BGWS: A Dependable Decentralized Ledger for a Blockchained Global Wallet Service

Diogo Cebola, 52718 and Gonçalo Areia, 52714

Abstract—

Index Terms—

1 Introduction

This work was proposed by professor Henrique Domingos as the course project of "Dependable Distributed Systems" 2020-21. Since the appearance

The remaining of the document is organized as follows. In Section 2, we introduce important concepts related to our work, more specifically Byzantine Fault Tolerance and the Blockchain technology. In Section 3, we present BGWS system model and architecture. Internal mechanisms, design assumptions and the service planes are covered in section 4. In Section 5, we explain implementation details (e.g. technologies used and development issues). Section 4 will present the experimental setting and discuss the obtained results. Finally, in Section 5 we conclude the document and mention future work. [1]

2 Background

2.1 Byzantine Fault Tolerance

2.2 Blockchain Technology

3 System Model and Architecture

4 Mechanisms and Service Planes

5 Implementation

5.1 Technology Stack

5.2 Issues

6 Experimental Evaluation

6.1 Experimental Setup & Methodology

6.1.1 Validation

6.1.2 Evaluation

6.2 Experimental Results

In this section we present the results as an average of the three runs executed, and describe the patterns observed.

6.3 Discussion

In this section we will discuss the variation in the results obtained for the different experiments.

7 Coverage of Requirements

8 Conclusion & Future Work

References

[1] S. Nakamoto, "Bitcoin: A peer-to-peer electronic cash system," Manubot, Tech. Rep., 2019.

[2] V. Buterin and V. Griffith, "Casper the friendly finality gadget," *arXiv preprint arXiv:1710.09437*, 2017.

[3] O. Moindrot and C. Bournhonesque, "Proof of stake made simple with casper," *ICME, Stanford University*, 2017.

[4] E. Androulaki, A. Barger, V. Bortnikov, C. Cachin, K. Christidis, A. De Caro, D. Enyeart, C. Ferris, G. Laventman, Y. Manevich *et al.*, "Hyperledger fabric: a distributed operating system for permissioned blockchains," in *Proceedings of the thirteenth EuroSys conference*, 2018, pp. 1–15.

[5] J. Sousa, A. Bessani, and M. Vukolic, "A byzantine fault-tolerant ordering service for the hyperledger fabric blockchain platform," in *2018 48th annual IEEE/IFIP international conference on dependable systems and networks (DSN)*. IEEE, 2018, pp. 51–58.

[6] M. Castro, B. Liskov *et al.*, "Practical byzantine fault tolerance," in *OSDI*, vol. 99, no. 1999, 1999, pp. 173–186.

[7] A. Bessani, J. Sousa, and E. E. Alchieri, "State machine replication for the masses with bft-smart," in *2014 44th Annual IEEE/IFIP International Conference on Dependable Systems and Networks*. IEEE, 2014, pp. 355–362. [Online]. Available: https://github.com/bft-smart/library

[8] M. J. Fischer, N. A. Lynch, and M. S. Paterson, "Impossibility of distributed consensus with one faulty process," *Journal of the ACM (JACM)*, vol. 32, no. 2, pp. 374–382, 1985.