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Fast Blockchains
A Closer Look at Smart Contracts

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Introduction

- Distributed Ledger Technology
    - Blockchain
    - Directed Acyclic Graph
    - Hashgraph

- Applications
    - Cryptocurrency transactions
    - Smart Contracts
    - NFTs

- Thousands of transactions per second

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Problem Definition

- Problem: How to scale consensus algorithm to allow high throughput and low latency?

  - Partial Solution

    - Hashgraph

    - Aleph Zero

    - Solana

  - What about smart contracts?

- *How do we increase throughput and reduce latency for smart contracts?*

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Problem Definition

DLT	Consensus Algorithm	Throughput (TPS)	Throughput (Smart Contracts TPS)	Latency
Bitcoin	Proof of Work	7	7	60 mins
Ethereum	Proof of Stake	25	25	6 mins
Hashgraph	Virtual Voting / modified Proof of Stake (aBFT)	10,000+	25 (?!)	5 secs
Solana	Proof of History + Proof of Stake	50,000	No numbers provided	5 secs

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Related Work

- Hashgraph

    - DLT based on "gossip of gossip"

- Solana

    - Proof of History + Proof of Stake

- AlephZero

    - Asynchronous Byzantine Fault Tolerance

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Proposed Solution and Evaluation

- Proposed Solution
  - Work on smart contract runtime that removes smart contract bottleneck
  - Modify existing consensus algorithm – like Hashgraph
- Evaluation
  - Test against existing performant smart contract blockchains
    - Numerical Simulation
    - If possible, practical simulation in virtual environment

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Questions

The floor is open for questions