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Performance Analysis of TCP Newreno Over Mobility Models Using Routing Protocols in MANETs

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ABSTRACT

A MANET is a collection of nodes connected wirelessly that try to converse with each other with no need for any central control or infrastructure establishment. The model of mobility depicts the poignant nature of every node which is mobile in MANETs that is considered to be realistic. It plays a vital role in measuring the performance of MANETs. Mobility is considered to be the prime motive in simulation, because it is a huge influence over the design and network's performance due to limitation in resources and it lead to packet delivery ratio (PDR), varying velocity node energy (NE). Lots of work has been done to improve the above problems. Therefore, there is a requirement of more improvement in this area to enhance overall performance of mobility models. This paper presents a comparative simulation-based analysis of Gauss Markov, Manhattan, and random waypoint mobility models over TCP Newreno that uses a DSDV and AODV routing protocols. Moreover, experiment results and performance analysis have been performed with PDR and NE of the varying number of mobile nodes.

KEYWORDS

AODV, DSDV, GMM, MMM, Mobility Models, RWMM, TCP Newreno

1. INTRODUCTION

MANET is a self-regulating system of networking that consists of autonomous wireless nodes. Howeverthe nodes move and change their network connectivity dynamically. The network can be set up anywhere, at any time, the mobile nodes are interconnected and can converse with each other either in one hop when they are under the radio range of one another or via multi-hop due to the flexibility which MANETs offers (Roy, 2011). In MANETs, the mobile nodes are able to play the role of mobile hosts as well as a router. In a real scenario, the existence of mobility makes a challenge for the design and implementation of the MANET. It is a big challenge to design protocols and services for mobile environments. Moreover, the features of different models of the mobility of mobile nodes in MANET required be studying and examining mindfully. However, the influence of the pattern of mobility on supporting application services, protocols, and systems should be taken into consideration for improved implementation and design. Vehicular communication, military, disaster relief, and manage conferences are some real-life applications of the MANET.

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1.1 Characteristics of MANETs

Routing: The routing in MANETs is really a challenge because of the constant changes and topology modifications and route may be disconnected due to the movement of nodes from one position to another. The routing plays a very important role in mobile adhoc networks due to its frequent route updates and challenges in topologies. However, paths can be disengaged when nodes move from one place to another. Routing mechanism in mobile adhoc network involves different node topology and mobility changes including lesser energy consumption, transmission bandwidth, and utilization of resources. Traditional distance vector and link-state routing mechanisms are unsuitable for mobile adohc network due to huge traffic updates and unnecessary lead routing overhead. Moreover, various protocols associated with routing have been introduced in MANETs environment to avoid this problem and they can be categorized as follows (Colagrosso, 2006; Roy, 2011): geocast, multicast, and unicast. A unicast routing protocol is responsible for transferring routing messages in a point to point manner. However, for MANETs, several protocols are proposed and designed and may be categorized mainly into three classes: proactive, reactive, and hybrid routing based protocols. In proactive, all mobile nodes keep routing information of other nodes in MANET. The routing information of each mobile node is maintained using different routing tables for continuous evaluation of paths to all accessible nodes and try to update regularly, update routing information. If at all, a change is seen in network topology, then routing tables are sometimes updated. Examples of proactive routing protocols (Colagrosso, 2006) are DSDV, OLSR, GSR, and HSR. Reactive protocols are mainly proposed to minimize the overhead of the traffic. However, reactive is used for searching routing paths when only the demand for routes and a route discovery operation need to maintain a route destination process. The Route discovery process ends either when a path is discovered or no path exists. However, the source mobile nodes may experience long waits due to finding a route before forwarding the data packets and have less control of traffic overhead. However, the reactive routing protocols are two categories, one is hop-by-hop routing, and other is source routing. In source routing protocols, the entire source and destination address are carried by packets, and all other packets are forwarded by intermediate nodes as per the information kept in the header of every packet. In routing protocol, up to date routing information is not mandatory to be maintained for intermediate nodes. In hop by hop routing protocol, the data packets need to carry only the next-hop address and destination address. However, every intermediate mobile node is calculated to arrive at the destination and analyze its routing information for forwarding packets to the subsequently in MANETs. Moreover, Hybrid routing protocols are a combination of both proactive and reactive routing protocols and resolve disadvantages by reducing routing overheads. The hybrid routing protocols strategy is used to take advantage of the hierarchical architecture of MANETS. Moreover, the performance parameters like path availability, node energy, mobility model, interference, QoS like throughput, packet loss and delay, reliability for improved utilization of resources and may be used in performance evaluation parameters for routing protocols in MANET. However, it is little tough to find those protocols which can perform best in network scenarios using a variety of mobility patterns, variety of performance parameters and with increase in speed, node energy, node density and number of hope counts.

Broadcast: The process of broadcasting plays the most powerful task in MANETs due to its broadcasting nature in radio transmission. In order to transmit a relay packet, a node needs to access only a free channel before transmission data packets. There is no resource available at the time collision occurs, and also the nodes have no knowledge about whether the data is received effectively through its neighbors or not.

Void avoidance routing Problem: In WSN, a greedy routing may fizzle due to the presence of a void zone. In a dense network, there are generally numerous accessible ways to the destination. Unexpectedly, the number of void zones will be expanded by lessening the quantity of transfer hubs in a sparse network. A decent routing protocol convention ought to maintain a strategic distance from the production of voids by load adjusting. Also if voids are created, it ought to have procedures to work around the void locales, to successfully deliver packets to the destination hub (Ghoreyshi et al., 2016).

Authenticity Challenges of Wearable Technologies

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