



A Robust Reputation Scheme for Group Management in mobile ad hoc networks

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- **Reputation systems**
 - Principles
 - Existing studies

- **A New and Robust Reputation System**
 - Specification of security properties
 - Evaluation of the system parameters

- **Conclusion**

■ Reputation Systems: quality of the other nodes

- Evaluation of the (future) members
 - Prevention of malicious behavior
 - Detection of malicious nodes and reactions

■ Principle of the reputations Systems

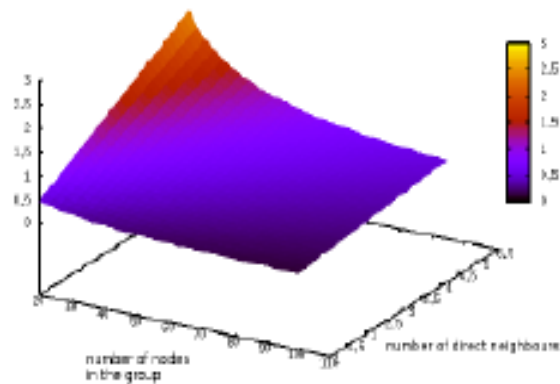
- A node acts well
 - α : increase rate
- A node acts well
 - β : decrease rate

Existing Solutions

■ Several Studies already exist

- Most of them are not adapted (local reputation)
- Most of them are vulnerable

■ Example: information is drowned



■ Example of specifications

- Properties 1x: increase rate

Property 1a

The collusion of malicious nodes must not engender the eviction of a correct node

- Properties 2x: decrease rate

Property 2a

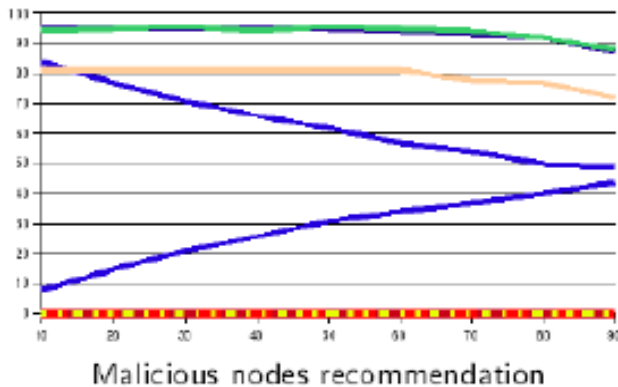
A collusion of malicious nodes must not prevent a malicious nodes from having a decrease of its reputation

A New and Robust Reputation System

■ Consequences

- Expression of α and β in function of the constraints and the environment

■ Evaluation of the system parameters and functions



$$rec_t(i) = rec_{t-1}(i) \cdot ns_{rec} + (1 - ns_{rec}) \cdot \frac{\prod_{j=0}^n diff(rep_t(j,i), our_reputation(j))}{n}$$

$$rec_t(i) = rec_{t-1}(i) \cdot ns_{rec} + (1 - ns_{rec}) \cdot \frac{\sum_{j=0}^n diff(rep_t(j,i), our_reputation(j))}{n}$$

■ Definition of a robust reputation and recommendation system

- Reinforcement of the security
 - Evaluation of the other members
- Expression of the system parameters based on the environment hypotheses
 - Assertion of security properties

■ Many applications

- Group Management
- Detection of Malicious Bodes