

An Enhanced DAP-NAD Scheme for Multi-hop Broadcast based on MIL-STD-188-220 Networks

Jong-yon Kim*, Bosung Kim* and Byeong-hee Roh**

* Mobile Multimedia Communication Network Lab., Ajou University, Suwon, South Korea

** Department of Software Convergence Technology, Ajou University, Suwon, South Korea

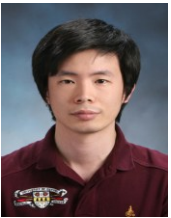
{kmakjy, kbs8354, bhroh}@ajou.ac.kr

Abstract— In this paper, we propose an enhanced DAP-NAD scheme for multi-hop broadcast based on MIL-STD-188-220 networks. MIL-STD-188-220 is a key factor for real-time communication in the battlefield. We define it as “Multi-hop Broadcast” that a source station transmits a message to all stations in multi-hop wireless networks. The multi-hop broadcast schemes as defined in the standard cause a lot of unnecessary delays. This is because they do not suggest the algorithms about an optimal selection of relay stations for multi-hop broadcast. Furthermore, no priority of network access opportunity is given to these relay stations over DAP (Deterministic Adaptable Priority)– NAD (Network Access Delay). To solve this problem, we adopt the concept of MPR (Multi-Point Relay) and modify the mechanism of DAP-NAD based on the topology information. The proposed scheme is thoroughly examined by simulation method. The results show that complete time of multi-hop broadcast becomes significantly shorter than the time in conventional scheme. This improves the performance of MIL-STD-188-220 based on military systems.

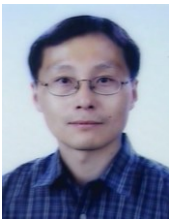
Keywords—MIL-STD-188-220; multi-hop; DAP-NAD; broadcast; Multi-Point Relay; tactical; military



Jong-yon Kim received a B.S degree in mechanical engineering from Korea Military Academy, Seoul, South Korea in 2003 and have studied M.S course in Network Centric Warfare engineering from Ajou University, Suwon, South Korea since 2011. In 2003, he is commissioned second lieutenant in field artillery in Republic of Korea Army. He worked as the field artillery officer for 8 years. He was selected a scholarship student of M.S course in 2010. His scholarship supports the Ministry of Defense. His research interests include the MIL-STD-188-220 and Cognitive Radio, MANET, QoS



Bosung Kim The second paragraph uses the pronoun of the person (he or she) and not the author’s last name. It lists military and work experience, including summer and fellowship jobs. Job titles are capitalized. The current job must have a location; previous positions may be listed without one. Information concerning previous publications may be included. Try not to list more than three books or published articles. The format for listing publishers of a book within the biography is: title of book (city, state: publisher name, year) similar to a reference. Current and previous research interests end the paragraph.



Byeong-hee Roh received a B.S. degree in Electronics Engineering from Hanyang University, Seoul, Korea, in 1987, and M.S. and Ph.D. degrees in Electrical Engineering from Korea Advanced Institute of Science and Technology (KAIST), Taejeon, Korea, in 1989 and 1998, respectively. From 1989 to 1994, he was with Telecommunication Networks Laboratory, Korea Telecom, as a researcher. From February 1998 to March 2000, he worked with Samsung Electronics Co., Ltd., Korea, as a Senior Engineer. Since March 2000, he has been with the Graduate School of Information and Communication, Ajou University, Suwon, Korea, where he is currently an associate professor. During 2005, he was a visiting associate professor at Dept. of Computer Science, State University of New York, at Stony Brook, New York, USA. His research interests include mobile multimedia networking, network QoS, wireless sensor networks, network security, and military communications.