

# An overview of Plasma

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# Rosco Kalis

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- Creator of truffle-assertions library for smart contract testing
- Winner of BCH DEVCON Amsterdam
- Creator of PandaCash suite of developer tools for Bitcoin Cash

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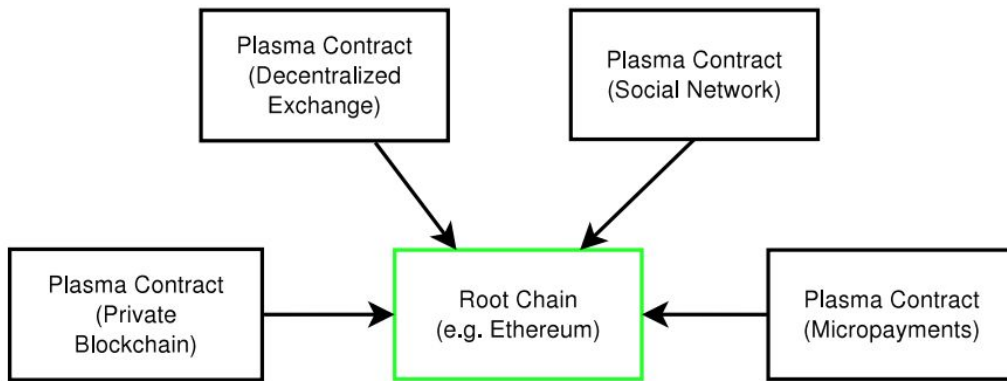
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- What is Plasma?
- Minimal Viable Plasma
- Plasma Cash
- The future of Plasma

# What is Plasma?

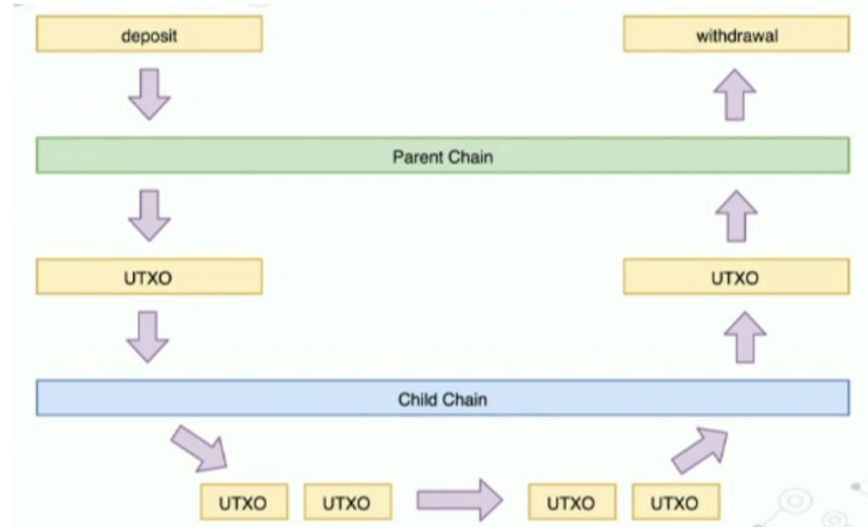
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- Layer 2 scaling solution for Ethereum
- Framework for sidechains (Plasma chains)
- Sidechains are usually less secure than root chain
- Transactions executed on Plasma chain, but enforceable on root chain



# Minimal Viable Plasma

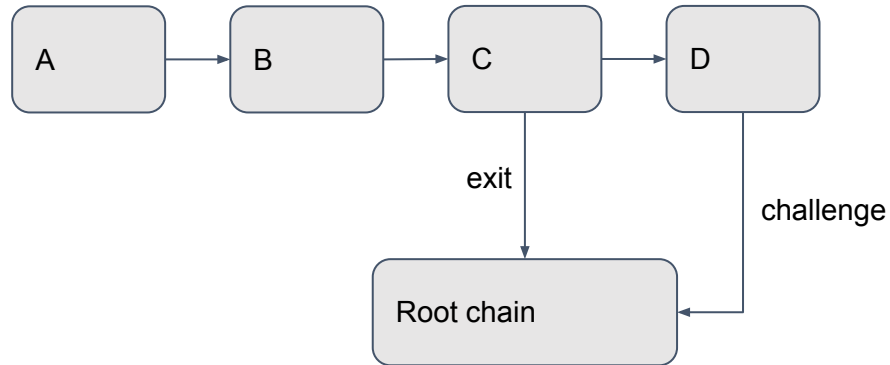
- First Plasma implementation
- Plasma Contract on root chain
- Users deposit Eth to contract and receive utxo on Plasma chain
- Users transact with these utxos
- Operator periodically submits blocks to the root chain
- Users can withdraw (exit) utxos and receive Eth on root chain



# MVP Security

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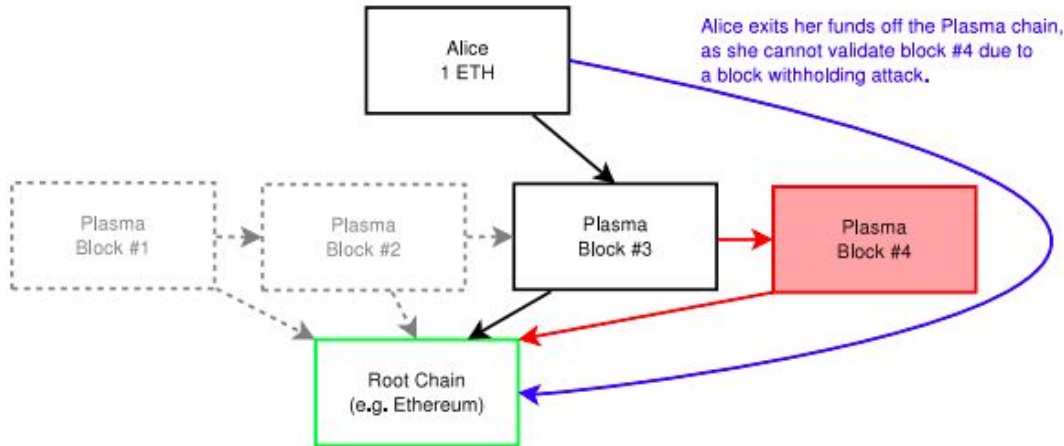
- Security against malicious users
  - Merkle proof of ownership at exit
  - Exit can be challenged with proof of spend



# MVP Security

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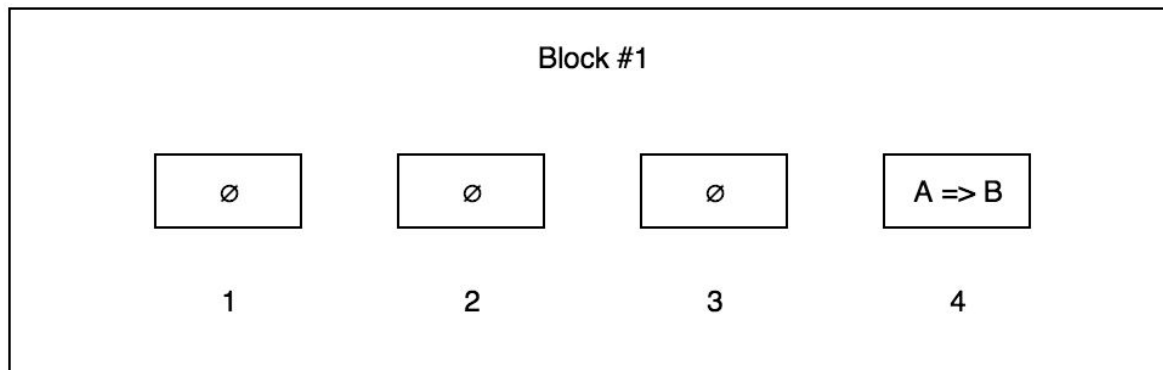
- Security against malicious operators
  - Users can exit at any time
  - Exit priority based on utxo ordering
  - Double signing transactions (confirmations)



# Plasma Cash

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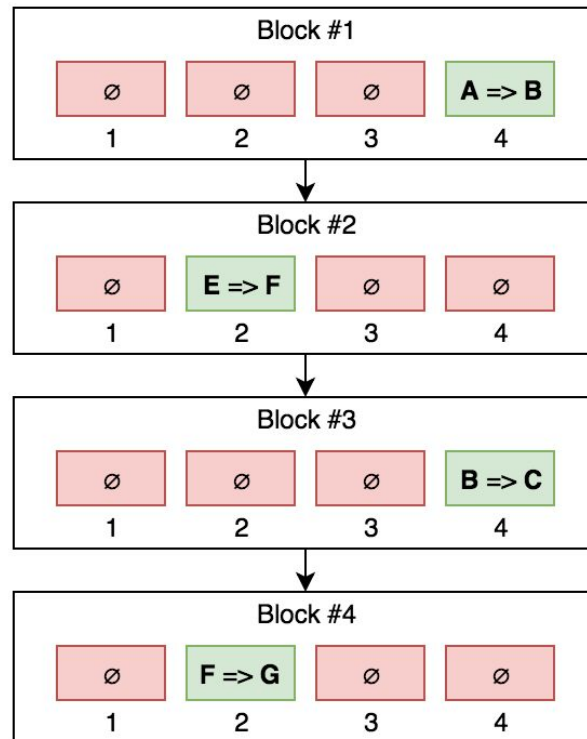
- Deposited Eth/tokens are represented as NFTs
- Sparse Merkle Trees to store all tokens on chain
- Users only need to watch their own tokens





# Plasma Cash

- Proof of ownership needs token transaction history
- Exit request (with latest token history)
- Exit can be challenged
  - By providing proof of spend
  - By providing proof that history is invalid



# The future of Plasma

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- Loom Network / Zombie Battlegrounds
- More Viable Plasma / Plasma Debit / Plasma XT

# Resources / Further Reading

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- <https://plasma.io/plasma.pdf>
- <https://media.consensys.net/the-state-of-plasma-1-6b48c1e4b295>
- <https://www.learnplasma.org/>
- <https://github.com/loomnetwork/plasma-cash>
- <https://www.youtube.com/watch?v=uyuA11PDDHE>
- <https://media.consensys.net/the-state-of-plasma-1-6b48c1e4b295>