A survey on potential reactive fault tolerance approach for distributed systems in big data

Sharifah Hafizah Sy Ahmad Ubaidillah[a] *, A. Noraziah*[a,b] *, Sahabudin, N. A*[a]
[a]Faculty of Computing, University Malaysia Pahang, Pahang, Malaysia
[b]Centre for Software Development and Integrated Computing, Universiti Malaysia Pahang, Pahang, Malaysia

ABSTRACT
Due to their unique properties such as high availability and reliability, distributed systems are gaining popularity nowadays. However, the rapid growth of Big Data in distributed systems creates new issues for dataset reliability and availability. In any distributed computer system, the presence and recurrence of failures is an inescapable factor. Both hardware and software components of distributed systems are prone to failure. As a result, the issue of fault tolerance is being recognized as the fundamental theme and essential requirement for the construction and maintenance of the distributed computing paradigm in order to achieve prominence and criticality. Fault tolerance refers to the application that must be executed even in failure conditions by detecting and correcting the fault. Reactive fault tolerance techniques are used to effectively troubleshoot the systems upon occurrences of failures. This paper aims to provide a better understanding of reactive fault tolerance techniques and identifies various approaches used as reactive fault tolerance in distributed systems. Based on the reviews done in this research, there are various reactive fault tolerance techniques that can improve the performance of the distributed systems in terms of availability, reliability, total execution time, and communication cost such as replication, checkpointing task resubmission, and job migration.

KEYWORDS
Reliability; Distributed system; Reactive fault tolerance; Computational intelligence

ACKNOWLEDGMENTS

The authors would like to thank the Ministry of Higher Education for providing financial support under Fundamental Research Grant Scheme (FRGS) No. FRGS/1/2018/ICT03/UMP/02/3 (University reference RDU190185) and Universiti Malaysia Pahang for laboratory facilities as well as additional financial support under Internal Research grant RDU1903122. In addition, appreciation also goes to Tabung Persidangan Luar Negara (TPLN) for funded the paper fees registration.