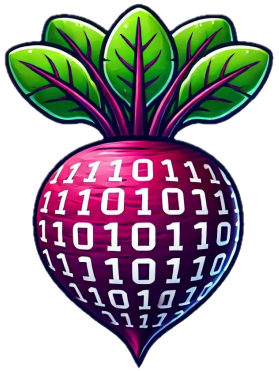
21 Million Bitcoin?

by BitRoot



1

21 Million Supply Cap?

- Bitcoin Supply Formula
- Bitcoin Source Code Analysis

2

Why can the Supply Cap **not** be changed?
(People have tried before!)

Basics Bitcoin Network

Who has control over Bitcoin within the Network?

Bitcoin Supply Formula

Each Term represents the **Bitcoin Block Reward** that goes to Bitcoin Miners within one Period (“Epoch”).

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{50}{2^i}\right)$$

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The maximal (initial) Block Reward.

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Reward halving after each Epoch

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The maximal (initial) Block Reward.

The current Epoch

The number of Blocks mined in each Epoch (on avg. one in 10 min)

Reward halving after each Epoch

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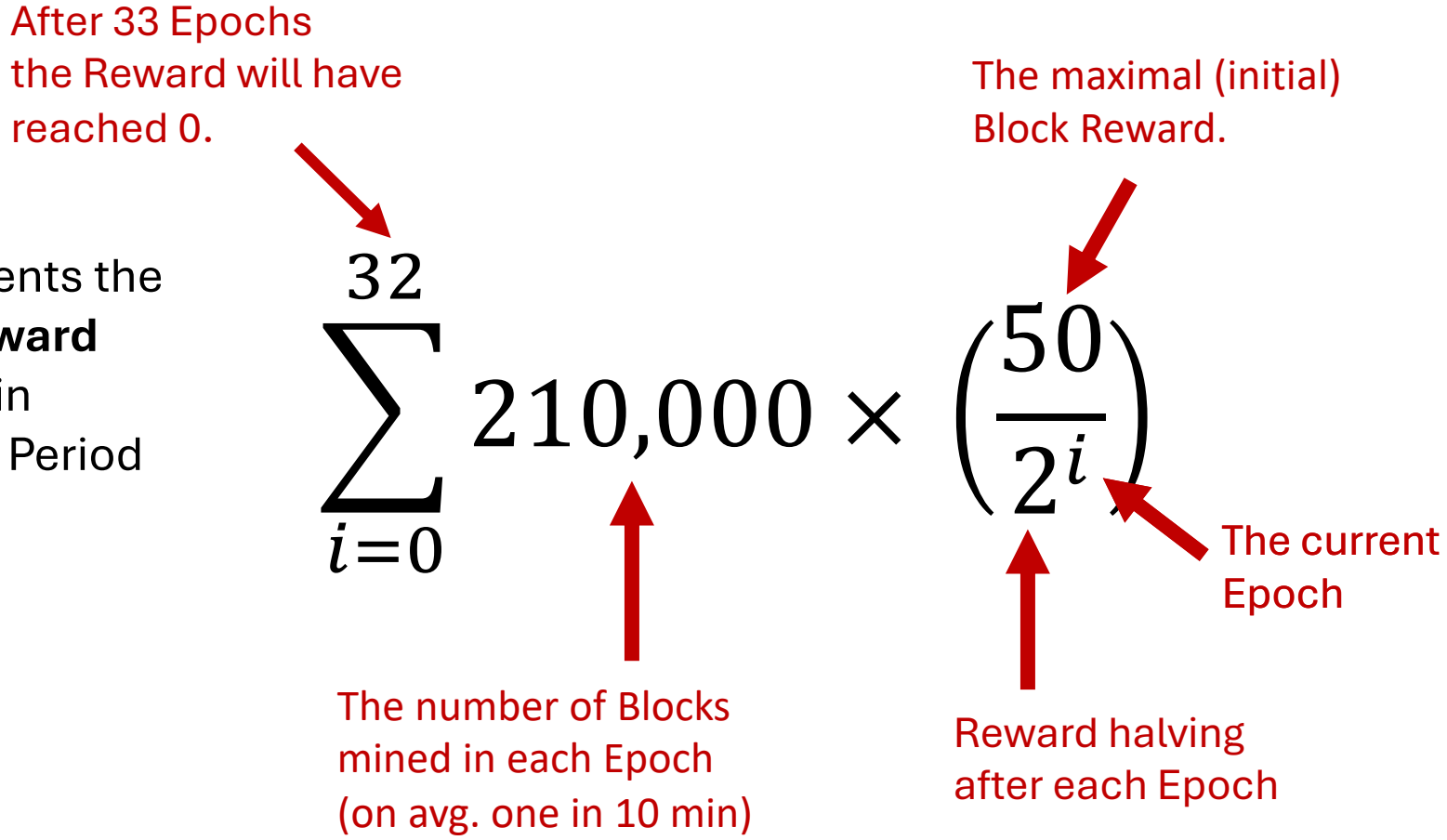

Bitcoin Supply Formula

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{50}{2^i}\right) = 210{,}000 \times \left(\frac{50}{2^0}\right) + 210{,}000 \times \left(\frac{50}{2^1}\right) + \ \ldots \ + 210{,}000 \times \left(\frac{50}{2^{32}}\right)$$

$$= \ 10{,}500{,}000 \quad + \quad 5{,}250{,}000 \quad + \cdots \ + \ 0.00000001$$

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In Practice: 20,999,999.9769 Bitcoin

System discards fractional results from the halving process.

Bitcoin Supply Formula

Variables required to define the Bitcoin Supply:

1. Number of Epochs: **33**
2. Blocks mined during each Epoch: **210,000**
3. The initial Block Reward was **50 Bitcoin**.
4. Bitcoin Supply **halved** at the end of each Epoch.

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{50}{2^i}\right)$$

→ Max Bitcoin Supply: Almost 21,000,000

Source Code Analysis

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{50}{2^i}\right)$$

bitcoin / src / validation.cpp ↑ Top

Code | Blame | 6048 lines (5365 loc) · 286 KB | Raw

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Contains rules for block and transaction validation. E.g. Blocks per Epoch (210,000)

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$$halvings = \frac{Current\ Block\ Height}{210{,}000}$$

In which halving cycle (epoch) are we currently?

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COIN = 100,000,000
BTC to SATS calculation

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If ‘halving’ (epoch) is larger than **64**, no reward will be returned!

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Bitshift Operator
The same effect as:

$$nSubsidy = \frac{nSubsidy}{2}$$

Source Code Analysis

Decimal to Binary Representation

	32	16	8	4	2	1
Decimal: 1	0	0	0	0	0	1
Decimal: 2	0	0	0	0	1	0
Decimal: 3	0	0	0	0	1	1
Decimal: 35	1	0	0	0	1	1

Source Code Analysis

Right Bitshift Operator ...
moves all bits one entry to the right

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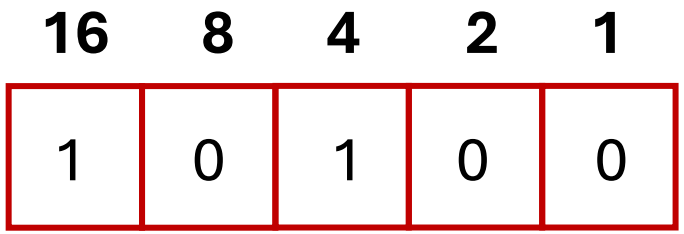

Decimal: 20

Source Code Analysis

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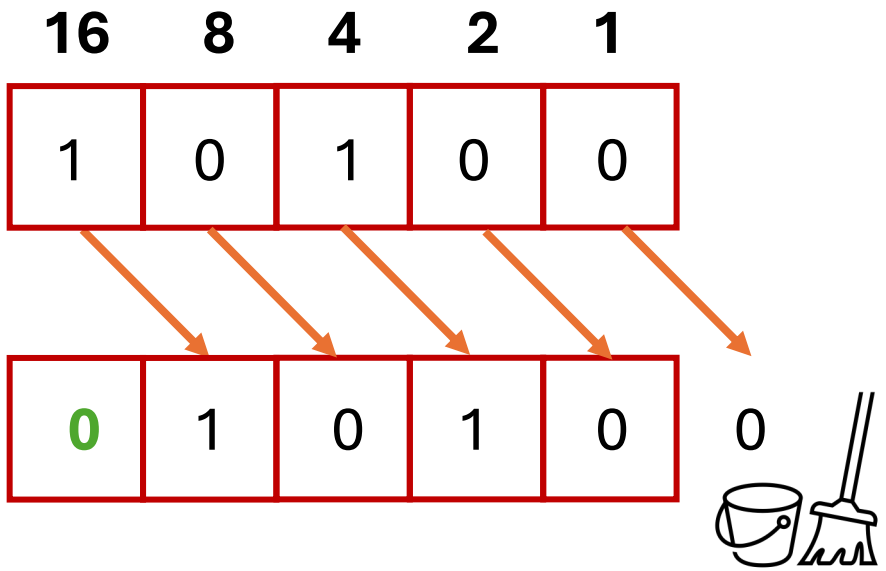

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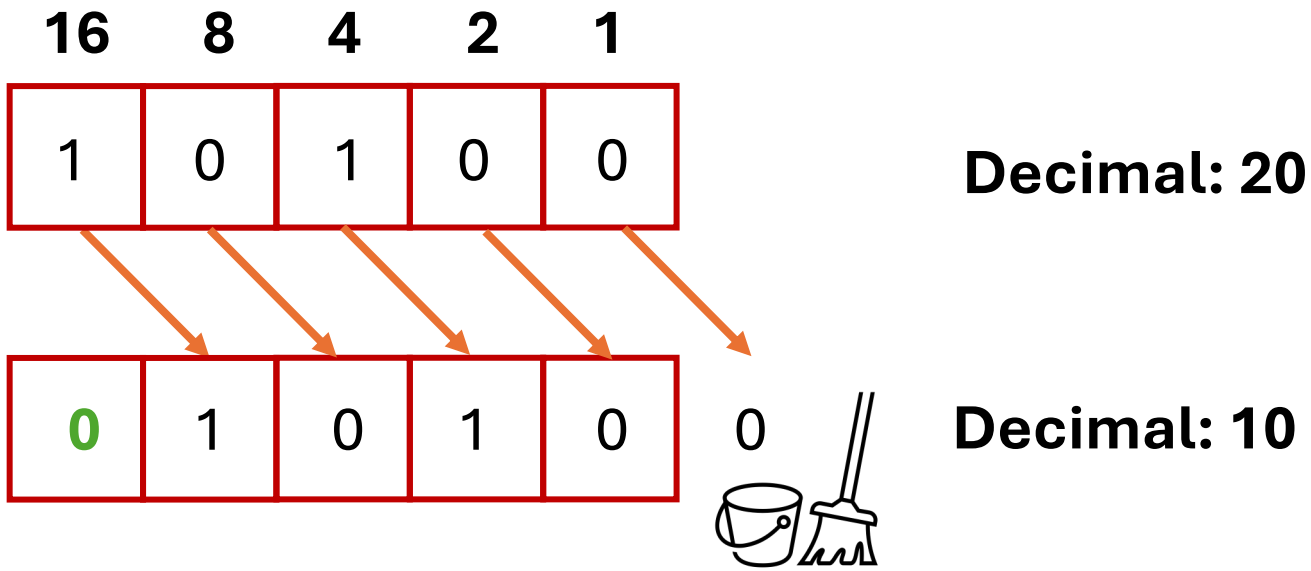

Source Code Analysis

Epoch	nSubsidy 64 Bit Integer in Binary Representation	nSubsidy Decimal
0	1001010100000010111110010000000000	5,000,000,000

First Satoshi
(5 Billion)

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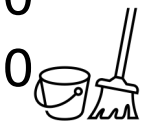

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64		UNDEFINED

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After 64 Bitshift Operations, the Code will return ‘undefined’ and ERROR!

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Why don't check:

```
if (halvings >= 33)
    return 0;
```

After we reached epoch number 33, nSubsidy will be 0 anyway!

Mathematical Adjustment - Bitcoin Supply from 21 to 210 Million

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{50}{2^i}\right)$$

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Larger initial Bitcoin Reward

$$\sum_{i=0}^{32} 210{,}000 \times \left(\frac{500}{2^i}\right)$$

Increased Speed of Block creation

$$\sum_{i=0}^{32} 2{,}100{,}000 \times \left(\frac{50}{2^i}\right)$$

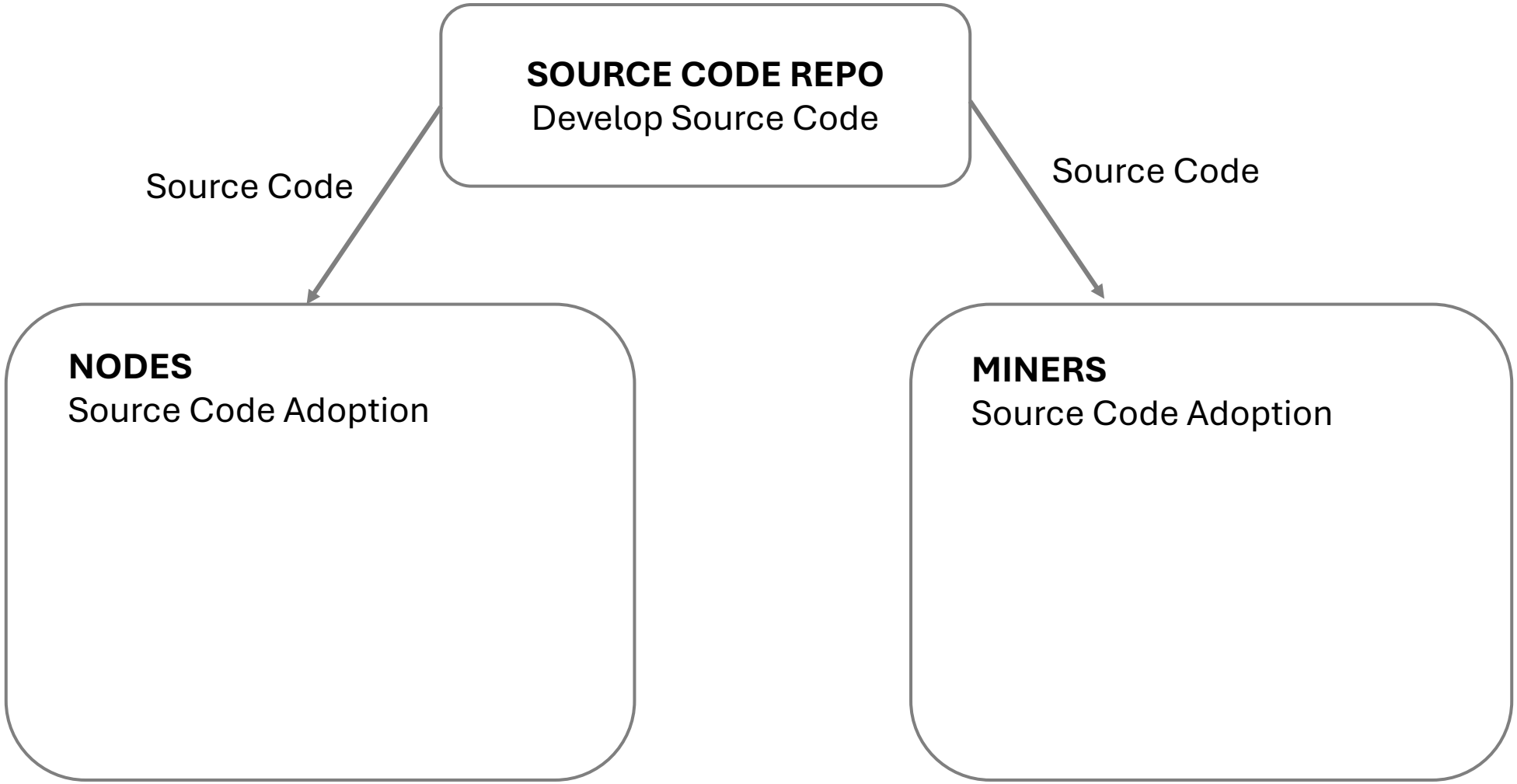
Why can the Supply Cap **not** be changed?

(People have tried!)

Bitcoin Network

SOURCE CODE REPO
Develop Source Code

Bitcoin Network



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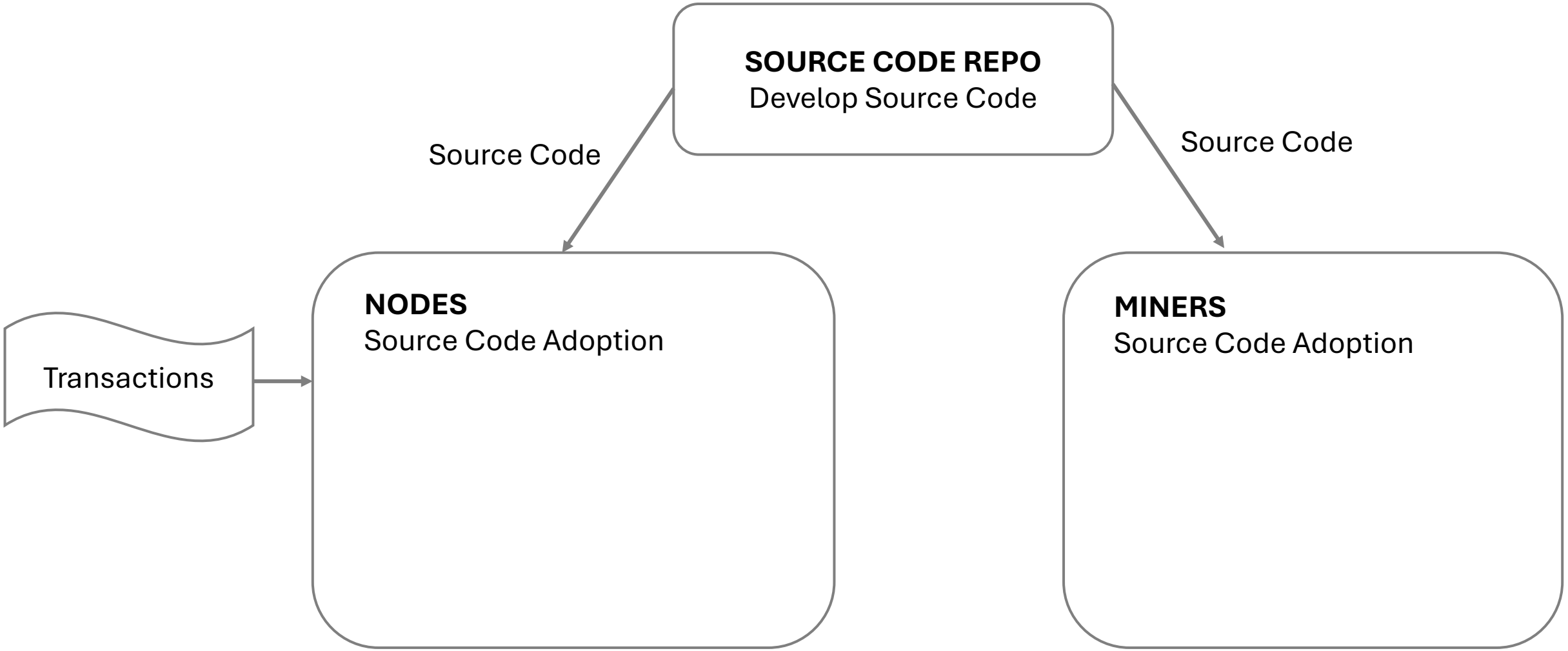

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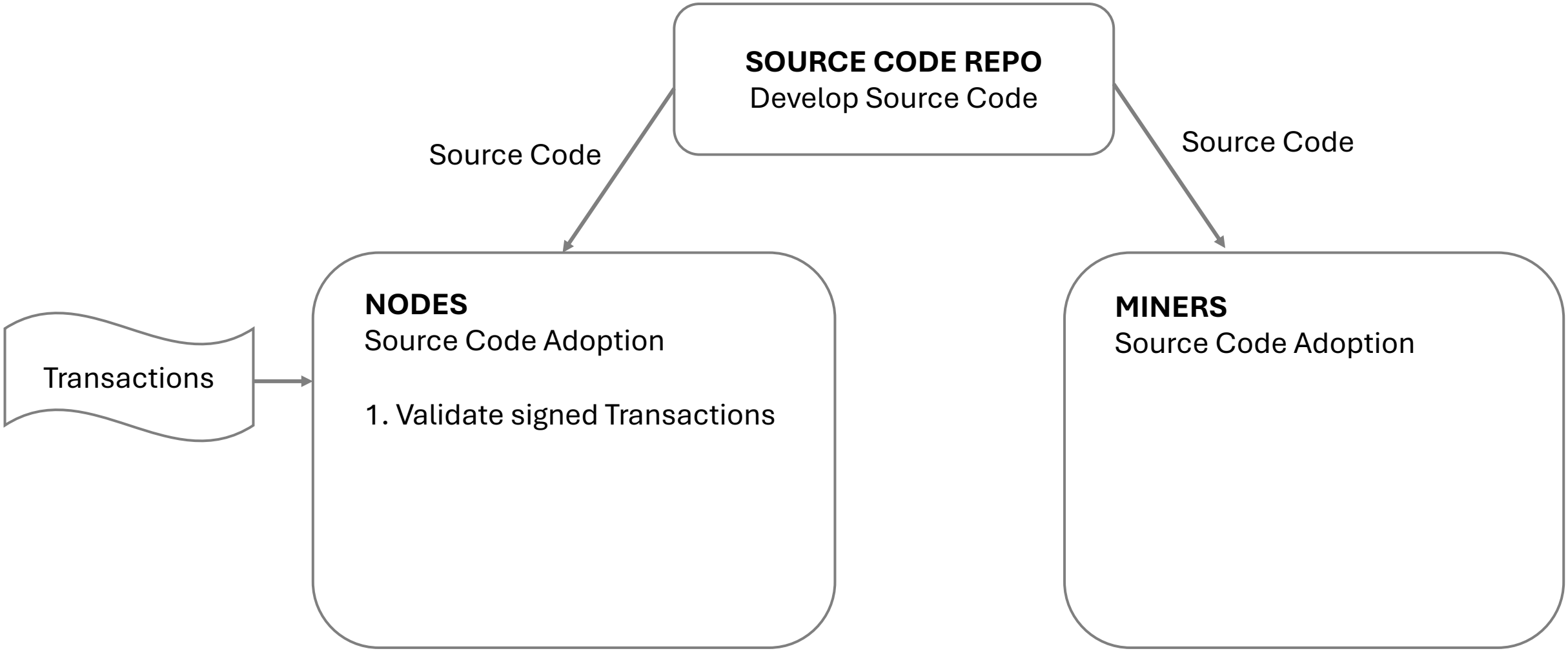

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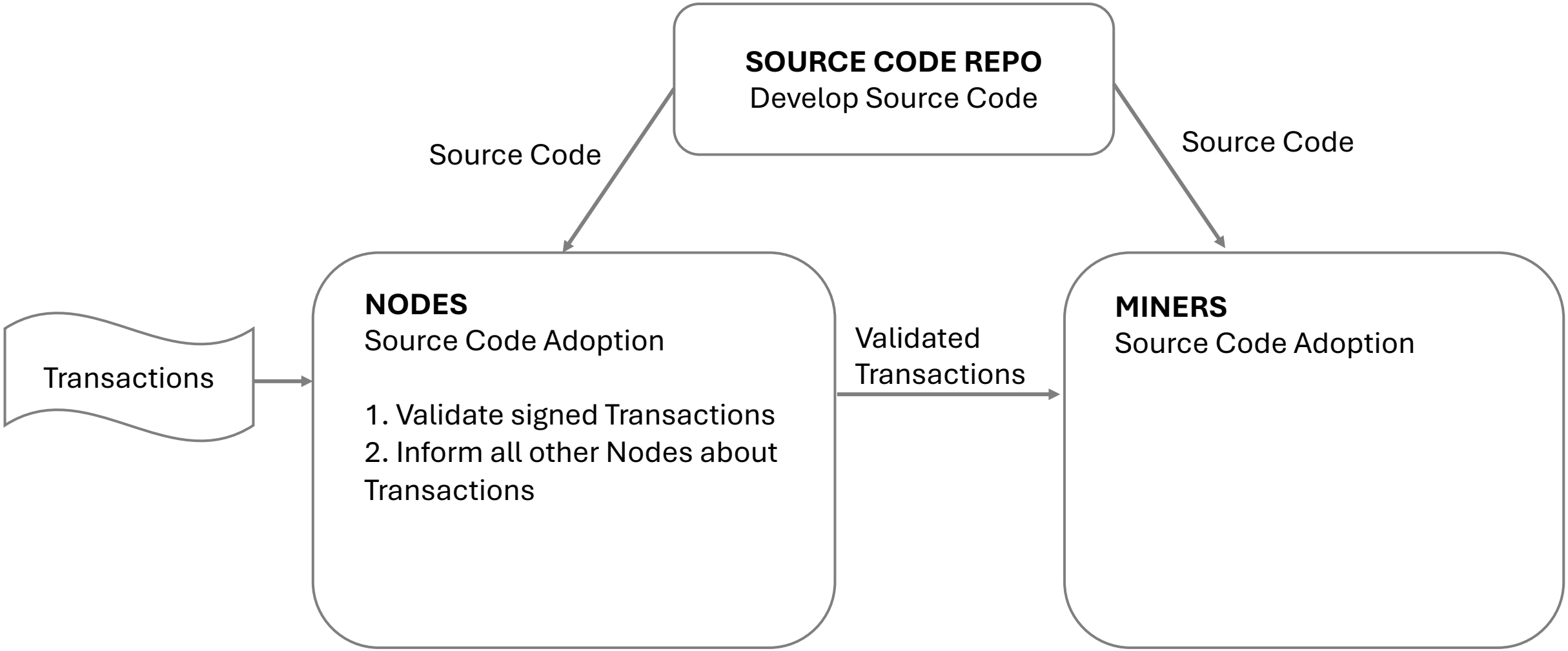

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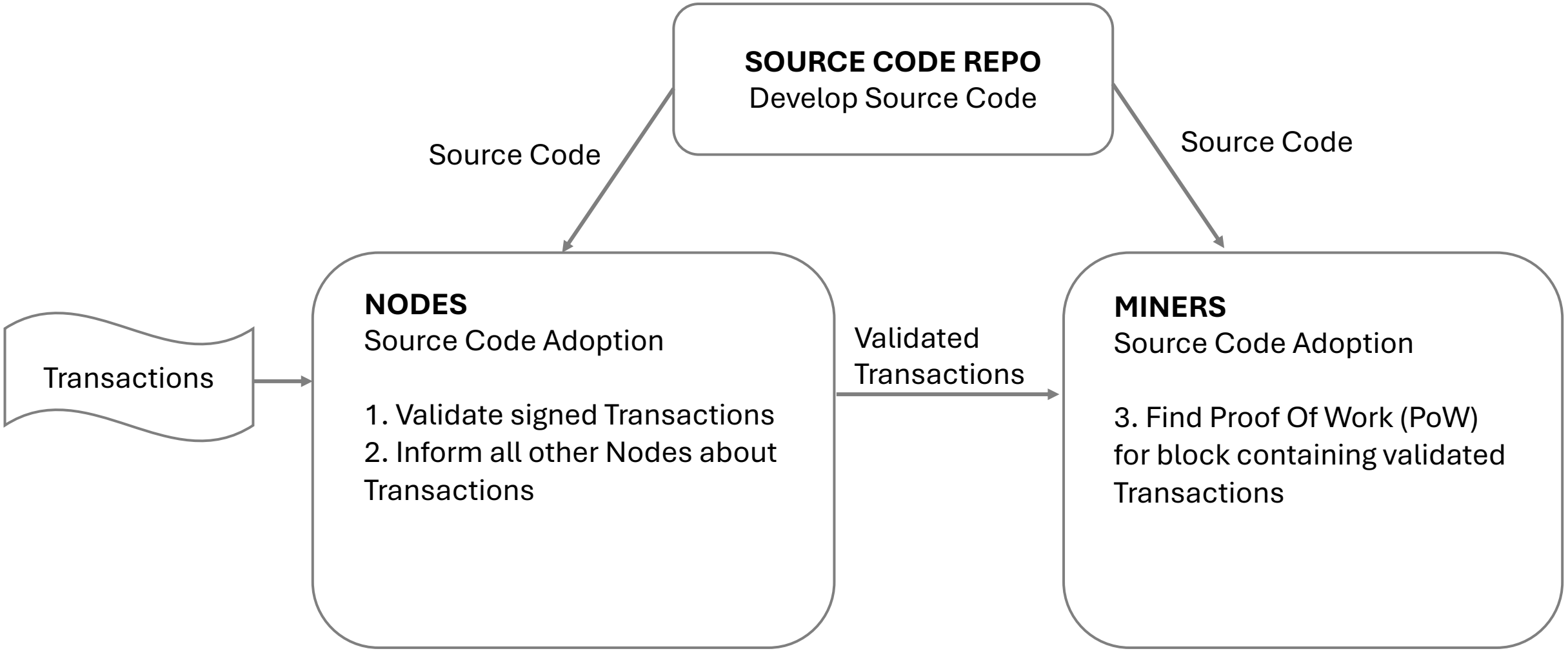

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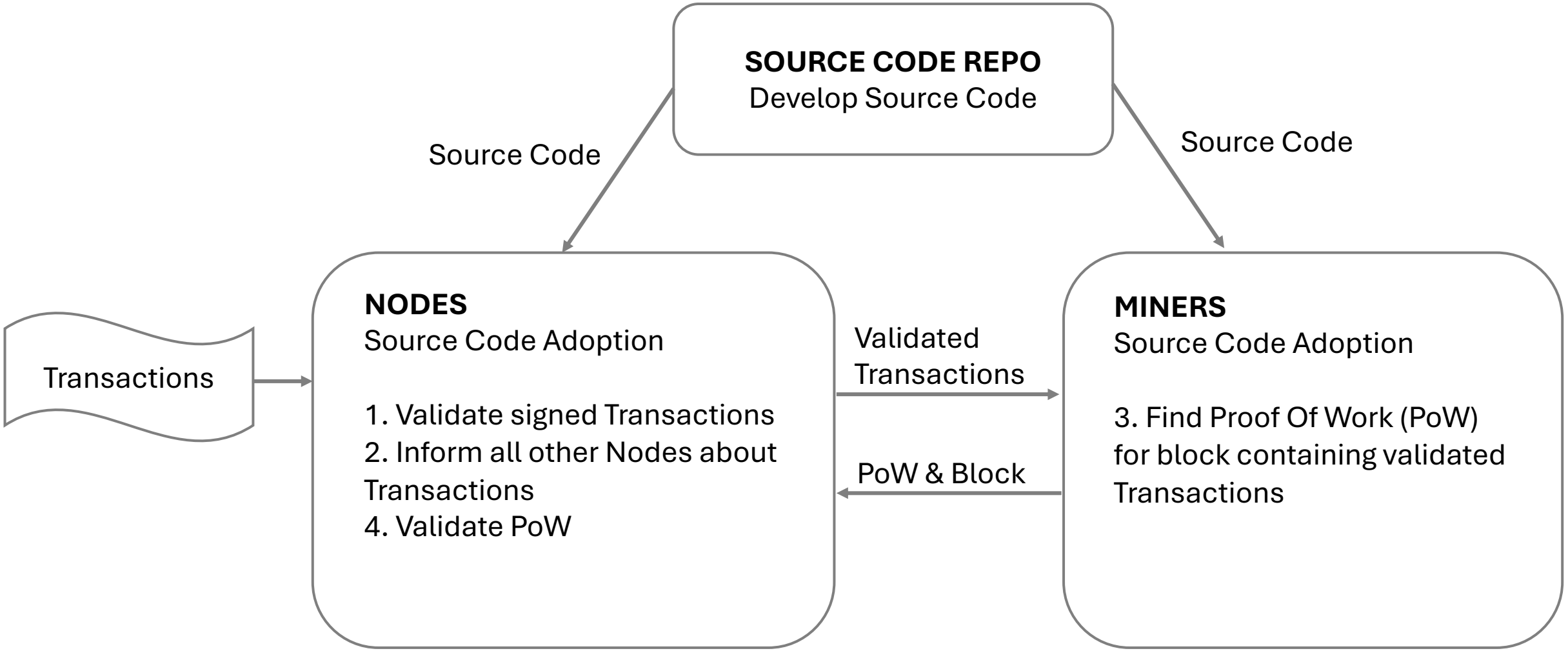

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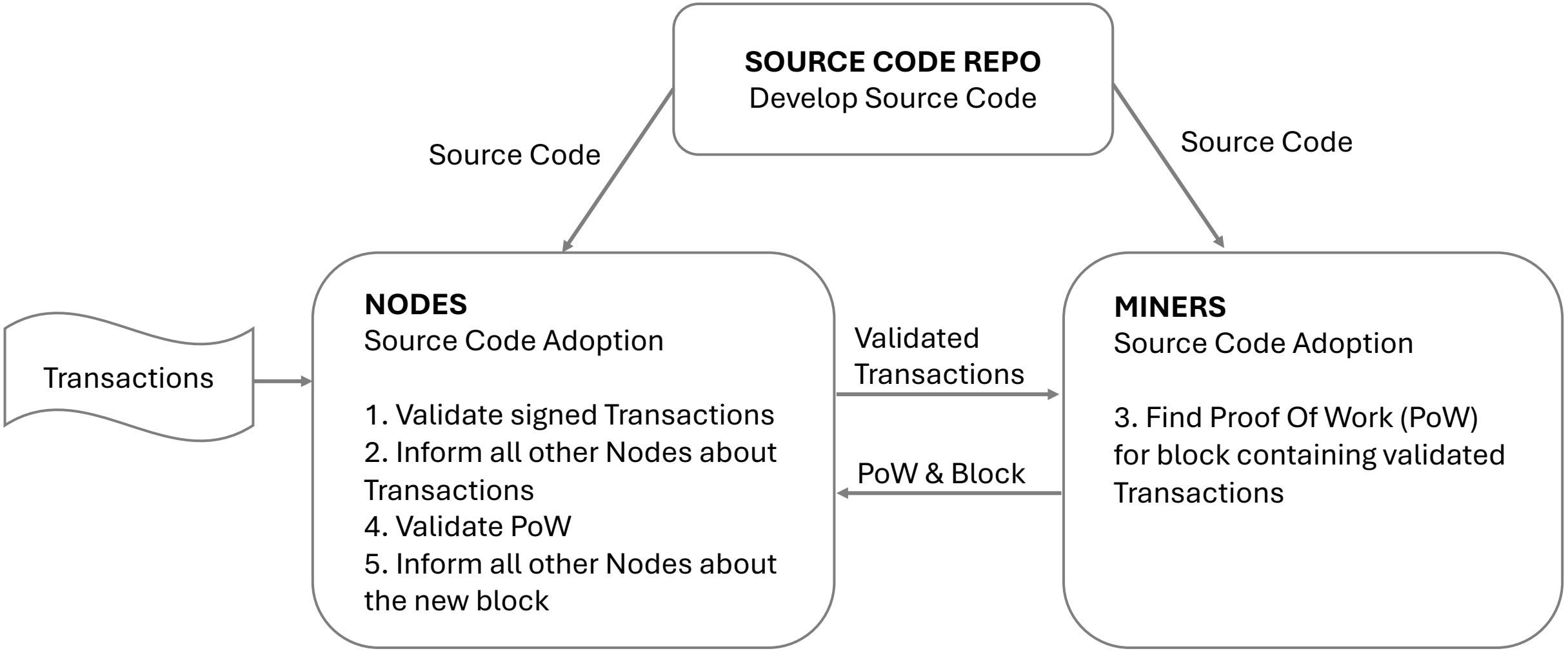

Source Code Developers control Bitcoin?

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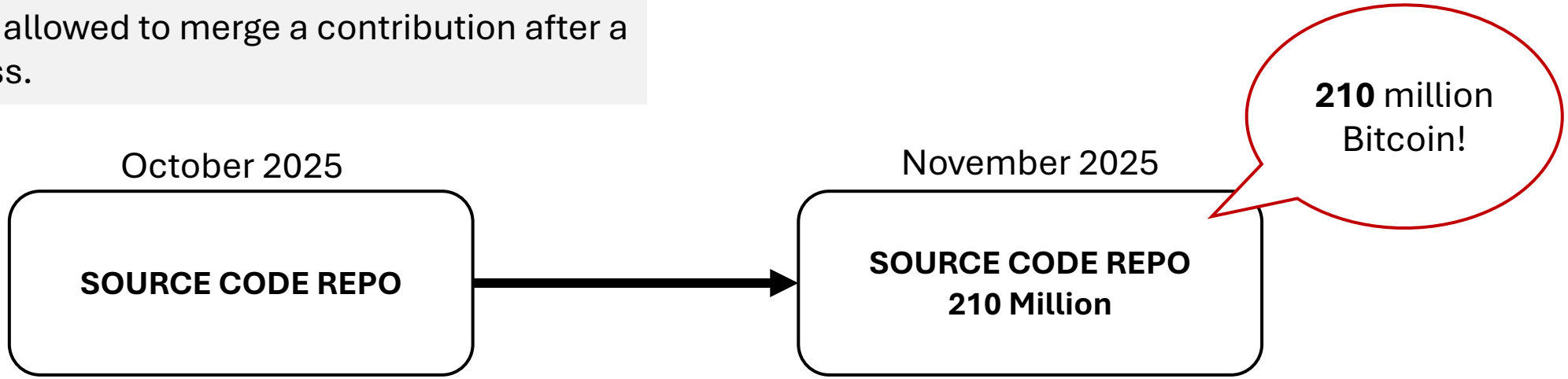

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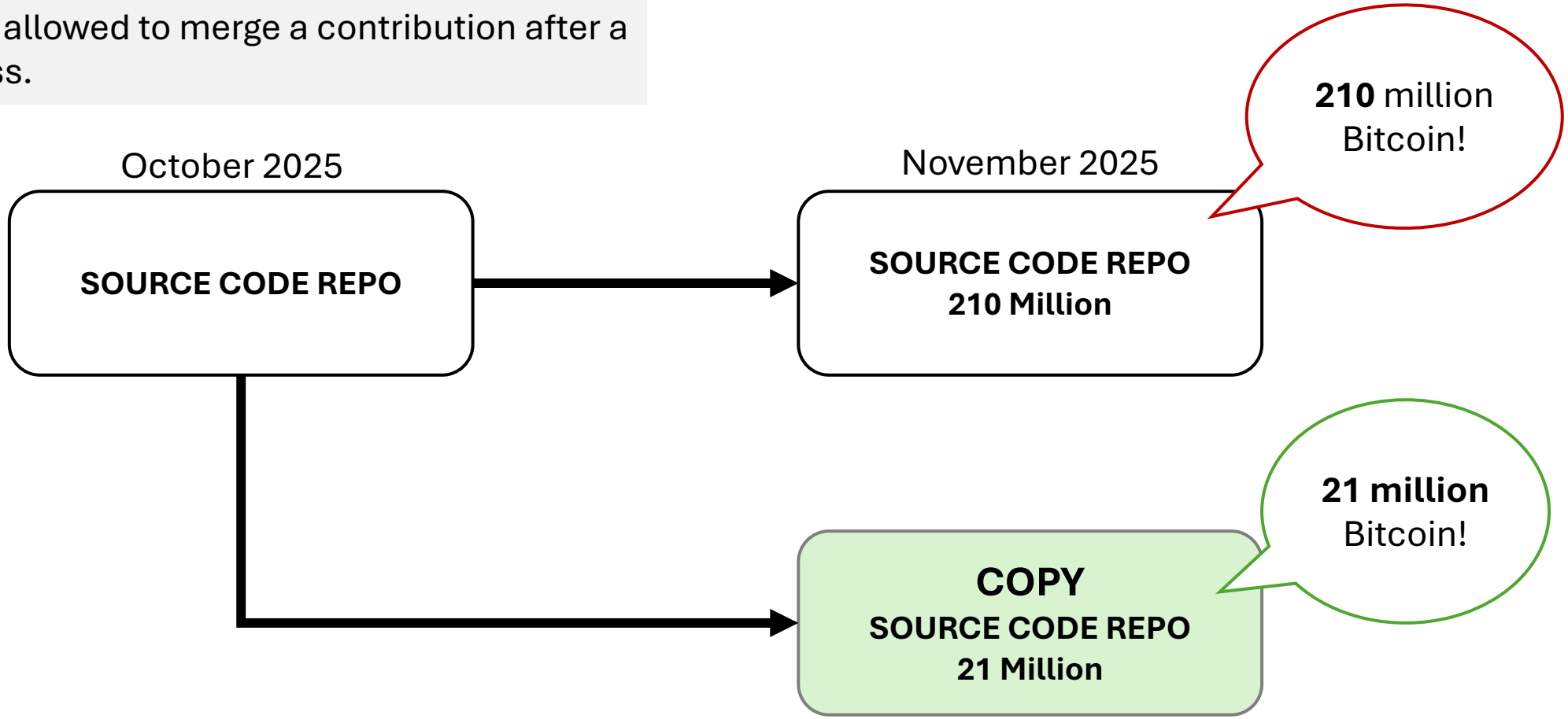
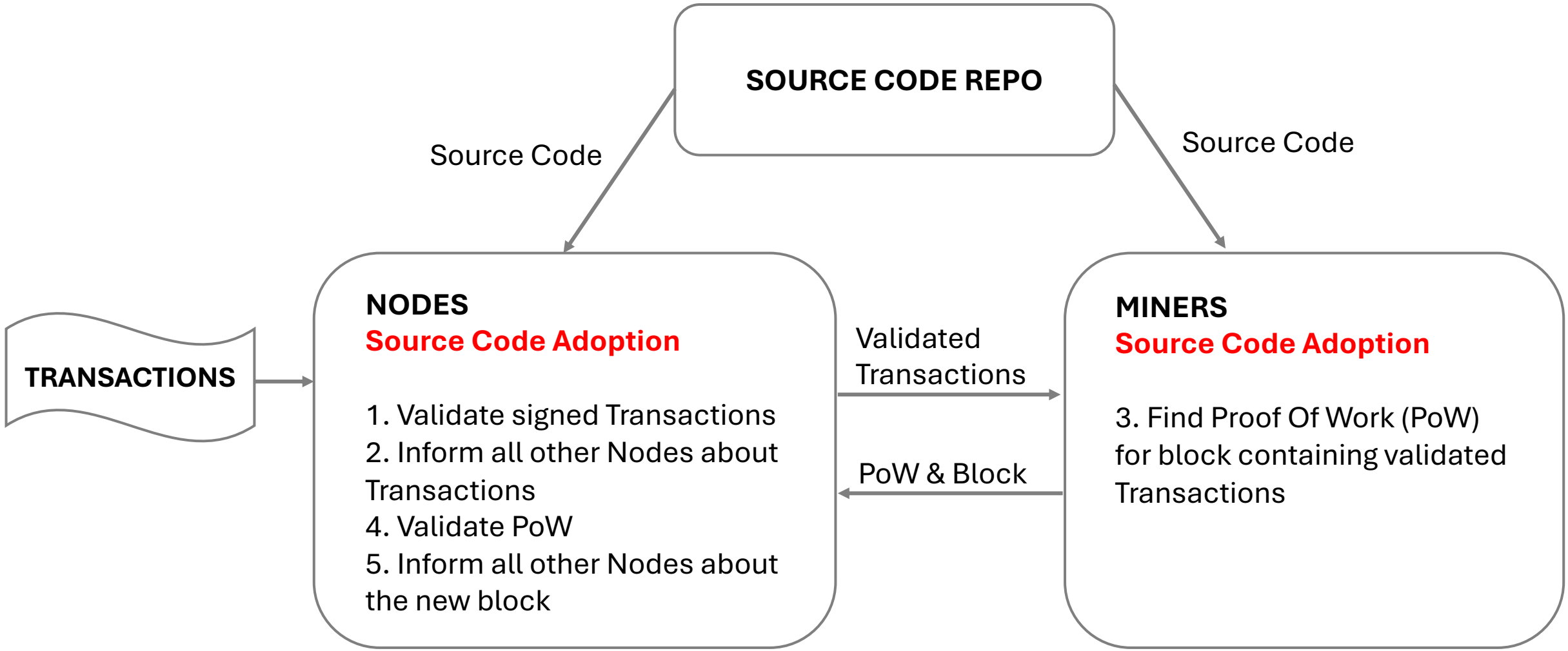


Source Code Developers control Bitcoin?

Yes!
Developers can introduce significant changes!

And No!
- *Anyone* can introduce source code changes!
- *Anyone* can copy a repository!
- No one can force owners of miners and nodes to run a specific software.

Owner of Miners and Nodes control Bitcoin?



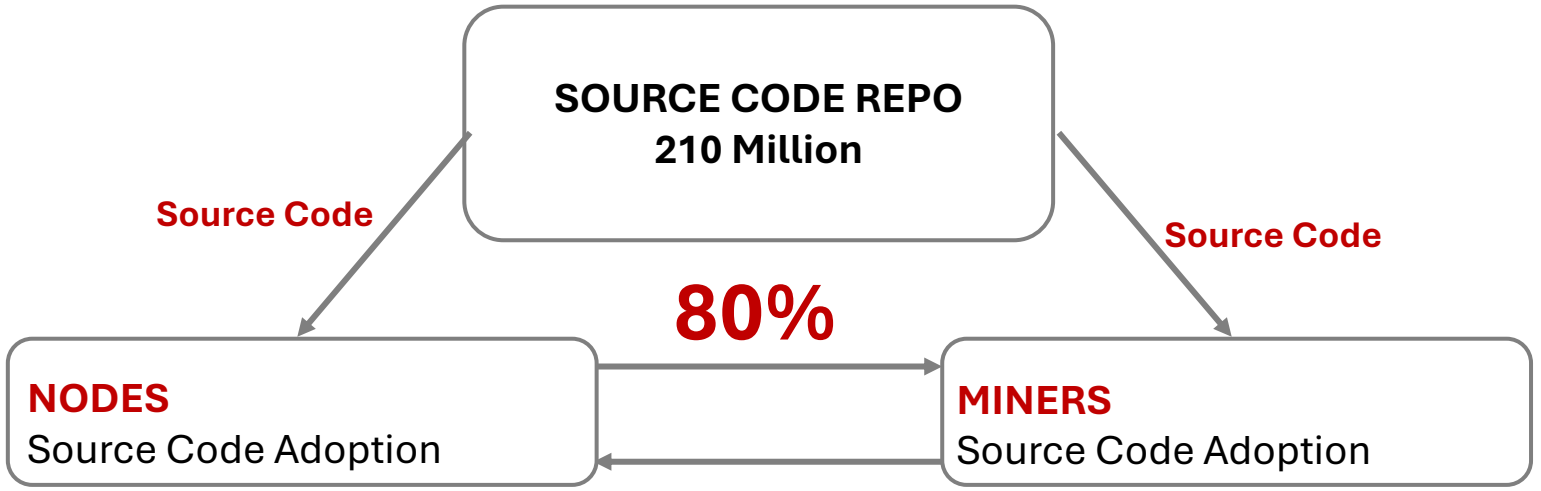
Owner of Miners and Nodes control Bitcoin?

Yes!
Miners and nodes can choose which repositories to upgrade from.

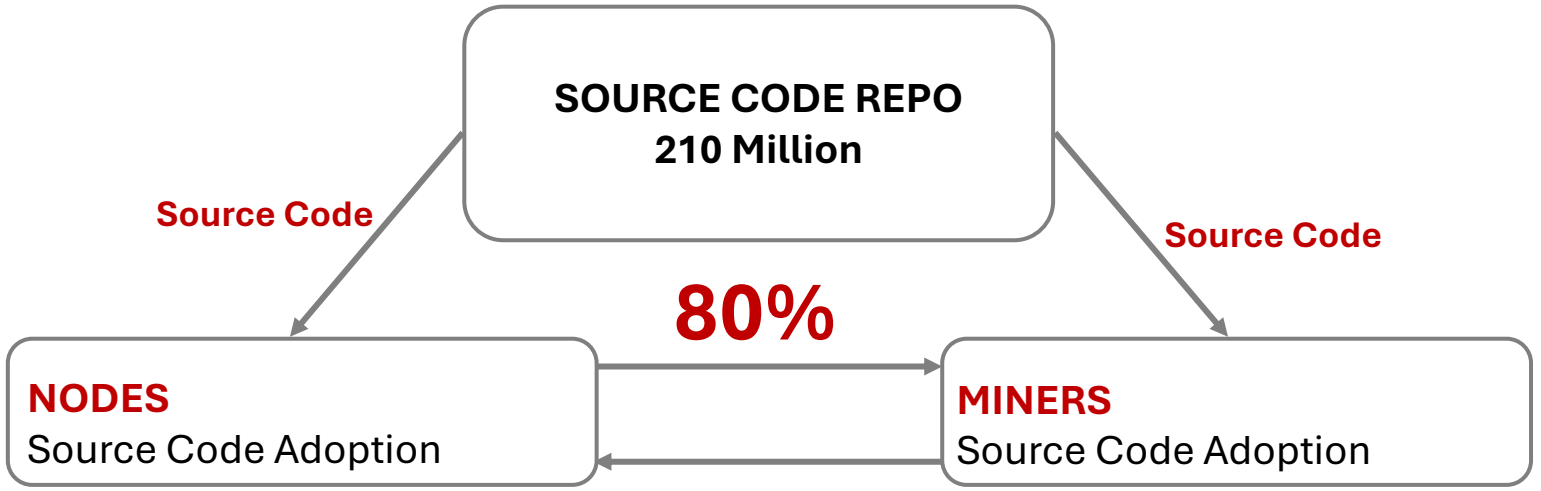
And No!

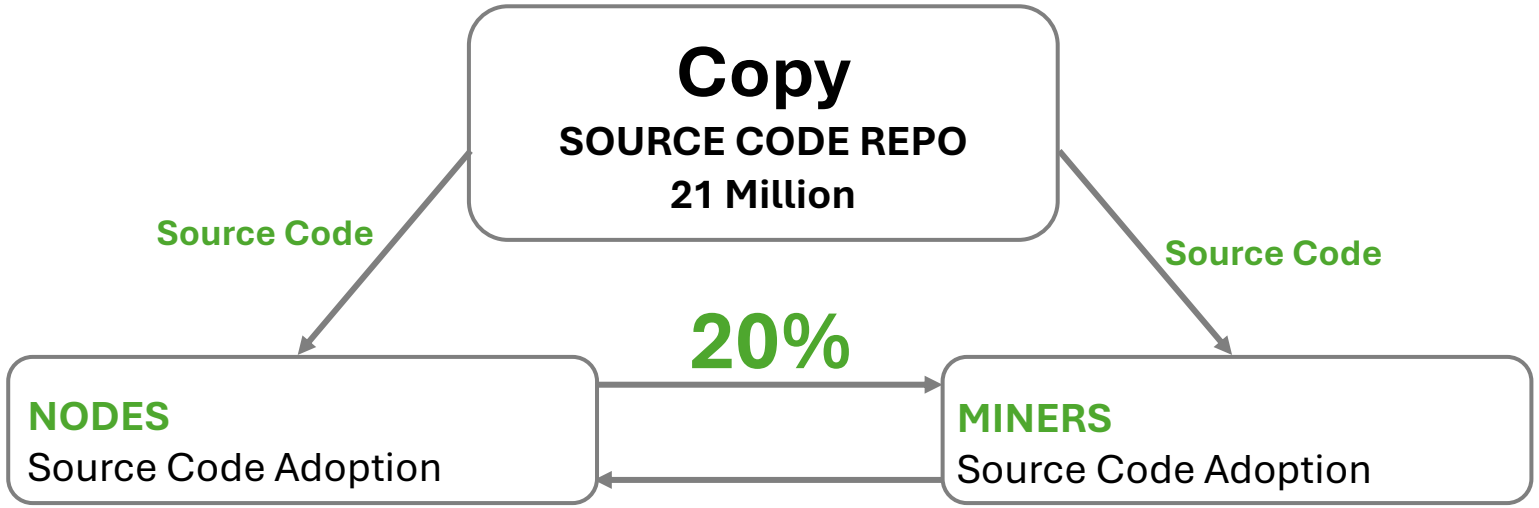
- Anyone can run a node or miner using their *preferred* source code repository.
- No one can force Bitcoin hodlers to execute transactions through specific nodes and miners.

What happens if...



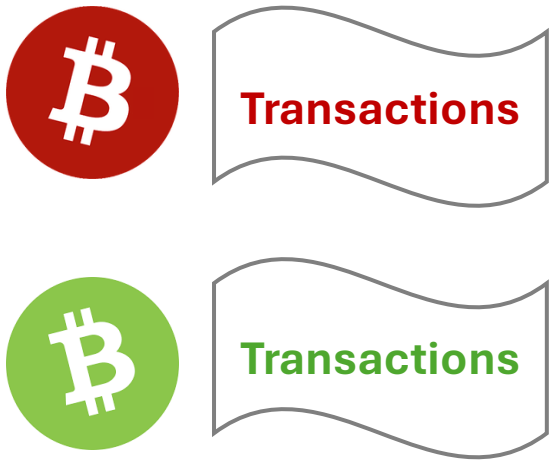
What happens if...





Hodlers control Bitcoin?

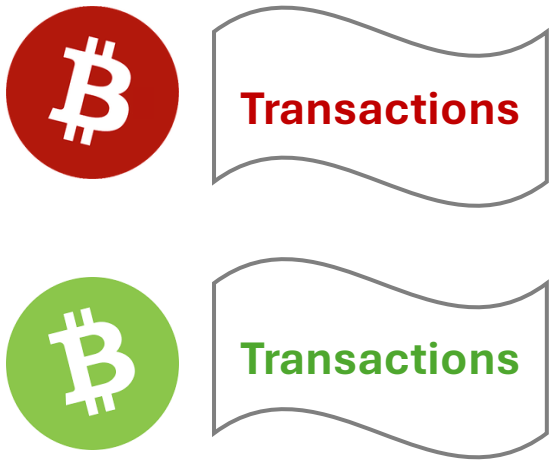
Owners **receive an equivalent amount of the new Bitcoin version** on the new, separate blockchain.



Hodlers control Bitcoin?

Owners **receive an equivalent amount of the new Bitcoin version** on the new, separate blockchain.

All Hodlers can now **trade both** Bitcoin Versions.



Hodlers control Bitcoin?

Yes!
You can decide which Bitcoin is more valuable through your buying and selling power.

And No!
You might lose out by acting against the majority, as your individual decision is not enough to control adoption.

Previous Attempt to increase the Bitcoin Supply

24th November 2017

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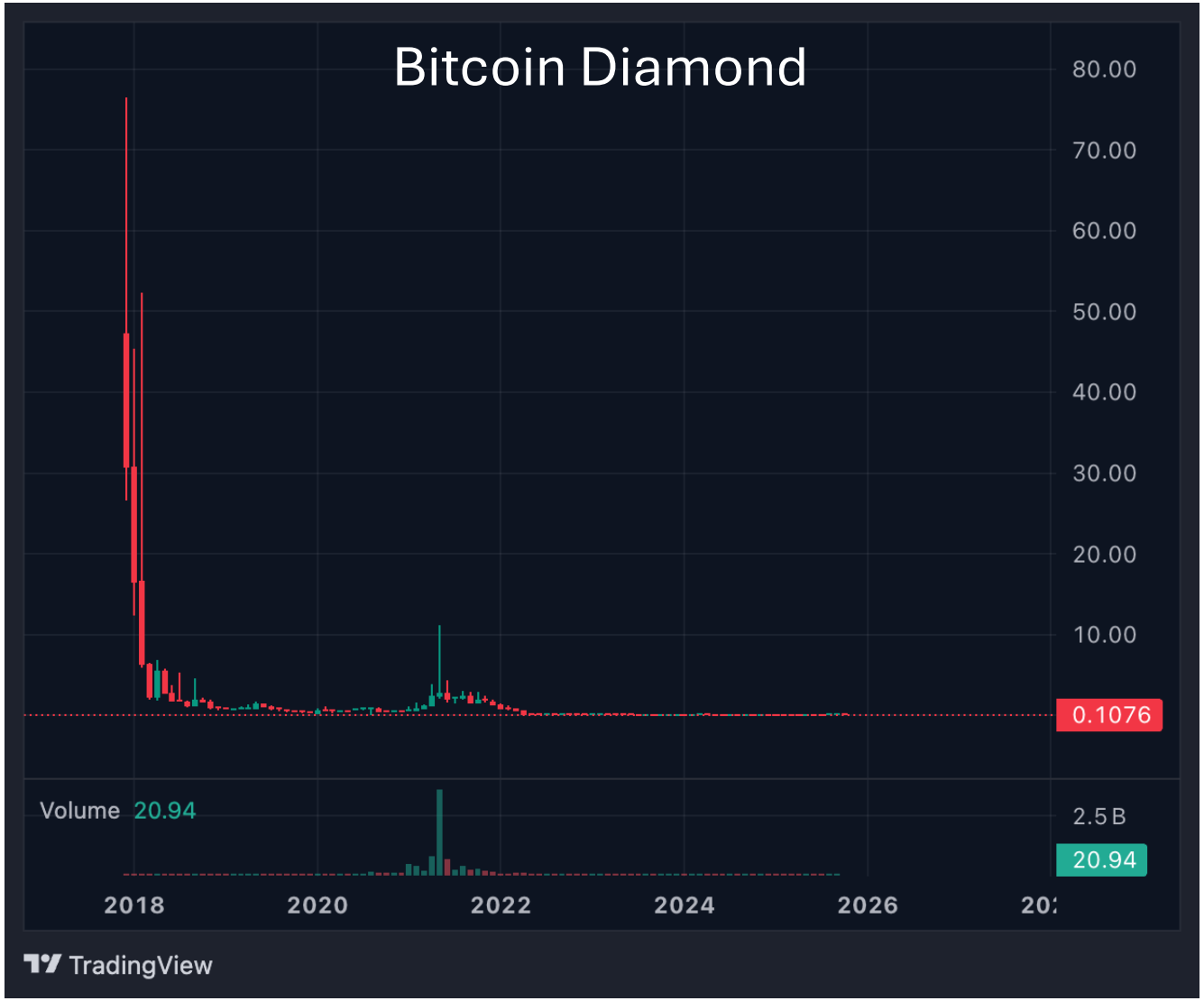
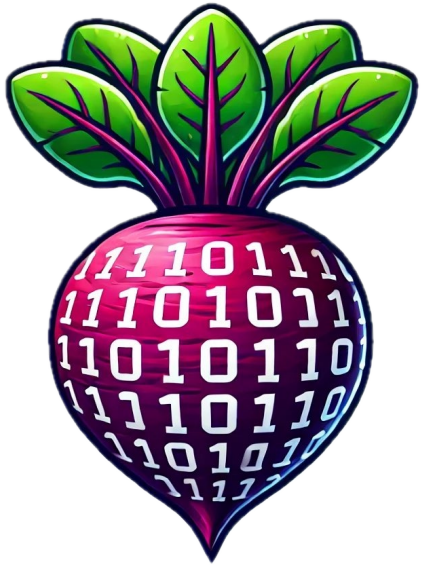
November 2017
Bitcoin: $8

November 2025
Bitcoin: $ 115,000
Bitcoin Diamond: $0.10

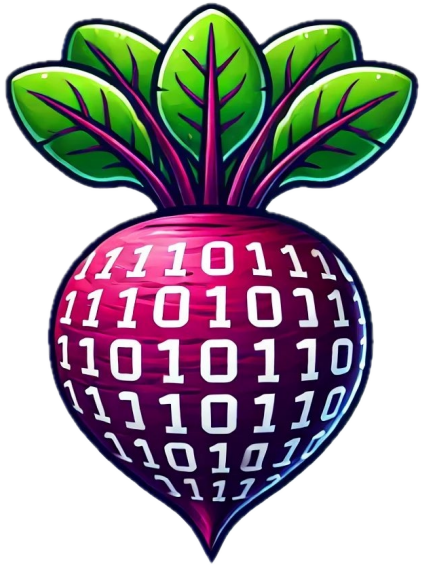


Yes, everyone and **no, no one** has control over Bitcoin and it’s supply cap.



bitroot.me

bitroot@zaps.lol



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