An adaptive call admission control with bandwidth reservation for downlink LTE networks

ABSTRACT

In recent years, consumers of 4G cellular networks have increased exponentially as they discover that the service is user-friendly. Due to the large users and their frequent demands, it is necessary to use the limited network resources that guarantee the eminent standard quality of service (QoS). Call admission control (CAC) scheme has a major impact in assuring QoS for different users with various QoS requirements in 4G networks. Recently, the reservation-based scheme and bandwidth degradation schemes were proposed with the aim to provide effective use of network resources and assure QoS requirements to admitted calls. However, in spite of these several objectives, these schemes are not efficient as a result of the modeling and approximation method that starve the best effort (BE) traffic. The dynamic threshold value approach adjusts handoff call and new call based on time-varying conditions resulted in a waste of network resources, where bandwidth are reserved for handoff call, but at the network environment, there is little or no handoff calls. In this paper, we propose a novel CAC scheme to provide effective use of network resources and avoid the starvation of BE traffic. The scheme introduces an adaptive threshold value, which adjusts the network resources under heavy traffic intensity. In addition, we proposed reservation and degradation approach to admit many users when there is a limited number of bandwidth, which also achieved effective utilization of network resources. Simulation results show that the proposed scheme significantly outperforms the reservation-based scheme and bandwidth degradation schemes in terms of admitting many calls and guaranteeing QoS to all the traffic types in the network. Numerical results imitate to experimental results with insignificant differences.