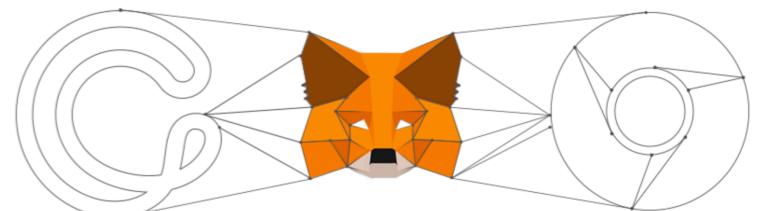


# Install MetaMask

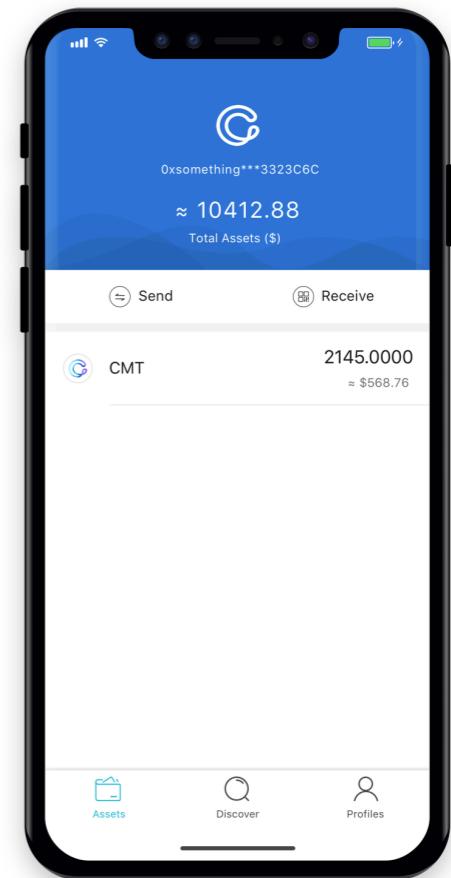
MetaMask For CMT: <https://www.cybermiles.io/metamask/>



Brings CyberMiles to your browser

# Install CMT Wallet

CMT Wallet: <https://www.cybermiles.io/cmt-wallet/>



# Remix for CMT

Remix CMT: <http://remix.cybermiles.io/#version= builtin>

ERC721



Kitty 2641



Kitty 2640

# Smart Contract 103

Zhun Shen, CyberMiles

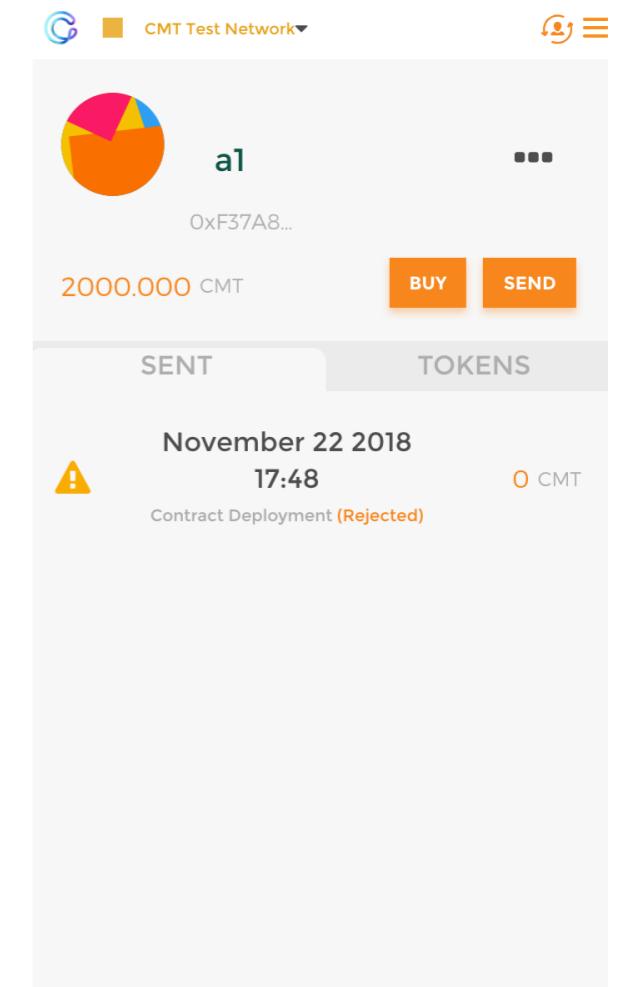
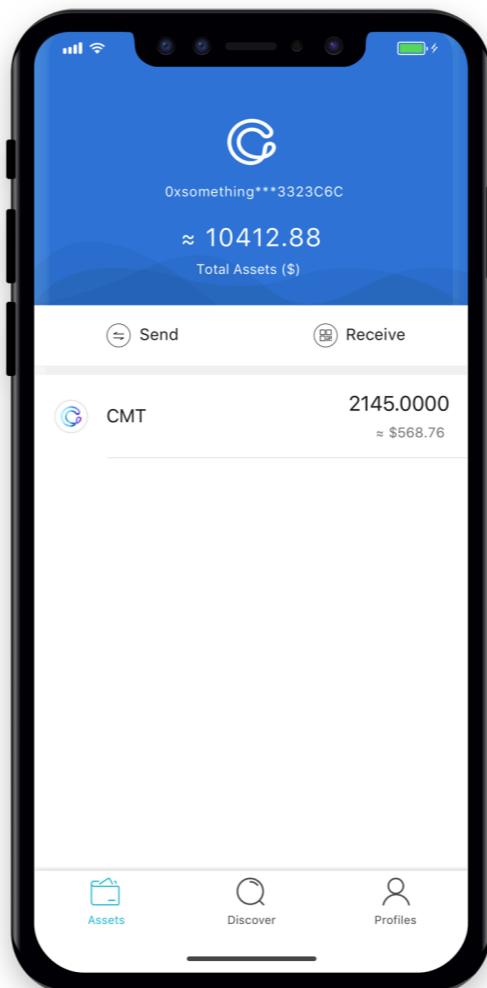
# Agenda

- Introduction of Smart Contract and DApp
- Warm-up: Hello World & Remix How-to
- ERC-721
- Create your own ERC721 Token
- Game: Biding a Painting
- QA

# Introduction

# Wallet

- CMT Wallet
- MetaMask
- imToken
- MyEtherWallet
- ...



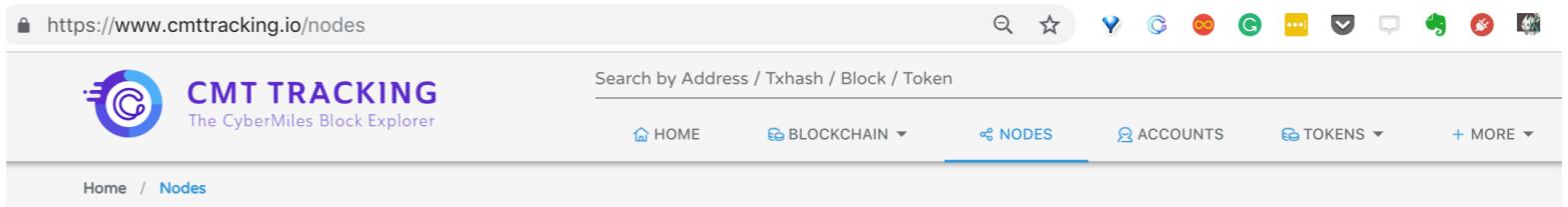
# Gas



To run an application on Ethereum  
**YOU NEED GAS**

# Validator Nodes

- Validator
- Delegator



The screenshot shows a web browser displaying the CMT Tracking website at <https://www.cmtracking.io/nodes>. The page title is "CMT TRACKING The CyberMiles Block Explorer". The navigation bar includes links for HOME, BLOCKCHAIN, NODES (which is underlined), ACCOUNTS, TOKENS, and MORE. Below the navigation is a search bar labeled "Search by Address / Txhash / Block / Token". The main content area is titled "Nodes" and displays a table of validator nodes. The table columns are: Name, Voting Power, Rank, Owner Address, Verified, State, Location, Total Stakes, and Compensation. The table lists 21 entries, each with a link to its details page.

Name	Voting Power	Rank	Owner Address	Verified	State	Location	Total Stakes	Compensation
Huobipool	6034201	1	0x64832de9...	Y	Validator	Beijing, China	18,697,488.86	50.00%
CyberMiles Vietnam	5950500	2	0x1b92c5bb...	Y	Validator	Sai Gon Vietnam	20,601,067.49	45.00%
SSnodes	5630576	3	0x55249a08...	Y	Validator	Shenzhen, China	26,777,865.44	30.00%
Kryptial Group	5066131	4	0x221507f2...	Y	Validator	Cayman Islands	25,456,251.53	40.00%
Noomi	3035192	5	0x70a52ff3...	Y	Validator	Malta	14,608,138.23	50.00%
Block Wonderland	2454528	6	0x858578e8...	Y	Validator	Osaka, Japan	14,269,031.43	20.00%
ArcBlock	2384371	7	0x9a3482fd...	Y	Validator	USA	7,579,880.38	50.00%
Hayek Capital	1774122	8	0x1724d4a8...	Y	Validator	Australia	7,977,886.07	50.00%
Wancloud	1613367	9	0x3af427d0...	Y	Validator	Shanghai, China	6,925,879.40	40.00%
Lvl99	1475966	10	0xcd3090e8...	Y	Validator	Jakarta, Indonesia	4,515,970.09	50.00%
COBINHOOD	1084823	11	0x89586183...	Y	Validator	Taipei, Taiwan	3,686,767.06	50.00%
TGL Capital	826364	12	0x1ac7d4f1...	Y	Validator	Beijing China	2,701,550.19	50.00%
Moon Fund	822574	13	0xeb65290b...	Y	Validator	San Francisco, USA	2,666,735.34	55.00%
Snow Eagle Group Limited	745698	14	0x0da518ec...	Y	Validator	Israel	2,470,486.03	50.00%
Hash Tower	683041	15	0xfd0e8e4c...	Y	Validator	Seoul, South Korea	2,271,780.86	50.00%
Portland Master Limited	608516	16	0x4cdaf011...	Y	Validator	Hong Kong	2,233,436.80	50.00%
LiMaGo	570972	17	0xf9a43166...	Y	Validator	Taipei Taiwan	2,167,319.76	50.00%
Ellipal	564415	18	0x77f05c29...	Y	Validator	Hongkong,China	5,743,397.18	20.00%
Seed Backup Validator	149494	19	0xe2185094...	Y	Validator	HK	508,794.86	99.00%
Seed Backup Validator	139561	20	0x04ba6cf9...	Y	Backup Validator	HK	474,990.54	99.00%
Cobo Validator	134508	21	0x73879b18...	N	Backup Validator	Beijing, China	544,234.89	50.00%

<https://www.cmtracking.io/>

# DApp

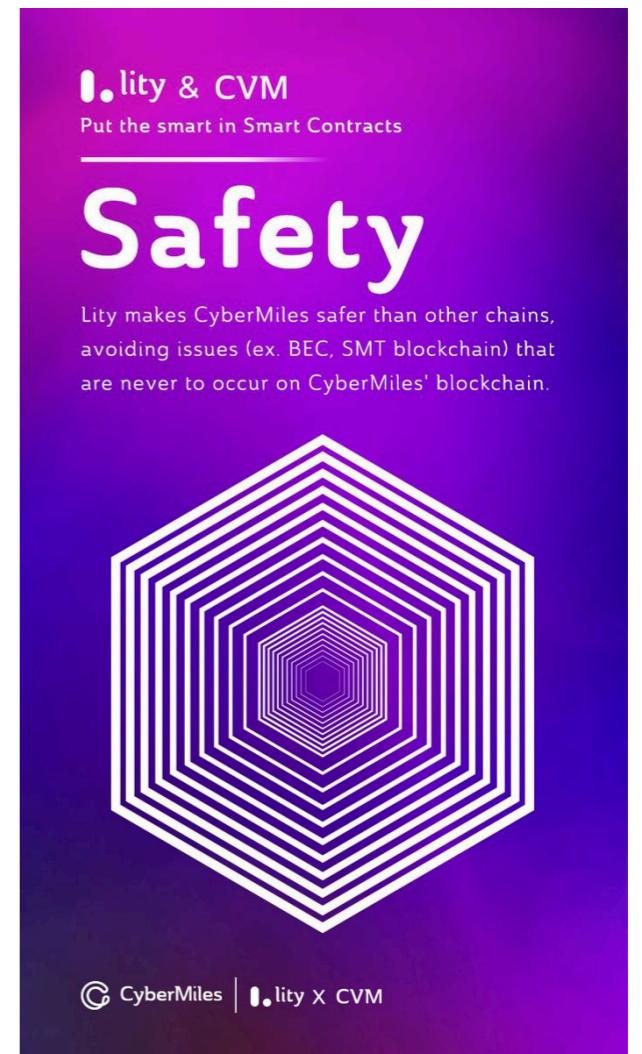


## What is CryptoKitties?

CryptoKitties is a game centered around breedable, collectible, and oh-so-adorable creatures we call CryptoKitties! Each cat is one-of-a-kind and 100% owned by you; it cannot be replicated, taken away, or destroyed.

# Language & Compiler

- Lity (powerful)
- Solidity
- ...



<https://www.litylang.org/>

# Consensus Mechanism

- Proof of Work (POW)
- Delegated Proof of Stake (DPOS)
- ...

# **Warm-up**

# Hello World

33 lines (25 sloc) | 694 Bytes

```
1 pragma lity ^1.2.4;
2
3 contract HelloWorld {
4
5     mapping(address => string) userMessage;
6     address public owner;
7
8     modifier onlyOwner() {
9         assert(msg.sender == owner);
10        _;
11    }
12
13    constructor () public {
14        userMessage[msg.sender] = "Hello world";
15        owner = msg.sender;
16    }
17
18    function updateMessage (string _new_msg) public {
19        userMessage[msg.sender] = _new_msg;
20    }
21
22    function sayHello() public view returns (string) {
23        return userMessage[msg.sender];
24    }
25
26    function sayHelloByAddress(address addr) public view returns (string) {
27        return userMessage[addr];
28    }
29
30    function terminate() external onlyOwner {
31        selfdestruct(owner);
32    }
33 }
```

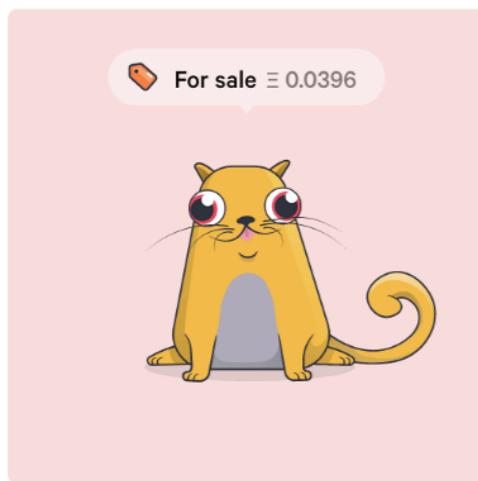
**ERC-721**

# What's ERC721(NFT)?

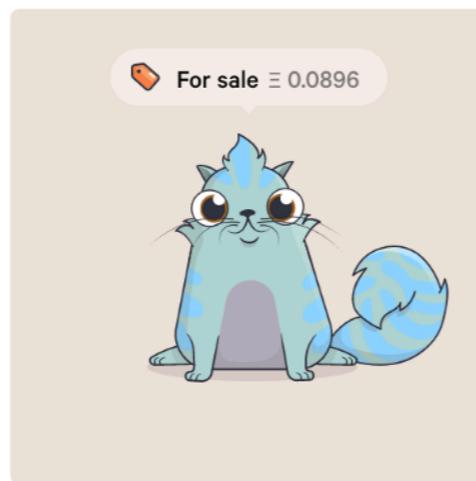
The screenshot shows a GitHub repository page for the Ethereum/EIPs repository. The repository name is "ethereum / EIPs". The main navigation tabs are "Code", "Issues 333", "Pull requests 96", "Releases", and "More". The "Issues" tab is selected. The specific issue shown is titled "ERC: Non-fungible Token Standard #721". The issue is labeled as "Open" and was created by "dete" on Sep 23, 2017, with 365 comments. A green "New issue" button is visible on the right. The issue content discusses the acceptance and merging of the proposal as a draft standard, pointing to the "officially tracked version". It also mentions PR #841 and thread #721 for further discussion. Below the content are social sharing icons and a reaction bar with counts: 157 likes, 3 dislikes, 6 emojis, 28 reactions, and 14 hearts. To the right of the issue content, there are sections for "Assignees" (No one assigned), "Labels" (None yet), "Projects" (None yet), and "Milestone" (No milestone).

<https://github.com/ethereum/eips/issues/721>

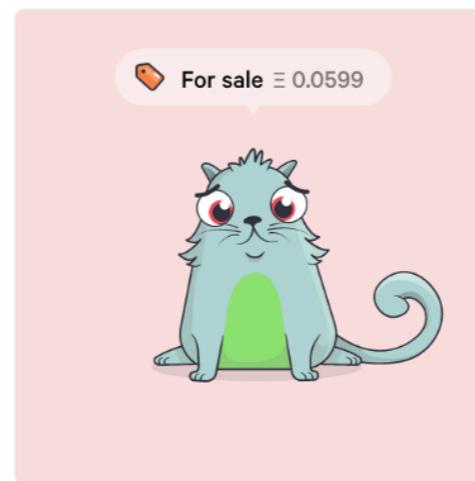
# NFT: CryptoKitties



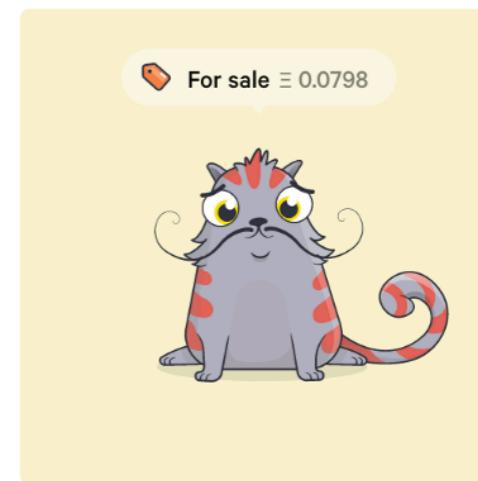
Kitty 240616 · Gen 8  
Snappy



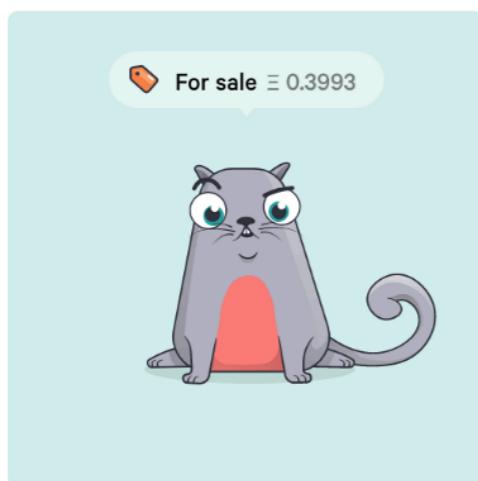
Kitty 240611 · Gen 4  
Swift



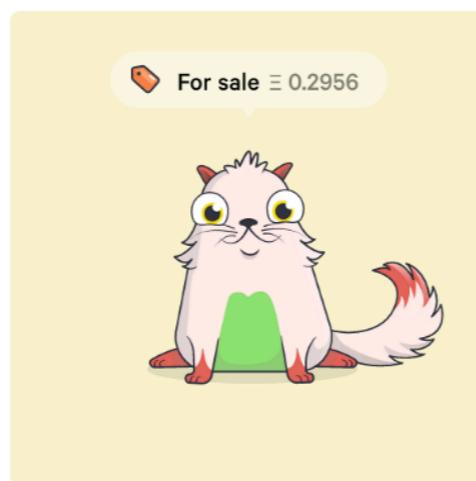
Kitty 240609 · Gen 7  
Snappy



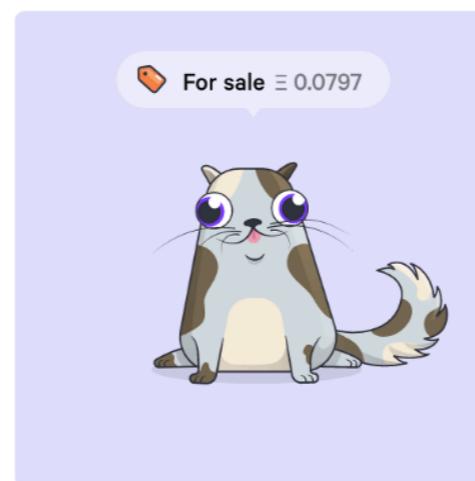
Kitty 240603 · Gen 7  
Snappy



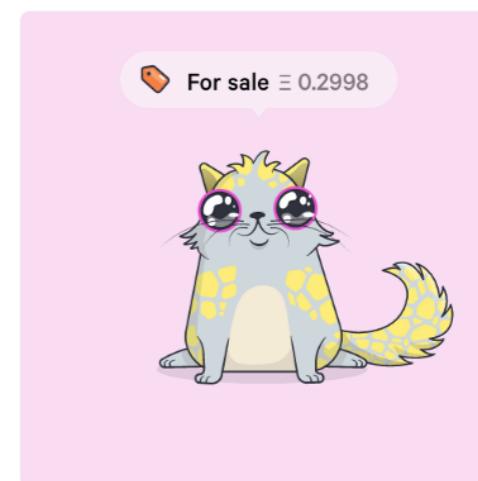
Kitty 240601 · Gen 9  
Snappy



Kitty 240570 · Gen 7  
Snappy

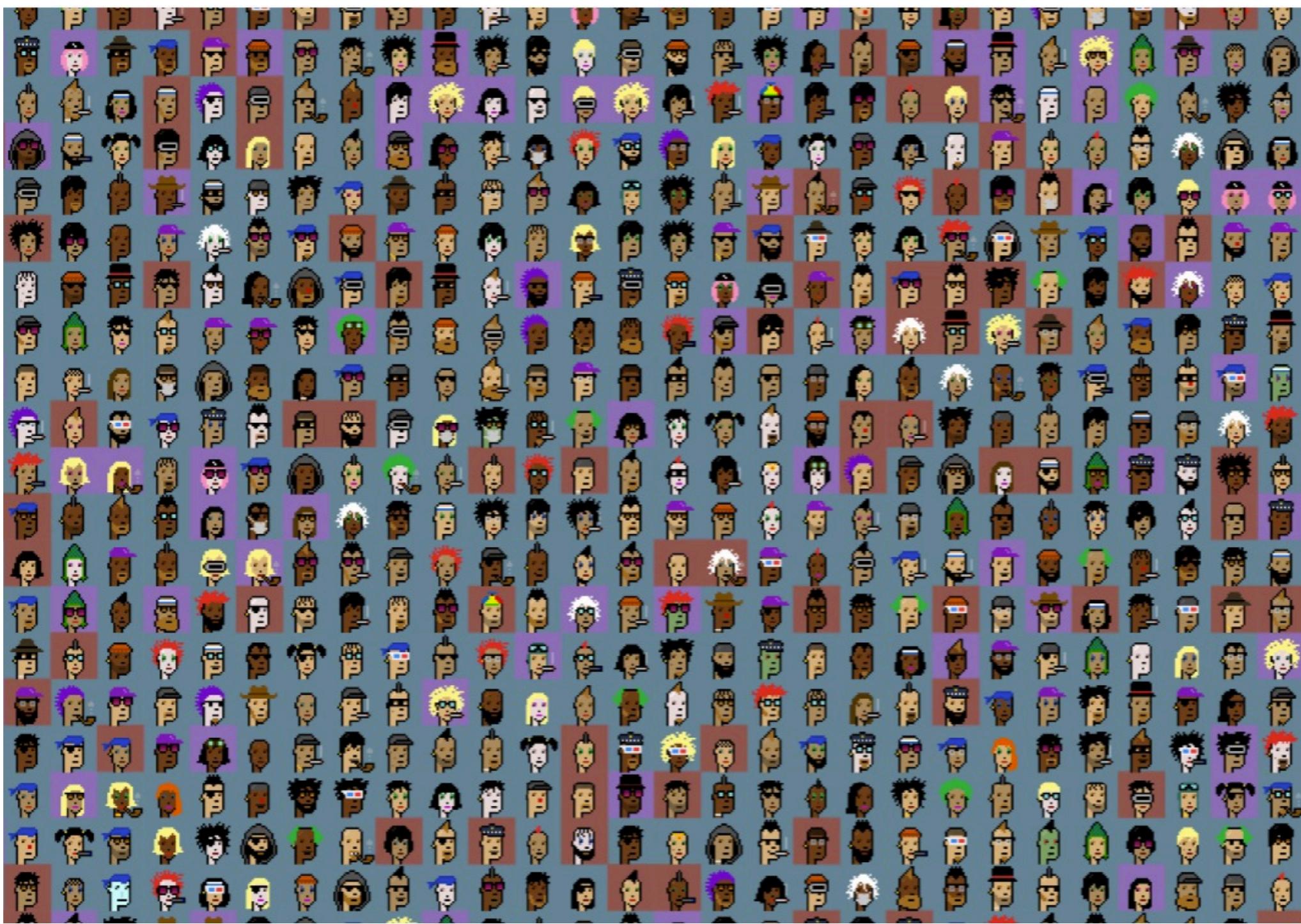


Kitty 240568 · Gen 15  
Plodding

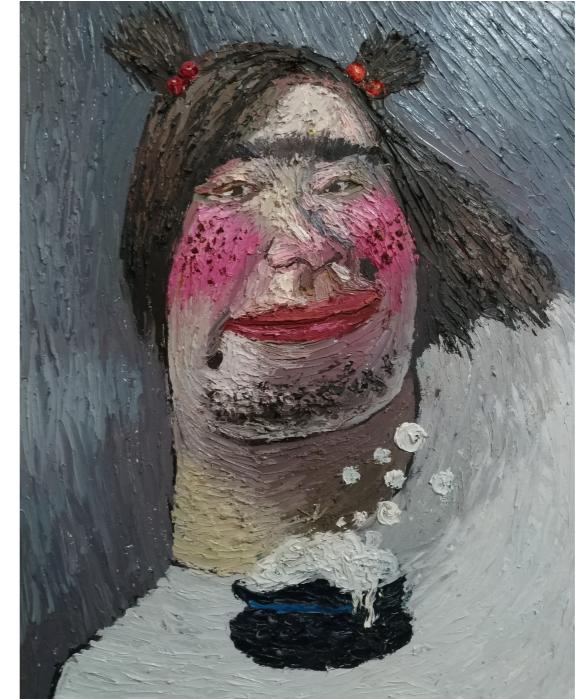


Kitty 240560 · Gen 9  
Snappy

# NFT: CryptoPunks



# NFT: Painting



# Methods

MyNFT at 0x7d9...ca498 (blockchain)		
addMinter	address account	▼
approve	address to, uint256 tokenId	▼
mint	address to, uint256 tokenId	▼
renounceMinter		
safeTransferFrom	address from, address to, uint256 tokenId	▼
safeTransferFrom	address from, address to, uint256 tokenId, bytes _data	▼
setApprovalForAll	address to, bool approved	▼
transferFrom	address from, address to, uint256 tokenId	▼
balanceOf	address owner	▼
getApproved	uint256 tokenId	▼
isApprovedForAll	address owner, address operator	▼
isMinter	address account	▼
name		
ownerOf	uint256 tokenId	▼
supportsInterface	bytes4 interfaceld	▼
symbol		
tokenByIndex	uint256 index	▼
tokenOfOwnerByIndex	address owner, uint256 index	▼
tokenURI	uint256 tokenId	▼
totalSupply		

<https://github.com/ethereum/EIPs/blob/master/EIPS/eip-721.md>

**Let's create your own NFTs**

Not Secure | remix.cybermiles.io/#version= builtin

browser/PaintingMasterPiece.sol

```
1 pragma lity ^1.2.4;
2
3 // File: openzeppelin-solidity/contracts/introspection/IERC165.sol
4
5 /**
6  * @title IERC165
7  * @dev https://github.com/ethereum/EIPs/blob/master/EIPS/eip-165.md
8  */
9 interface IERC165 {
10 /**
11  * @notice Query if a contract implements an interface
12  * @param interfaceId The interface identifier, as specified in ERC-165
13  * @dev Interface identification is specified in ERC-165. This function
14  * uses less than 30,000 gas.
15  */
16 function supportsInterface(bytes4 interfaceId)
17     external
18     view
19     returns (bool);
20 }
21
22 // File: openzeppelin-solidity/contracts/token/ERC721/IERC721.sol
23
24 /**
25  * @title ERC721 Non-Fungible Token Standard basic interface
26  * @dev see https://github.com/ethereum/EIPs/blob/master/EIPS/eip-721.md
27  */
28 contract IERC721 is IERC165 {
29
30     event Transfer(
31         address indexed from,
32         address indexed to,
33         uint256 indexed tokenId
34     );
35     event Approval(
36         address indexed owner,
37         address indexed approved,
38         uint256 indexed tokenId
39     );
40     event ApprovalForAll(
41         address indexed owner,
42         address indexed operator
43     );
44 }
```

ContractDefinition MyNFT 0 reference(s)

Compile Run Settings

Current version:1.2.4+commit.64034966.Emscripten.clang

Select new compiler version

Start to compile Auto compile Hide warnings

MyNFT

Details Publish on Swarm ABI Bytecode

Address

ERC165

ERC721

ERC721Enumerable

ERC721Full

ERC721Metadata

ERC721Mintable

IERC165

IERC721

[2] only remix transactions, script Search transactions

# Game Time





# Q&A