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Frustrating Whitewashing in Reputation Systems using Game Theory

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ABSTRACT

Reputation systems have been proposed as a means to encourage cooperation among the nodes of ad hoc networks and peer-to-peer systems. Well-reputed nodes are considered trustworthy and receive network services based on their reputation. Reputation systems, however, are vulnerable to a number of attacks such as whitewashing due to the availability of cheap pseudonyms and the initial reputation assigned to a newcomer.
In this thesis, we focus on the whitewashing attack and the way one may improve the solutions proposed to frustrate it. To this end, we present a game model of the interactions between two internal nodes of a MANET. It is a Bayesian game involving the possible types of a node, selfish and normal. Then, we find a perfect Bayesian equilibrium of the game. The analysis of the equilibrium shows that by deciding on appropriate identity cost the attack can be prevented while normal nodes remain motivated to enter to the network.

Keywords: Game Theory, Mobile ad Hoc Networks, Peer to Peer Systems, Reputation Systems, Trust Management, Whitewashing.