

# Picolo: Fast, Decentralized Globally Distributed Database Network<sup>☆</sup>

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## Abstract

Picolo is a fast, scalable, verifiable, fully-decentralized, globally distributed transaction oriented database for Blockchain-based Applications. Picolo uses a probabilistic replication framework on top of DHTs to achieve a  $O(1)$  lookup latency for most queries. Its the first and so-far only system of its kind to distribute data at a global scale with full-decentralization and externally-consistent distributed transactions. Its design is tailored to support Blockchain-based applications.

- Allows for verifiable transaction logs.
- Token economics that gamify honest participation from nodes over malicious intent.

*Keywords:* Science, Publication, Complicated

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## 1. Introduction

- What are Dapps. Dapps will grow, but need to store data.
- Solutions today provide file storage semantics which might not work for all application types.
- Introduce the database problem on the blockchain. What are the requirements for a decentralized database.

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<sup>☆</sup>Work in progress, Version 0.1 Draft.

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- Overview of current approaches and limitations (details in the Background and Related work section).

### *1.1. Picolo's Features*

- Network layer Scales with  $O(\log N)$  overhead for  $N$  nodes.
- Network lookup using  $O(1)$  amortized lookup cost for DHT.
- Horizontally scalable
- Automated data sharding
- Transactions can be applied across rows, columns and tables across machines
- Client controlled replication and data placement
- Synchronous replication and external consistency, the strongest form of consistency any database can support
- SQL like interface
- Supports storage of typed data
- Supports semi-relational structure for tables
- Configurable backups and restore mechanisms
- Verifiable ledger for transactions.

## **2. Background**

- item

## **3. Related Work**

## **4. Overall Design**

- Overall Picolo architecture.
- Token economics.

## 5. Network Subsystem

- DHT layer for lookup. Replication and caching for O(1) lookups for popular items.
- Token economics for incentivized participation.
- Building with BFT.

## 6. Database Subsystem

### 6.1. Cluster

### 6.2. Versioning

### 6.3. Replication and Token economics

### 6.4. Handling Failures

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 1: Table caption

$$e = mc^2 \tag{1}$$

Some factors that affect prices of cryptos are listed below. These factors are by no means exhaustive but provide a framework within which mechanisms to analyze them can be discussed. See the sub sections where some techniques are presented. [1] Factors affecting the prices of crypto assets:

## 7. Conclusion

Initial implementations of AI algorithms that analyze structured and unstructured data are discussed. Unstructured data is analyzed in two steps: first, at a unit level and second as a sequence by feeding it to an LSTM. Structured data consisting of live feed from exchanges, current and past bets on the platform amongst others is represented as a game state where an independent decision making agent learns to take actions that maximize its game score. A method of determining payouts to platform users is discussed where they are determined by the magnitude as well as the category of contribution.

- [1] Adi Kancherla and Arunesh Mishra. Picolo: Fast, decentralized globally distributed database network. <https://picolo.network/Whitepaper.pdf>.