LEDGER
ledgerjournal.org

ISSN 2379-5980 (online)
associated article DOI
10.5915/LEDGER.2019.173

A Decentralized Context Broker Using Byzantine Fault Tolerant Consensus: Open Review

Authors: Aswin Karthik Ramachandran Venkatapathy, † Michael ten Hompel‡

Reviewers: Reviewer A, Reviewer B

Abstract. The final version of the paper "A Decentralized Context Broker using Byzantine Fault Tolerant Consensus" can be found in Ledger Vol. 4, S1 (2019) 17-24, DOI 10.5915/LEDGER.2019.173. There were two reviewers involved in the review process, neither of whom have requested to waive their anonymity at present, and are thus listed as A and B. After initial review (1A), the author submitted a revised submission and responses (1B). The revised submission was reviewed once again by reviewers A and B, who determined that the author had adequately and substantively addressed their concerns, thus completing the peer-review process. Authors' responses in are in bullet form.

1A. Review

Reviewer A:

This paper presents an architecture that decentralizes a 'context broker' to provide reliability in message relay systems. The proposed architecture uses several layers that together provide secure communication services (peer-to-peer networking + blockchain consensus + streaming service). The authors compare their new architecture to other currently used brokers; the main claim is that prior systems are not truly decentralized, and that this is what DezCom can offer. The idea is relevant to this community.

The article itself is in a premature state (no results nor tests). It is therefore hard to identify what the contributions are.

† A. K. Ramachandran Venkatapathy (aswinkarthik.ramachandran@tu-dortmund.de) is Research Associate of Chair for Material Handling and Warehousing at TU Dortmund, Germany.
‡ M. ten Hompel (michael.tenhompel@tu-dortmund.de) is Professor of Chair for Material Handling and Warehousing at TU Dortmund.

Comments:

Section 2.1 provides a list of requirements, but does not address which available architectures satisfy them, and which do not.
Section 4 provides a prosaic description of the system, but no results that illustrate its utility.

Details:
Figures: the labels are much too small to read.

Reviewer B:

The paper presents a decentralized context broker using Byzantine Fault Tolerant Consensus. Aims, and experimental design are included in the manuscript. However, results for the proposed approach are not present in the current manuscript. Therefore, even though this paper is relevant for this symposium it needs significant changes to reach publication quality. In the following lines, I will describe the proposed changes in order of appearance in the text:

- Introduction

This reviewer wonders how the proposed work is different from the current algorithms for byzantine fault tolerant consensus, especially, W-MSR, and the swarm blockchain approach described in Strobel et. al (Managing Byzantine Robots via Blockchain Technology in a Swarm Robotics Collective Decision Making Scenario).

- Figures

In order to increase the readability of the paper, you need to increase the size of the figures and make the inner text more visible. Fig. 2,3,5 are extremely hard to read.

- Page 4, first paragraph

Node connection and consensus process should be displayed chronologically in a figure.

- Page 4, Implementation of DezCom

Adding a results and discussion (with performance metrics) section to the paper would be appreciated.

- Conclusion

Please change "decentral" to "decentralized" throughout the paper.

ISSN 2379-5980 (online)
associated article DOI
10.5915/LEDGER.2019.173

1B. Authors' Response

Reviewer A:

This paper presents an architecture that decentralizes a 'context broker' to provide reliability in message relay systems. The proposed architecture uses several layers that together provide secure communication services (peer-to-peer networking + blockchain consensus + streaming service). The authors compare their new architecture to other currently used brokers; the main claim is that prior systems are not truly decentralized, and that this is what DezCom can offer.

The idea is relevant to this community.

The article itself is in a premature state (no results nor tests). It is therefore hard to identify what the contributions are.

- Added performance testing using robots in an industrial use-case and tested dezCom in industrial mobile robots.

Comments:
Section 2.1 provides a list of requirements, but does not address which available architectures satisfy them, and which do not.

- Centralised architectures have those requirements but are not capable to work in a decentralized manner.
- This is tested using dezCom in an industrial test platform.

Section 4 provides a prosaic description of the system, but no results that illustrate its utility.

- The whole section has been rewritten with results to show its utility.

Details:
Figures: the labels are much too small to read.

- Some figures are redone and some figures were removed.

Reviewer B:

The paper presents a decentralized context broker using Byzantine Fault Tolerant Consensus. Aims, and experimental design are included in the manuscript. However, results for the proposed approach are not present in the current manuscript. Therefore, even though this

ISSN 2379-5980 (online)
associated article DOI
10.5915/LEDGER.2019.173

paper is relevant for this symposium it needs significant changes to reach publication quality. In the following lines, I will describe the proposed changes in order of appearance in the text:

- Introduction

This reviewer wonders how the proposed work is different from the current algorithms for byzantine fault tolerant consensus, especially, W-MSR, and the swarm blockchain approach described in Strobel et. al (Managing Byzantine Robots via Blockchain Technology in a Swarm Robotics Collective Decision Making Scenario).

- The ambiguity is addressed, here the blockchain is used only for decentralized consensus without overhead of mining.
- In a customized product manufacturing industry where robots play an important role in lean production planning as described by project SMARTFACE is used as use case definition where dezCom is used for messaging between the process machines in decentralized manner.

- Figures

In order to increase the readability of the paper, you need to increase the size of the figures and make the inner text more visible. Fig. 2,3,5 are extremely hard to read.

- Some figures are redone and some figures were removed.

- Page 4, first paragraph

Node connection and consensus process should be displayed chronologically in a figure.

- Changed the stack figure to depict messaging and consensus is show in another picture to enforce that dezCom is independent of decentralized consensus used.

- Page 4, Implementation of DezCom

Adding a results and discussion (with performance metrics) section to the paper would be appreciated.

- added.

- Conclusion

ISSN 2379-5980 (online)
associated article DOI
10.5915/LEDGER.2019.173

Please change "decentral" to "decentralized" throughout the paper.

- Changed.

ISSN 2379-5980 (online)
associated article DOI
10.5915/LEDGER.2019.173