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ScienceDirect

Procedia Computer Science 48 (2015) 408 – 413

Procedia Computer Science

International Conference on Intelligent Computing, Communication & Convergence

(ICCC-2015)

Conference Organized by Interscience Institute of Management and Technology,

Bhubaneswar, Odisha, India

Mobility Assisted Uncertainty Reduction in MANETS Using Forward Node Optimization

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Abstract

A mobility-assisted scheme called efficient flooding scheme is provided to achieve the high probability of trust convergence. Trust will be defined as the belief in the capability of an entity (node) to proceed reliably, securely and dependably within a specified context. It represents a MANET participant's hope of other nodes' behavior while assessing the risk involved in future interactions. Here, the participant, called the trustor, and other nodes are said to be trustee. The trust relationship usually builds on the basis of the trust or's past direct interaction experiences and others' recommendations related to the trustee. The abstracted value from precedent experiences and from recommendations is defined as the trustee's reputation. The proposed mobility assisted scheme, an efficient flooding scheme which is based on node's mobility. The efficient flooding scheme is based on one-hop neighbor that leads to reduction of number of forwarding nodes. This scheme offers a handy tradeoff between delay, cost, packet delivery and trust ratio which leads to uncertainty reduction.

Keywords: Flooding; Mobile ad hoc Networks; Node forwarding; Trust Covergence; Uncertainty reduction.

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Peer-review under responsibility of scientific committee of International Conference on Computer, Communication and Convergence (ICCC 2015)
doi:10.1016/j.procs.2015.04.114

1. Introduction

Mobile Ad Hoc Networks able to communicate using a wireless medium without having to choice to a preexisting network infrastructure. A fundamental characteristic of ad hoc networks is that they can configure themselves on-the-fly without the participation of a centralized administrator. Since MANET is a self configuring and autonomous communication system that uses node to node hops to transmit data from one node to another. In MANET, traffic which was not terminated by a node is forwarded by that node to rest of the nodes within range and a node which helps in forwarding may therefore act as a simple router.

Uncertainty refers to the degree to which a node that cannot accurately predict the behavior of its communal rival [1]. Uncertainty arises from information asymmetry and opportunism. One way to efficiently reduce the uncertainty is to exploit the key aspect of MANETs: mobility. The movement of node can increase the scope of direction and recommendation propagation and thereby pace up trust convergence. The proposed scheme called efficient flooding scheme helps in exploiting the mobility.

Flooding is one of the most primary operations in mobile ad hoc networks (MANET). Most of the key routing protocols like Dynamic Source Routing, ZRP and AODV rely on flooding for route discovery dissemination, route upholding and topology update. Flooding is a very recurrently invoked efficacy function in MANETs. Therefore, an efficient play of flooding scheme is very important in order to limit the overhead of routing protocols and to enhance the throughput of networks. Flooding scheme needs that every node to keep only 1-hop neighbor information. An efficient implementation flooding schemes reduce the overhead of routing protocols and improving the throughput of the network. The efficient flooding scheme varies from the broadcast mechanisms.

2. Related Work

2.1 Trust Evaluation

Uncertainty is evaluated in terms of trust convergence and high authentication probability. Different mobility schemes like metropolis, hierarchical are implemented. Existing reputation systems leaves gives space for elaborate attackers for launching false accusation attacks since there is no restriction on update frequency. This approach has also not able to separate newcomers from misbehavers. Josang [7] introduced algebra for determining trust relations, where a triplet designating uncertainty, belief and disbelief are assigned to each trust declaration. However, its primary weakness is that the opinion of every entity is based on its own slanted policy and the system cannot assure that users will have consistent values. It also lacks hand to fuse different recommendations. Carbone et al. proposed a formal trust structure in [14].

2.2. Reputation System

Reputation and Trust-based Monitoring Systems (RTMSs) has provided an ideal framework for securing Wireless Sensor Network (WSN). In the existing RTMSs, typically each node is provided with a *watchdog* which operates in a promiscuous mode for acquiring information about neighbouring node's behaviour. Sensors are very highly resource (energy)-constrained and their autonomous operation in unreceptive territories renders them exposed to physical node capture attacks. So the resource-constrained sensors should be used only for demanding services so that the network lifetime can be extended.

2.3. Flooding Scheme

Flooding is one of the most basic and vital operations in mobile ad hoc networks. Traditional approaches of flooding suffer from the problems of excessive message redundancy, resource contention, and signal collision. This causes a high protocol overhead and interfering with the existing traffic in the networks. Many flooding schemes were proposed to avoid these problems. However, those schemes either perform poorly in reducing transmission