

Alleviating reader Collision Problem in mobile RFID Networks

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Abstract

With the emergence of wireless RFID technologies, the problem of scheduling transmissions in dynamic RFID systems has been arousing attention. In recent year, it has also instigated researches to propose different heuristic algorithms for scheduling transactions between RFID readers and tags. In this paper, we present a two phase dynamic modulation (TPDM) technique, which consists of regional scheduling and hidden terminal scheduling phases, aims to efficiently perform communications between readers and tags in high density and mobile RFID networks. TPDM is a simple mechanism for coordinating simultaneous transmissions among multiple readers and hidden terminals. A significant improvement of this approach is that TPDM can prevent reader collisions by using a distributed self-scheduling scheme. An advantage of the proposed technique is that TPDM is adaptive in both static and dynamic RFID environments. To evaluate the performance of the proposed technique, we have implemented the TPDM scheme along with the Colorwave and Pulse protocols. The experimental results show that the TPDM scheduling techniques provide superior and stable performance in both static and dynamic circumstance, especially in mobile and high density RFID environments. The TPDM is shown to be effective in terms of throughput, system efficiency, and easy to implement.

Keyword : Reader collision problem - Hidden terminal - RFID scheduling - TPDM - Wireless network - Anti-collision