An adaptive super-peer selection algorithm considering peers capacity utilizing asynchronous dynamic cellular learning automata

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Abstract

Super-peer networks refer to a class of peer-to-peer networks in which some peers called super-peers are in charge of managing the network. A group of super-peer selection algorithms use the capacity of the peers for the purpose of super-peer selection where the capacity of a peer is defined as a general concept that can be calculated by some properties, such as bandwidth and computational capabilities of that peer. One of the drawbacks of these algorithms is that they do not take into consideration the dynamic nature of peer-to-peer networks in the process of selecting super-peers. In this paper, an adaptive super-peer selection algorithm considering peers capacity based on an asynchronous dynamic cellular learning automaton has been proposed. The proposed cellular learning automaton uses the model of fungal growth as it happens in nature to adjust the attributes of the cells of the cellular learning automaton in order to take into consideration the dynamicity that exists in peer-to-peer networks in the process of super-peers selection. Several computer simulations have been conducted to compare the performance of the proposed super-peer selection algorithm with the performance of existing algorithms with respect to the number of super-peers, and capacity utilization. Simulation results have shown the superiority of the proposed super-peer selection algorithm over the existing algorithms.

Keywords

Dynamic cellular learning automata Peer-to-Peer networks
Super-Peer selection problem

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