Comparison of Routing Protocols in Wireless Sensor Networks for Monitoring Applications

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Abstract

In recent years, evaluation and development of the routing protocols in wireless sensor networks (WSNs) are very important and attractive research topic especially for monitoring applications. Because of, the difficulties of studying WSNs routing protocols in real implementation which takes a lot of time and it can be very expensive, using a suitable simulator become a common trend in such evaluation. This paper presents a systematic performance study of three routing protocols, Ad hoc On Demand Distance Vector (AODV), Dynamic Source Routing (DSR), and Optimized Link State Routing (OLSR) protocols for WSNs by proposing a simulation model that targeted to the sensor networks with mobile sensor nodes and single sink as it is often seen in many monitoring applications such as military, agriculture, medical, transport, industry, etc to monitor physical environments. The performance study of
WSNs routing protocols is analyzed by comparing important metrics like the end-to-end delay, total packets dropped, load, routing overhead, route discovery time, and number of hops per route in the Network under the same random waypoint mobility model for the three protocols. These routing protocols are implemented and simulated using OPNET Modeler simulator. Theoretical analysis and simulation results show that both AODV and DSR protocols have identical on demand behavior but with performance differentials resulted from the differences in protocol mechanics. In addition to, they are suffering from higher end to end delay compared to the Optimized Link State Routing (OLSR) protocol. The results obtained may be useful for implementation of wireless sensor networks for many monitoring and control applications.

References

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- The OPNET Modeler Simulator, available, "http://www.opnet.com;" 

Index Terms

Computer Science
Networks

Keywords
WSNs Routing Monitoring AODV DSR OLSR OPNET