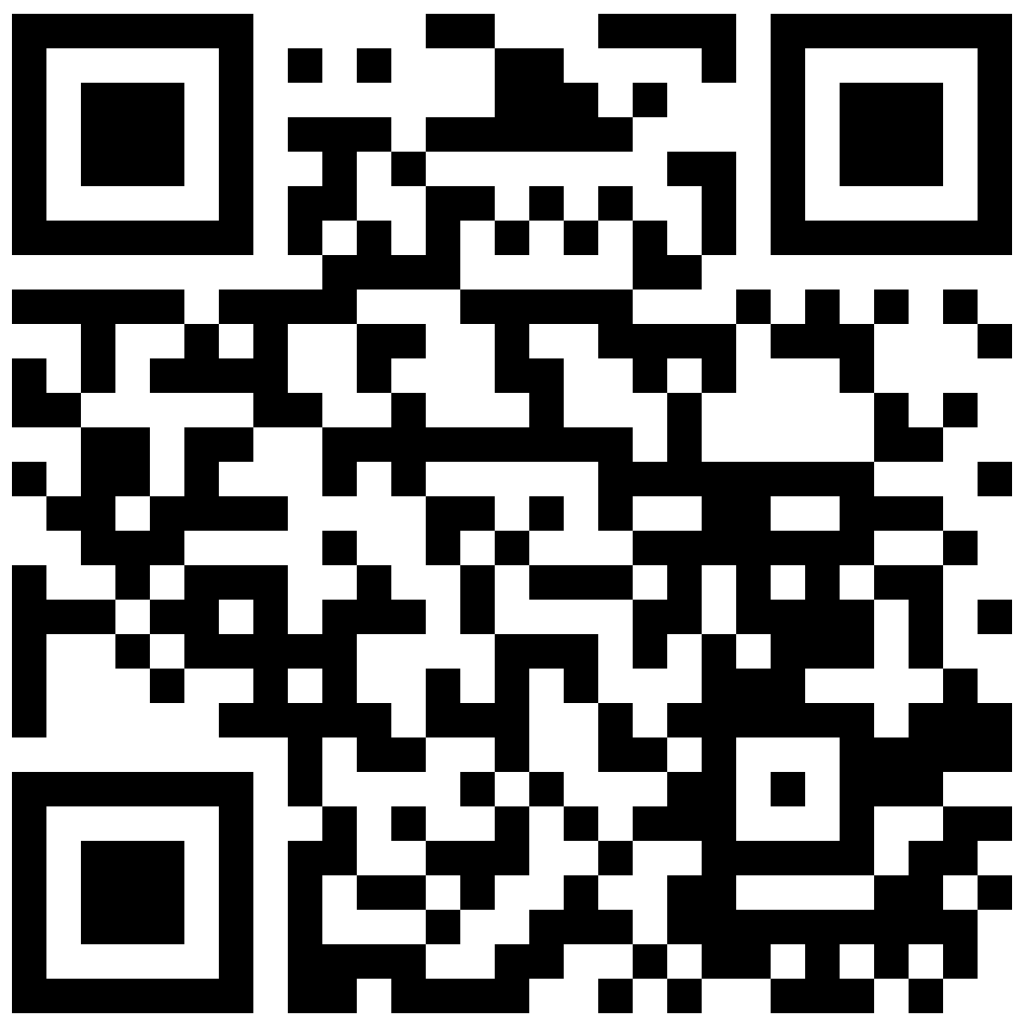


Impacts of widespread Utreexo adoption

How Utreexo changes incentives for protocols and end users



<https://github.com/kcalvinalvin/2024-btc-singapore>

Me!

Calvin Kim

- Research & implementation on Utreexo for 5 years
- Bitmex 2020-2023
- HRF 2023-2024



What you guys should take away!

3 things

- What is Utreexo

- What is Utreexo
- What are the benefits for end users

- What is Utreexo
- What are the benefits for end users
- **What are the impacts on the Bitcoin ecosystem**

What is Utreexo?

**Replace the database used
for the UTXO set with fancy
merkle trees**



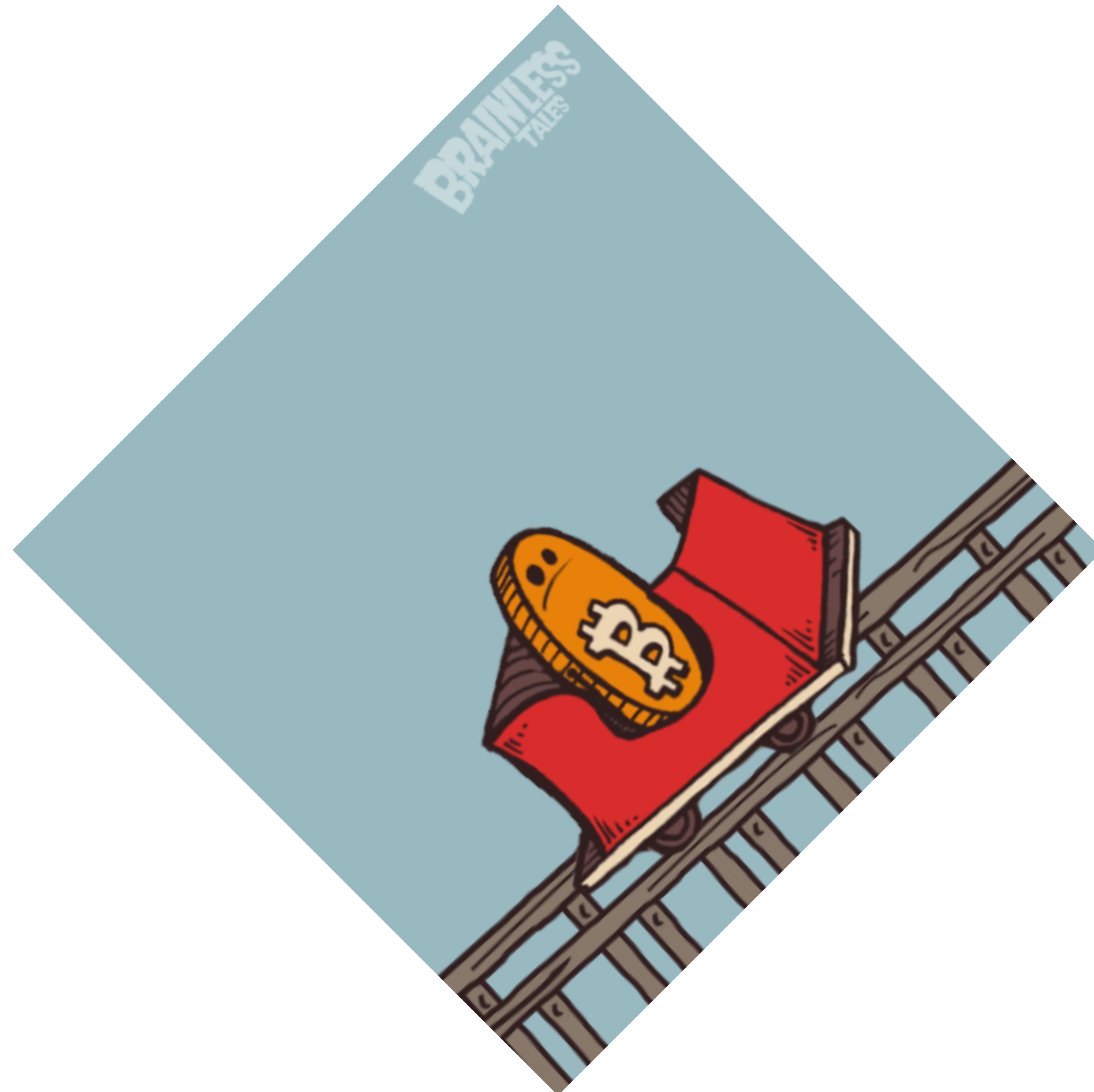
Merkle
trees



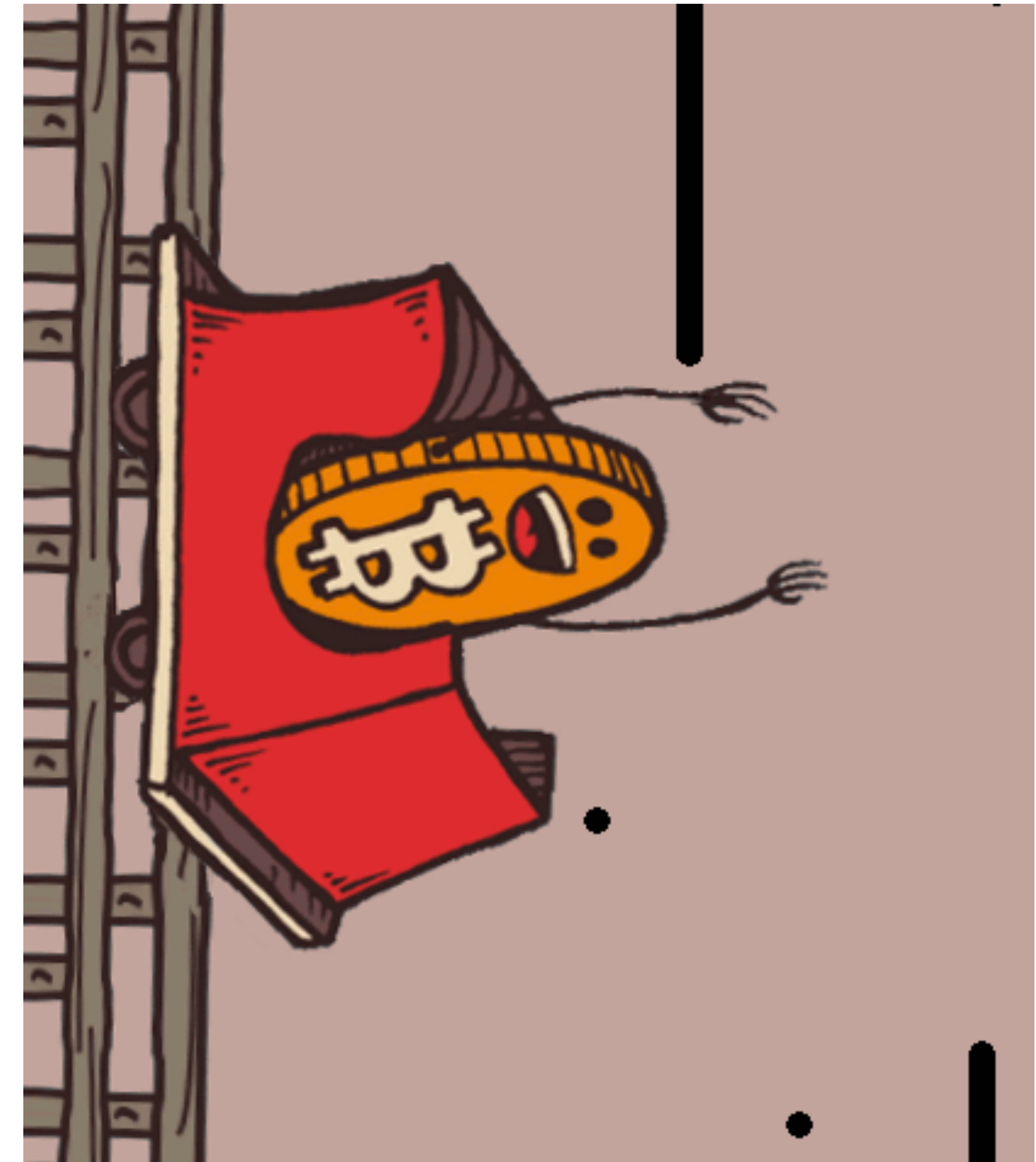
Utreexo

Why?

Internet usage
CPU



disk read/write
disk usage
RAM usage



Tradeoffs

- Use slightly more CPU and more internet

Tradeoffs

- Use slightly more CPU and more internet
- **Massively save on disk read/write, disk usage, and RAM usage**

What are the benefits for end users?

**Better UX for running fully
validating nodes**

Fully Validating Nodes

- Nodes that check all blocks/txs follow Bitcoin consensus rules

Why is it important?

For an individual

- Only way to be sovereign

Why is it important?

For the Bitcoin network

- Miners may cheat if there aren't enough nodes on the network

With Utreexo:

- Web browser full nodes
- Mobile wallet full nodes

Features

Over traditional fully validating nodes

- Immediate bootstrap

Features

Over traditional fully validating nodes

- Immediate bootstrap
- Less than 1KB of memory usage from 10GB

Features

Over traditional fully validating nodes

- Immediate bootstrap
- Less than 1KB of memory usage from 10GB
- Lower device resource usage

Impacts on the Bitcoin Ecosystem

**Assuming that significant amount
of nodes are utreexo nodes**

Current full nodes

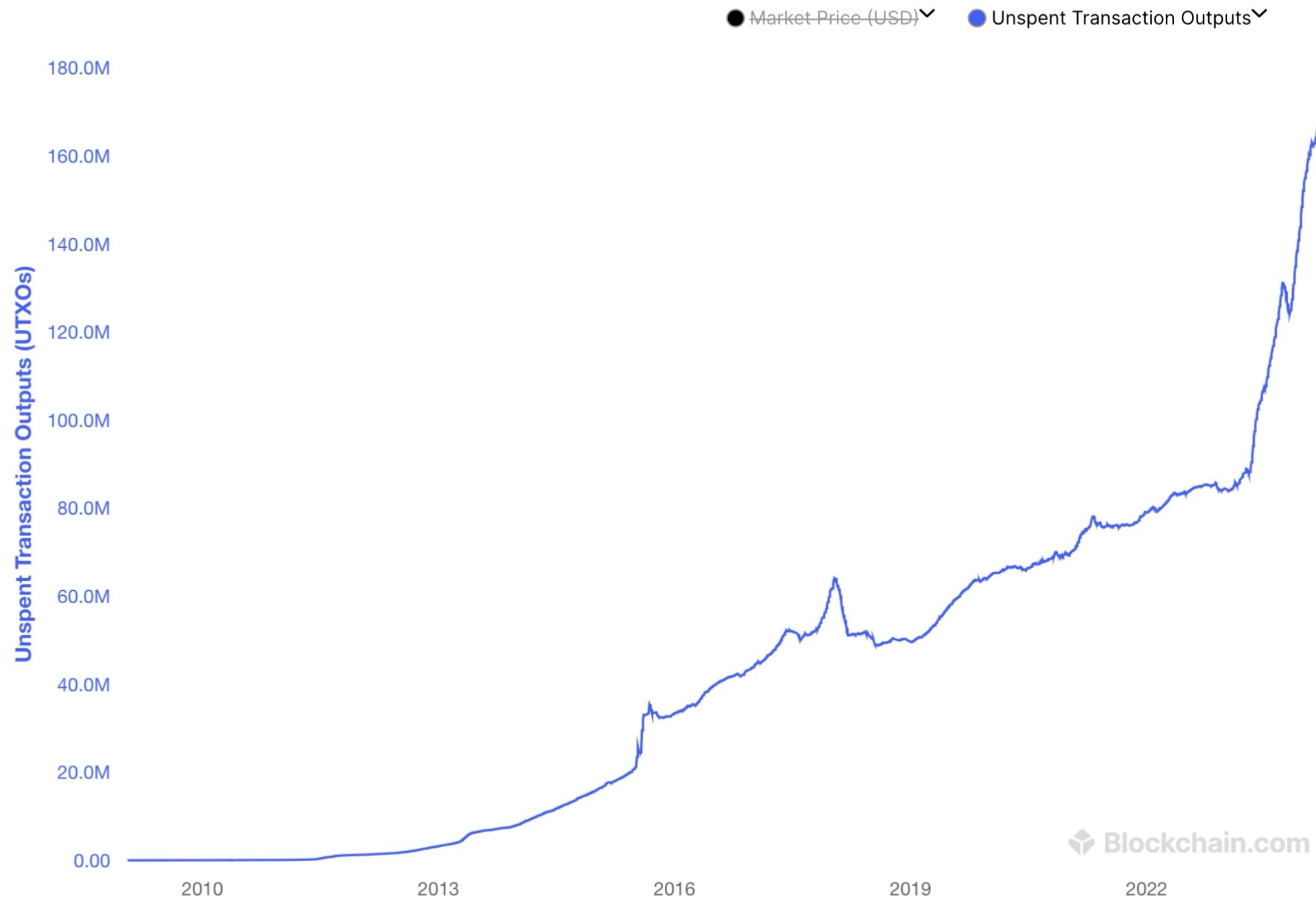
- Everyone stores the entire UTXO set

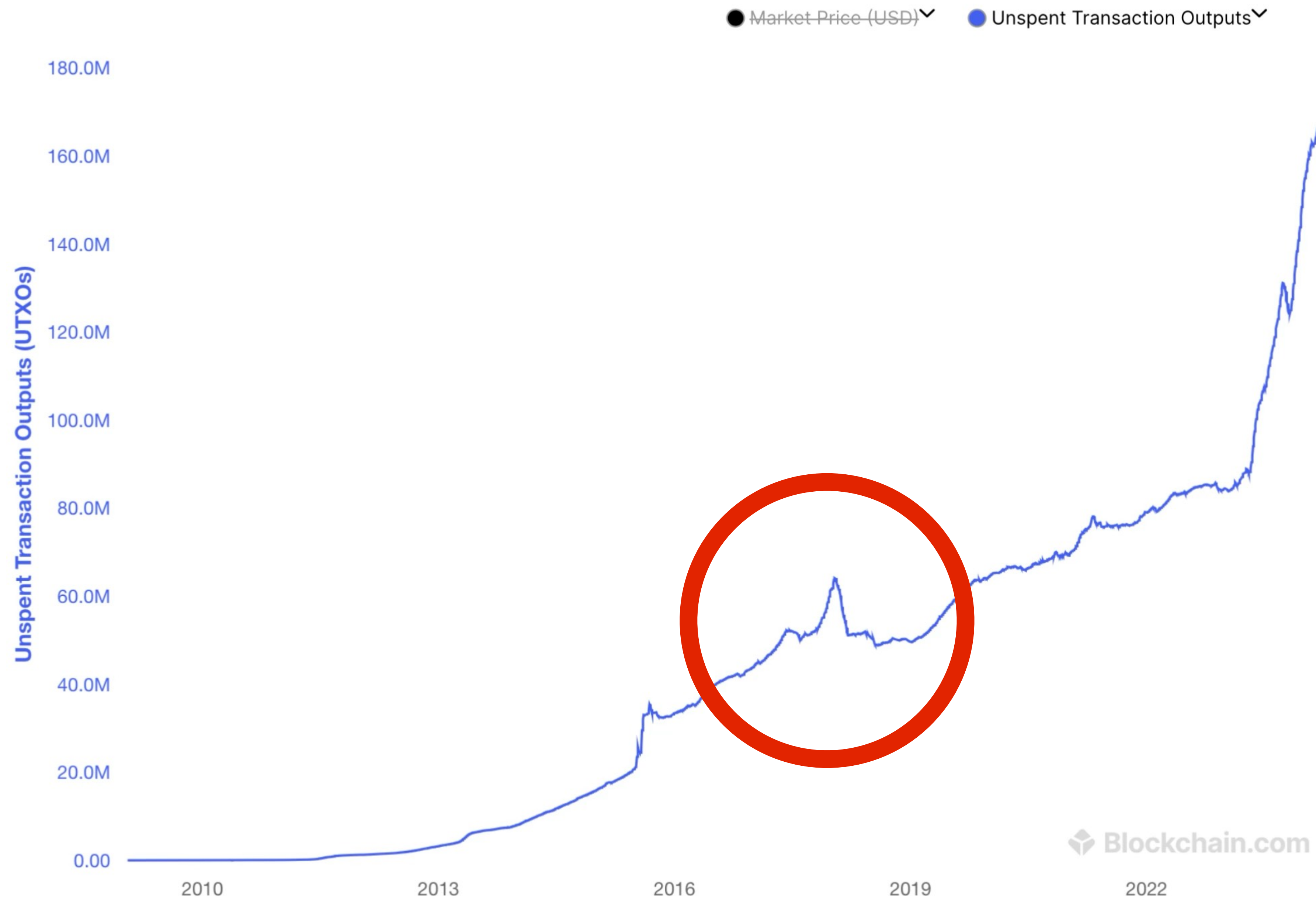
Current full nodes

- Everyone stores the entire UTXO set
- I have the burden of storage if someone else creates a lot of UTXOs

One time fee and free forever

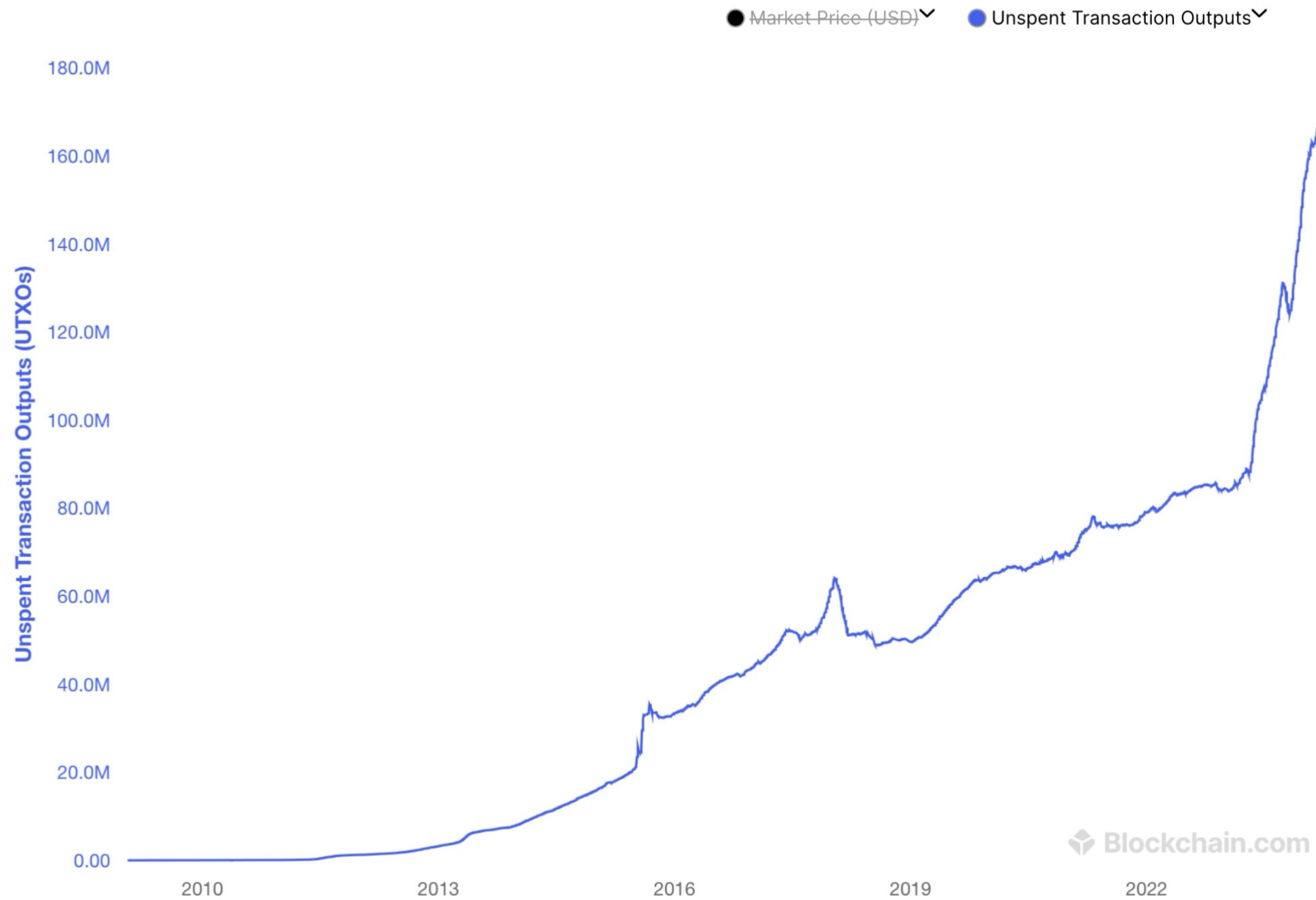
coinbase

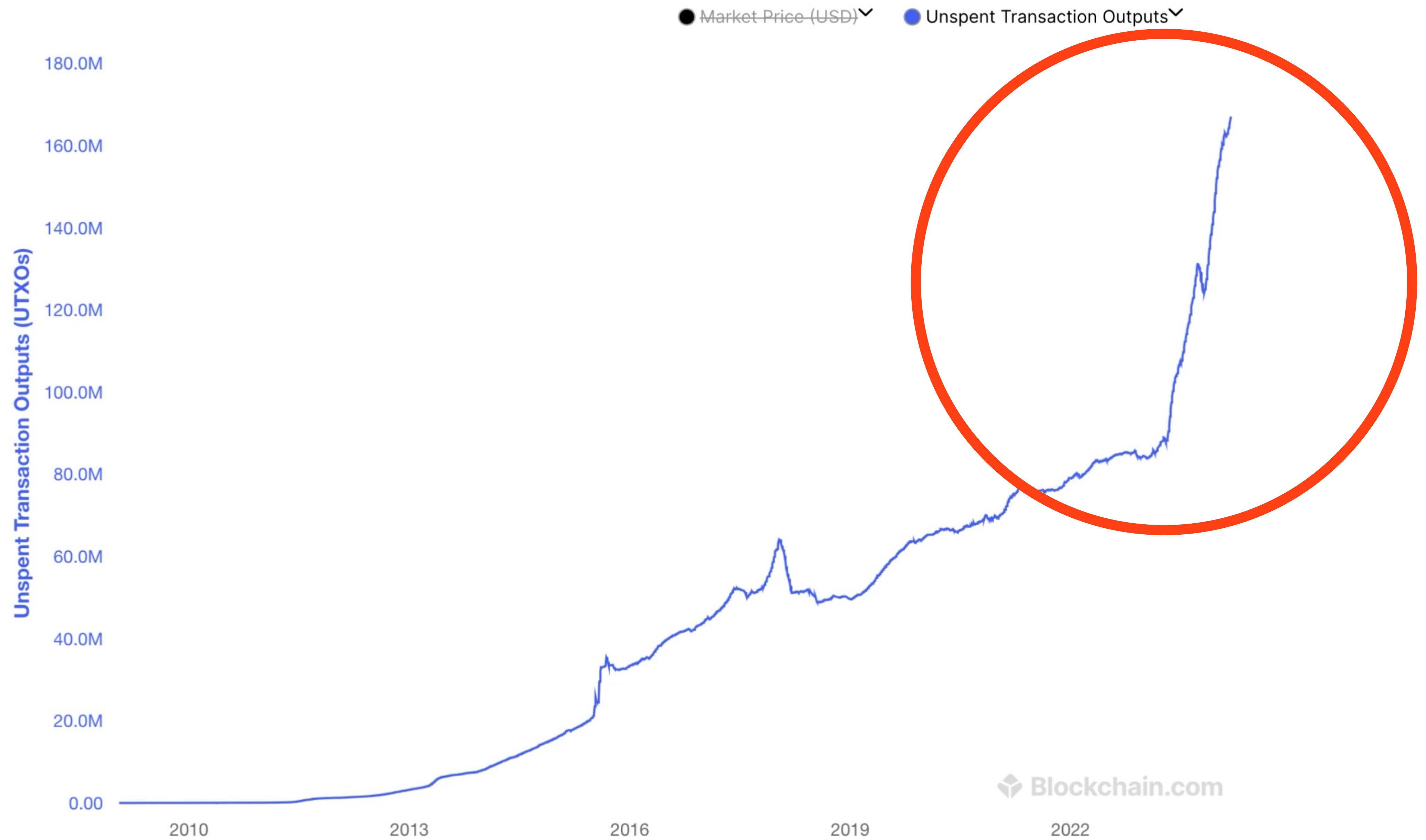




coinbase

Ordinals





coinbase

Ordinals

BITCOIN STAMPS

Unprunable UTXO Art, Because Sats Don't Exist.

Why is the UTXO set growth bad?

- **Increases storage requirements**

Why is the UTXO set growth bad?

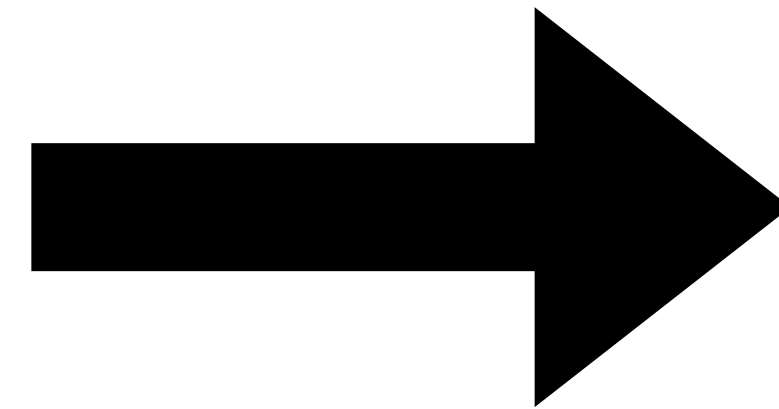
- Increases storage requirements
- Increased cost for block/tx validation as the UTXO set gets bigger

With Utreexo

- Adds the burden of storage when creating a UTXO

Burden of Storage

Everyone



Owner of
the UTXO

No more free storage

- Current incentive structure doesn't account for the data storage overhead

No more free storage

- Current incentive structure doesn't account for the data storage overhead
- Utreexo solves this problem by making the creator store the UTXO

- What is Utreexo
- The benefits for end users
- The impacts on the Bitcoin ecosystem

Alpha release imminent!

Resources

- github.com/utreeexo/utreeexod
- <https://github.com/Davidson-Souza/Floresta>