



# 深入浅出聊一聊Libra架构

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Westar实验室

# 大纲

- 🔄 背景
- 🔄 Libra的整体架构
- 🔄 Network
- 🔄 Mempool
- 🔄 Consensus
- 🔄 Executor
- 🔄 总结



## 背景

- 🔄 区块链是什么？
- 🔄 为什么需要共识？
- 🔄 如何共识？



# 区块链是什么？

🔄 银行流水

顺序 => 余额 => 账本

🔄 其他可数字化场景

游戏等级、积分等等

# 为什么需要共识?



顺序

分布式

# 如何共识?

🔄 中心化数据库

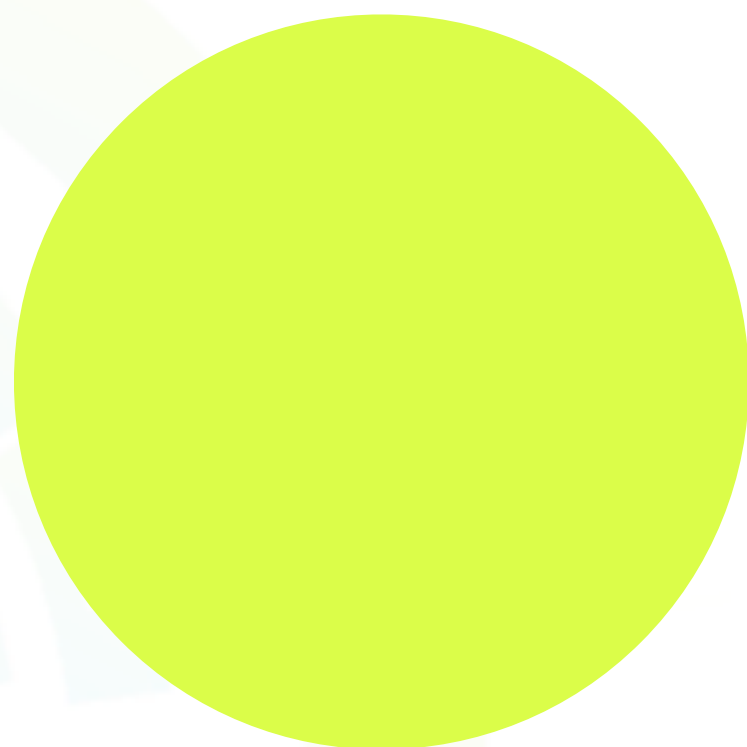
Web 1.0 / 2.0

公司行为

🔄 去中心化

价值 + 激励

无限制



# Libra架构

- 🔄 区块链&Libra
- 🔄 共识&Libra
- 🔄 架构&Libra

# 区块链&Libra



UTXO

纸钞

BTC



Account

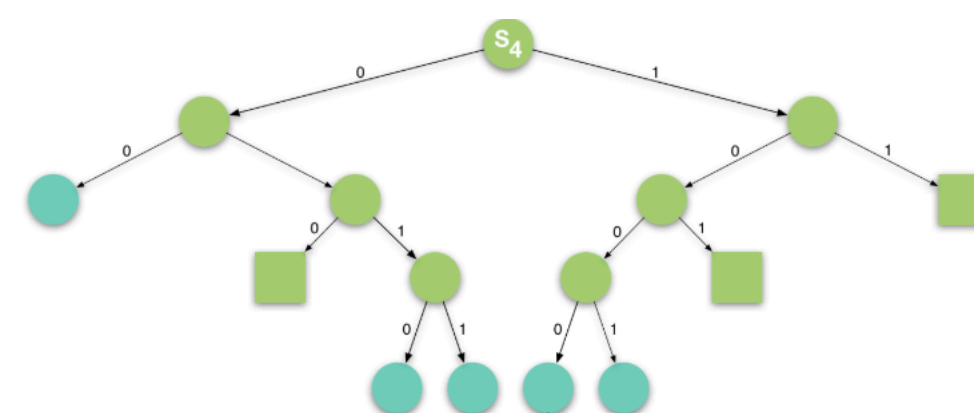
银行卡

ETH

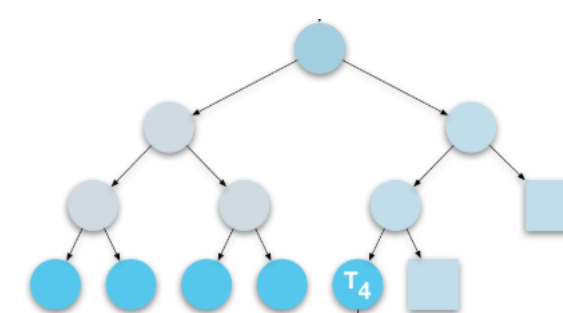


# 区块链&Libra

🔄 Sparse Merkle Tree



🔄 Merkle Accumulator



# 共识&Libra

 Pow

BTC/ETH 1.0

 PoS

ETH 2.0

 BFT

Libra?

# 共识&Libra

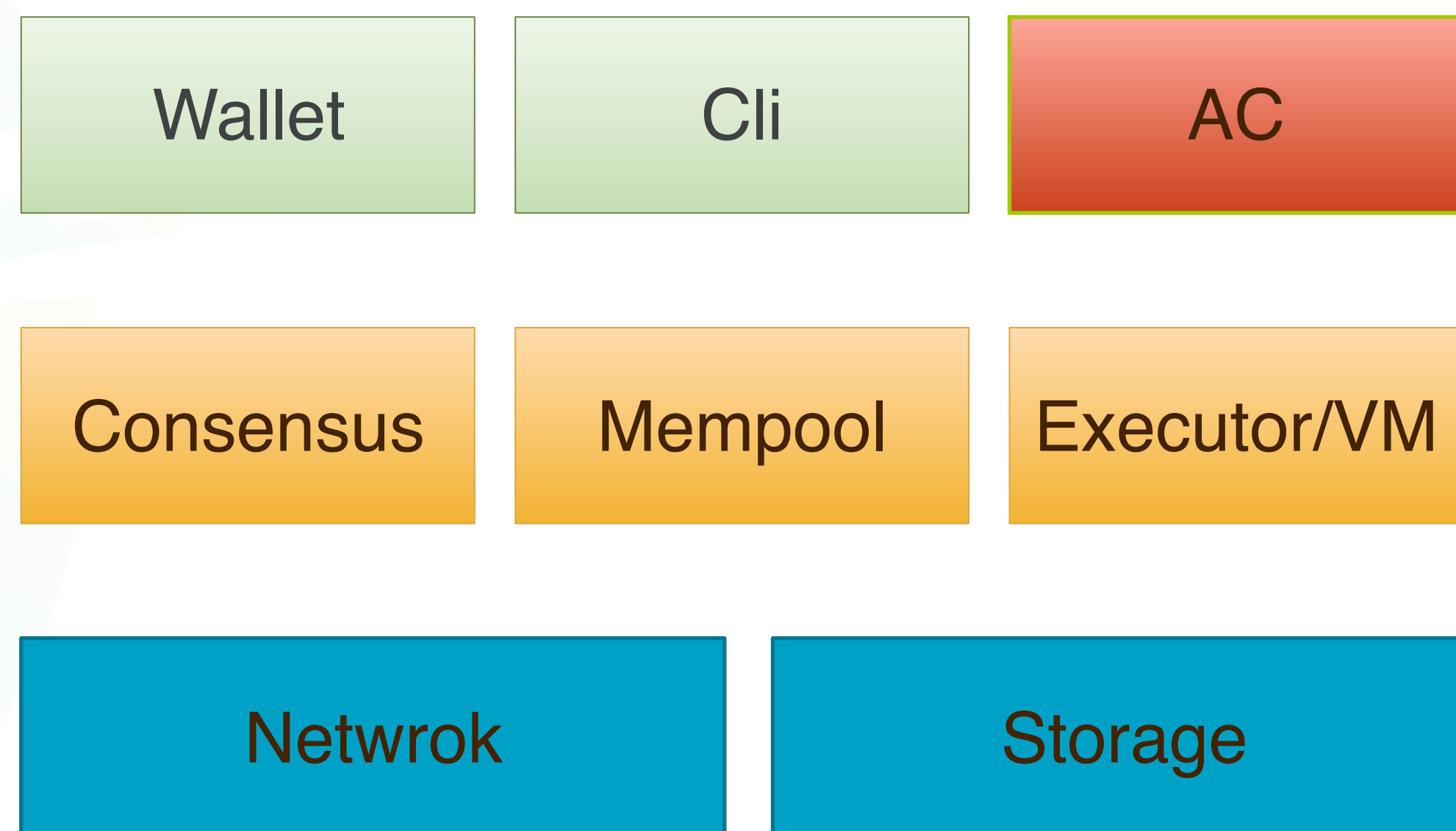


Hot Stuff



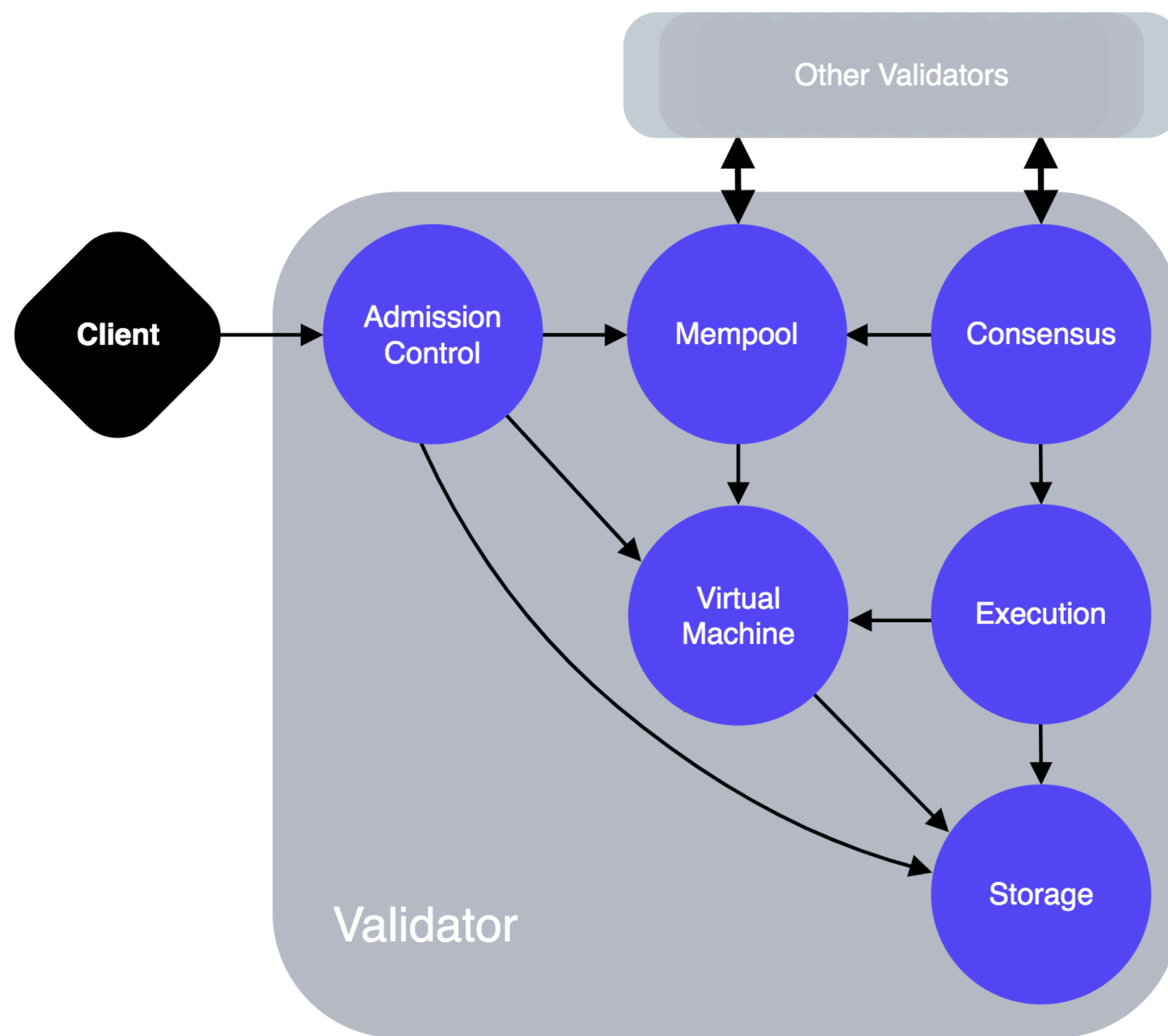
LibraBFT

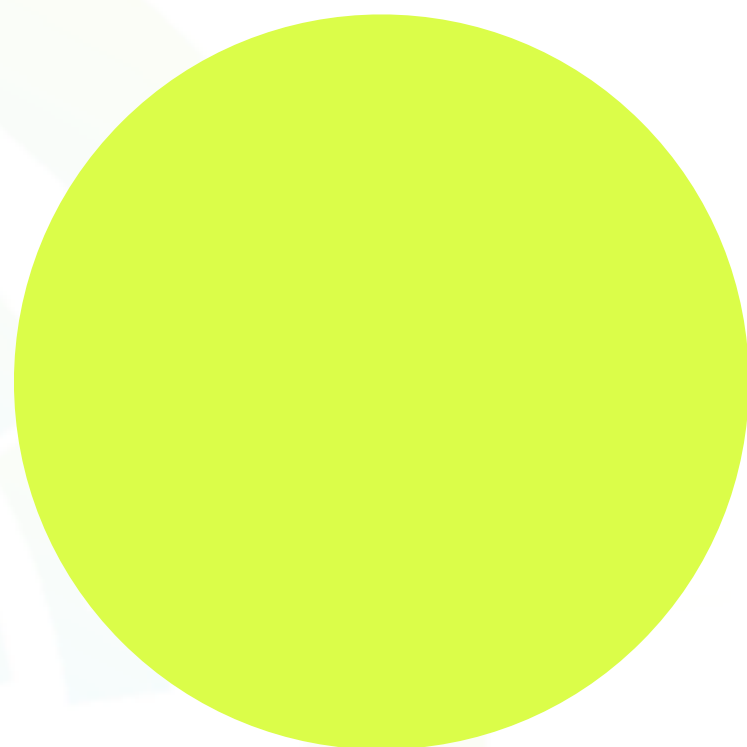
# 架构&Libra





# 架构&Libra





# Network

- 组件
- 协议
- Validator&Full Node

# 组件

Rpc

Direct Send

Sub Stream

Negotiate

Multi Stream

Transport

Noise

Mem Socket

Tcp Socket

# 协议

AC

Mempool

Consensus

State Sync

Discovery

Health

Identity

Direct  
Send

Rpc

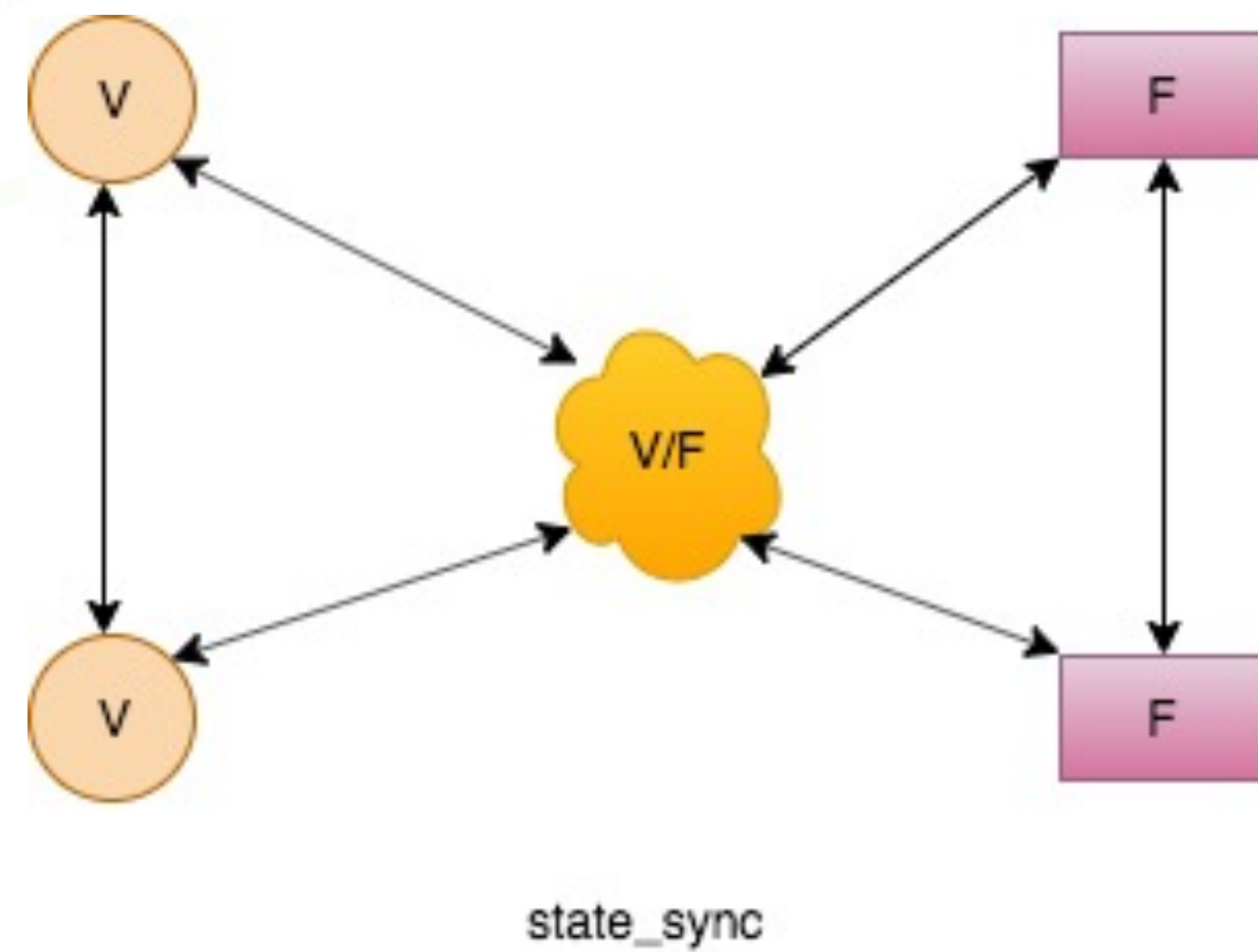
Dial Peer

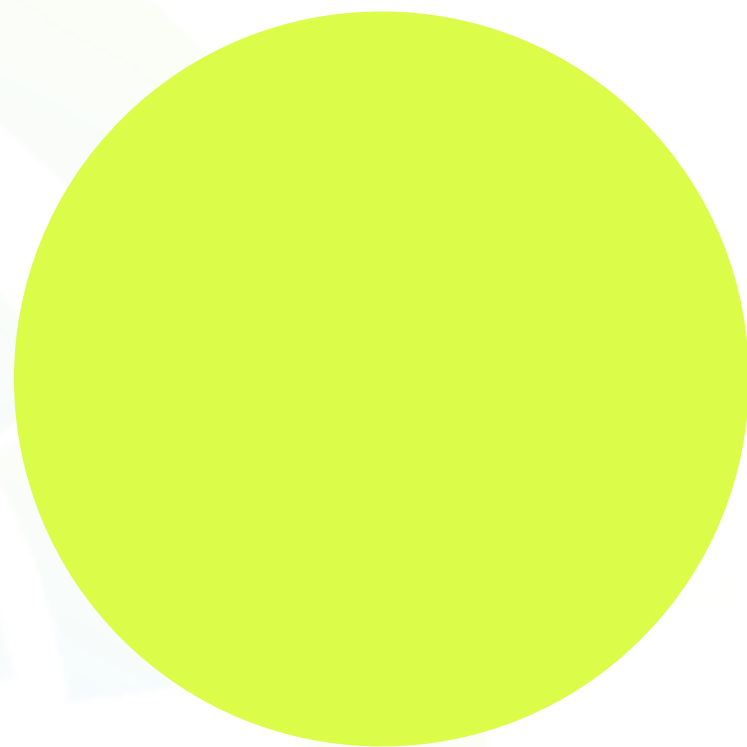
Disconnect Peer

Open Sub Stream



# Validator&Full Node

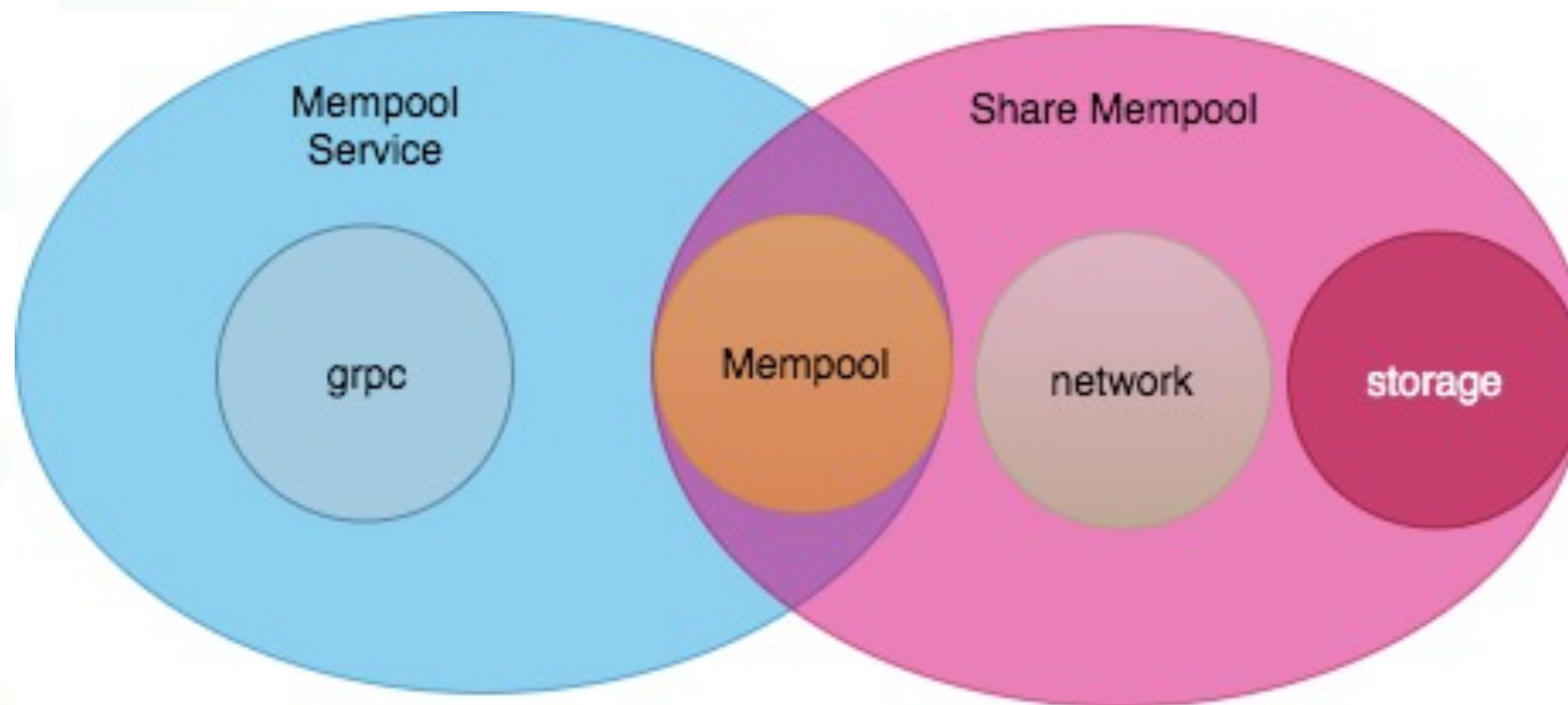




# Mempool

- 🔄 Mempool Service&Share Mempool
- 🔄 交易的3种状态&交易广播
- 🔄 交易排序

# Mempool Service&Share Mempool



# 交易的3种状态&交易广播

- NotReady
- NonQualified
- Ready(u64)



# 交易的3种状态&交易广播

- 只广播自己节点接收到的交易；
- 只广播有机会包含在下一个block中的交易，也就是Ready的交易；

# 交易排序

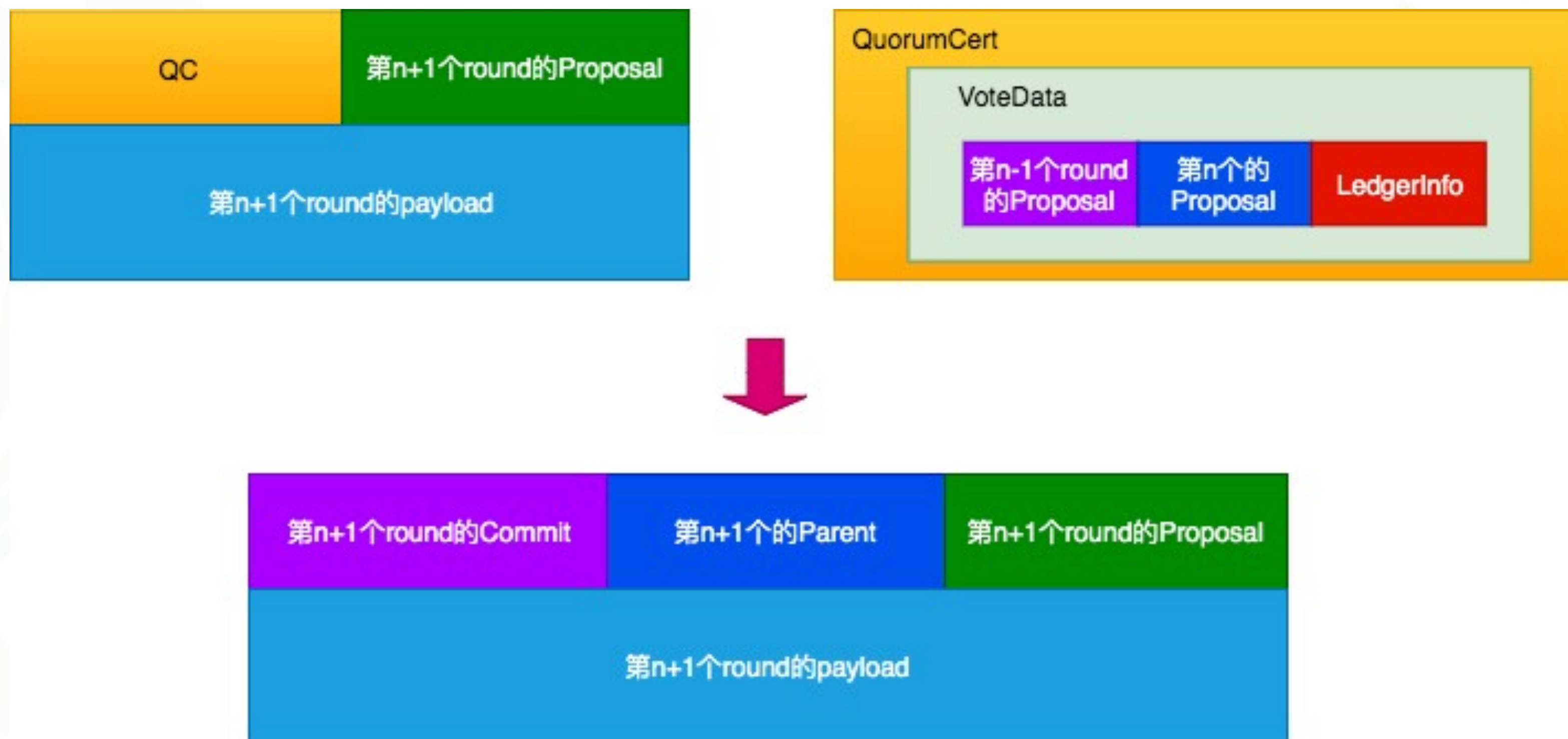
 gas\_price expiration\_time address sequence\_number



# Consensus

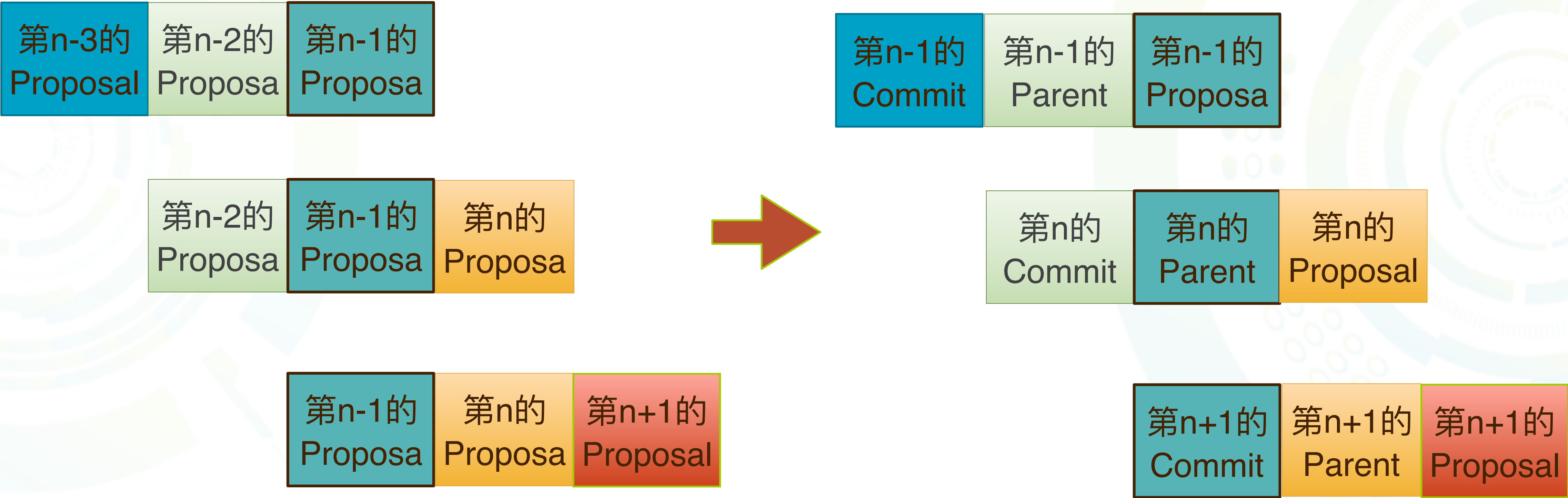
- 🔄 共识与Block结构
- 🔄 共识流程
- 🔄 疑问
- 🔄 总结

# 共识与Block结构

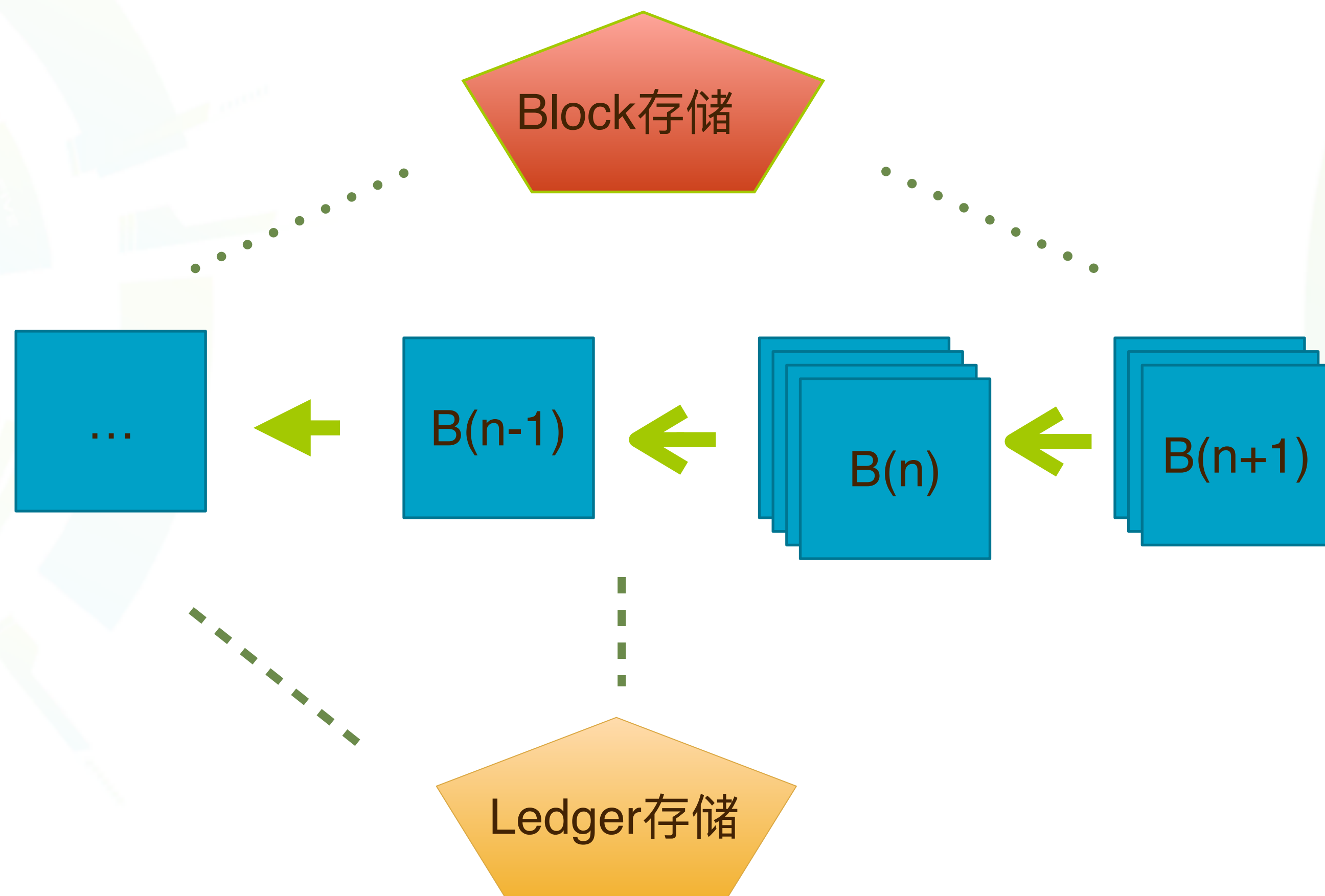




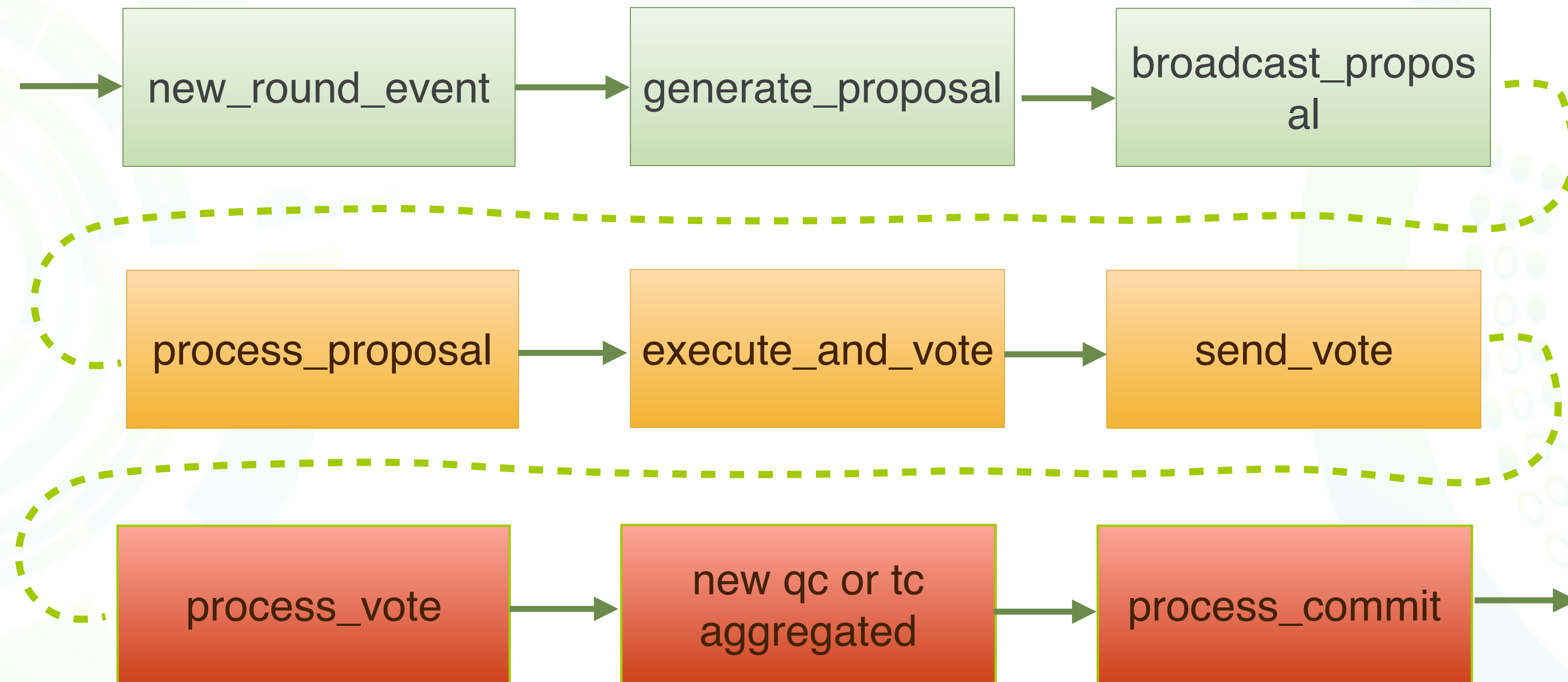
# 共识与Block结构



# 共识与Block结构



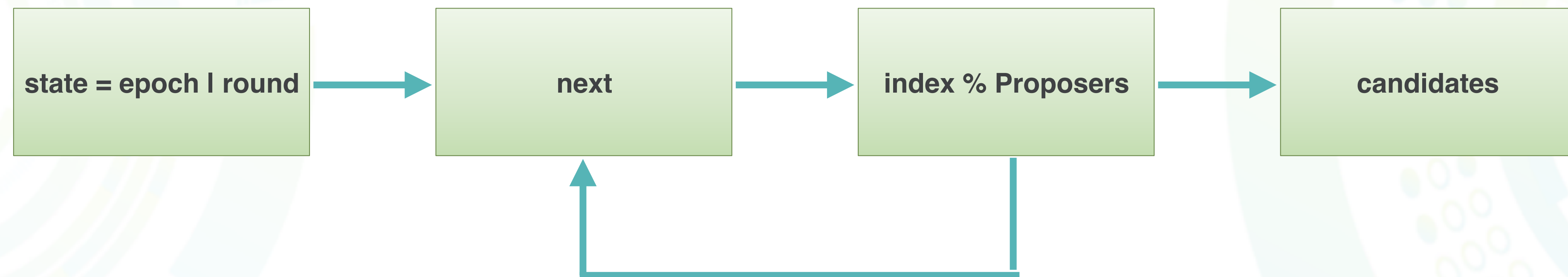
# 共识流程



# 疑问

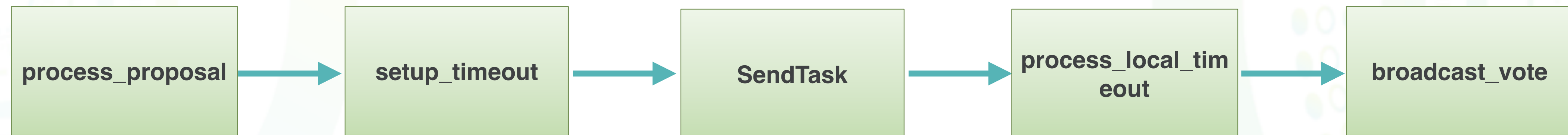
- 🔄 如何选举proposer? 一个round只有一个proposer?
- 🔄 当前round的primary proposer失联怎么办?
- 🔄 如何更新一组proposer?

# 疑问1. 选举Proposer

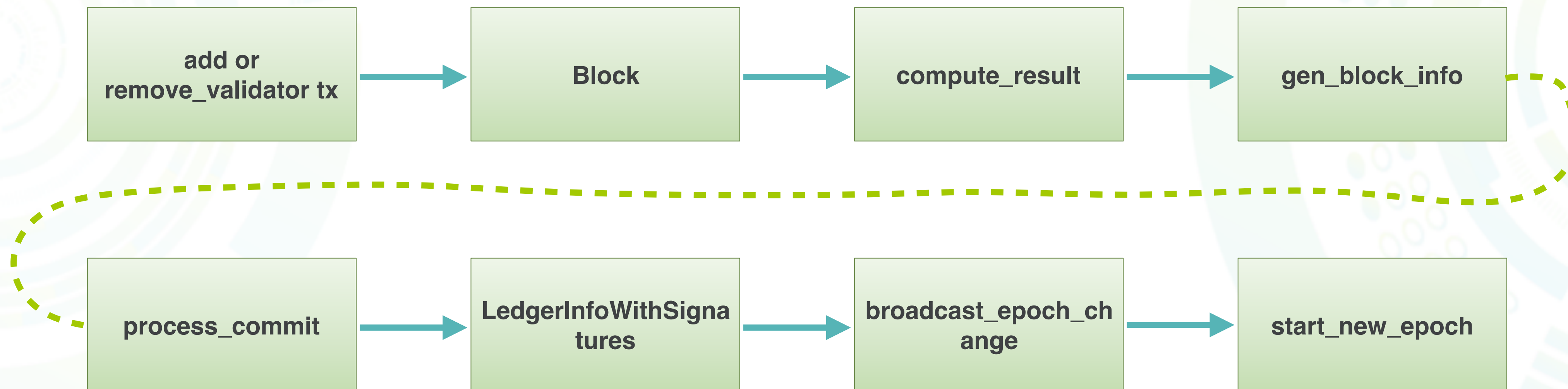




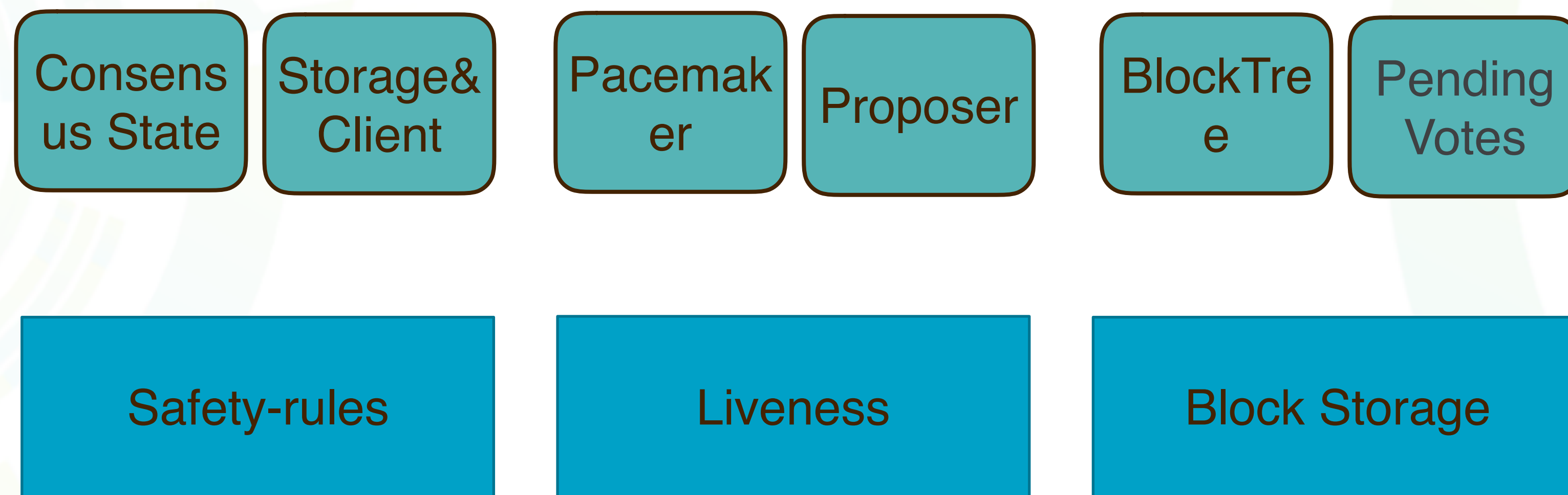
## 疑问2. Primary Proposer失联



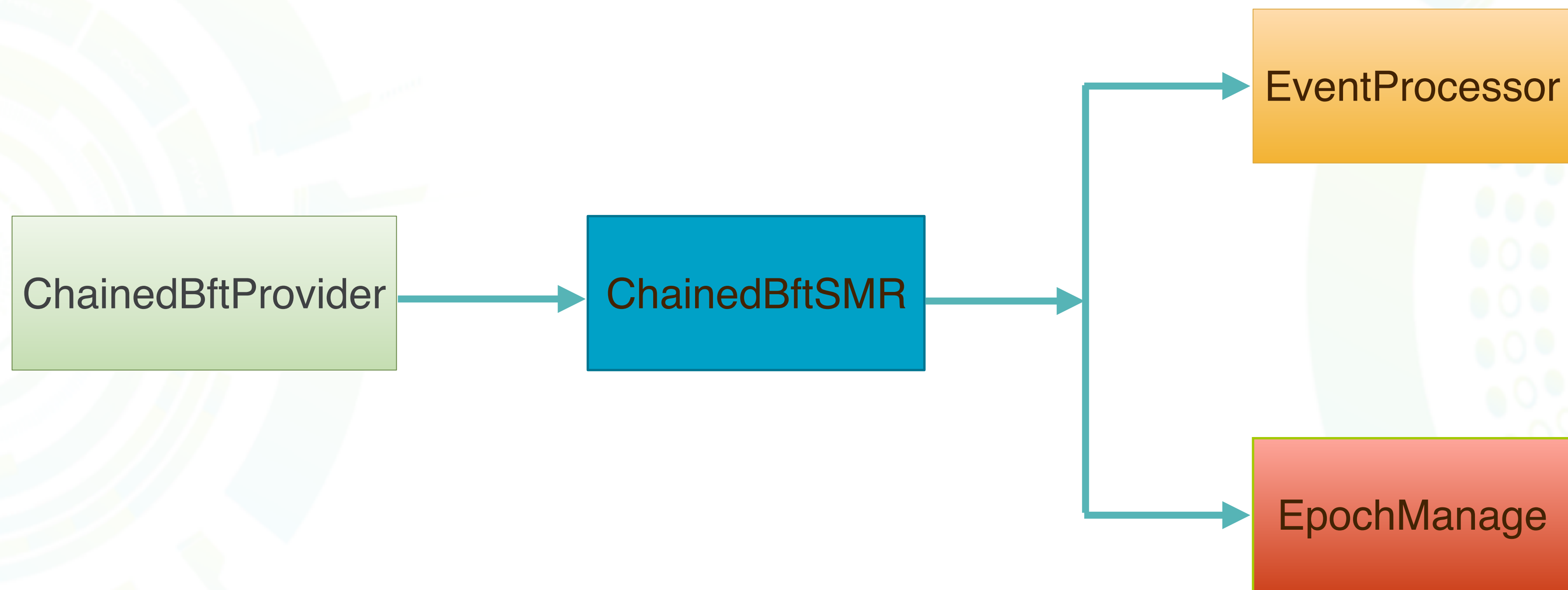
## 疑问3. Reconfiguration

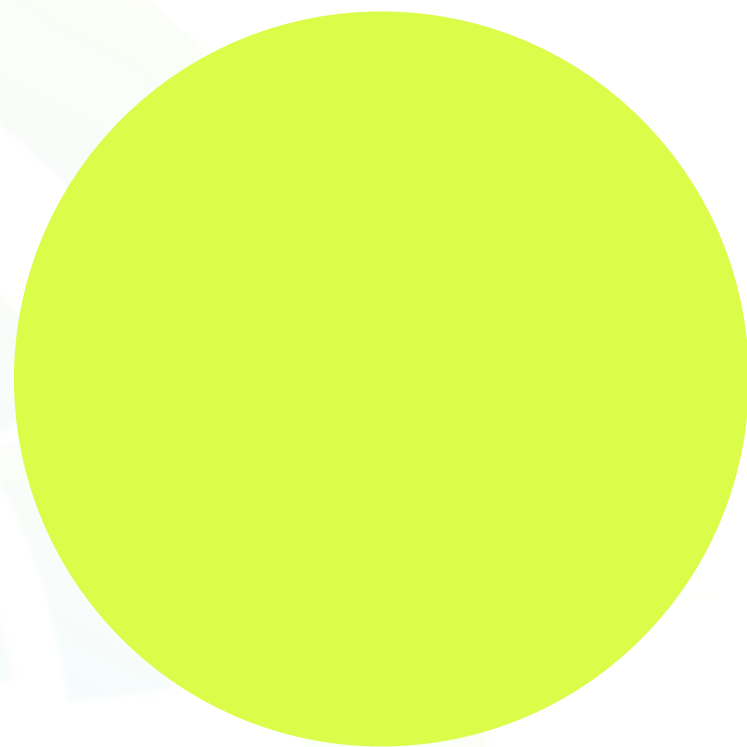


# 总结





# 总结



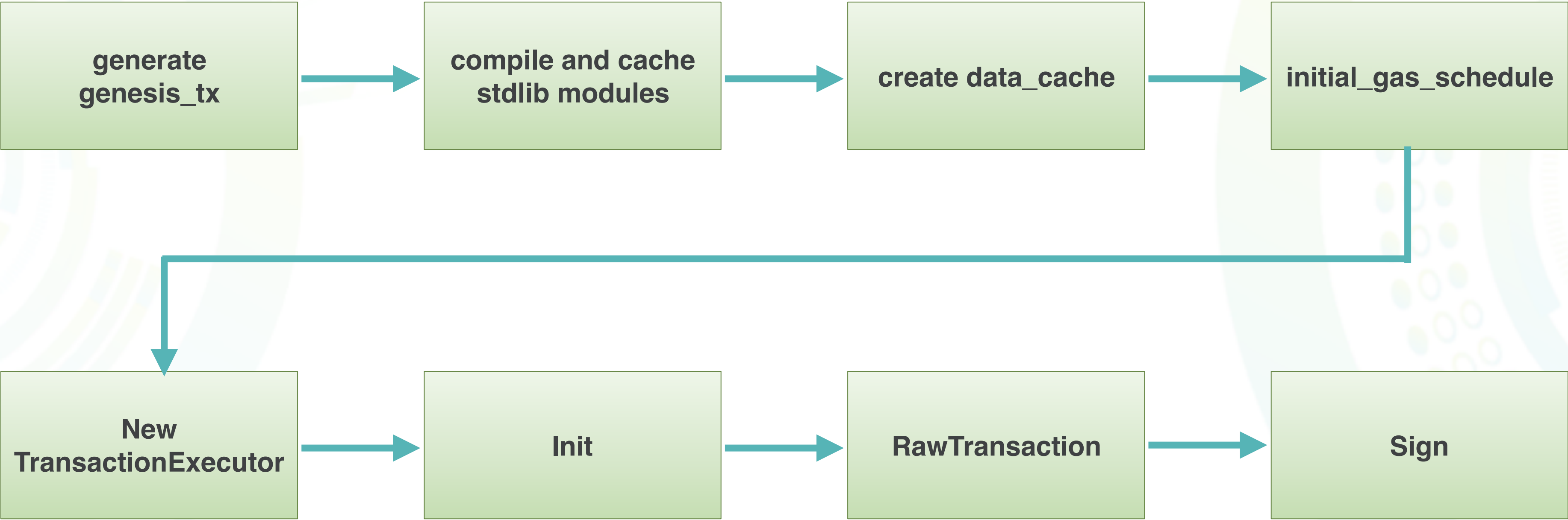


# Executor

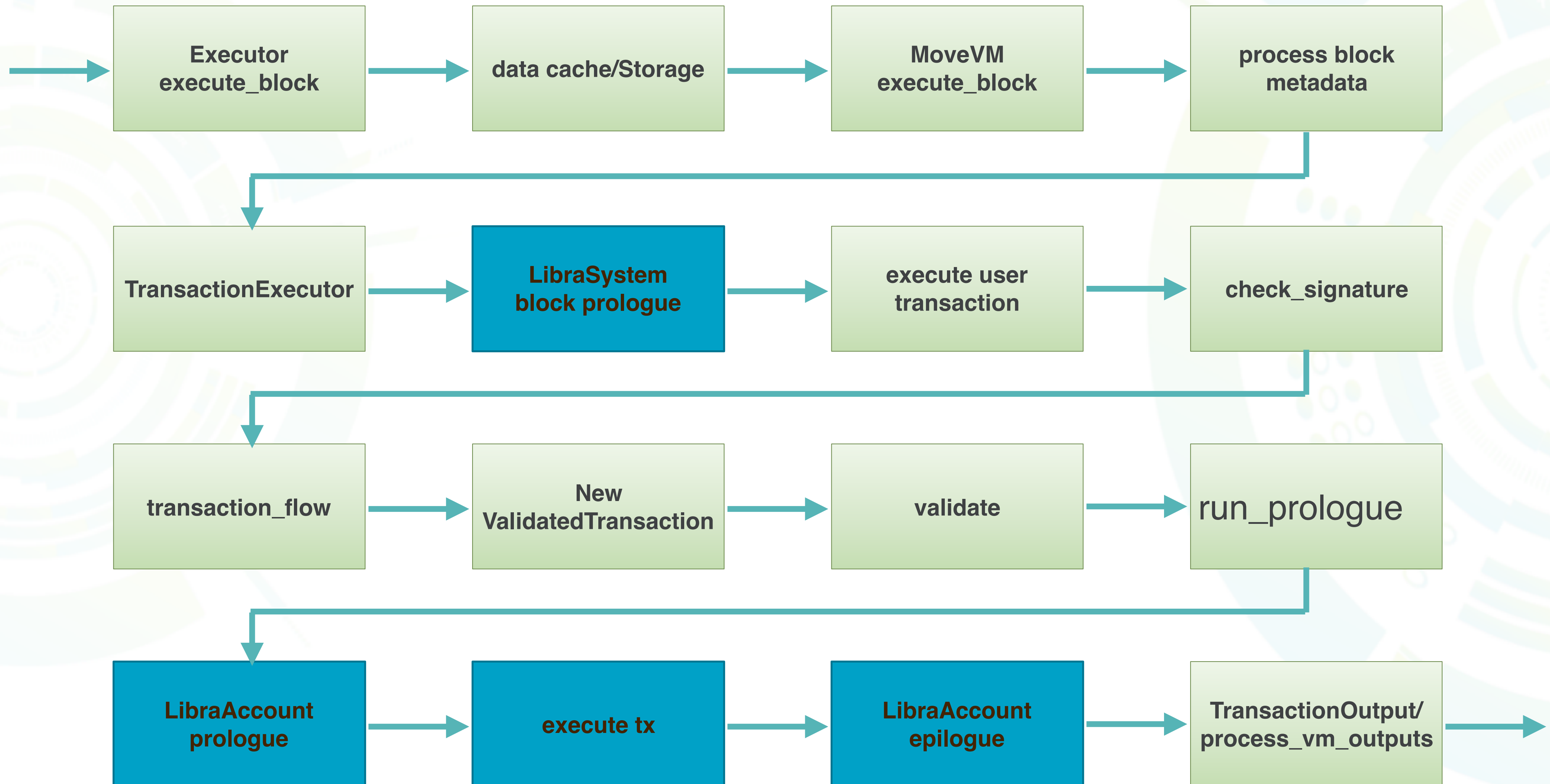
-  Genesis
-  Executor Block



# Genesis



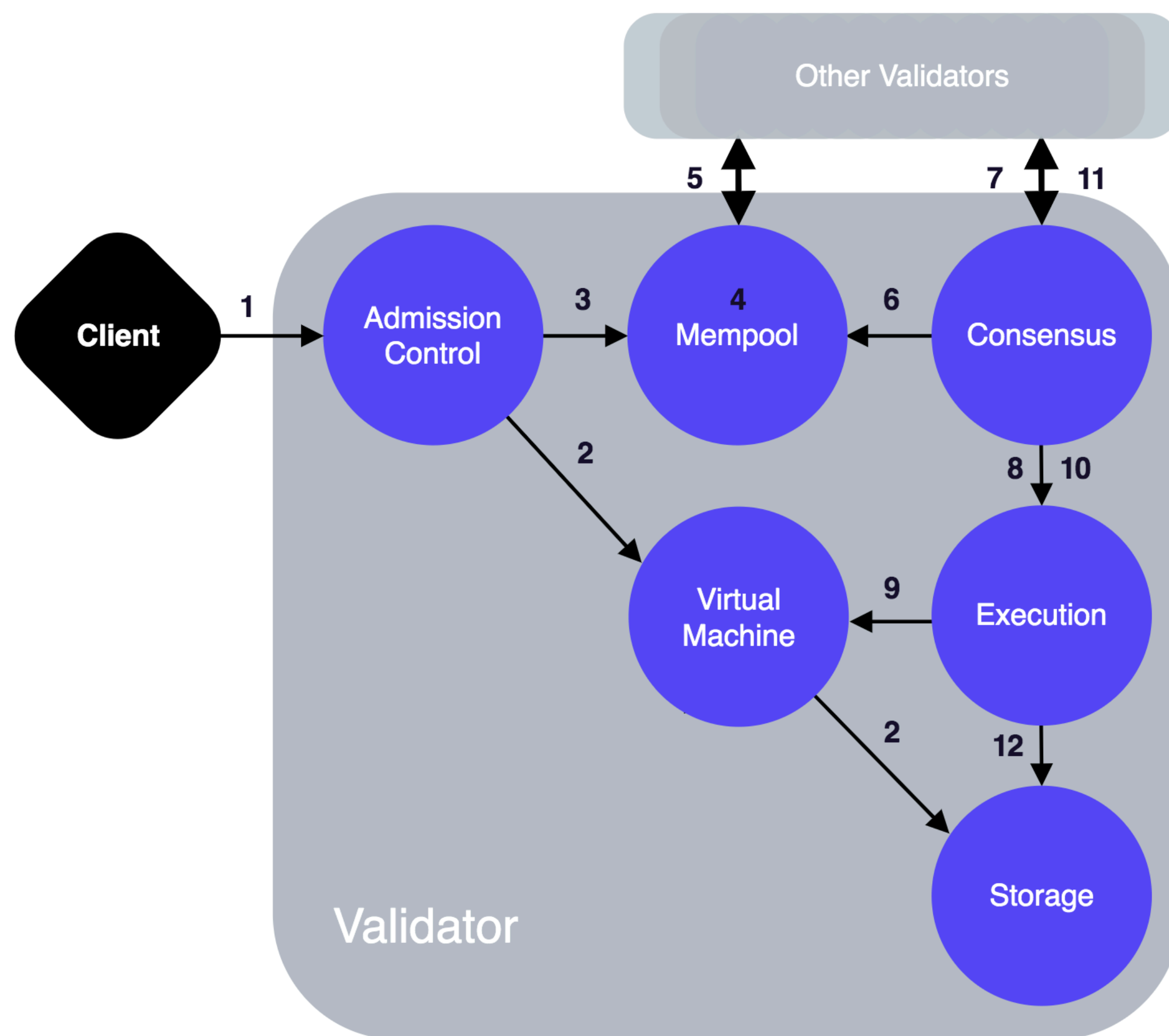
# Executor Block





总结

# 交易的生命周期







The background features a light gray hexagonal grid pattern. On the left side, there is a circular diagram with concentric rings and segments. The segments are labeled 'TWO', 'THREE', 'FOUR', and 'FIVE' in a clockwise direction. The diagram is composed of various shades of green and blue. A thin green horizontal line is positioned below the word 'Thanks'.

# Thanks