In this paper, we propose a new algorithm to detect and resolve distributed deadlocks in the generalized model. The initiator of the proposed algorithm diffuses the probes along the outgoing edges of Wait-For Graph (WFG) and collects the replies that carry the dependency information between processes directly. However, the initiator simplifies the unblocking conditions of blocked nodes in response to a reply from an unblocked node and receives almost two replies from any node unlike the earlier algorithms. It finally declares all the nodes that have not been reduced as deadlocked. We also prove the correctness of the algorithm. It has a worst-case time complexity of $d+1$ and message complexity of less than $e+2n$ where $d$ is the diameter, $e$ is the number of edges and $n$ is the number of nodes in the WFG. Since the termination detection of the proposed algorithm is isolated from deadlock detection, it minimizes the message length into a constant without using any explicit technique. It is the significant improvement over the existing algorithms. It also minimizes additional rounds of messages to resolve deadlocks.

Reference


An Efficient Detection and Resolution of Generalized Deadlocks in Distributed Systems


Index Terms

Computer Science

Communication

Networks

Key words

Distributed Deadlocks

Generalized Model

Deadlock Detection

Wait-For Graph

Deadlock resolution