

Paper Title:

A Performant Protocol for Distributed Health Records Databases

Paper Link:

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9530673>

1 Summary**1.1 Motivation**

The paper aims to improve the performance of EHR insertion operations in distributed health records databases, a particularly critical issue in medical imaging cases due to the data volume using a distributed database consensus protocol.

1.2 Contribution

The protocol ensures consistency, availability, and data protection in a distributed system, following GDPR guidelines and reduces data contention through data isolation, improving retrieval performance and detection of misbehaving parties.

1.3 Methodology

The paper presents proof of correctness through a set of lemmas and theorems, ensuring consistent reads and the availability of the most up-to-date finalized commit. The protocol follows the European General Data Protection Regulation (GDPR) guidelines to ensure data protection. It assumes a static quorum of n parties and handles (n, t) quorum changes.

1.4 Conclusion

The assessment validates the viability of the suggested method, showcasing moderate enhancements in transaction throughput on systems with 4 and 8 nodes, along with significant improvements in reducing latency. Additionally, the data slicing strategy effectively retrieves files, approaching the theoretical limit concerning the number of slices.

2 Limitations**2.1 First Limitation**

The paper does not discuss the scalability of the protocol in large-scale distributed systems. Scalability is a common challenge in distributed systems, and it is possible that the proposed protocol may face limitations in terms of scalability when applied to large-scale EHR databases.

2.2 Second Limitation

The proposed BFT-PNT consensus protocol assumes that the client is trustworthy enough to resolve consensus conflicts and pre-serialize the sequence of updates, improving read-write contention results. This assumption may not hold in scenarios where the client is malicious or compromised, leading to potential issues in the consensus process and the overall integrity of the distributed database.

3 Synthesis

In terms of future work, the paper suggests that the proposed methodology can be extended to enhance consistency, availability, and data protection in distributed EHR systems. Possible future extensions to the protocol can include authorization procedures, data representation transformations, storage providers, custom constraint validators, and indexation services.