Mei-juan JIA , Hui-qiang WANG , Jun-yu LIN, *et al.*, 2017. DGTM: a dynamic grouping based trust model for mobile peer-to-peer networks. *Frontiers of Information Technology & Electronic Engineering*, **18**(4):559-569.
http://dx.doi.org/10.1631/FITEE.1601535

DGTM: a dynamic grouping based trust model for mobile peer-to-peer networks

Key words: Mobile P2P networks; Trust management; Dynamic grouping; Super peer

Corresponding author: Jun-yu Lin
E-mail: linjunyu@iie.ac.cn
ORCID: http://orcid.org/0000-0003-4807-0609

Motivation

- Mobile P2P (MP2P) networks do not have central administration and peers are autonomous; the peers are inherently insecure and untrustworthy. Thus, it is very challenging to construct a trust relationship between two peers in an MP2P network.
- Group-based trust models have drawn increasing attention from experts in various types of fields.
- In the existing group-based trust models, the members in a group are fixed once the grouping is completed, which is not appropriate for MP2P networks.

Main idea

• It is noted that peers with the same or similar interests are more capable of maintaining cooperation. This characteristic can help guarantee the stability of the trust relationship between peers.

• The proposed model can guarantee a stable successful transaction rate in MP2P networks.

Method

- Introduce three roses of peers and the concept of similarity that peers are dynamically divided into groups based on their interests.

- Present a trust management model based on two new trust metrics: intragroup trust and intergroup trust.

- Carry out various experiments based on the proposed framework.

Major results (I)

- Compared with SGTM, M-Trust, and PowerTrust, our model can generate more steady successful transaction rates.

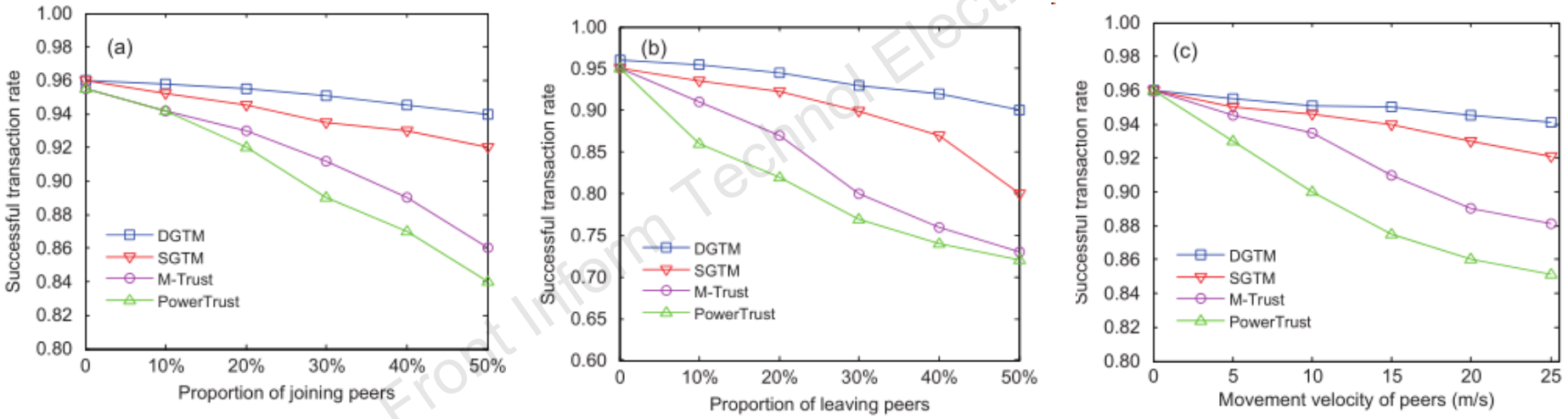

Fig. 2 The successful transaction rate with peers joining (a), peers leaving (b), and movement velocity (c)

Major results (II)

- Compared with SGTM, M-Trust, and PowerTrust, our method generates less communication overhead.

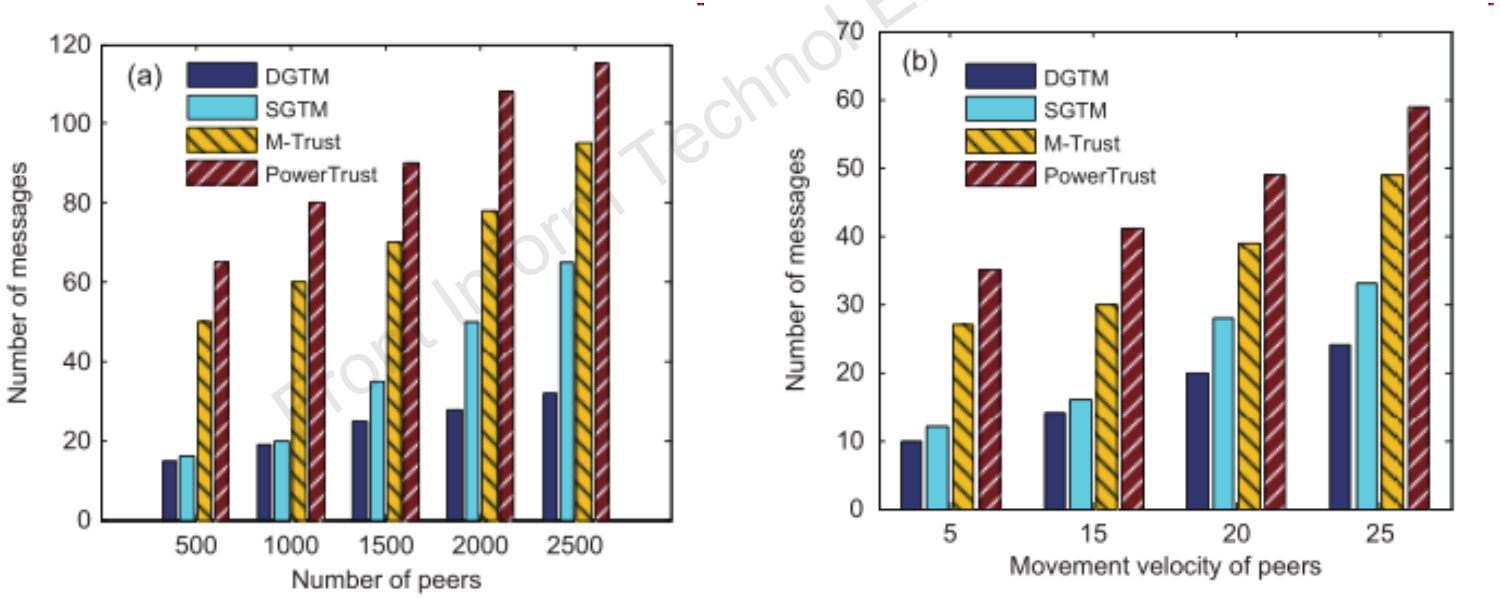

Fig. 3 Number of messages vs. the number of peers (a) and movement velocity (b)

Conclusions

- Inspired by the observations in a recent survey, this paper presents a novel model, the dynamic grouping based trust model.
- We proposed two trust metrics, intragroup trust and intergroup trust, which can be used to accurately measure the trust between peers in MP2P networks.
- We demonstrated the performance of our model through a series of simulations.