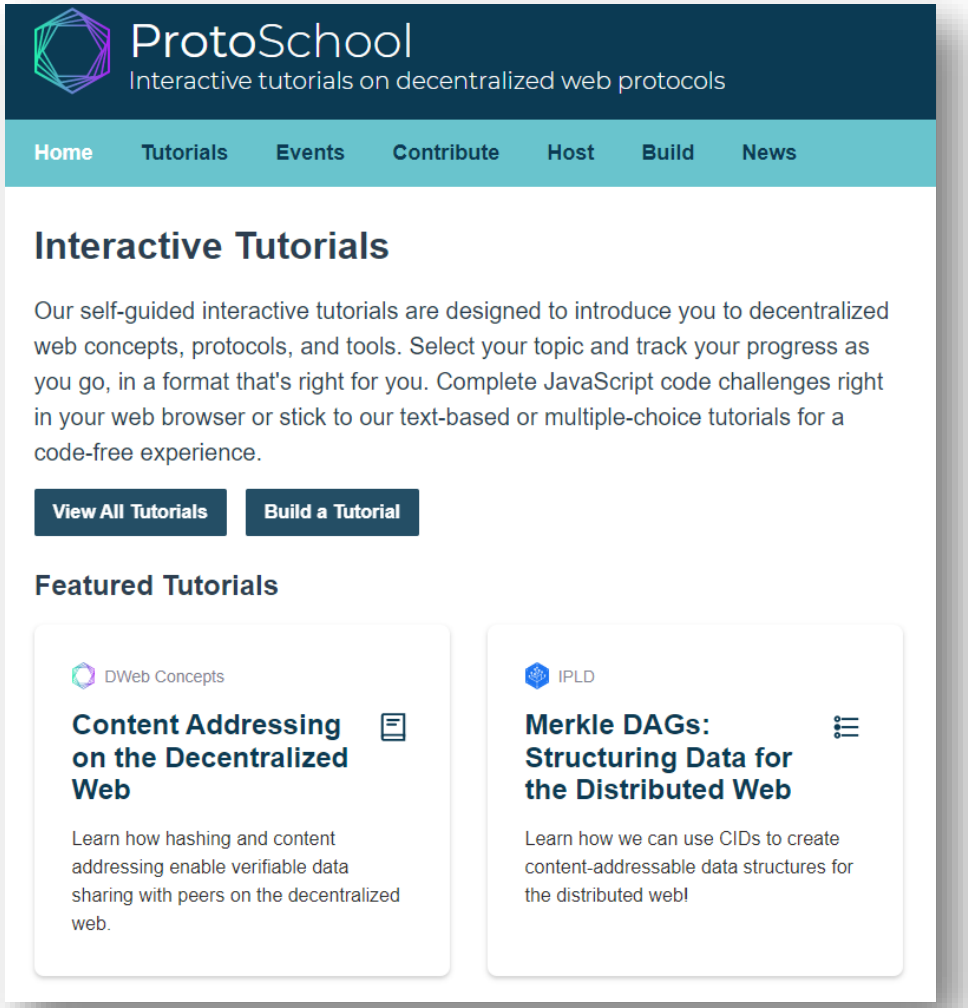




Recommended NFT resources

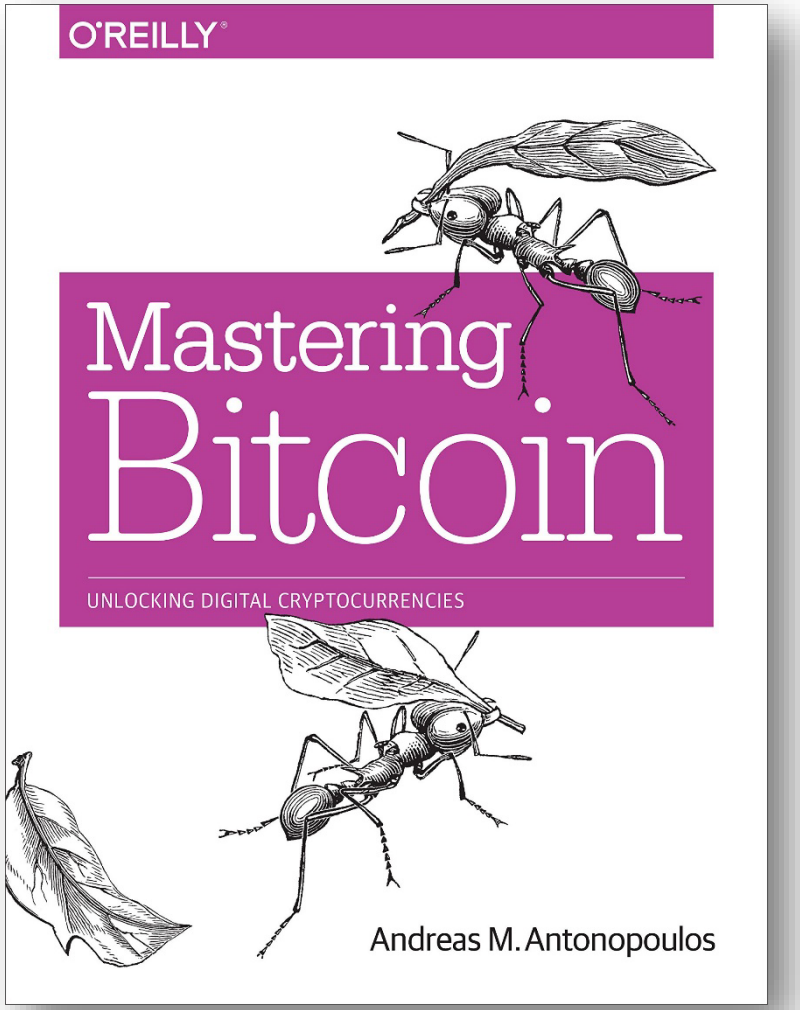


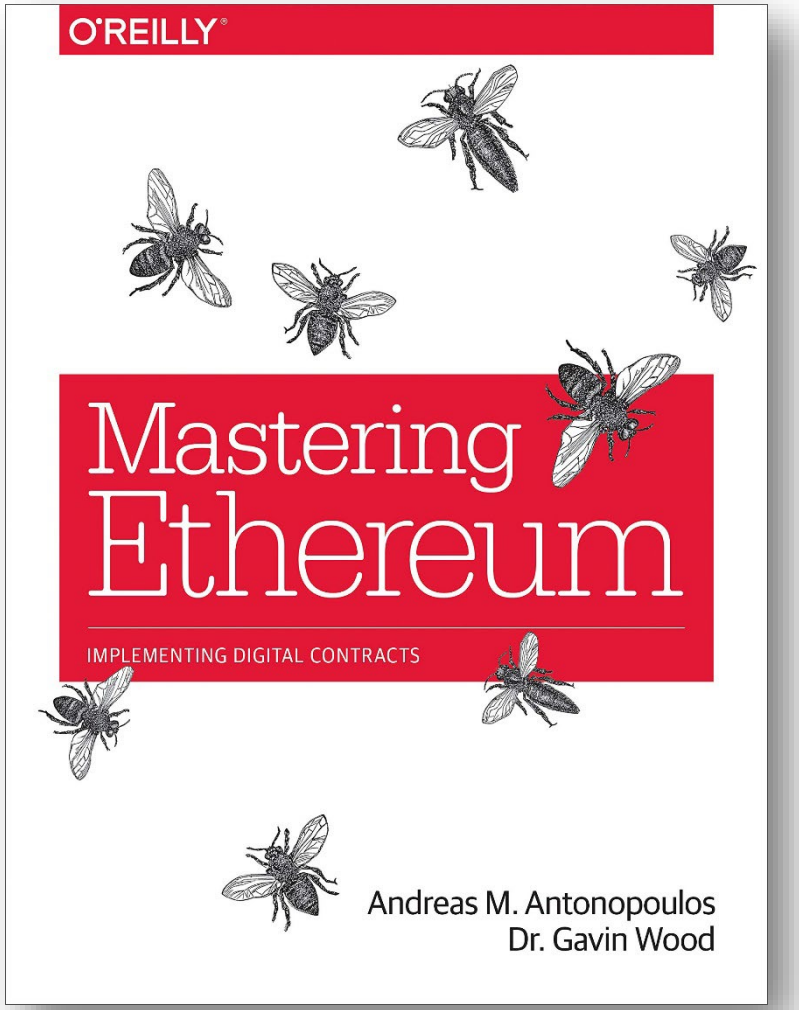
https://nftschool.dev



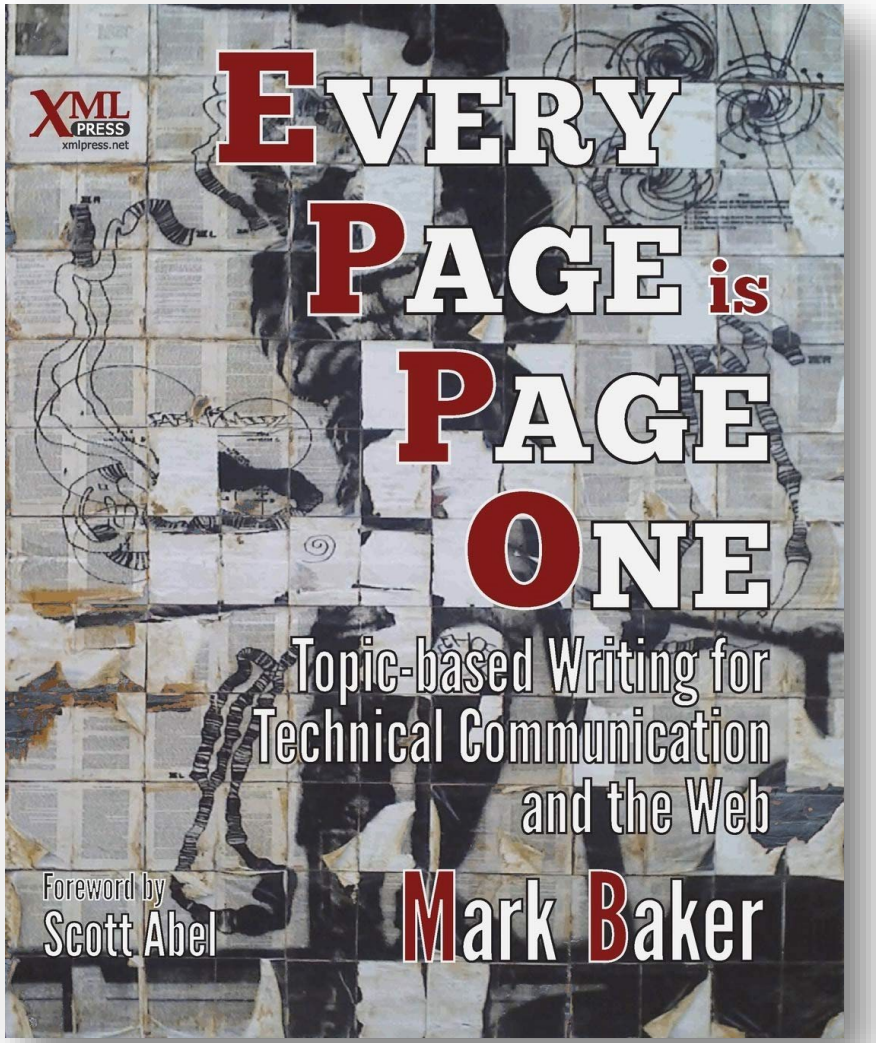
https://proto.school

Recommended blockchain resources



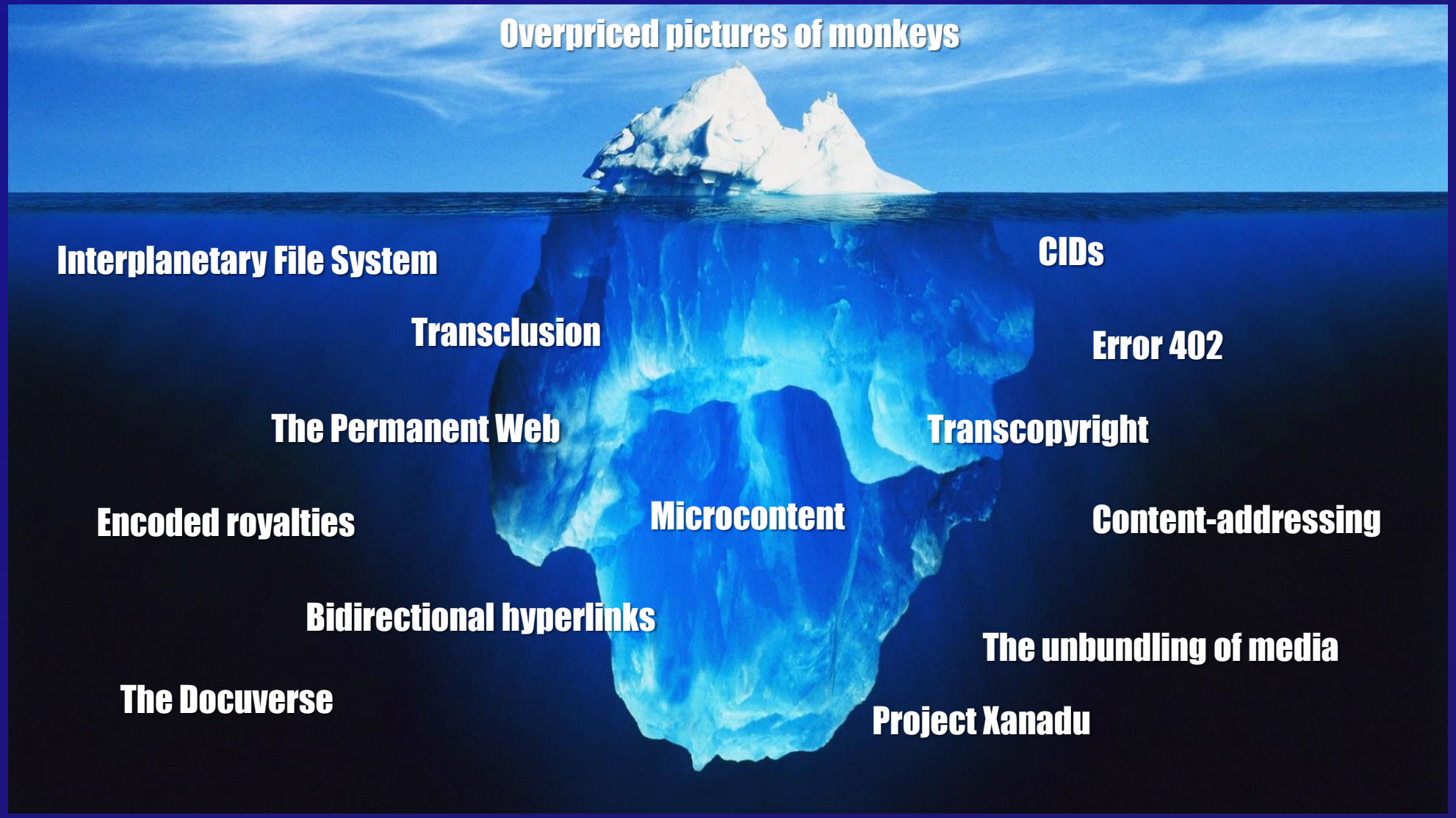


Recommended microcontent resources



https://www.precisioncontent.com/presentations-recordings-catalog/

In conclusion...



In conclusion...

- NFTs, working in conjunction with IPFS and microcontent, may finally enable long-forgotten visions for how content can operate and be monetized on the internet
- This vision revolves around unbundled pieces of content that can be easily reused, remixed, and reintegrated
- This technology is still in its infancy and liable to evolve dramatically
- For now, keep your content modular and think of ways to develop your user base into a community.

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Thank You!

Are you ready to upgrade, transform, and future-enable your content?
Contact us and we'll show you what's possible.

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