Journal Name: International Journal of System Assurance Engineering and Management IF: 2.0

Title: Modelling of blockchain based queuing theory implementing preemptive and non-preemptive algorithms

Author: Kandpal, Meenakshi; Keshari, Niharika; Yadav, Amrendra Singh; Yadav, Mohit; Barik, Rabindra Kumar

Details: 2024

Abstract: Blockchain is one of the leading technologies, and it has already begun to transform several industries and areas, including banking, business, healthcare, smart homes, and the Internet of Things. Its benefits include a decentralized network, robustness, availability, stability, anonymity, audibility, and accountability. As Blockchain applications proliferate, it becomes clear that most of the effort is focused on their engineering implementation. However, there has yet to be much focus on the theoretical side. This paper simulated the mining process in Blockchain-based systems using queuing theory. In order to simulate Bitcoin, one of the most well-known cryptocurrencies, we used actual data from Bitcoin and JSIMgraph's M/M/n/L queuing system. We used genuine Bitcoin data and JSIMgraph's M/M/n/L queuing system to replicate Bitcoin, one of the most well-known cryptocurrencies. We produced realistic results that are applicable and will pave the way for future theoretical research on Blockchain-based Queuing systems. Our study implemented both non-preemptive algorithms (such as First Come First Serve, Longest Job First, Shortest Job First, and Last Come First Serve) and preemptive algorithms (such as Round Robin). Further, the average queue waiting time of transactions under these algorithms is also compared.

URL: https://link.springer.com/article/10.1007/s13198-024-02276-0