

MEV NFT (a ERC-721 fork)

A talk about NFT Arbitrage

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What started this talk?



@bertcmiller ⚡🛡️
@bertcmiller

...

New MEV just dropped: @moonbirds_xyz arbitrage

Searcher bought for 44 ETH and sold it for 240 ETH in the same transaction, pocketing a cool ~180 ETH for themselves after fees

etherscan.io/tx/0x0659a203b...



4:04 nachm. · 21. Apr. 2022 · Twitter Web App

Question:
What happens if you click swap?



Swap

Tokens

Pool



Connect | ▾

Swap



1

\$1,297.76

ETH ▾



11.7253

\$1,293.79 (-0.306%)

GNO ▾

1 GNO = 0.08529 ETH (\$110.34)

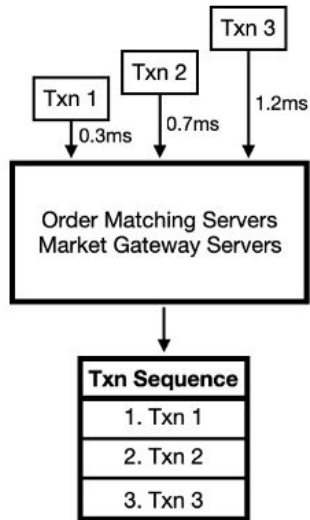
\$3.04 ▾

Connect Wallet

Technical explanation

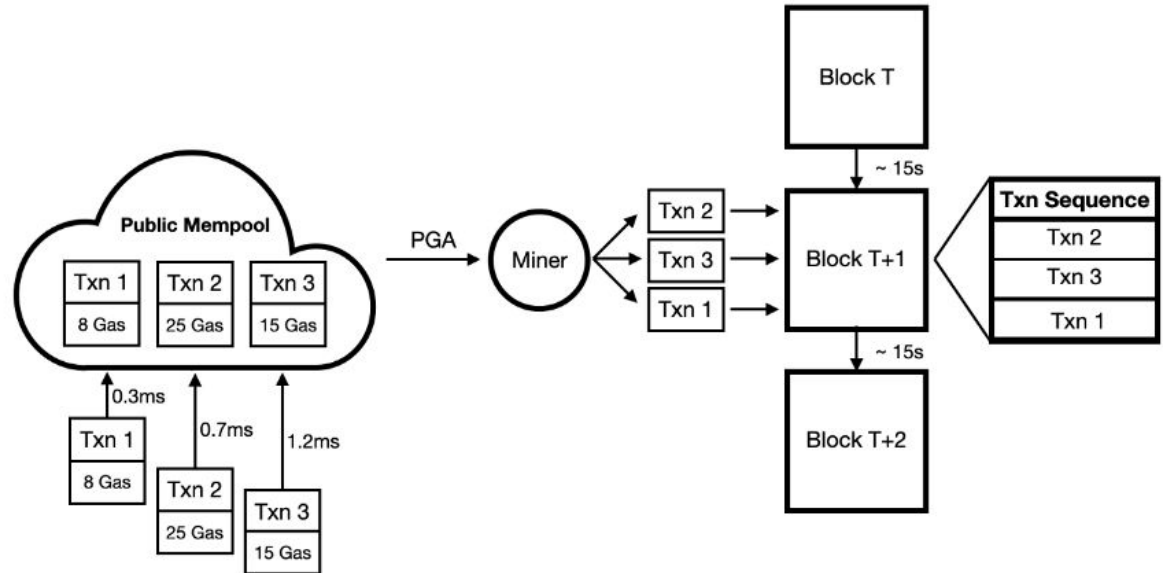
Traditional Markets

Order Sequence's Economic Value is Preserved



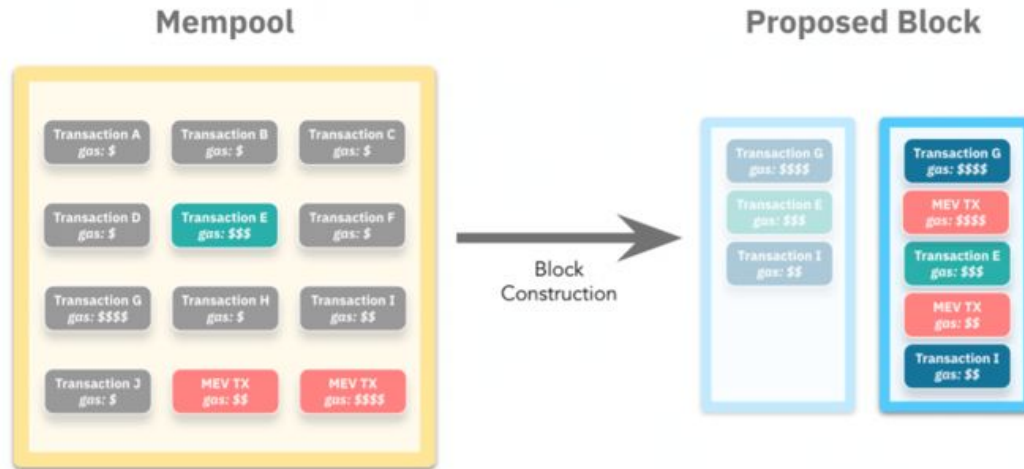
Crypto Markets

Order Sequence Determined by Gas Fee, Creating MEV



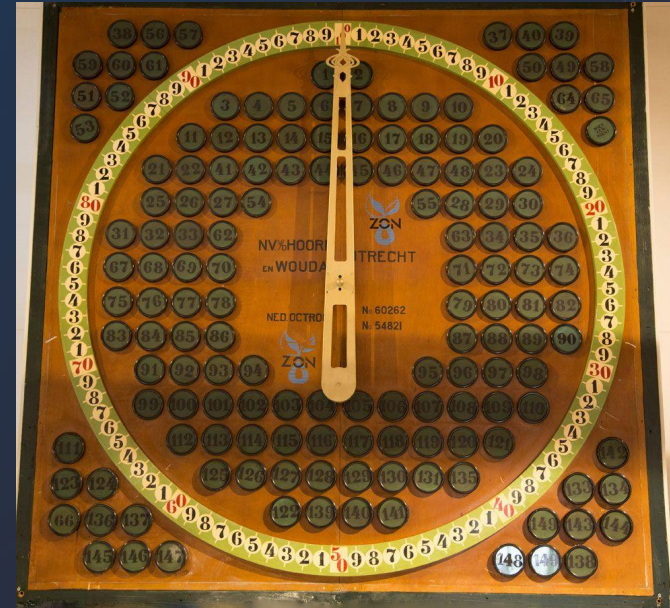
Proof of Stake

Transaction Ordering Sandwich Attacks



Example before blockchain: Tulip auctions

- Public tulip auctions since 17th-century
- For each flower the clock counts from high price to low price
- Bid by pressing a button
- MEV:
60% of flowers are sold in advance by contract now, bypassing the clocks entirely.



Dutch auction clock (Source: BBC)

NFTs

- Smart contract (ERC-721)
- Similar to a token (ERC-20), but non fungible (entities with ID)
- Top 10 gas spender (OpenSea)
- Search volume:
 - “create ERC20 token”: 1K – 10K
 - “create nft”: 10K – 100K
- Conclusion: NFTs are mainstream



Question: What happens if you place a collection bid?



Milady Maker

Created by 0xb520f...4778

Milady Maker is a collection of 10,000 generative pfpNFT's in a neochibi aesthetic inspired by street style tribes.

Floor	0.3188 ETH
Volume	10.9K ETH
Items	10.1K
Owners	3.1K

Blockchain	Ethereum
Address	0x5af...25a5

Create marketplace

Place a bid for any NFT
from this collection

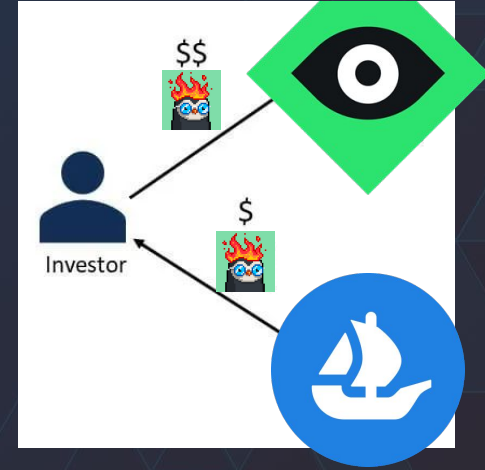
Place a bid





Definition of arbitrage

Arbitrage is the simultaneous purchase and sale of the same asset in different markets in order to profit from tiny differences in the asset's listed price. It exploits short-lived variations in the price of identical or similar financial instruments in different markets or in different forms.



Definition: Investopedia

Graphic: @jayveg

@bertcmiller ⚡
@bertcmiller

...

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Amber Group ✓
@ambergroup_io

...

Reproducing the \$APE Airdrop Flash Loan Arbitrage/Exploit

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medium.com

Reproducing the \$APE Airdrop Flash Loan Arbitrage/Exploit

On March 17th 2022, an airdrop equivalent to 15% of the total supply of ApeCoin was distributed to BAYC/MAYC owners [1]. To claim the...

10:46 nachm. · 21. März 2022 · Twitter Web App

13 Retweets · 2 Zitierte Tweets · 35 „Gefällt mir“-Angaben

Step 1: Illuminate the dark forest

- Washtrading: Volume vs. floor price
- Flashbots for frontrunning protection / gas minimization
- Understand bribed mints
- Commit reveal auctions
- Whitelisting

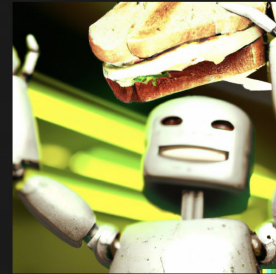
./ MEV Olympics



Who is the top of the block in 2022?

13 August 2022

Sandwich Connoisseur



The champion of this discipline will be awarded with the NFT if he sandwich contract

Claim your NFT under this address on Goerli:

`0x51efff19ab9a88a9133dc413c3ef664f8d2682e2`



Evanss6.eth

@Evan_ss6 · Follow



Here's a successful sandwich attack on Uniswap FARM/ETH pool:

1 (sandwich open): etherscan.io/tx/0x699de2603...

2 (target): etherscan.io/tx/0xd82a86f83...

3 (sandwich close): etherscan.io/tx/0x699de2603...

Profit: ~14eth (\$24,000)

<https://mev.tools>

Step 2



ERC-721 Fork

Code / Idea:

- Store each transfer of an tokenId into a mapping
- Store last block
- Check if token has been transferred in this block
- Revert

```
contract NonAtomicNFT is ERC721, AccessControl {
    using Counters for Counters.Counter;

    mapping(uint => uint) public tokenBlocks; // tokenId => block number

    bytes32 public constant MINTER_ROLE = keccak256("MINTER_ROLE");
    Counters.Counter private _tokenIdCounter;

    constructor(string memory name, string memory symbol) ERC721(name, symbol) {
        _setupRole(DEFAULT_ADMIN_ROLE, msg.sender);
        _setupRole(MINTER_ROLE, msg.sender);
    }

    /// @notice disallow transfers of a token in the same block
    modifier nonAtomic(uint tokenId) {
        require(tokenBlocks[tokenId] != block.number, "can't transfer in the same block");
        tokenBlocks[tokenId] = block.number;
        _;
    }

    /// @notice disallow transfers of a token in the same block

    function transferFrom(
        address from,
        address to,
        uint256 tokenId
    ) public nonAtomic(tokenId) override(ERC721) {
        super.transferFrom(from, to, tokenId);
    }
}
```

Conclusion

- Different stakeholders (markets, traders, users)
- NFT long tail
- Didn't read just ape
- Varying volume
- Users long term interest
- Regulations

The screenshot displays an NFT marketplace interface. At the top, a blue banner reads "Shop NFTs at the best prices from more marketplaces". Below this, a navigation bar includes "Discover", "Shop", "Trending", and "Drops". A "Connect Wallet" button is visible in the top right. The main content area features a large "SOLD OUT" message over a collection of NFTs, which are portraits of Bill Murray with 3D glasses. A "View collection" button is present. To the right, a sidebar provides details for the collection "Otherdeed", including its contract address, an example address, a trust score of 70, and historical activity metrics. Below the main image, the text "Murray 1000" is visible, along with a "Share" button. At the bottom, a table shows statistics: Price, Owners (79), and Total sales (121.5 ETH). A "Links" section includes icons for Discord, Twitter, and a globe. A "Creators" section lists "Bill Murray".

Shop NFTs at the best prices from more marketplaces

Connect Wallet Settings

Discover Shop Trending Drops

Data provided by MEV NFT

0x34d85c9cdeb28fa97cb08333b511ac86e1c4e25d

Collection: Otherdeed

Example: 0xbc4ca0eda7647a8ab7c2061c2e118a18a936f13d

Trust score 70

Historic MEV Activity 0.0448% high (114)

Historic Phishing Activity 0.0491% very high (125)

Diamond hands 42637

Max holding time since 2022-05-01 21:14:27

SOLD OUT

This drop

View collection

Murray 1000

Share

Links

Creators

Bill Murray

Price	Owners	Total sales
-	79	121.5 ETH



Thank you!

Franz Krekeler
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@filmfranz



Atomic transactions?

Transaction
(tx in the block)

method call
stack trace
revert or execute

Block number: 15180737 at 2022-07-20 17:03:07 UTC
Tx cost: 0.004005864 ETH / 6.26 USD
Gas used: 87,084 / 46.00 Gwei

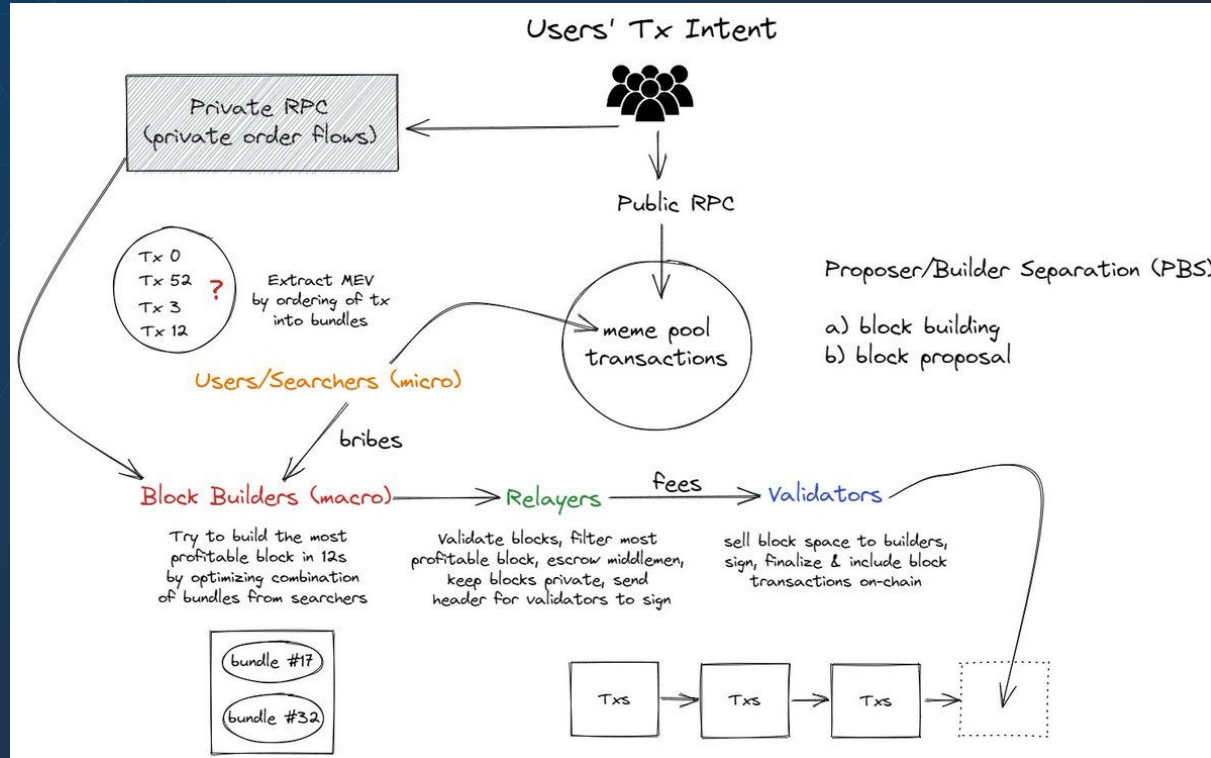
Emitted events:

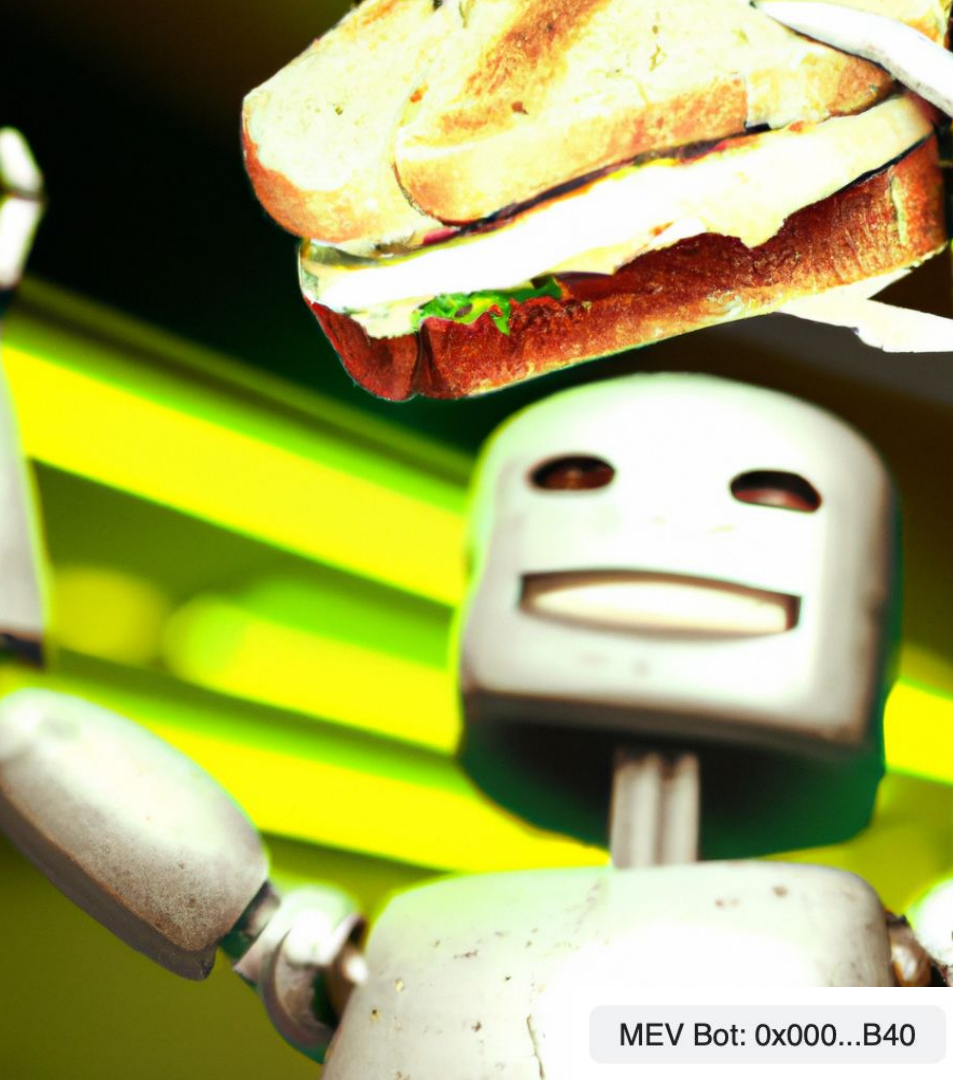
```
[21] WETH.Transfer(src=[receiver] 0x00000000003b3cc22af3ae1eac0440bcee416b40, dst=UNI-V2, wad=0.713685685944451)
[22] eRSDL.Transfer(from=UNI-V2, to=[receiver] 0x00000000003b3cc22af3ae1eac0440bcee416b40, value=157629.866360565)
[23] UNI-V2.Sync(reserve0=18263793572862595272433727, reserve1=83156845221068121764)
[24] UNI-V2.Swap(sender=[receiver] 0x00000000003b3cc22af3ae1eac0440bcee416b40, amount0In=0, amount1In=713685685944451)
```

Account balances:

Address	Token	Balance
[receiver] 0x00000000003b3cc22af3ae1eac0440bcee416b40	WETH	-0.7137
	eRSDL	157,629.8664
UNI-V2	WETH	0.7137
	eRSDL	-157,629.8664

MEV in POS Ethereum





MEV Bot: 0x000...B40

Forms of MEV

- Insertion
- Ordering
- Blocking
- Sandwiching
- Frontrunning
- Arbitrage