

Efficient Monitoring Approach for Reputation system based Trust-aware Routing in Wireless Sensor Networks

Abstract:

Trust-aware routing in wireless sensor networks (WSN) is a crucial problem that has drawn the attention of researchers. The motivation for tackling this problem arises directly from the highly constrained nature of WSN and its easy exposure to insecure conditions. In this regard, reputation based solutions are used to provide trust-aware routing. However, this approach requires that a node needs to continuously monitor its environment to detect misbehavior events. This is considered to be a costly operation for WSN nodes due to its resources scarcity. In this work, we propose a reputation system based solution for trust aware routing that implements a new monitoring strategy called Efficient Monitoring Procedure in Reputation System (EMPIRE). EMPIRE is a probabilistic and distributed monitoring methodology that tries to reduce the monitoring activities per node while maintaining the ability to detect attacks at a satisfying level. The proposed procedure has been evaluated using Monte-Carlo simulation. New evaluation methodologies are introduced to test and explore the efficiency of our proposed procedure. Simulation results of the reputation system show that reducing monitoring activities with EMPIRE does not have a significant impact on system performance in terms of security.