Assignment - 1

Scaling DLT Technologies

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Paper 1: Towards Scaling Blockchain Systems via Sharding

One of the main reasons of scaling challenges in Blockchain is due to a different kind of failure model suited for a more hostile environment.

This Byzantine failure tolerance model can be improved by leveraging TEE (Trusted execution environment – Intel SGX, TrustZone, Sanctum) to eliminate equivocation.

Without Equivocation existing BFT protocols can achieve higher fault tolerance with the same number of nodes, Further improvements to BFT models to scale in failure tolerant environment and increase throughput in shard formation is to use Attested Hyperledger as a trusted log cache (and AHLR), alongside, a randomness beacon for shard formation optimization.

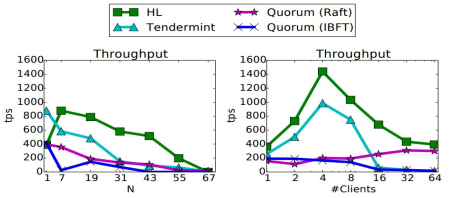
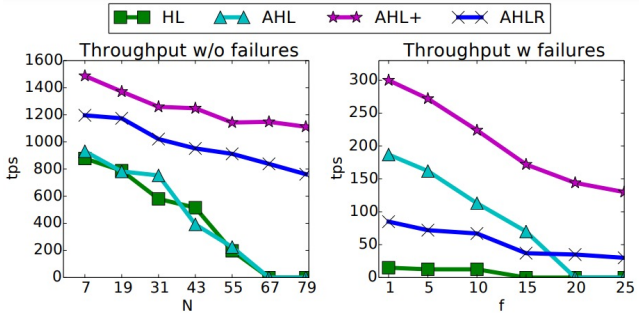


Figure 2: Comparison of BFT protocols with varying number of nodes and clients.



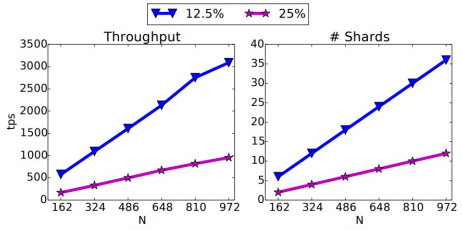


Figure 13: Sharding performance on GCP.

Paper 2: Pervasive Smart Contracts for Blockchains in IoT Systems

Main domain of issues in IoT smart contracts: Autonomous Execution, Heterogenous contacts, Intermittent Information flow.

Issues are addressed using the microservice architecture to develop “pervasive” smart contracts. Challenge of accessing external data still remains.

Technology used : Ethereum, Solidity, Oraclize and TEE

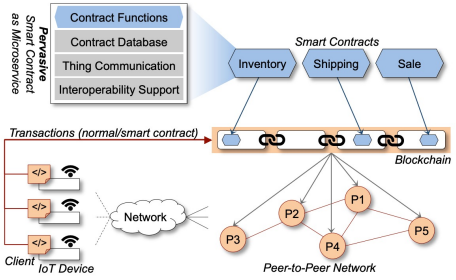


Figure 1: Overall integration model for IoT and blockchain with pervasive smart contracts as microservices