A QoS Multicast Routing Algorithm Working with Imprecise State Information

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ABSTRACT

In large networks, maintaining precise global network state information is almost impossible. Many factors, including non-negligible propagation delay, infrequent link state update due to overhead concerns, link state update policy, and hierarchical topology aggregation, have impacts on the precision of the network state information. The existing QoS multicast routing algorithms do not provide satisfactory performance with imprecise state information. In the paper, we propose a distributed QoS multicast routing scheme based on traffic lights, called QMRI algorithm, which can probe multiple feasible tree branches, and select the optimal or near-optimal branch through the *UR* or *TL* mode for constructing a multicast tree with QoS guarantees if it exists. The proposed algorithm considers not only the QoS requirements but also the cost optimality of the multicast tree. Extensive simulations show that our algorithm achieves high call-admission ratio and low-cost multicast trees with modest message overhead. The algorithm can tolerate high degree of state information imprecision.

Keywords: QoS, Multicast routing, Imprecise state information, Traffic lights, Simulation