



**A NOVEL MULTICAST DESIGNING FOR GROUP  
COMMUNICATION AND REAL-TIME POSITIONING  
ASSOCIATED WiMAX AND WiFi WITH MANET**

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**Abstract**

The conventional Mobile Ad hoc Network (MANET) is composed of mobile nodes without any infrastructure supporting. But, emergent traffic such as real-time positioning by using wireless infrastructure is indeed required. Therefore, a deployment for mobile ad hoc network would associate WiMax with WiFi which is called 802.16e MANET Environment in this paper. Based on the 802.16e MANET environment, we propose a novel Hierarchical Multicast Ad hoc On-Demand Distance Vector Routing protocol (H-MAODV) in supporting multicast traffic rather than multiple unicast. The proposed H-MAODV scheme can avoid significant number of route discovery cost by using various bounded wireless coverage areas. On the other hand, Two-Points Positioning (TPP) is researched for improving conventional triangulation method of GPS from more than three points. By using proposed multicast service for H-MAODV applying in our deployed 802.16e MANET environment, emergent traffic for real-time positioning would be delivered out immediately. Simulation results demonstrate that multicast service for group communication in H-MAODV has the scalability advantage comparing with conventional MANET framework. Through deployed 802.16e MANET environment, proposed positioning technology for TPP outperforms conventional triangulation method of GPS. Moreover, a case study for the WiMax-technology including with the proposed TPP fitted in future 802.16e metropolitan network environment shows a better successful positioning ratio (SPR) than GPS-technology based on various impact factors especially considering in climate and metropolitan coverage area. Mathematical analysis also defines a new weather factor to research the relations in between various climates and non-line-of sight (NLOS) wave (i.e., interference of future metropolitan building coverage area). The case study for the simulation result presents a good integration of WiMax-technology and GPS-technology in future metropolitan positioning which is also proved a similar result to match the theoretical analysis.

**Keywords and phrases:** mobile ad-hoc network (MANET), 802.16e, WiMax, multicast, real-time positioning.

