Comparison and performance analysis of routing protocol for mobile adhoc network

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ABSTRACT

In last few year the mobile adhoc network(MANET) become very popular in research and simulation. An adhoc network is a collection of wireless mobile nodes (or Routers) dynamically forming a temporary network without infrastructure or centralized administration. The nodes are free to move randomely and organize themselves arbitrarily thus the networks wireless topology may change rapidly and unpredictably such a network may operate in a stand alone fashion or may be connected to the internet. In this paper different routing protocol are to be discussed and measure the performance of Table Driven Routing protocol (DSDV) and Source Initiated Routing Protocol (AODV) by using random way point mobility model. For the implementation purpose we have used Network Simulator (NS-2.34).

Index Terms – **MANET, AODV, DSDV, CBR**

I.   INTRODUCTION

The history of wireless network started in the 1970 and the interest has been growing ever since at present this sharing of information is difficult as the users need to perform administrative tasks and setup static bidirectional link between the computer. This motivates the construction of temporary networks with no wires , no communication infrastructure and no administrative intervention required such interconnection between mobile computer is called an adhoc network.

An adhoc network is a collection of nodes that do not need to rely on a predefined infrastructure to keep the network can be formed ,merged together or partitioned into seprate network on the fly without necessarily relying on a fixed infrastructure to manage the operation nodes of adhoc network are often mobile which also implicates that they apply wireless communications to maintain the connectivity in which case the network are called as mobile adhoc network(MANET). The MANET have several characterstics   1).infrastructure less network 2).no base station and rapid deployment 3). Highly Dynamic topology with multihop. 4).adhoc network automatically forms and adopts to   changes 5).cost effective 6).less setup time 7).energy constrained operation 8).limited physical security 9).self configuring and self organizing 10). Can be set up "on the fly". For instance in a computer science classroom an adhoc network could be formed between students PDA and the work station of the teacher the main objective of this paper is comparatively study of routing protocol like DSDV and AODV.

DESCRIPTION OF ADHOC ROUTING PROTOCOL
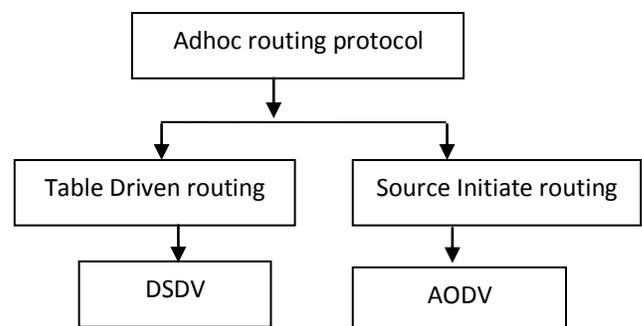
A. DSDV

DSDV is a Table driven routing protocol for mobile adhoc network.DSDV is based on traditional bellman ford algorithm. DSDV is a hop by hop distance vectorrouting protocol that in each node has a routing table for all reachable destinations stores the next hop and number of hops for that destinations .DSDV requires that each node periodically broadcast routing updates. The advantage with DSDV over traditional distance vector protocols is that DSDV guarantee loop freedom. To guarantee loop freedom DSDV uses a sequence number shows the freshness of a route and route with higher sequence number are favorable. In routing table of DSDV an entry stores the next hop towards a destinations the cost metric for the routing path to the destination and a destination sequence number that is created by the destination.the full dump carries all available routing information and the incremental dump that only carries the information that has changed since the last dump.

B. AODV

AODV is a packet routing protocol designed for use in mobile adhoc network.the algorithm uses different message to discover and maintain links . AODV uses a many type of message in order to find route from one mobile device to another mobile device.whenever a node want to try and find a route to another node it broadcast a Route Request(RREQ) to all its neighbours . the RREQ propagates through the network until it reaches the destination or a node with a fresh enough route to the destination then the route is made available by unicasting a RREP back to the source. The algorithm uses hello message that are broadcast periodically to the immediate neighbors . these hello messges are local advertisements for the continued presence the node and neighbors using routes through the broadcasting node will continue to mark the route as valid . if hello messages stop coming from a particular node the neighbors can presume that the node has moved away and mark that link to the node as broken and notify the affected set of nodes by sending a link failure notification to that set of nodes. AODV needs to keep track of the following information for each route table entry. Destination IP address, destination sequence number, hop count, next hop, active neighbors list and request buffer.

III. Packet delivery ratio

It is the ratio of data packets delivered to the destination to those generated by the sources. It is calculated by dividing the number of packet received by destination through the number packet originated from source.

$$PDF = (Pr/Ps)*100$$

Where Pr is total Packet received & Ps is the total Packet sent.

IV. Average End-to-End Delay (second)

This includes all possible delay caused by buffering during route discovery latency, queuing at the interface queue, retransmission delay at the MAC, propagation and transfer time. It is defined as the time taken for a data packet to be transmitted across an MANET from source to destination.

$$D = (Tr - Ts)$$

Where Tr is receive Time and Ts is sent Time

V. Average jitter

Jitter is used as a measure of the variability over time of the packet latency across a network. A network with constant latency has no variation (or jitter). Packet jitter is expressed as an average of the deviation from the network mean latency. Jitter is cause by network congestion, timing drift, or route changes. At the sending side, packets are sent in a continuous stream with the packets spaced evenly apart. Due to network congestion, improper queuing, or configuration errors, this steady stream can become lumpy, or the delay between each packet can vary instead of remaining constant.

VI. Number of packet dropped for buffer overflow

This parameter measure Total number of packets dropped at network layer because of buffer overflow. Normally with the increase of network traffic data packet dropped will increase significantly.

VII. Simulation Setup

We have used Network simulator 2.34 in our evaluation on linux (ubuntu 11.04) platform . In simulation scenario we have place 50 nodes uniformaly distributed in terrain area 750m X 750 m . for this study we have used random waypoint mobility model . In random way point is a mobility model that use random based mobility of mobile devices in a wireless communication System.

Table 1: Simulation Parameter

Parameter	Value
Routing Protocol	AODV,DSDV
MAC Layer	802.11
Packet Size	512 byte
Terrain Size	750m*750m
Nodes	50
Mobility Model	Random waypoint
Data Traffic Type	CBR
Simulation Time	200 sec.
Maximum Speed	0-20 m/sec(30 sec pause time)
CBR Traffic Rate	8 Packet/sec
Maximum buffer size for Packets	10 Packets.

VIII.   CONCULSION

Compare to the Table Driven routing protocols for mobile adhoc networks, less control overhead is a distinct advantage of the Source initiated routing protocols. For the we know the AODV Routing algorithm is best suited for large terrain area with thousands number of node . it send a lot of messge (hello) to check for dedicated link . In AODV the node may suffer   to find the route . It establish the connection when needed. DSDV is may not suffer to find the route in network . It maintain the routing information   so that help to find the route in a minimum time . it is well suited for small terrain area with less number of node . my opinon is that AODV is well suited when the terrain area is large with large number of node . comparatively DSDV is good for small terrain area with less number of mobile node .

IX. Acknowledgment

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