Abstract

In the present paper, we propose a hierarchical algorithm to solve the group mutual exclusion (GME) problem in cluster-based systems. We consider a two-level hierarchy in which the nodes are divided into clusters and a node in each cluster is designated as coordinator which is essentially the cluster head. The number of global messages per critical section entry in our algorithm depends upon the number of clusters in the system unlike most of the existing GME algorithms where it depends upon the total number of nodes in the system. Performance of the algorithm directly depends on the coherent behavior of nodes inside clusters. The results have been substantiated with extensive simulation. A fault tolerant extension of the algorithm has also been proposed in the present exposition.

References

Thiare, O., Gueroui, M., Naimi, M., 2006, Distributed Group Mutual Exclusion Based on
Clients/Server Model, In Proc. 7th Int. Conf. on Parallel and Distribut. Comput. Appl. and
Technol. 67-73.

- Advance System Format (ASF) specifications for digital media files available at URL:
- Kean, P., Moir, M., 1999, A Simple Local Spin Group Mutual Exclusion Algorithm, In
- IEEE 802.11 Working Group for Wireless Local Area Networks, available at URL:
  Proc. 6th Int. Conf. on Comput. Sci. and Inf. 266-272.
  on Princ. of Distrib. Comput., 100-106.
- Attreya, R., Mittal, N., 2005, A Dynamic Group Mutual Exclusion Algorithm using
- Mamun, Q. E. K., Nakazato, H., 2006, A New Token Based Algorithm for Group Mutual
  Exclusion in Distributed Systems, In Proc. 5th Int. Symp. on Parallel and Distrib. Comput.,
  34-41.
- Mittal, N., Mohan, P. K., 2007, A Priority Based Distributed Group Mutual Exclusion
  Algorithm when Group Access is Non-Uniform., J. of Parallel and Distrib. Comput. 67(7),
  795-815.
- Swaroop, A., Singh, A. K., 2007, A Token-Based Fair Algorithm for Group Mutual
- Madhuram, S., Kumar, A., 1994, A Hybrid Approach for Mutual Exclusion in Distributed
- Singhal, M., 1989, A Dynamic Information Structure Distributed Mutual Exclusion
  Algorithm for Distributed Systems. In Proc. 9th Int. Conf. on Distrib. Comput. and Syst.,
  70-78.
A Hybrid Algorithm to Solve Group Mutual Exclusion Problem in Message passing Distributed Systems


Index Terms

Computer Science
Algorithms

Keywords

Concurrency  Group Mutual Exclusion  Hybrid  Token.