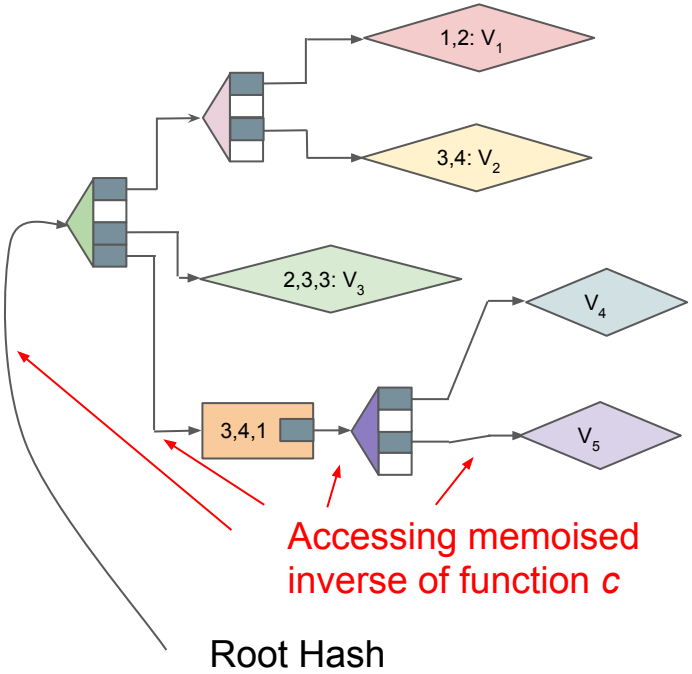
Turbo-Geth

What is it about now?

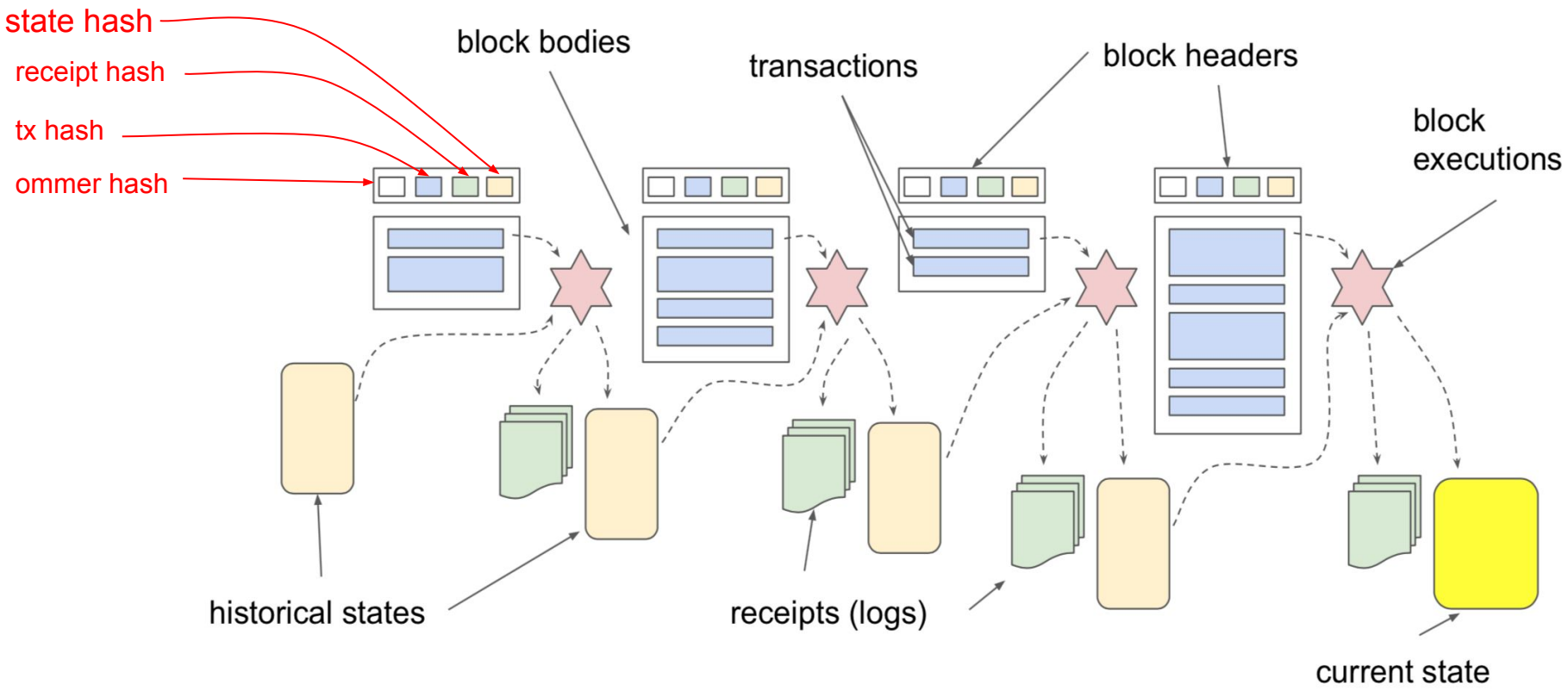
Persistence of Patricia tree in geth (and others)

Number of blocks with arrows on them == number of records in the DB

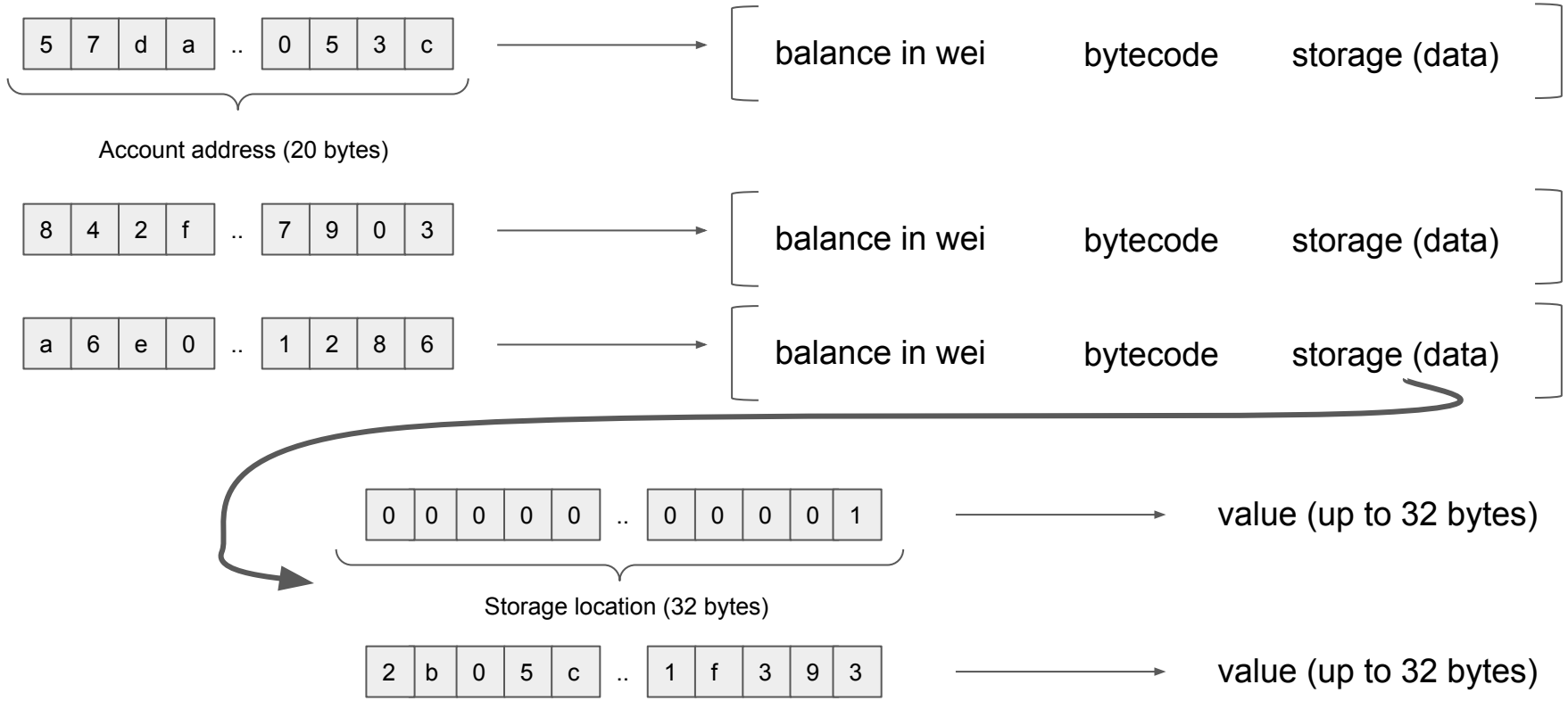


Key	Value
sha3(rlp(1,2: V_1))	rlp(1,2: V_1)
sha3(rlp(3,4: V_2))	rlp(3,4: V_2)
sha3(rlp( ))	rlp( )
sha3(rlp(2,3,3: V_3))	rlp(2,3,3: V_3)
sha3(rlp(V_4))	rlp(V_4)
sha3(rlp(V_5))	rlp(V_5)
sha3(rlp( ))	rlp( )
sha3(rlp(3,4,1))	rlp(3,4,1)
sha3(rlp( ))	rlp( )

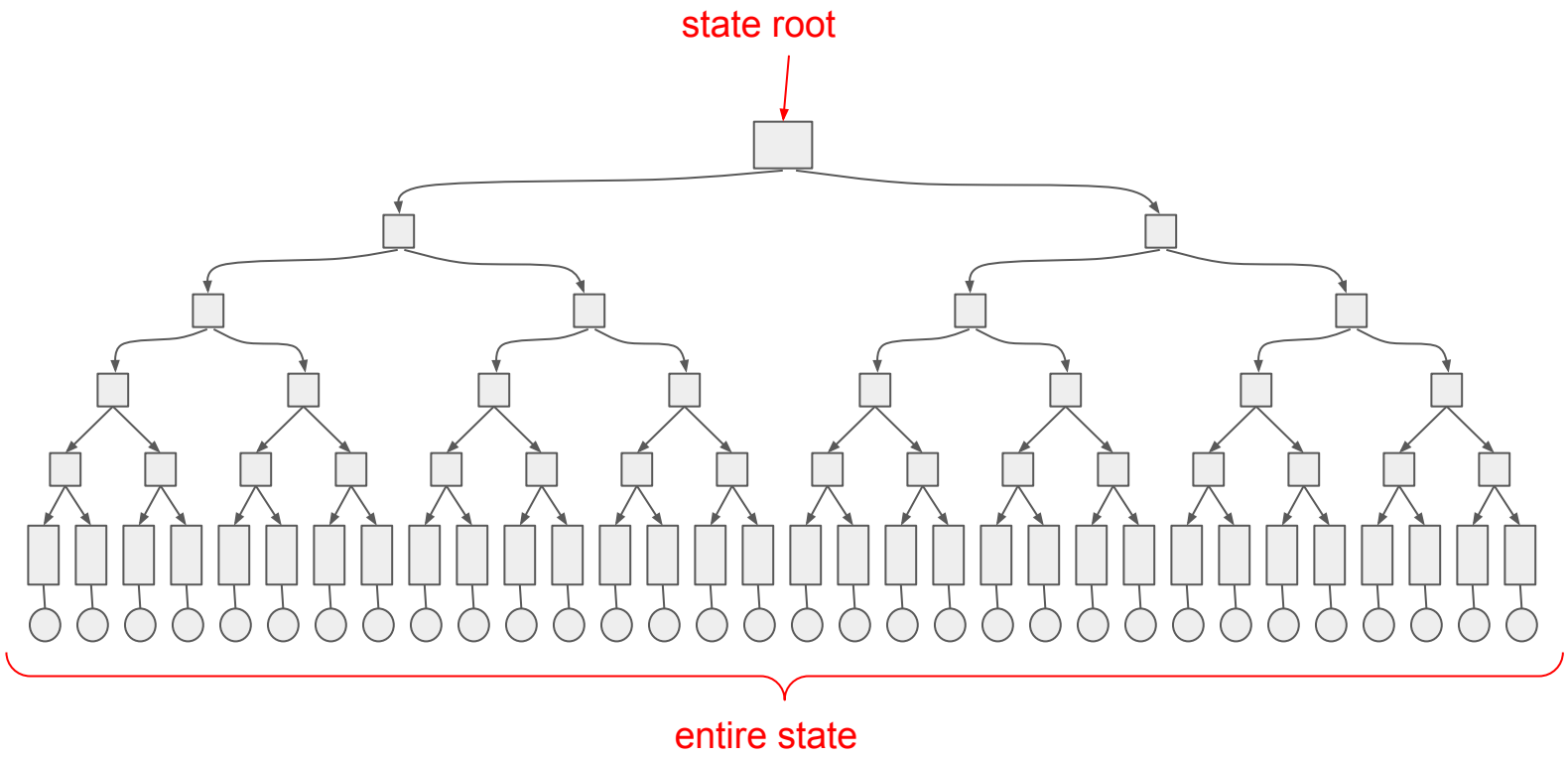
Why is trie the primary data structure?



Ethereum State from EVM's point of view - **no tries!**



How to compute root hash from flat data?



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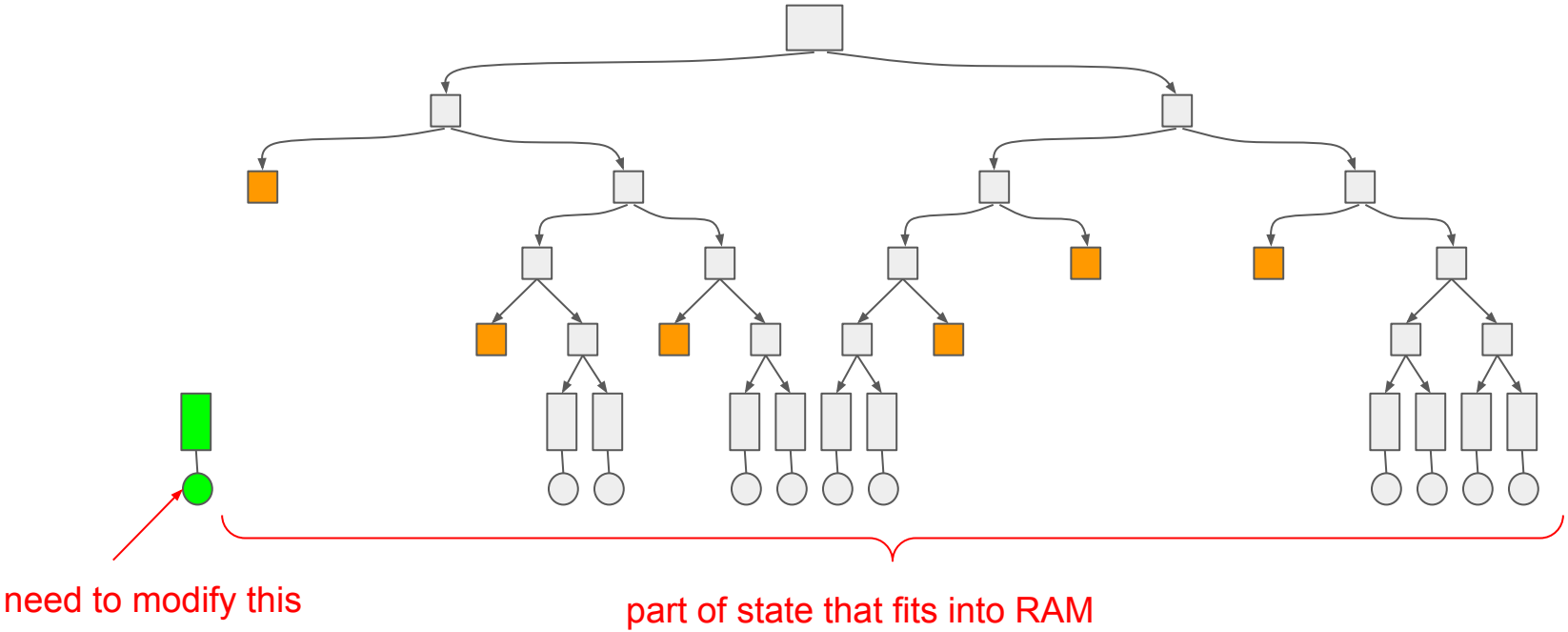

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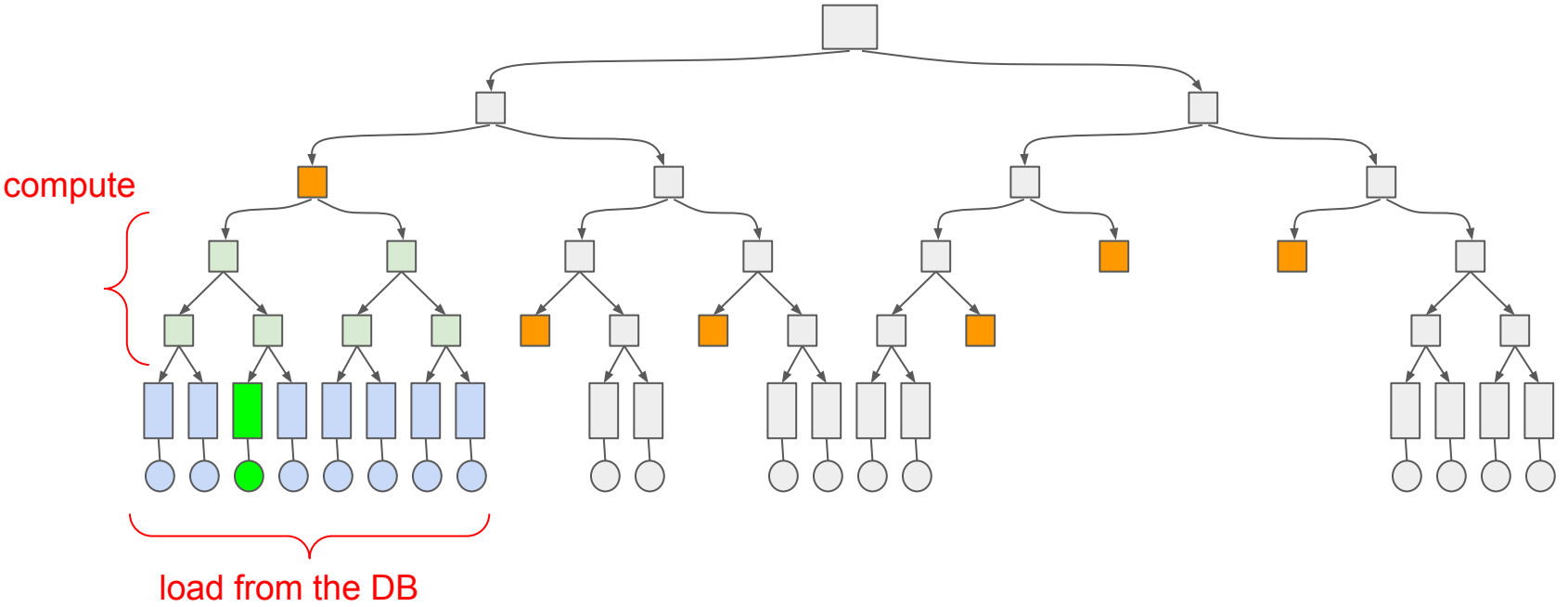

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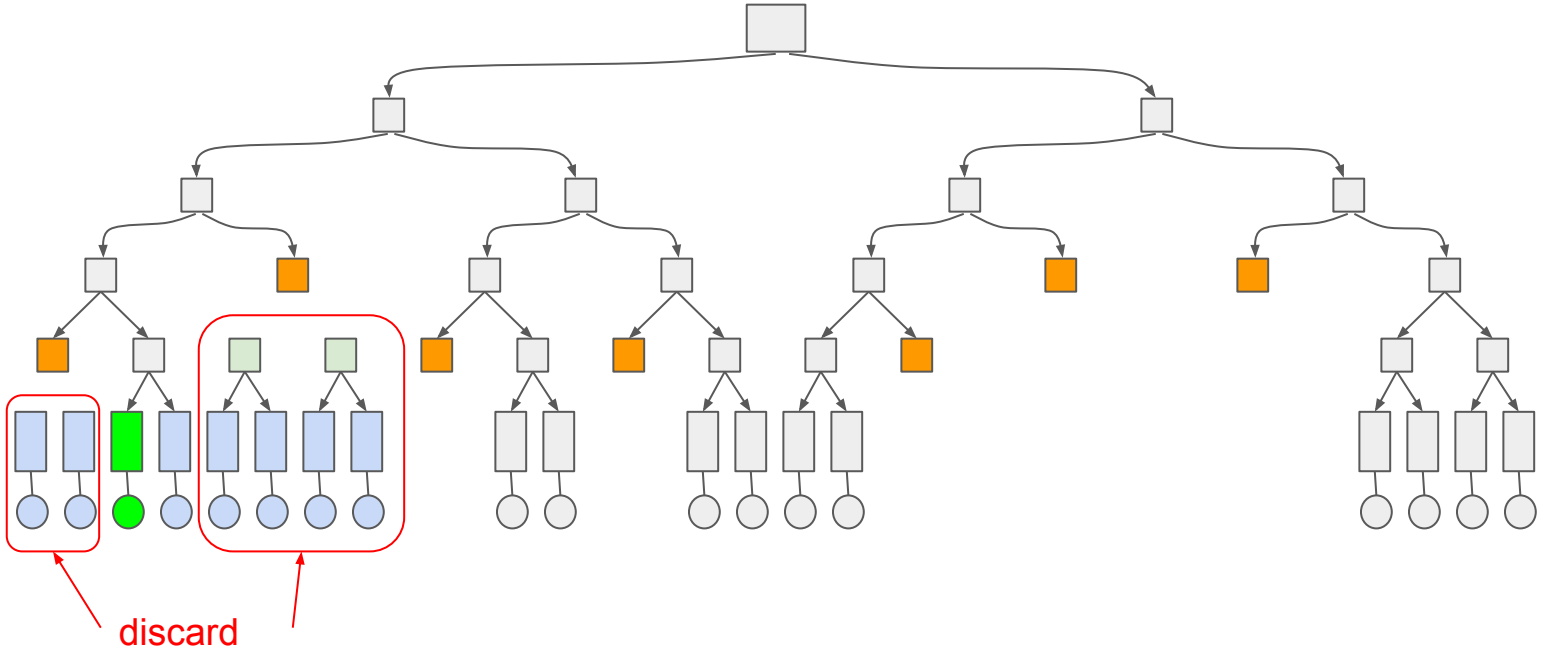
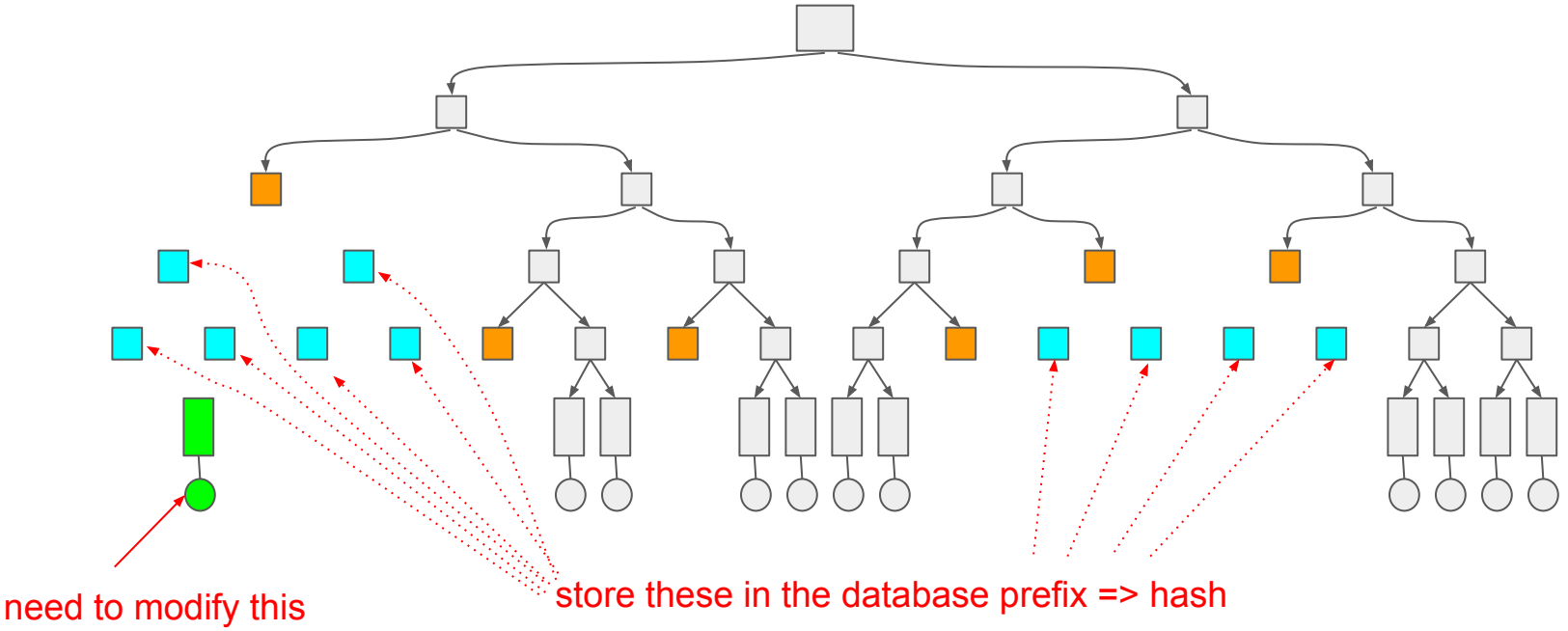
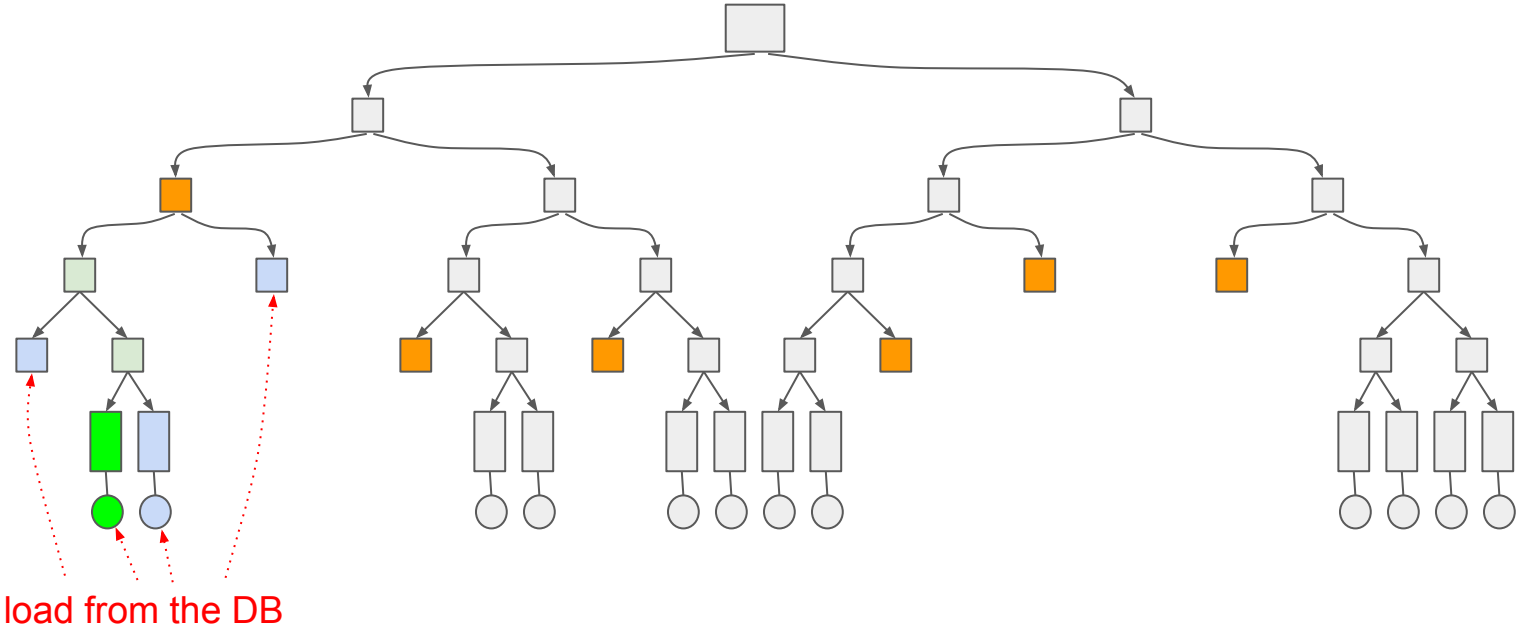


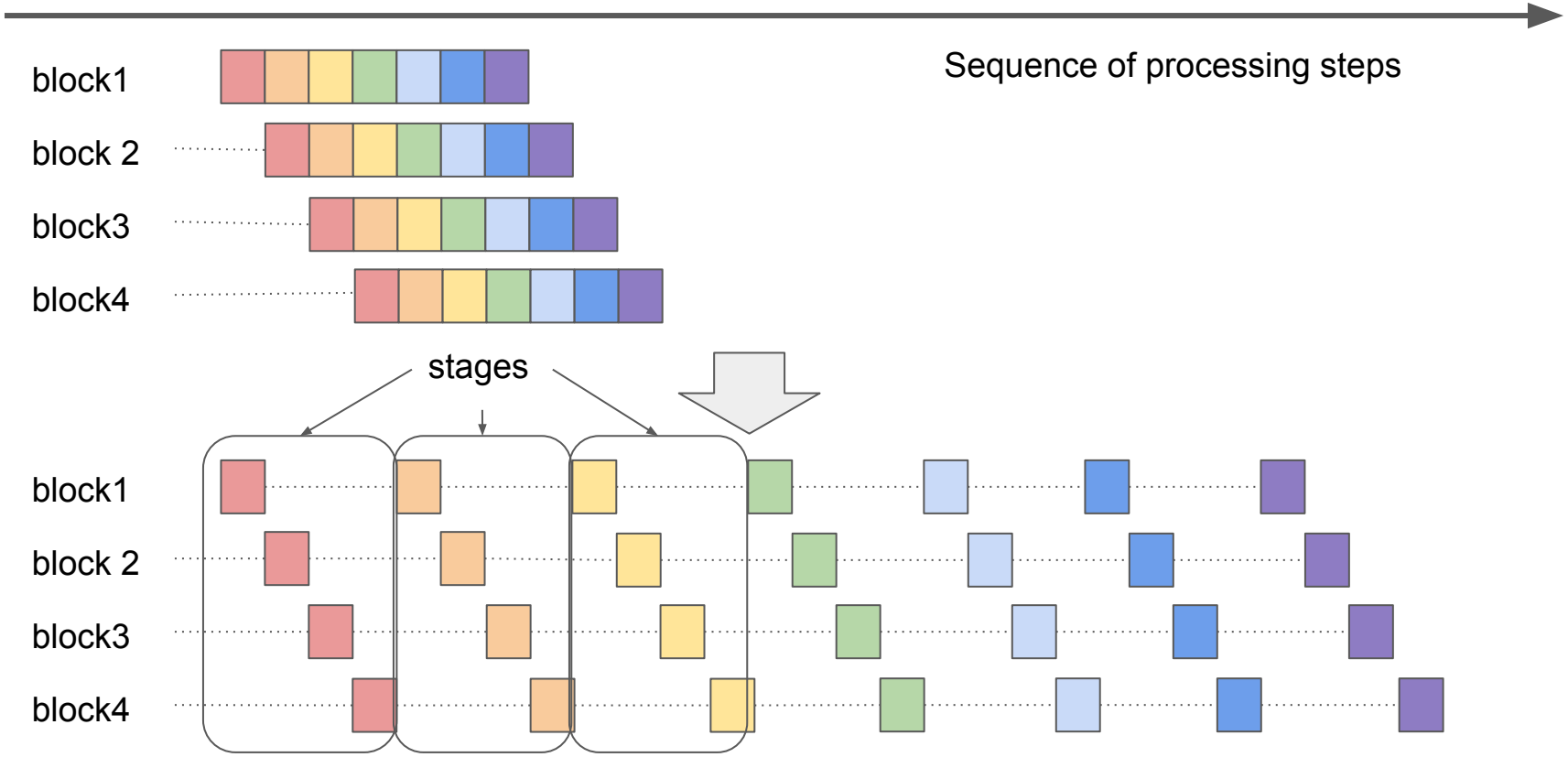
Intermediate hashes - solution (almost) without tradeoffs



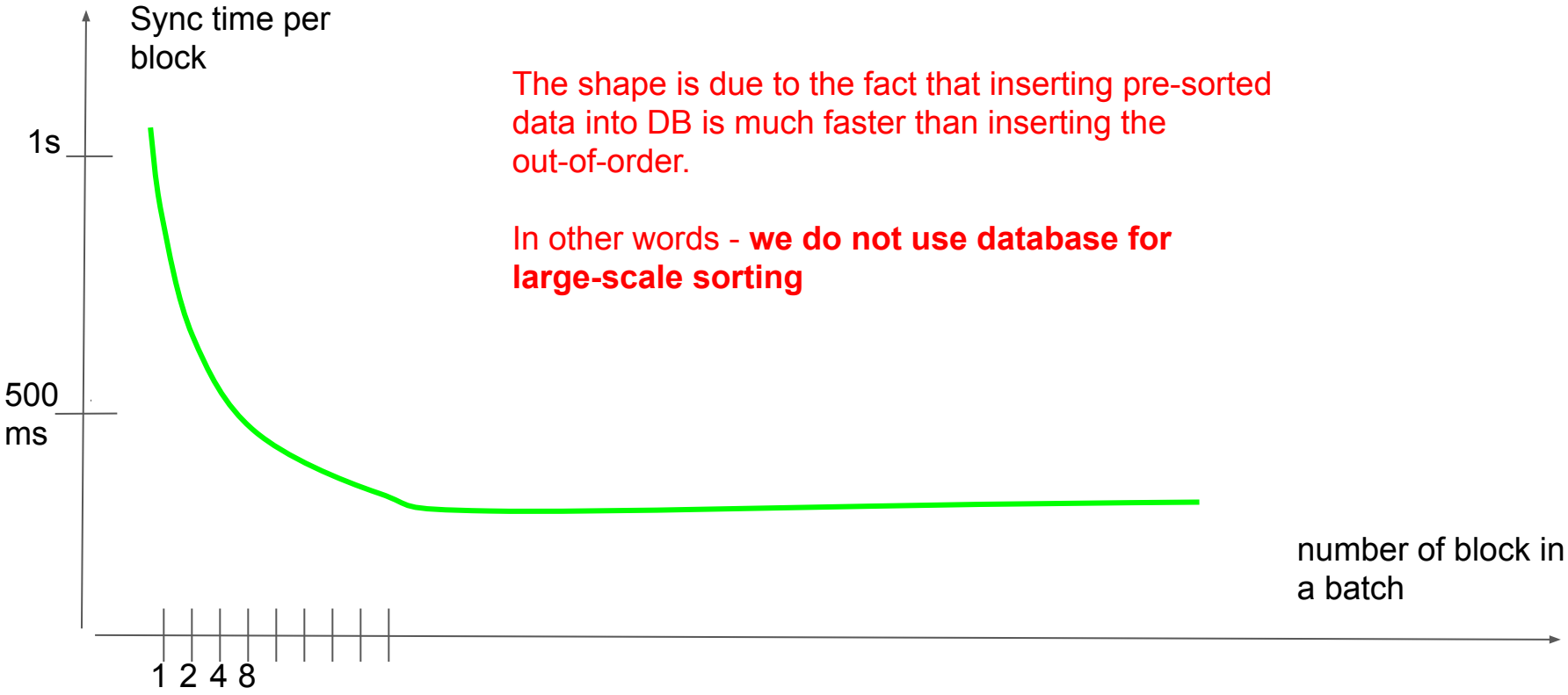
Intermediate hashes - solution (almost) without tradeoffs



CONCURRENCY - Staged sync



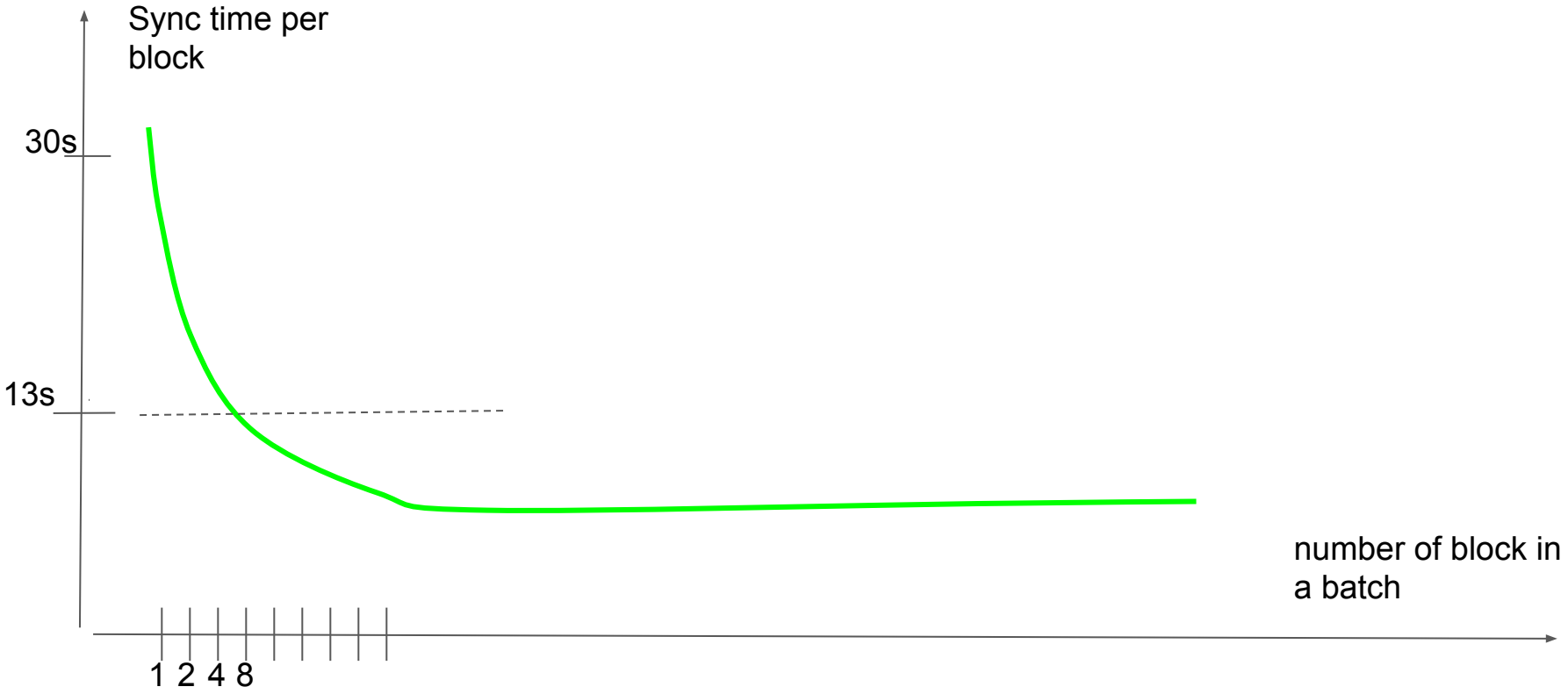
Staged sync



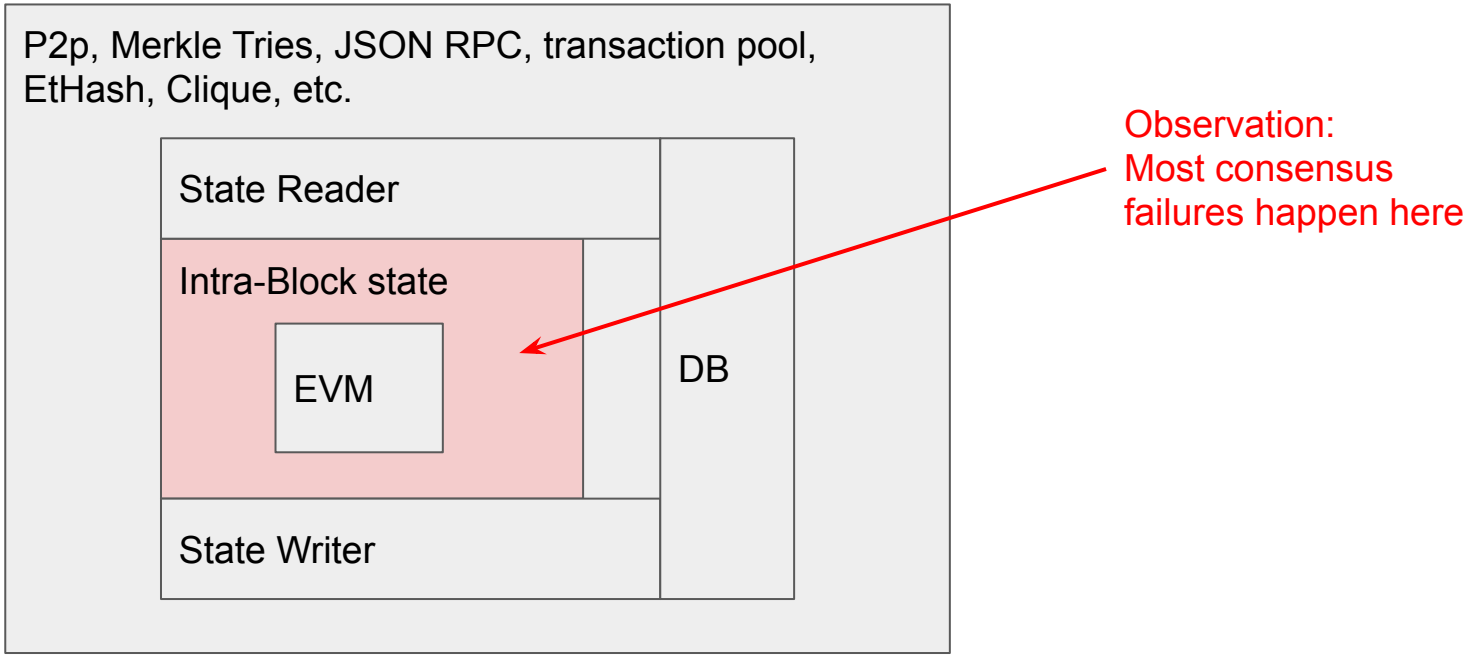
The shape is due to the fact that inserting pre-sorted data into DB is much faster than inserting the out-of-order.

In other words - **we do not use database for large-scale sorting**

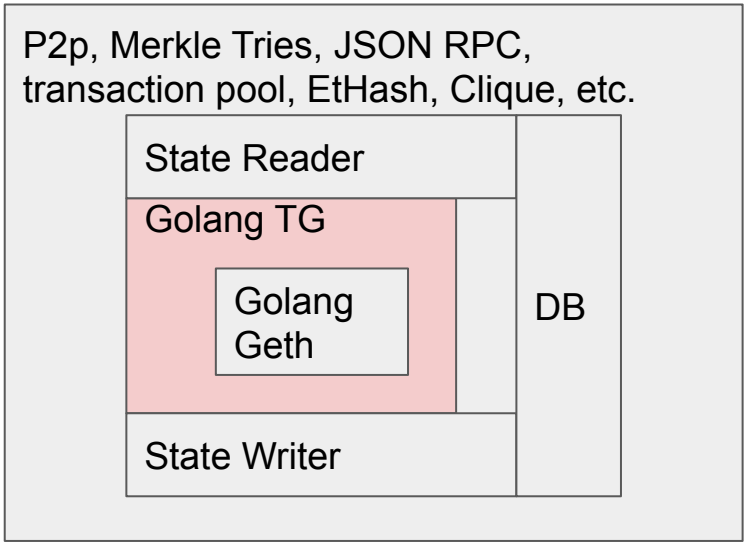
Staged sync on HDD (for academic purposes?)

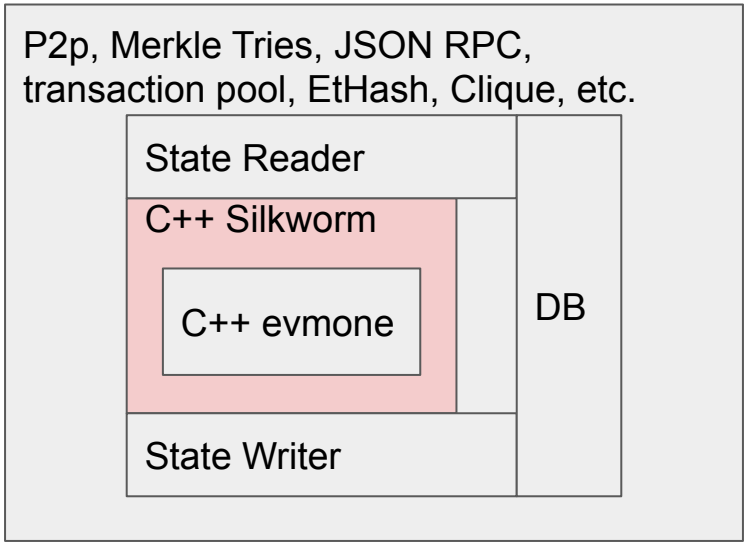


Diversity of implementations and consensus failures

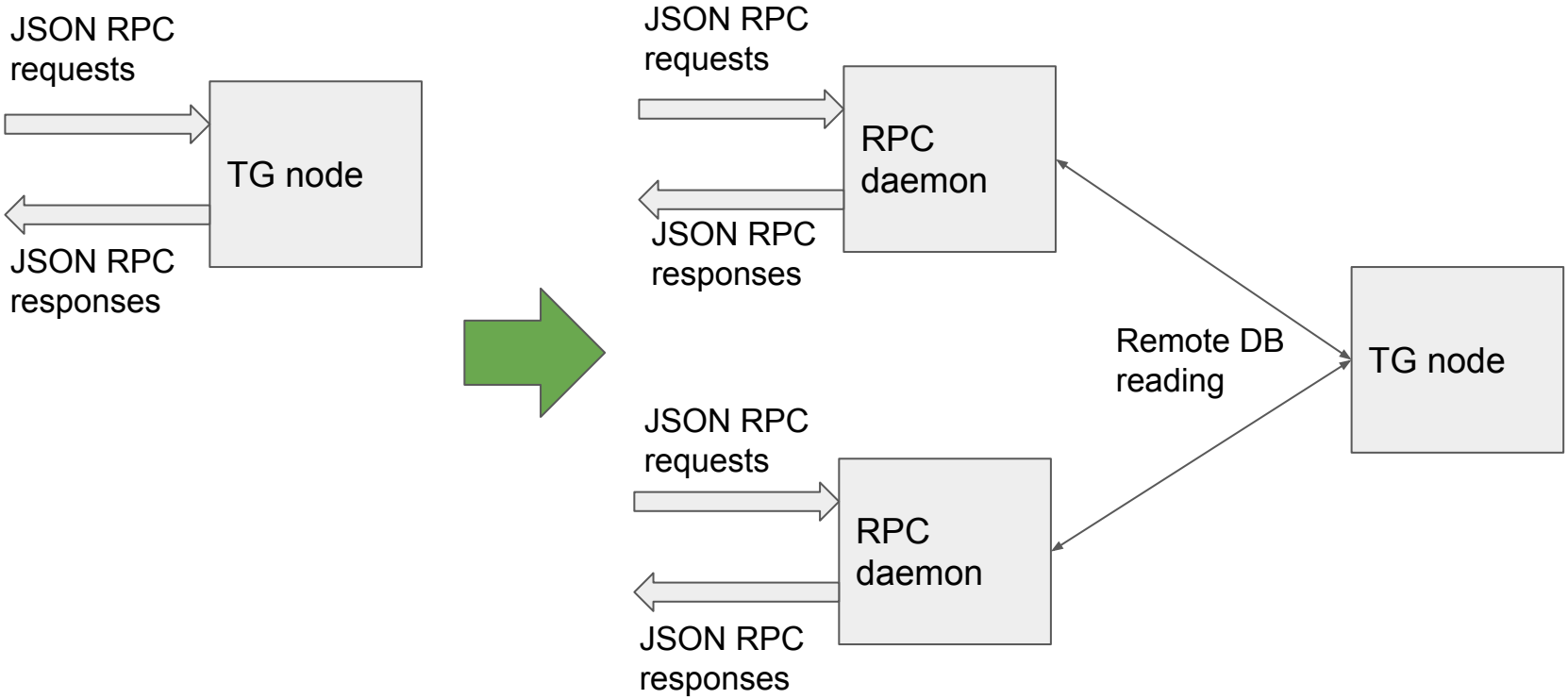


Practical examples: Silkworm execution engine





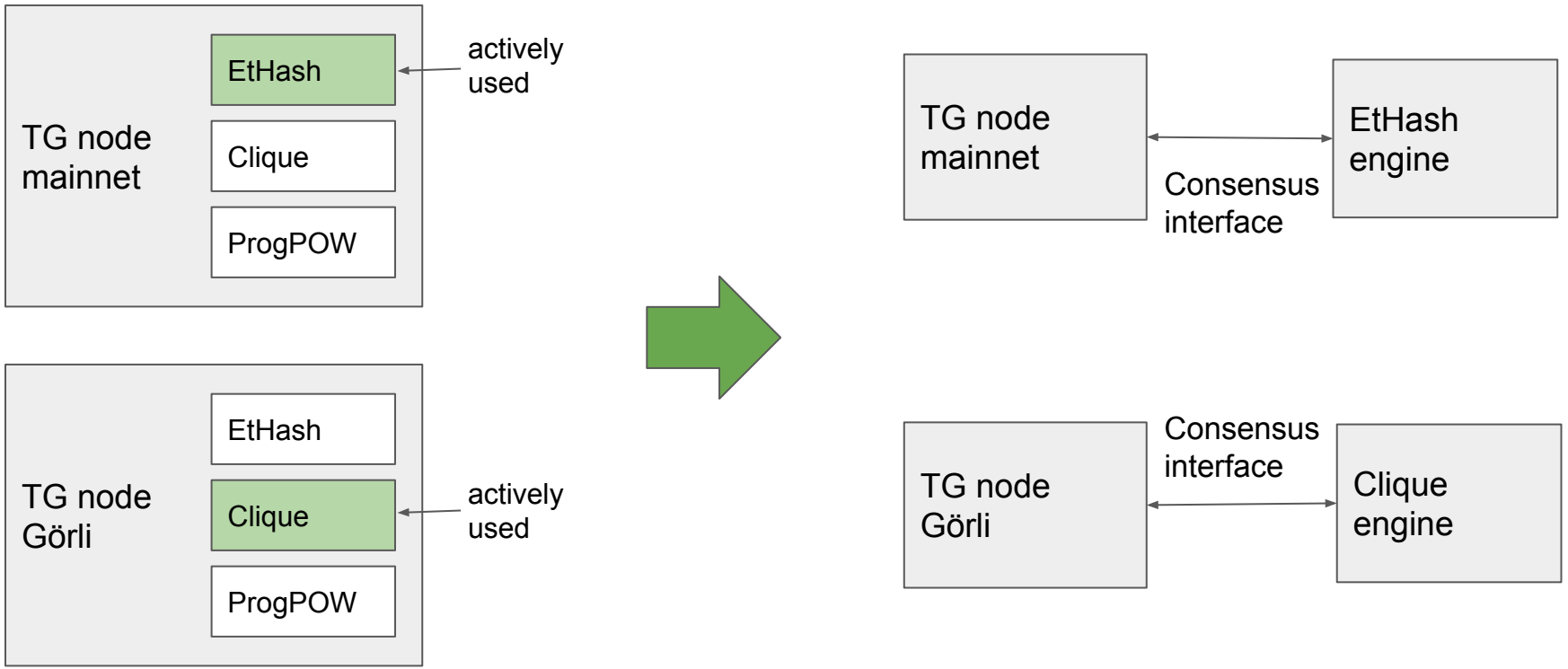
Practical examples - RPC daemon split



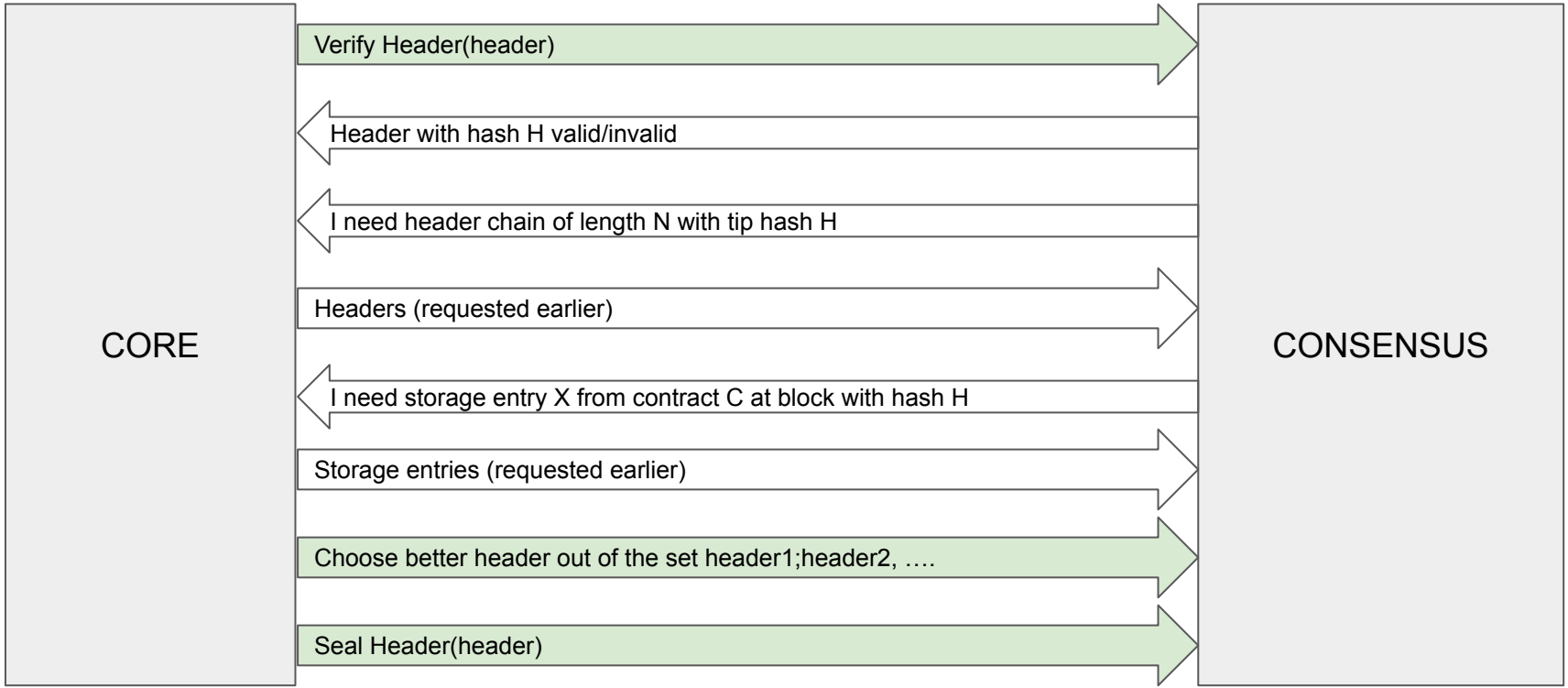
RPC daemon - interface

```
service KV2 { rpc Tx(stream Cursor) returns (stream Pair2); }

message Cursor { Op op = 1;  string tableName = 2; uint32 cursor = 3;
bytes k = 4; bytes v = 5; }

enum Op { FIRST = 0; FIRST_DUP = 1; SEEK = 2; SEEK_BOTH = 3; CURRENT = 4;
GET_MULTIPLE = 5; LAST = 6; LAST_DUP = 7; NEXT = 8; NEXT_DUP = 9;
NEXT_MULTIPLE = 10; NEXT_NO_DUP = 11; PREV = 12; PREV_DUP = 13;
PREV_NO_DUP = 14; SEEK_EXACT = 15; SEEK_BOTH_EXACT = 16;  OPEN = 30;
CLOSE = 31; }

message Pair2 { bytes k = 1; bytes v = 2; uint32 cursorID = 3; }
```

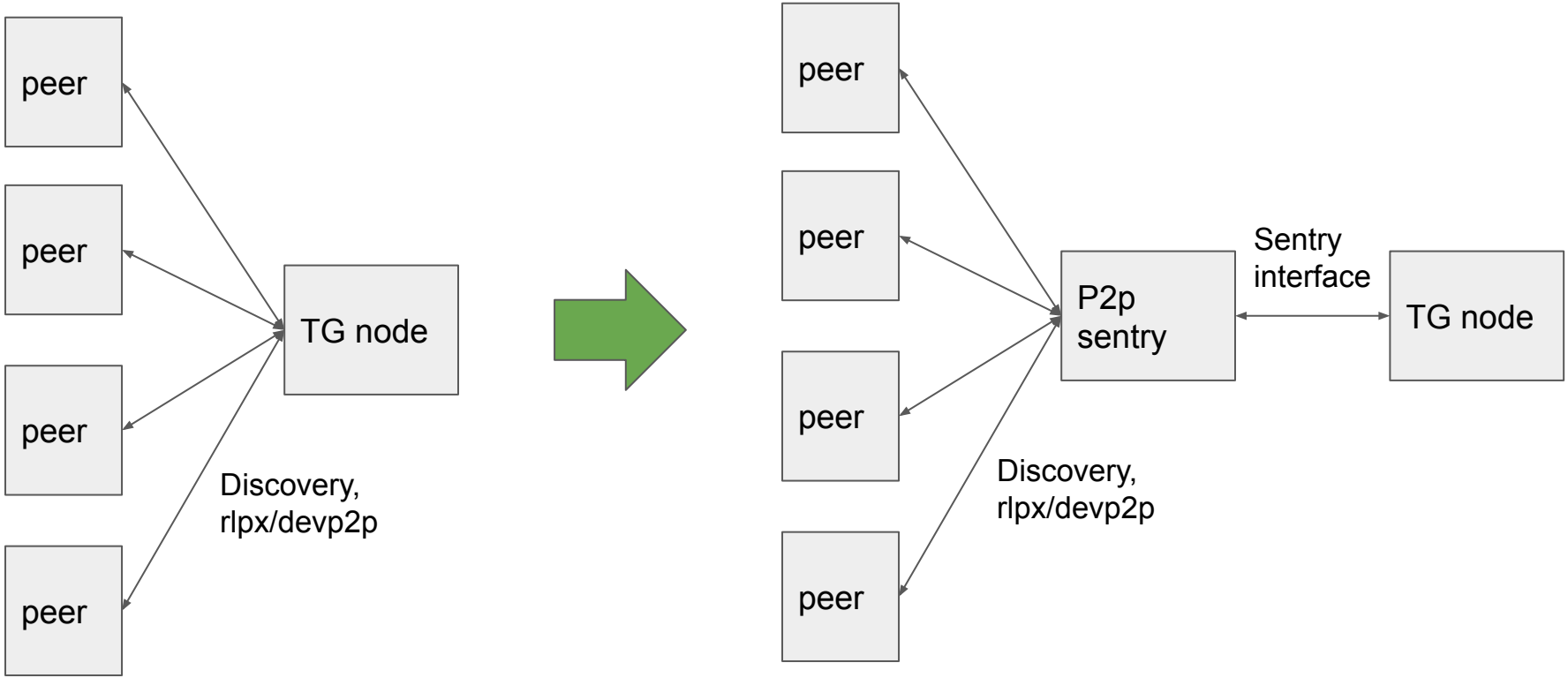
Practical examples - Consensus Engine split



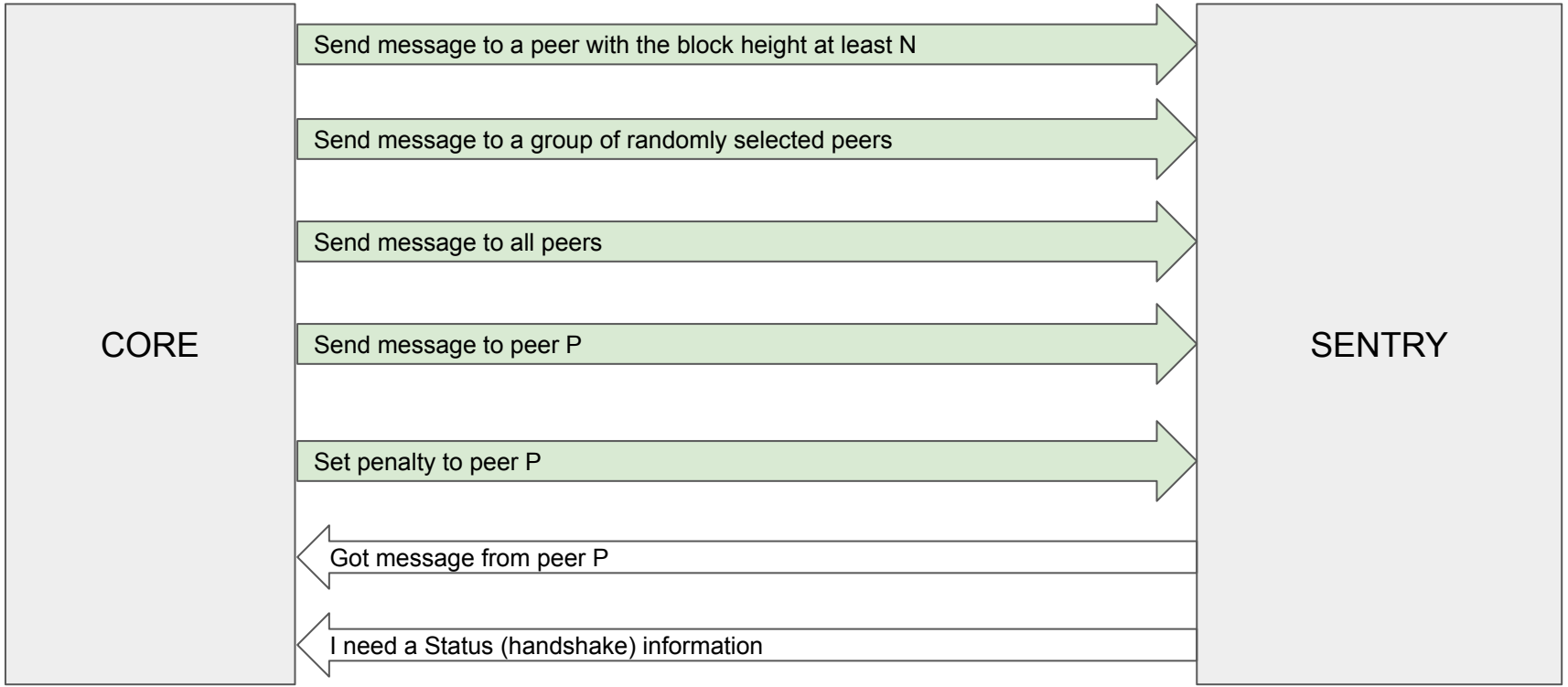
Consensus Engine split - interface (conceptual only)



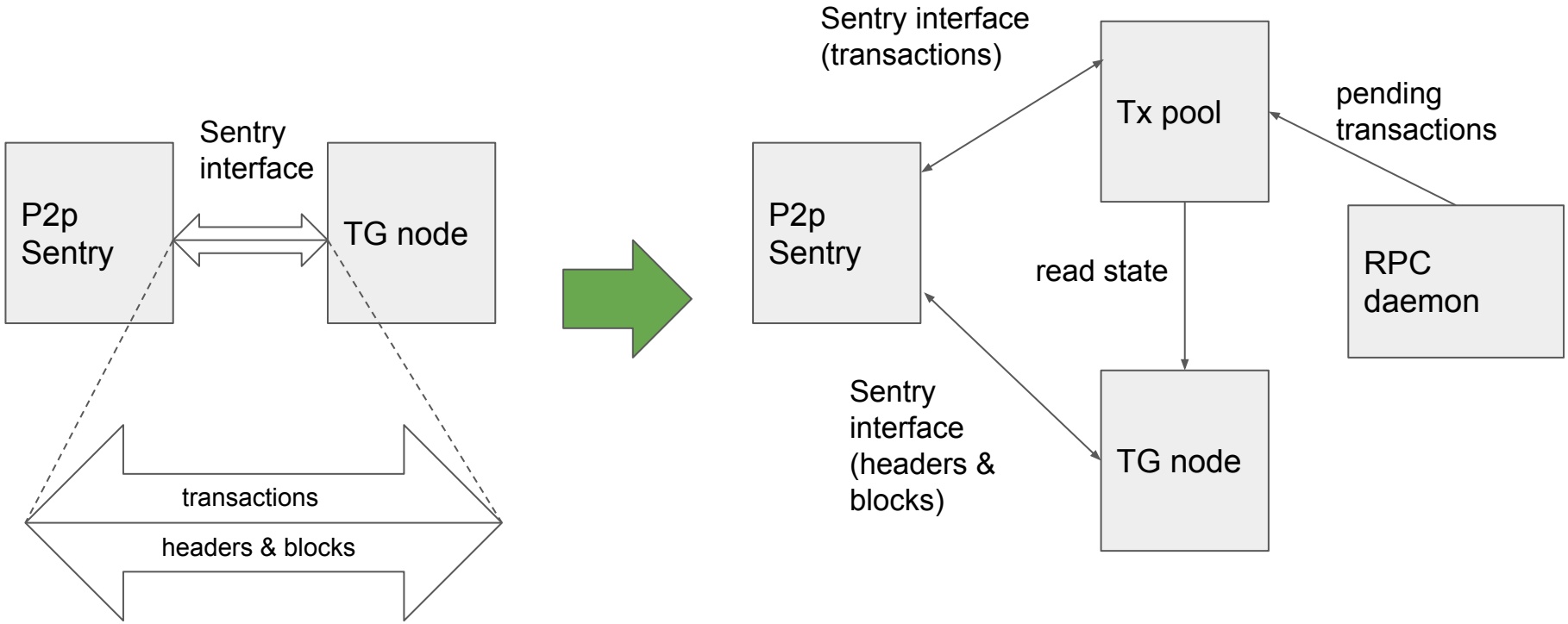
Practical examples - P2P sentry split



P2p sentry split - interface (conceptual only)



Practical examples - Transaction pool split



Future Talks

November 25: SKALE : Standard Kit for Asynchronous LEdgers

- Konstantin Kladko
- 5 pm Brisbane time zone (GMT+10)

December 9: Filecoin's Launched: Understanding Cryptocurrency's Newest Network

- Hannah Howard
- 12:30 pm Brisbane time zone (GMT+10)

January 20: Stateless Ethereum / Eth1.x

- Piper Merriam
- 1 pm Brisbane time zone (GMT+10)

February 3: Atomic Crosschain and Cross-Shard Function Calls: Business logic across blockchains

- Peter Robinson
- 12:30 pm Brisbane time zone (GMT+10)