Abstract

This article investigates a mechanism to tolerate malicious nature of sequencer in moving sequencer based atomic broadcast in distributed systems. Various mechanisms are already given for moving sequencer based atomic broadcast like RMP [1], DTP [2], Pin Wheel [3] and mechanism proposed by Srivastava et al. [4]. But none of these mechanisms are efficient to tolerate different failure. Scholarly observation is that, these algorithms can tolerate only crash failure but not capable to tolerate omission or byzantine (malicious) failure. This work proposes a mechanism to tolerate byzantine failure (malicious nature) of sequencer in moving sequencer based atomic broadcast. The mechanism proposed in [4], has been considered as an abstract model and design refined model in order to fulfill objective. Since it relies on unicast broadcast hence it will introduce a very less number of messages in comparison to previous mechanisms [5]. B [6] formal technique has been used for development of this model and Pro B [7] model checker tool for constraint based checking to discover errors due to invariant violation and deadlocks, thereby, validating the specifications. The models have been verified for invariant violations, errors and deadlock occurrence. The B machine animated through Pro B worked very well. The Pro B managed to explore the entire state space of the B-machine in few
minutes and confirming the specifications.

References


Index Terms

Computer Science
Applied Science

Keywords

Broadcast Atomic Broadcast Total Order Unicast Sequencer Crash Byzantine
Model Checking
B formal method.