Deterministic Cluster-based Skip List Protocol for Dynamic Distributed Systems

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Abstract

Dynamic distributed system (DDS) is a continually running system with a large number of entities as processes or nodes that are connected with each other and each of them has only a partial view of the system as Peer-to-peer (P2P) system which can be decentralized, centralized or hybrid of both to make the system operations faster as possible. In P2P, any number of entities can join and leave the system at any moment which makes the topology of the system continuously changed. So, the system must deal with these changes to be stable as possible. So, data management algorithms are needed to build an overlay network which is a logical layer that used to store the information about these entities. Skip list structure is the most common and efficient overlay structure for data management in P2P systems. However, using this structure cannot minimize the time delay for query processes as searching, inserting, and deleting in case of there is a huge number of entities in the skip list. In addition, most of existing algorithms that use this structure have been developed based on a special structure of skip list and they did not be applicable for another structure of the skip list. In this paper, to overcome
these drawbacks, a new skip List structure and query processing methods are proposed. The conducted simulation results show that the proposed structure and algorithm are much better than the existing algorithms in the time delay and the required number of steps to nish any query process.

References

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Index Terms

Computer Science

Information Systems

Keywords

P2P, Distributed Systems, Dynamic Systems, Deterministic, Skip List