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Performance Comparison of ADSDV and DSDV in MANET

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Abstract

A Mobile Ad hoc Network is a kind of wireless ad-hoc network, and is a self configuring network of mobile routers connected by wireless links. Mobile Ad-Hoc Network (MANET) is a wireless network without infrastructure. Mobile Ad hoc networks are characterized by a lack of infrastructure, and by a random and quickly changing network topology; thus the need for a robust dynamic routing protocol that can accommodate such an environment. To improve the packet delivery ratio of Destination-Sequenced Distance Vector (DSDV) routing protocol in mobile ad hoc networks with high mobility, a message exchange scheme for its invalid route reconstruction is being used. The Author proposed Advance DSDV (ADSDV) protocol that is simulated using NS-2 simulator and compared results in terms of packet delivery ratio, end to end delay and routing overhead in different environment; varying number of nodes, speed and pause time.

Keywords: AODV , DSDV, Wireless network, NS-2.

Introduction

A mobile ad-hoc network (MANET) is a network composed of mobile nodes mainly characterized by the absence of any centralized coordination or fixed infrastructure, which makes any node in the network act as a potential router. MANETs are also characterized by a dynamic, random and rapidly changing topology. This makes the classical routing algorithms fail to perform correctly, since they are not robust enough to accommodate such a changing environment. Consequently, more and more research is being conducted to find optimal routing algorithms that would be able to accommodate for such networks. In MANETs, communication between mobile nodes always requires routing over multi-hop paths.

In Mobile ad hoc networks, nodes do not start out familiar with the topology of their networks; instead, they have to discover it. The basic idea is that a new node may announce its presence and should listen for announcements broadcast by its neighbors. Each node learns about nodes nearby and how to reach them, and may announce that it, too, can reach them.

Wireless Mobile ad-hoc networks have gained a lot of importance in wireless communications. Wireless communication is established by nodes acting as routers and transferring packets from one to another in

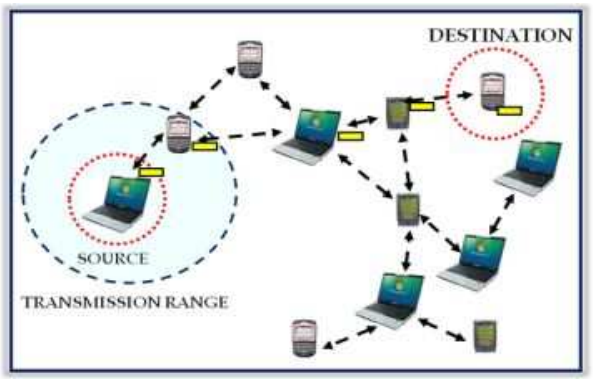

Figure 1.1 MANET Network

Mobile ad-hoc networks. Routing in these networks is highly complex due to moving nodes and hence many protocols have been developed. In this paper we have selected three main and highly proffered routing protocols for analysis of their performance. Figure1 below represents the scenario of MANET.

Destination-Sequenced Distance Vector routing protocol (DSDV) [1] is a typical routing protocol for MANETs, which is based on the Distributed Bellman-Ford algorithm. In DSDV, each route is tagged with a sequence number which is originated by the destination, indicating how old the route is. Each node manages its own sequence number by assigning it two greater than the old one (call an even sequence number) every time. When a route update with a higher sequence number is received,

the old route is replaced. In case of different routes with the same sequence number, the route with better metric is used. Updates are transmitted periodically or immediately when any significant topology change is detected. There are two ways of performing routing update: “full dump”, in which a node transmits the complete routing table, and “incremental update”, in which a node sends only those entries that have changed since last update. To avoid fluctuations in route updates, DSDV employs a "settling time" data, which is used to predict the time when route becomes stable. In DSDV, broken link may be detected by the layer-2 protocol [2], or it may instead be inferred if no broadcasts have been received for a while from a former neighboring node.

Protocols Implementation

The author implemented DSDV and Advance DSDV

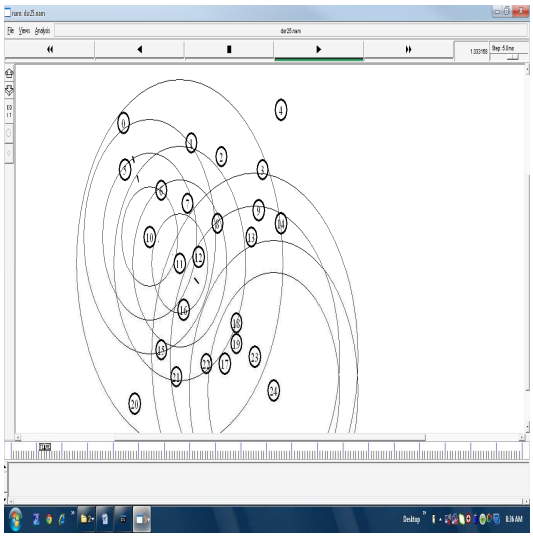

Figure 2.1 25 Nodes network using DSDV protolos

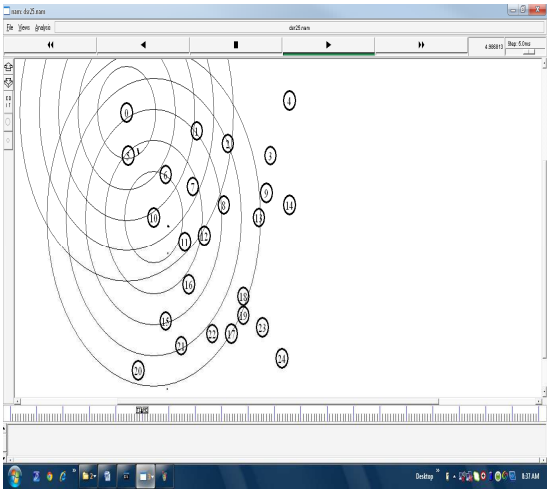

Figure 2.2 25 Nodes network using Advance DSDV protolos

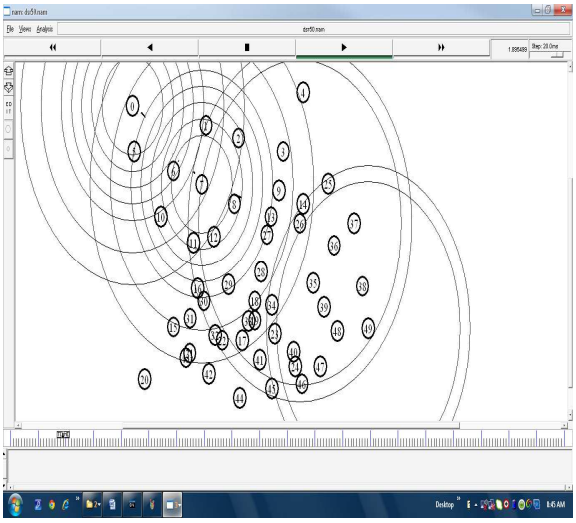

Figure 2.3 50 Nodes network using DSDV protolos

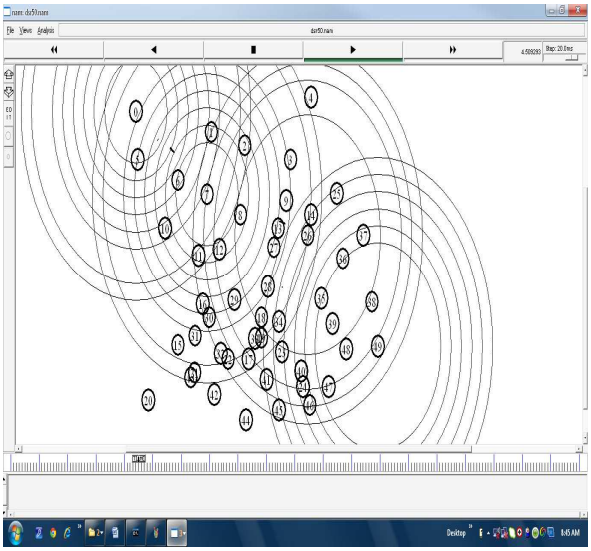

Figure 2.4 50 Nodes network using Advance DSDV protolos

Protocols using the NS-2 simulator. In the first step the author implemented the DSDV and Advance DSDV with 25 nodes network. In the second step the author implemented the DSDV and Advance DSDV with 50 nodes network.

Experimental Results

The simulation is conducted in two different scenarios. In the first scenario, the comparison of the two routing protocols are compared in various numbers of nodes. The number of nodes is set to 25 and 50 nodes.

In the second scenario, the routing protocols are evaluated in different pause time while the number of nodes and the node speed are fixed. The node speed is set to 20m/s and the number of nodes is set to 25 & 50 nodes..

Various Numbers of Nodes

In this scenario, all the two routing protocol are evaluated based on the three performance metric which are total no of received packets, total no of packets lost and total no of packets sent. The simulation environments for this scenario are: -

- Various number of node which are 25 and 50 nodes network.
- Packet size is set to 1400 Bytes
- Area size is set to 1000 x 1000 flat area
- Node Speed is fixed to 20 m/s
- Random Way Point mobility model is used

Fig. 3.1 Total no of packets received and lost in DSDV Protocol using 25 nodes network scenario.

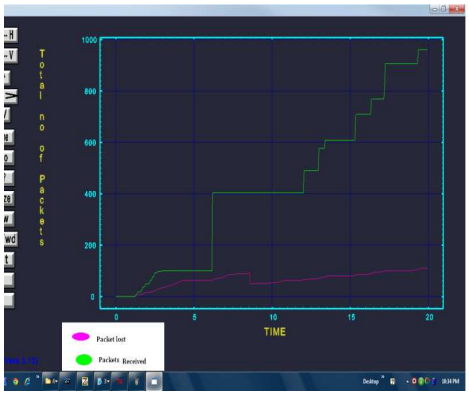

Fig. 3.2 Total no of packets received and lost in Advance DSDV Protocol using 25 nodes network scenario.

In the fig. 3.1 show total no of packets received and lost in 25 nodes network scenario uning DSDV Protocol. total no of received packets are 870 and total no of packets lost are 220. But in fig. 3.2 show total no of packets received and lost in 25 nodes network scenario using Advance DSDV Protocol. Total no of received packets are 920 and total no of packets lost are 110.

Fig. 3.3 Total no of packets received in DSDV and Advance Protocol using 25 nodes network scenario.

In the fig. 3.3 show total no of packets received in 25 nodes network scenario using DSDV and 25 nodes network scenario using Advance DSDV Protocol. Protocol. Total no of received packets using DSDV protocol are 870. Total no of received packets are 920 using Advance DSDV protocol.

Fig. 4.4 Total no of packets lost in DSDV and Advance DSDV Protocol using 25 nodes network scenario.

In the fig. 4.4 show total no of packets lost in 25 nodes network scenario using DSDV and 25 nodes network scenario using Advance DSDV Protocol. Total no of lost packets using DSDV protocol are 220. Total no of lost packets are 110 using Advance DSDV protocol.

Fig. 3.5 Total no of packets received and lost in DSDV Protocol using 50 nodes network scenario.

In the fig. 3.5 show total no of packets received and lost in 50 nodes network scenario using DSDV Protocol. total no of received packets are 750 and total no of packets lost are 220. But in fig. 3.6 show total no of packets received and lost in 50 nodes network scenario using Advance DSDV Protocol. Total no of received packets are 920 and total no of packets lost are 110.

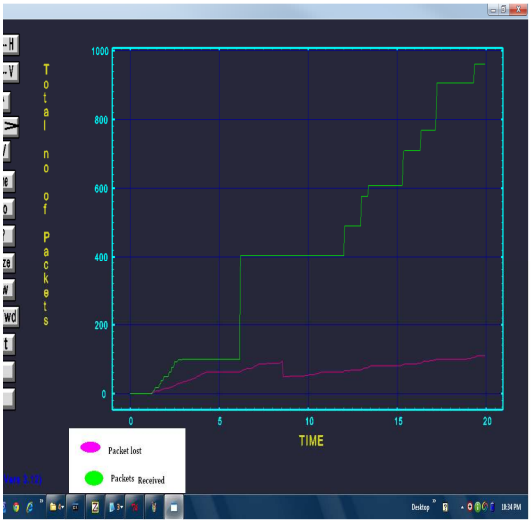

Fig. 2.6 Total no of packets received and lost in Advance DSDV Protocol using 50 nodes network scenario.

Fig. 3.7 Total no of packets received in DSDV and Advance DSDV Protocol using 50 nodes network scenario.

In the fig. 3.7 show total no of packets received in 50 nodes network scenario using DSDV and 50 nodes network scenario using Advance DSDV Protocol. Protocol. Total no of received packets using DSDV protocol are 750. Total no of received packets are 820 using Advance DSDV protocol.

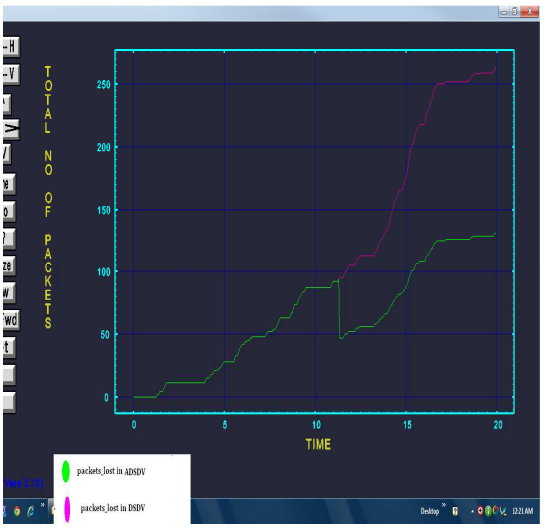

Fig. 4.8 Total no of packets Lost in DSDV and Advance DSDV Protocol using 50 nodes network scenario.

Metrics	DSDV	ADSDV
Total packets transmitted	1000	1000
Total packets received	750	820
Total packets lost	220	110

Table 1. Performance comparison between DSDV and ADSDV using 25 nodes network.

In the fig. 4.8 show total no of packets lost in 50 nodes network scenario using DSDV and 50 nodes network scenario using Advance DSDV Protocol. Total no of lost packets using DSDV protocol are 270. Total no of lost packets are 130 using Advance DSDV protocol.

Metrics	DSDV	ADSDV
Total packets transmitted	1000	1000
Total packets received	870	920
Total packets lost	270	130

Table 2. Performance comparison between DSDV and ADSDV using 50 nodes network

Conclusion and Future Work

In this paper the author proposed the Advance DSDV protocol. Then the author performed the comparison between both DSDV and Advance DSDV protocol based on the packets received, packets lost. So based on the result the author found Advance DSDV protocols is better than the DSDV protocols. But when the network size increase then the performance of Advance DSDV protocols slightly goes down.

So in the future work the author will use the Advance DSDV protocol for large network and remove the lack performance problem.

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