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Analytical Study of the Effect of Transmission Range on the Performance of Probabilistic Flooding Protocols in MANETs

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Abstract: Broadcasting is one of the most important operations that are used in Mobile Ad-Hoc Networks (MANETs) to disseminate data throughout the entire network. Simple flooding is the conventional operation that performs broadcasting in MANETs. Although flooding is a simple operation that achieves high delivery of data, it has many disadvantages summarized by the redundant broadcasts, contention and collision, which are referred to as the broadcast storm problem. Probabilistic protocols stand to provide a good solution to the problems associated with simple flooding. This paper, presents a comprehensive analytical study for the performance of probability-based routing protocols under different transmission ranges, and it shows the effect of this parameter on the overall performance metrics. All experiments are conducted using NS-2. The results show that when the transmission range values and number of Probability P increases the performance of the multiple-P's algorithms improved, where the protocol with higher P value (P4) outperforms all other protocols in terms of Packet Delivery Ratio (PDF), End-To-End Delay (ETED) and the routing overhead