The Study of Resource Reservation Framework for Wireless Local Area Networks

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ABSTRACT

The deployment of WLAN technology has grown significantly and rapidly in recent years. Accompanying the varied multimedia applications applied to the WLAN network, the development of IEEE 802.11e provides the enhanced Quality of Service (QoS) to network traffics. However, IEEE802.11e still has the weakness that needs to be improved on handling the handover connections. When the handover of a mobile host (MH) occurs in a WLAN with providing QoS, there are two reasons concluded that a roaming MH can ’t maintain its QoS. First, the re-negotiation of Traffic Specification (TSPEC) and the delay of re-authentication affect the deserved QoS of the MH after handover. Second, the lack of message exchange framework for switching between APs in a QoS-based WLAN, which can ’t reserve sufficient resources in advance for performing the connectivity of MHs. To resolve the problems stated above, this study integrate both IEEE802.11e and IEEE 802.11f protocols to solve the problem of keeping QoS of MHs during handover. First of all, we have known that using the IEEE 802.11f could resolve the problem of authentication delay. Next, based on the fundamental concepts of IEEE802.11f, we propose a new framework called message exchange mechanism for a QoS-based WLAN network, which utilizes the AP exchange messages defined in 802.11f to inform the target AP about the TSPEC for the MH. After receiving this message, the target AP will count how many resources must reserve according to the context of TSPEC so as to provide for MH to deliver data. Furthermore, the study further proposes another new important framework called resource reservation mechanism for a QoS-based WLAN by modifying IEEE 802.11e scheduling which divide the direction of data flow into upstream(MH to AP) and downstream(AP to MH). In the upstream scheduling scheme, according to the TSPEC of a MH, the AP allocates polled TXOP and applies controlled channel access mode to poll the MH which is performing handover. On the other hand, in the downstream scheme, our proposed scheme adds an extra handover queue saving the type of voice and video frames to the MHs and set this handover queue to be the highest priority. Integrating both message exchange mechanism and resource reservation mechanism, we can effectively resolve the problem of handover delay and reduce the interruption probability in order to maintain QoS guarantee in WLAN networks.

Keywords : IEEE 802.11e ; IEEE 802.11f ; WLAN ; QoS ; handover ; scheduling

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