

New vertical handover method to optimize utilization of wireless local area network in high-speed environment

Abstract

In heterogeneous wireless networks, wireless local area network (WLAN) is highly preferred by mobile terminals (MTs) owing to its high transmission bandwidth and low access cost. However, in high-speed environment, handover from a cellular network to a WLAN cell will lead to a high number of handover failures and unnecessary handovers due to the WLAN coverage limitation and will become worse at high speed. A new vertical handover method is proposed to minimize the probability of handover failure and unnecessary handover while maximizing the usage of WLAN in high-speed environment. The simulation results show that the proposed method kept the probability of handover failure and unnecessary handover below 0.5% and 1%, respectively. Compared with previous studies, the proposed method reduced the number of handover failures and unnecessary handovers up to 80.0% and 97.7%, respectively, while the MT is highly mobile. Using the proposed prediction method, the MT can benefit high bandwidth and low network access cost from the WLAN with minimum interruption regardless of speed.