Numbers
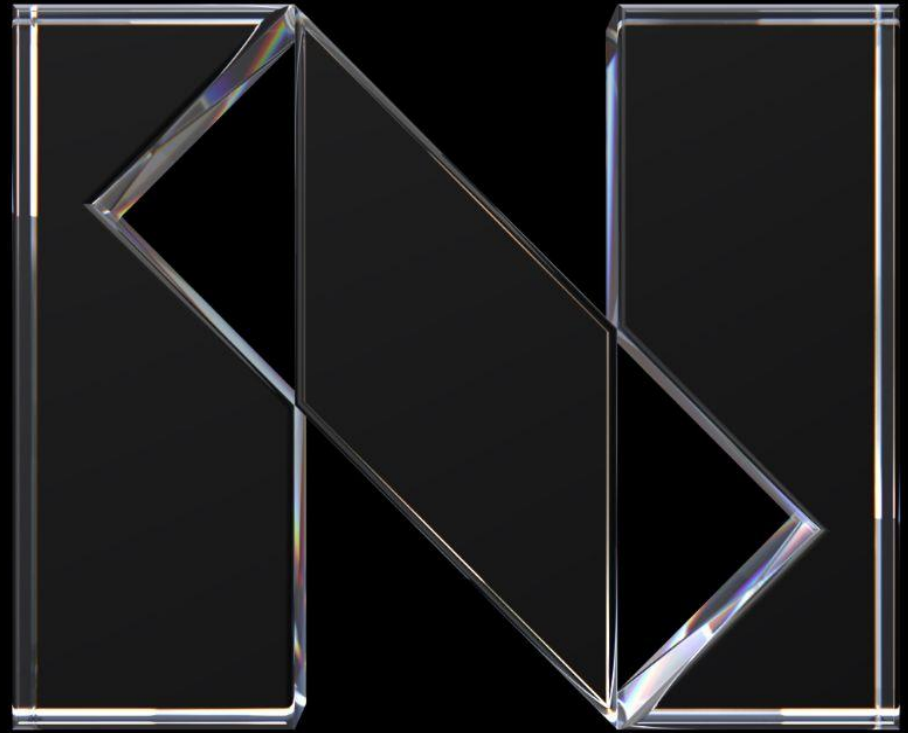
Open Source Decentralized Network
Ensuring Provenance for Digital Media
Created by Humans & AI

Bofu Chen

CTO & Founder
Open-source Developer

Delivering Accessible, Trustworthy & Verifiable Content

By indexing and storing on-chain data we are able to create comprehensive digital media histories that can be traced back to its origins

Numbers

Why Blockchain?

Immutable

Records are on the blockchain and immutable. Which helps in building the foundation of the trust.

Transparent

All records are transparent and are easily accessible. ERC standards allow all open-sourced developers to build together.

Ecosystem

Can leverage the Web3 ecosystem including the decentralized storage, allowing users own their own data, and the broader creativity economy such as NFT.

Numbers Content Infrastructure

Capture SDK
Developer tools to allow developers adopt provenance standards such as IPTC, C2PA easily

Capture Cam
Mobile app for quickly taking photos with content integrity assured

Capture Dashboard
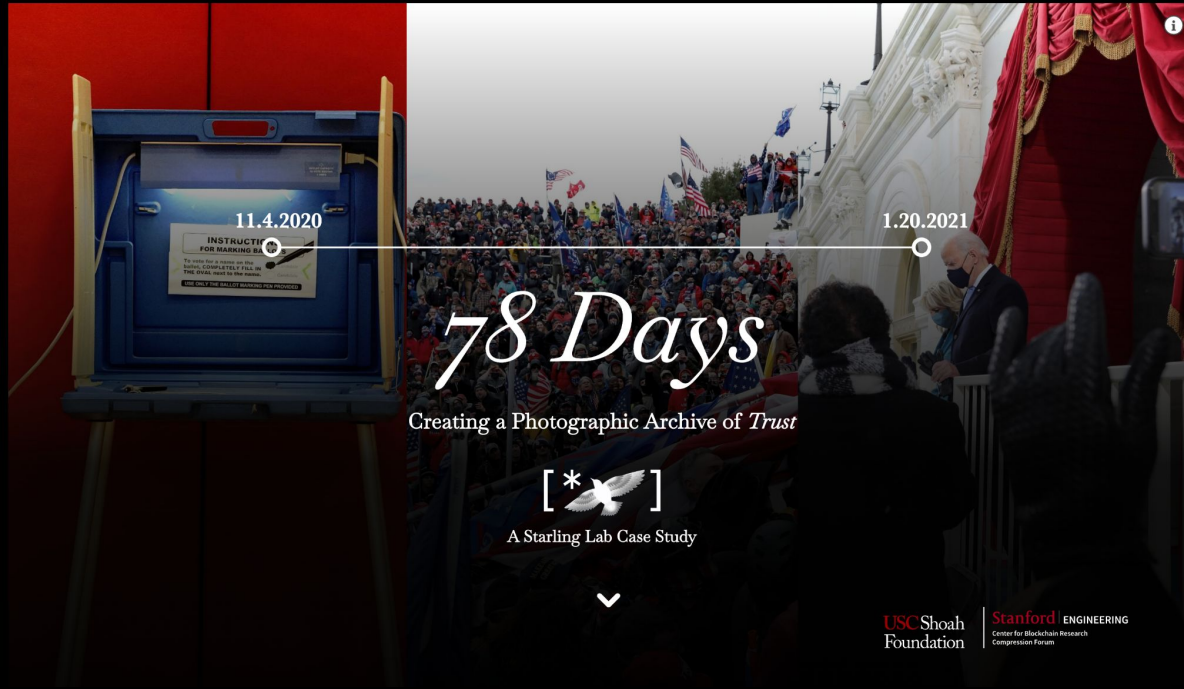Manage and monitor tools to manage content and its metadata

Blockchain Proof
Eco-friendly, fast and reliable blockchain

Use Case: Ukrainian Children's Drawings (MISW Museum)
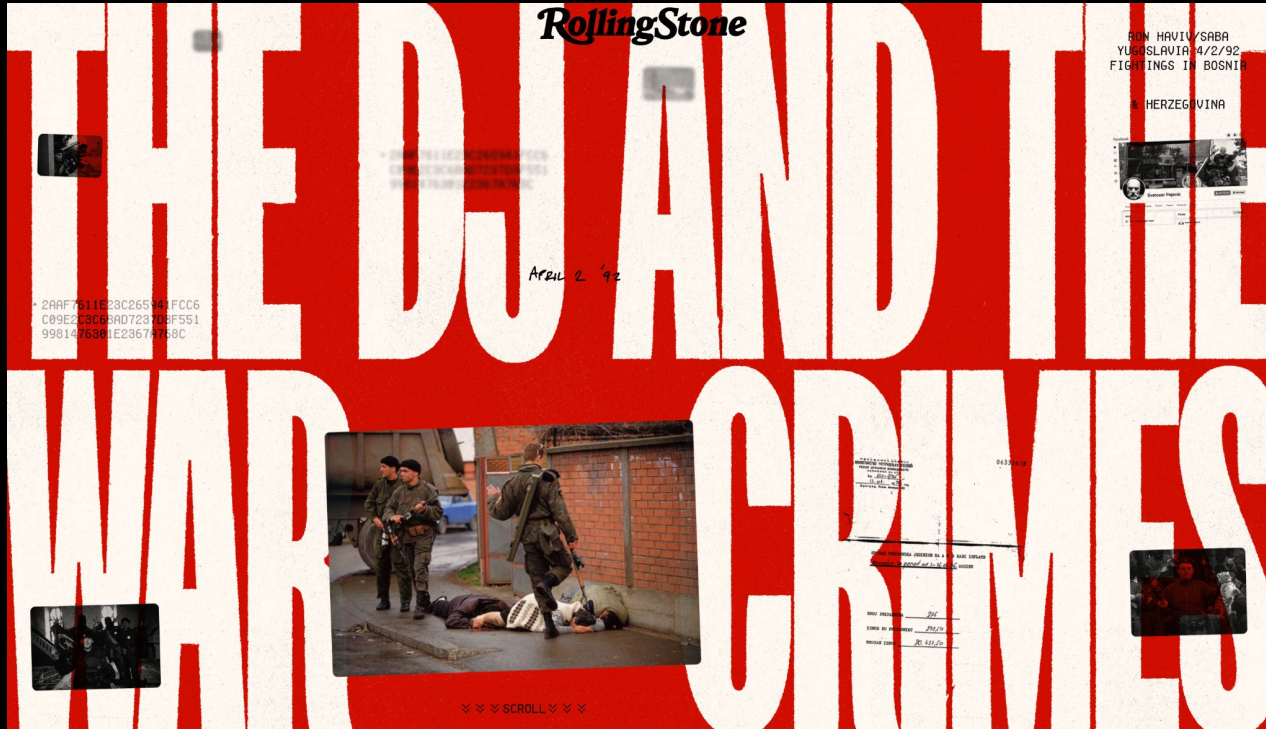
Use Case: 2024 Election Archive (Local media outlets)

Taiwan, Indonesia, India, US

Use Case: Awards Ceremony (Songwriters North America)

Verification Pipeline (1)

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│              │     │ Basic        │     │              │     │ Search on    │     │ Immutable    │
│ Content with │ ──▶ │ metadata is  │ ──▶ │ Acquire      │ ──▶ │ Blockchain   │ ──▶ │ content      │
│ C2PA         │     │ shown in     │     │ unique       │     │ network(s)   │     │ provenance   │
│              │     │ C2PA Verify  │     │ Content ID   │     │              │     │ and history  │
│              │     │ Site         │     │ (Nid)        │     │              │     │              │
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
```


Content ID (Nid)

Author: Benedict@Starling

Numbers

Asset Profile

Content ID (Nid)

On-chain Provenance

On-chain History

On-chain
Upgradable Metadata

```
{
  "assetCid": "bafybeigda2fjjeta7725hbicpfzldygsz14gbllcaybwuetlemraauazwm",
  "assetSha256": "dfdf40ede286fc01989c64bbec65b97f40c5d164dd05427a3b47909b333e214b",
  "encodingFormat": "image/jpeg",
  "assetTimestampCreated": "2023-05-19T00:48:16Z",
  "assetCreator": null,
  "license": {
    "name": null,
    "document": null
  },
  "abstract": "",
  "author": {
    "@type": "Organization",
    "identifier": "https://www.misw.org",
    "name": "Mom I See War Museum"
  },
  "usageInfo": "",
  "keywords": [
    "mom-i-see-war-museum",
    "misw-ukraine-archive"
  ],
  "extras": {
    "№ гугл файлу": "0",
    "Автор (M)": "Даша",
    "Author (M)": "Dasha",
    "Вік (M)": "9",
    "Місто (M)": "м. Суми",
    "Область (M)": "Сумська обл",
    "Країна (M)": "Україна",
    "City (M)": "Sumy",
    "Region (M)": "Sumy Oblast",
    "Country (M)": "Ukraine",
    "Колекція (M)": "Мамо, я бачу війну - Україна"
  },
  "contentFingerprints": [
    "hash://sha256/dfdf40ede286fc01989c64bbec65b97f40c5d164dd05427a3b47909b333e214b",
    "hash://md5/26ce6a9cfa09b6abca13a448127c7b29",
    "ipfs://bafybeigda2fjjeta7725hbicpfzldygsz14gbllcaybwuetlemraauazwm"
  ],
  "relatedContent": [],
  "name": "Authenticated Ukraine Archive",
  "description": "Ukranian children's drawings made during wartime",
  "nftRecord": "",
  "actionName": "action-commit",
  "action": "bafkreiceiqfe4w4g4j46rsi4h4tbqu35ivewfxm4q743tfmegscpg7d63m"
}
```

Verification Pipeline (2)
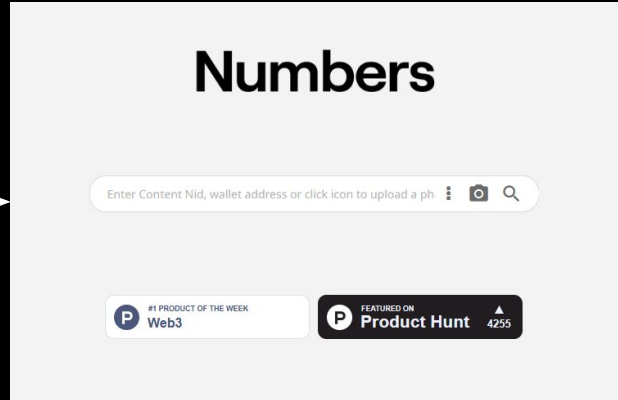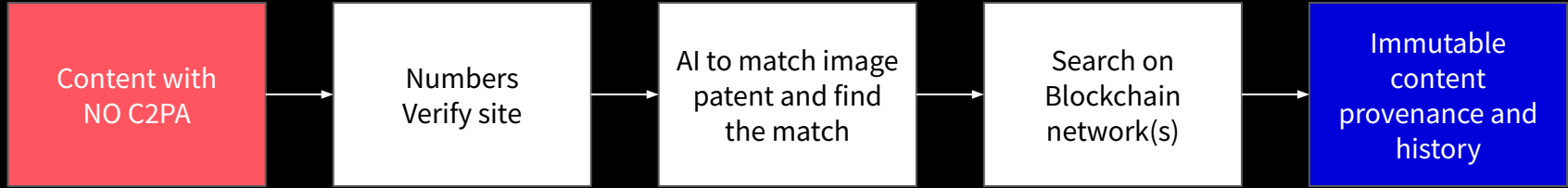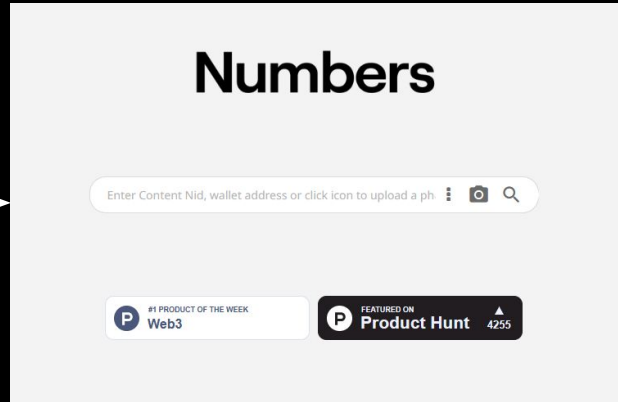
Content with NO C2PA → Numbers Verify site → AI to match image patent and find the match

(Screenshot)

Upload → **Numbers**

Enter Content Nid, wallet address or click icon to upload a ph...

#1 PRODUCT OF THE WEEK
Web3

FEATURED ON
Product Hunt 4255

AI Search →

Showing 1 out of 1 results

Nid
bafybeigda2fjjeta7725hbicpfzldygszl4g
blicaybwuetiemraauazwm

https://verify.numbersprotocol.io

Verification Pipeline (2)

| Content with NO C2PA | → | Numbers Verify site | → | AI to match image patent and find the match | → | Search on Blockchain network(s) | → | Immutable content provenance and history |

Upload → Numbers [Enter Content Nid, wallet address or click icon to upload a ph...] → AI Search →

Showing 1 out of 1 results

Nid
bafybeigda2fjjeta7725hbicpfzldygszl4g
blicaybwuetlemraauazwm

EIP-7053
Interoperable Digital Media Indexing

Fostering growth in the provenance space by committing to promoting open standards through EIP proposals

ERC-7053: Interoperable Digital Media Indexing 💬 ‹›

A universal indexing method to record, discover and retrieve the history of digital media on EVM-compatible blockchains.

Authors	Bofu Chen (@bafu), Tammy Yang (@tammyyang)
Created	2023-05-22

https://eips.ethereum.org/EIPS/eip-7053

EIP-7053 Design Concept: Registration
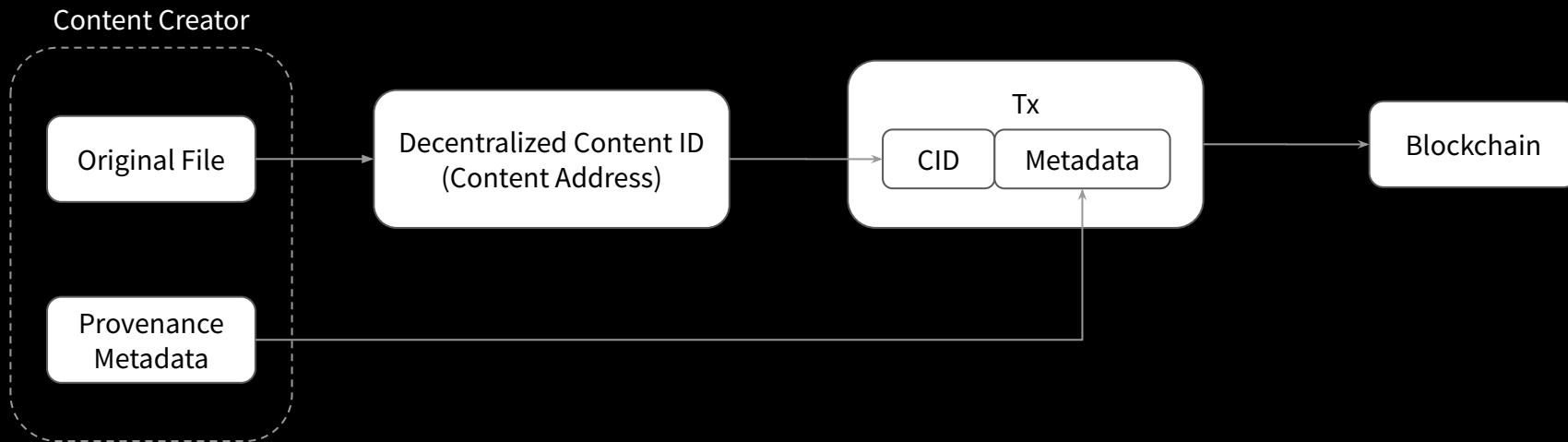
EIP-7053 Design Concept: Registration (cont.)

An Asset's metadata can be extended or updated, like Git's commits.

EIP-7053 Design Concept: Asset History

CID

query

Blockchain

return

Tx #1

| CID | Metadata |

Tx #2

| CID | Metadata |

...

Tx #N

| CID | Metadata |

On Chain History, "Commits"

Numbers
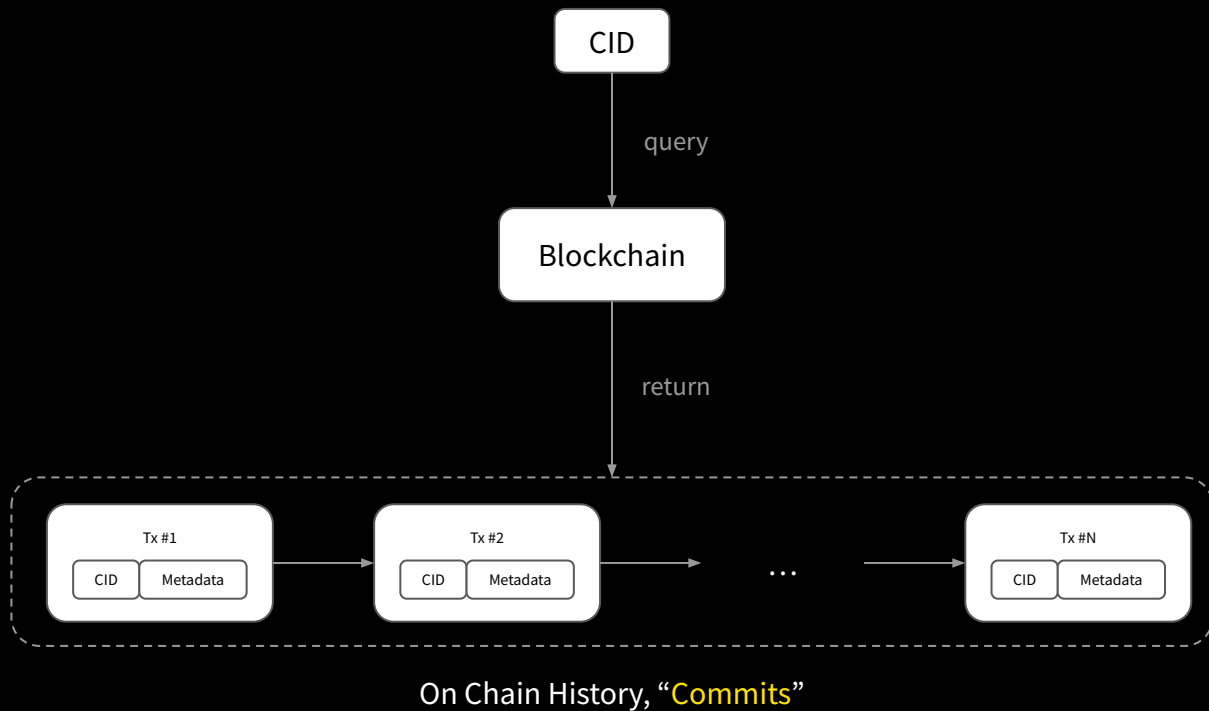
EIP-7053 Design Concept: Asset Tree

```
{
    assetTreeCid: "bafkreidneqjsh7nza7h2inigmogt33v4km2abzuivygjz5twyubumm2xiq",
    assetTreeSha256: "2cecbe42bd73120a946086389d12d61a30a1892c61df191afe9c60b0f42bbdb0",
    assetTreeSignature:
    "0x64e9c0411eb57f31ac82a949c0bf33e38dd09c09f0573f8c266a32d61aec8da44e887fe922356cebd58aa6767a
    4d47e9d629690abfeef1221524ec23d6a15adf1b",
    author: "0x6059DFC1daFb109474aB6fAD87E93A11Bfa5e1D2",
    ...
}
```

Content Creator

Original File

Decentralized Content ID
(Content Address)

Tx

CID   Metadata

Blockchain

Provenance
Metadata
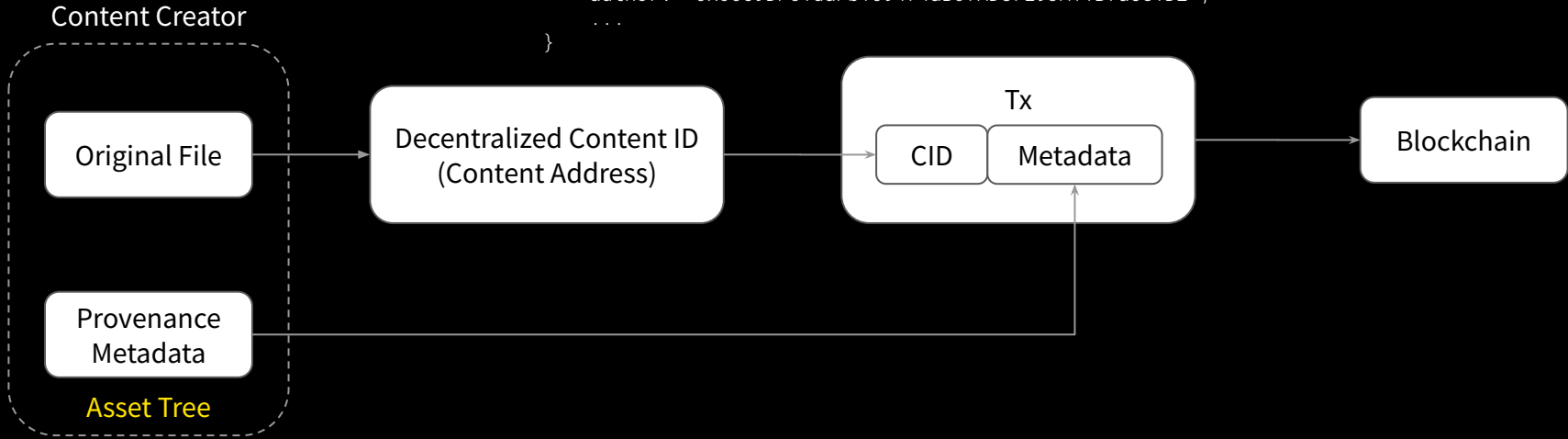
Asset Tree

```
{
    assetCid: "bafkreid4ug5djtm6iq6hptfs337n3k3driqncivegexzpffzlapiaple44",
    assetCreator: "Liang-Bing Hsueh",
    assetTimestampCreated: 1683287179,
    creatorWallet: "0x6059DFC1daFb109474aB6fAD87E93A11Bfa5e1D2",
    ...
}
```

Asset Tree contains a comprehensive collection of metadata that are important to authenticating digital assets.

Numbers

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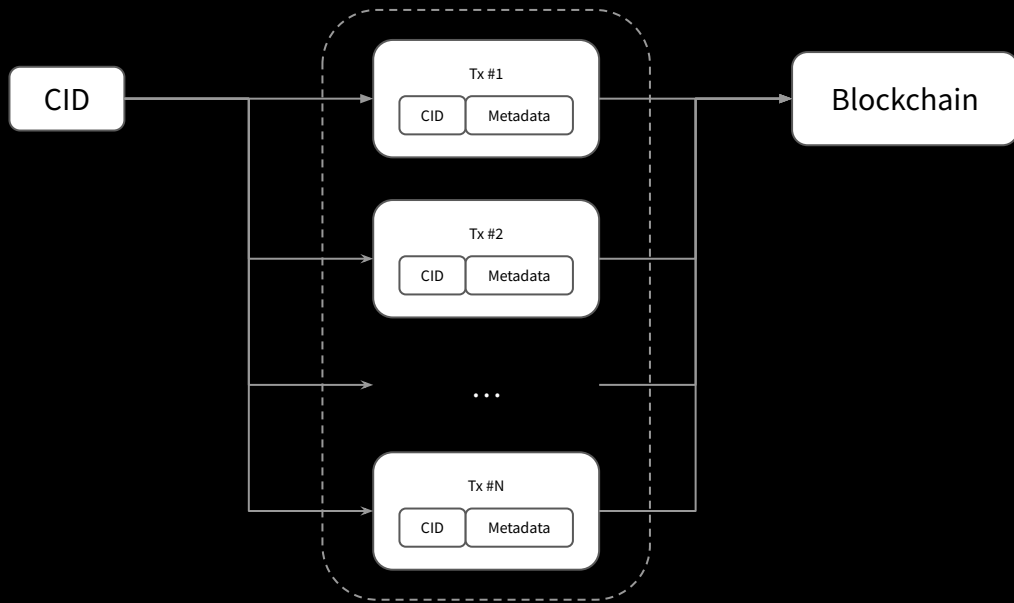
Authors Bofu Chen (@bafu), Tammy Yang (@tammyyang)

Created 2023-05-22

https://eips.ethereum.org/EIPS/eip-7053
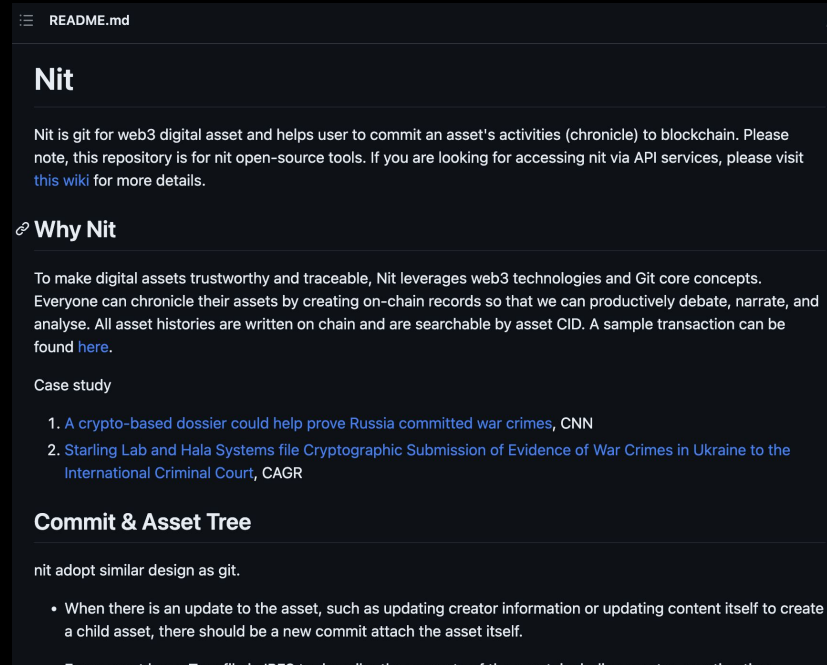
Nit: Git for Web3 Digital Assets

"Git" Web3 digital media helping to create on-chain provenance records in the form of tree structure we coined as Asset Tree

README.md

Nit

Nit is git for web3 digital asset and helps user to commit an asset's activities (chronicle) to blockchain. Please note, this repository is for nit open-source tools. If you are looking for accessing nit via API services, please visit this wiki for more details.

🔗 Why Nit

To make digital assets trustworthy and traceable, Nit leverages web3 technologies and Git core concepts. Everyone can chronicle their assets by creating on-chain records so that we can productively debate, narrate, and analyse. All asset histories are written on chain and are searchable by asset CID. A sample transaction can be found here.

Case study

1. A crypto-based dossier could help prove Russia committed war crimes, CNN
2. Starling Lab and Hala Systems file Cryptographic Submission of Evidence of War Crimes in Ukraine to the International Criminal Court, CAGR

Commit & Asset Tree

nit adopt similar design as git.

- When there is an update to the asset, such as updating creator information or updating content itself to create a child asset, there should be a new commit attach the asset itself.
- Every asset has a Tree file in IPFS to describe the property of the asset, including creator, creation time

EIP-7517: Open for feedback

EIP-7517: Content Consent for AI/ML Data Mining
■ EIPs erc

bofuchen   7 ✎   Sep 2023

A proposal adding "dataMiningPreference" in the metadata to preserve the digital content's original intent and respect creator's rights.

This EIP proposes a standardized approach to declaring mining preferences for digital media content on the EVM-compatible blockchains. This extends digital media metadata standards like ERC-7053 and NFT metadata standards like ERC-721 and ERC-1155, allowing asset creators to specify how their assets are used in data mining, AI training, and machine learning workflows.

Motivation

As digital assets become increasingly utilized in AI and machine learning workflows, it is critical that the rights and preferences of asset creators and license owners are respected, and the AI/ML creators can check and collect data easily and safely. Similar to robot.txt to websites, content owners and creators are looking for more direct control over how their creativities are used.

This proposal aims to propose a standardized method of declaring these preferences. Adding `dataMiningPreference` in the content metadata allows creators to include the information about how they want their work whether the asset may be used as part of a data mining or AI/ML training workflow. This ensures the original intent of the content is maintained.

For AI-focused applications, this information serves as a guideline, facilitating the ethical and efficient use of content while respecting the creator's rights and building a sustainable data mining and AI/ML environment.

https://ethereum-magicians.org/t/eip-7517-content-consent-for-ai-ml-data-mining/15755

🌐 NumbersProtocol.io

✉️ Hi@NumbersProtocol.io

Numbers

**Decentralized protocol to preserve
the values of both Human & AI creations**