Design and Implementation of Transactional Causal Consistency in MongoDB*

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ABSTRACT

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PVLDB Artifact Availability:
The source code, data, and/or other artifacts have been made available at URL_TO_YOUR_ARTIFACTS.

1 INTRODUCTION

MongoDB.

Transactions in MongoDB.

Snapshot Isolation in MongoDB.

Transactional Causal Consistency (TCC).

Challenges.

Our Contributions.

- Design (and TLA$^+$ specification)
- Correctness proof (TLC model checking; TLAPS theorem proving)
- Implementation
- Jepsen Testing

2 PRELIMINARIES

2.1 MongoDB

2.2 Transactional Causal Consistency

FaaSTCC [1]: "TCC combines the following guarantees: Transactions read from a causally consistent snapshot, which represents a view of the data store that includes the effects of all transactions that causally precede it; A transaction updating multiple objects respects atomicity, i.e., all updates occur and are made visible simultaneously, or none does. Applying updates in this fashion creates a new causally consistent snapshot of the store." "TCC is weaker than SI and allows concurrent transactions to write on the same set of keys."

3 RELATED WORK

Transactional Causal Consistency.

MTCC [2], FaaSTCC [1]

4 CONCLUSION

REFERENCES

[1] Taras Lykhenko, Rafael Soares, and Luis Rodrigues. 2021. FaaSTCC: Efficient Transactional Causal Consistency for Serverless Computing. In *Proceedings of the 22nd International Middleware Conference (Middleware '21)*. Association for Computing Machinery, New York, NY, USA, 159–171. https://doi.org/10.1145/3464298.3493392

[2] Chenggang Wu, Vikram Sreekanti, and Joseph M. Hellerstein. 2020. Transactional Causal Consistency for Serverless Computing. In *Proceedings of the 2020 ACM SIGMOD International Conference on Management of Data (SIGMOD '20)*. Association for Computing Machinery, New York, NY, USA, 83–97. https://doi.org/10.1145/3318464.3389710

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