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Dynamic Performance Analysis of DSR Routing Protocol in MANET at Different Hardware Platforms Using NS2

[1]Krishna Das, [2]Dr. Rakesh Rathi
[1]M.Tech, [2]HOD
[1, 2] Computer Engineering Department, Govt. Engineering College,
Ajmer, Rajasthan, India

Abstract: - Mobile ad hoc network is the collection of many distributed random mobile nodes in different range. In mobile ad hoc network many routing protocols are discovered for increase the performance and efficiency between the two and more than two mobile nodes of the network last few years. It's not clear that how the protocol is perform in different hardware platform. A protocol will be the best in the single platform but in another platform will be worst. The main goal of the article is check performance the routing protocol in different hardware platform i.e. DSR with two processors intel core 2 duo and intel core i3 performance on Network Simulator 2.35. In this paper use performance parameter like packet livery ratio (PDR), delay and packet dropped ratio. We have analysis the performance matrices of routing protocol and evaluate its performance in different processors.

Keyword: MANET, DSR, NS2.35, processors: core2 duo, core i3.

I. INTRODUCTION

Mobile ad hoc network is the infrastructure less network and there is no any centralized network. In this network the nodes are distributed in range with random distribution or according to mobility model. The every node must be act as end node and intermediate node. The network is router free network; all the intermediate nodes pass the data to other nodes [1]. The network has the limited range. So, within the range the nodes can directly transfer the data to the destination. We have analyzed the experiment result using AWK command. We have generated the mobility for random way point mobility model and CBR connection.

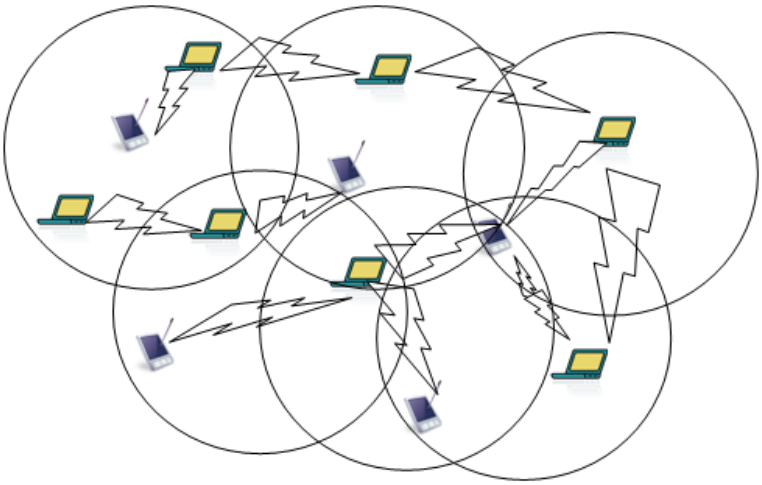

Figure 1: Mobile Ad Hoc Network (MANET)

II. DESCRIPTION OF THE PROTOCOL

Dynamic Source Routing (DSR) is for protocols for wireless mesh networks. It is same as the AODV in that it connect route on demand when a transmission mobile node request one. The routing protocol is taking the entire routing table for the data transmission using the intermediate nodes. Dynamic Source Routing (DSR) is mainly worked in two part that "Route Discovery" and "Route Maintenance". Firstly the route discovery; discover the route where the node is transmit the data to the nodes. After that there is any breakage in the link or another problem in the network so that it maintains the network link ant recovers the links of the network. For the path discovery every routing protocol choose shortest path to reach at the destination. It finds the path source to destination [2, 4, 7]. Route maintain that the communication path remain optimum and loop free according the change the topology of the network [3, 5].

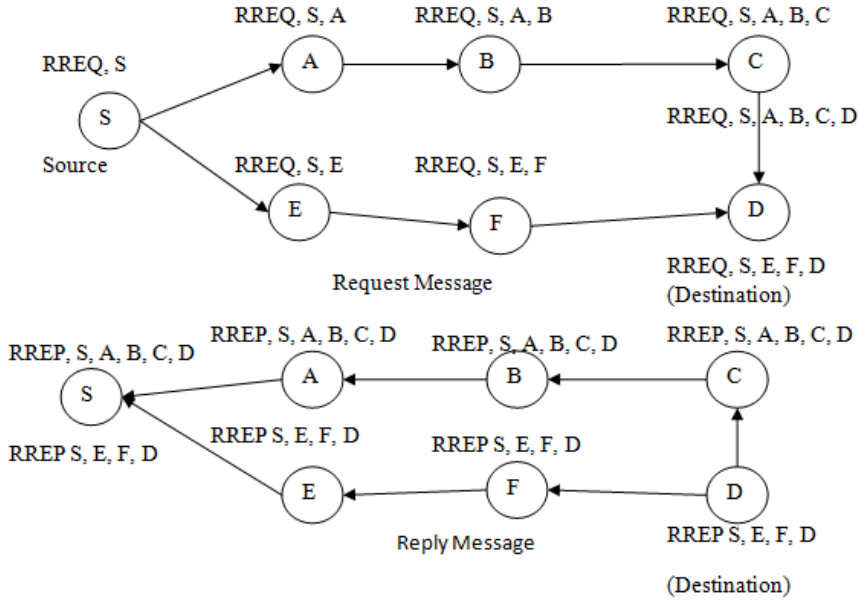

Figure 2: DSR Request and Reply Message

III. DESCRIPTION OF MOBILITY MODEL

In this model use the specific waiting pause time to calculate random speed and random location of the mobile nodes [9]. Using the pause time it select a random location in simulation range and speed in between 0 to V_Max m/s. when the node reached at the final location, mobile nodes also waits again pause time seconds before choosing new point and new location and it speed. The node can move anywhere in the simulation area and given range, in particular simulation time node can move with instant time, the instant time is calculate when random location of nodes. Random way point is largely use for mobile d hoc network. The calculate performance of mobile nodes it necessary to use random way point mobility model [6]. It this model use nodal parameter using this user can change the simulation area, simulation time, pause time and the average speed of the node. It can also check the dynamic performance of routing protocol in different location with different time [11, 13]. In this model each and every node has some location and some to move the simulation area, as a record the model take it. Model set another location as the destination till node move slow or fast as given speed. If there user select less speed then node travel long time with low speed to reach at the destination, but the speed it near to V_Max so node travel short time to reach destination the average speed of the node will be 0m/s or V_Min. to solve this type of problem here model choose V_Min as 1m/s with average speed node as ½ of V_Max. Using the random way point mobility model we are can calculate the average speed of the nodes in simulation environment. The advantage of Random way point mobility model is that it is easy to implement [7, 8]. It generate the unprintable movement of the nodes, it also enabling a long running simulation to all consider in all location and coordinates.

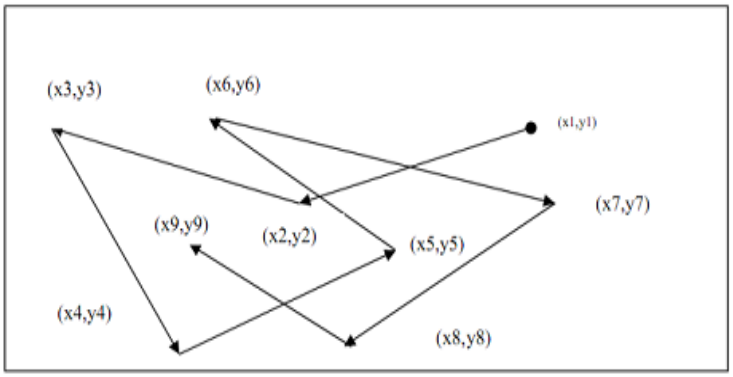

Figure 3: Random Waypoint Model Viewing Node Movement.

IV. SIMULATION AND PERFORMANCE METRICES

A. Simulation Model

We are use the network simulator 2 version 35 for the animation, graphical study and comparison of the results. We have the Linux (ubuntu 12.04 LTS) platform to simulate all the variables [12]. The Linux provides the many programming tool for the simulation. Random way point mobility model used for the random distribution of the mobile network and TCL script for generation of the simulation environment. CBR connection generates traffic. This script generate for the traffic between mobile nodes.

B. Simulation Constraint

All the simulation parameters are use for the simulation and summarized in table 1.

TABLE 1: SIMULATION PARAMETERS

Parameter	**Value**
Channel Type	Chanel/Wireless Channel
Simulator	NS2.35
Protocol	DSR
Simulation	500m
Number of Nodes	50,100,150,200,250,300,350,400
Transmission Range	250m
Mobility Model	Random way point mobility model
Processors	Intel Core2duo and Intel Core i3
MAC layer	802.11
Pause Time(s)	0,1,2
Maximum speed	20 m/s
Minimum Speed	0.5 m/s
Packet Rate	4 packet/s
Traffic Type	CBR
Data payload	512 bytes/packet
Max CBR connections	5, 10, 15
Range	1500m * 1500m

C. Performance parameters

To analysis of the performance of DSR routing protocols are check some performance metrics.

- *Packet Delivery Ratio (PDR)*: Packet delivery mainly shows the data transmission sender to destination. The Packet delivery ratio is run top of the network layer. Its define as the packet generated by the source node by the application layer and number of packet received by the destination. Source sends data to destination that ratio is called the packet delivery ratio.
  PDR : (Pr / Ps)*100
  Where Pr is total packet received & Ps is the total packet sent.
- *End to End Delay*: In the network delay is generate by many causes like buffering, retransmission delay, propagation and transfer times [8, 14]. The time is defined as when data is transmitting in network from source to destination.
  D = (Tr – Ts), where Tr is received Time and Ts is Sent Time.

V. SIMULATION RESULTS AND ANALYSIS

In the simulation of DSR routing protocol use two different processor to check the dynamicity of routing protocol with random way point mobility model, antenna size, network range , different pause time and CBR connection at network range. Calculate the packet delivery ratio and the end to end delay of the DSR routing protocol. According to PDR and end to end delay values, analysis the dynamic performance of the DSR routing protocol.

- *Packet Delivery Ratio (PDR)* : - The packet delivery ratio mainly show the average data transmission of network at different processors (Core2 Duo & Core i3)and different mobile nodes. Figure 4 define the packet delivery ratio in two different hardware platforms considering core2duo and core i3processors. In figure 4 all the three images (a), (b) and (c) shows the graph plot between number of nodes and packet delivery ratio with core2duo and core i3 processor. In all three images red line shows core2duo processors and green lines shows core i3 processor as DSR2 and DSR3 respectively. According to the simulation when we change the pause time and number of connection in DSR routing protocol in mobile ad hoc network with respective to the number of nodes in both processors the packet delivery in decrease but processor core i3 have more PDR then core2duo in DSR routing protocol. In figure 4 (a) shows the simulation result for DSR routing protocol by considering the following parameters pause time 0 sec and number of connections 5 and varying mobile nodes 50 to 400. DSR protocol gives the best PDR in core i3 processor when varying the nodes in large network and core2duo gives the best result in small network. In figure 4 (b) shows PDR when pause time 1 sec and number of connection 10 with same mobile nodes. Here DSR gives the high PDR in core i3 processor for all networks.

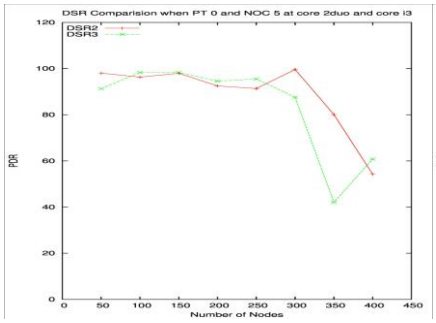

Figure 4: (a)

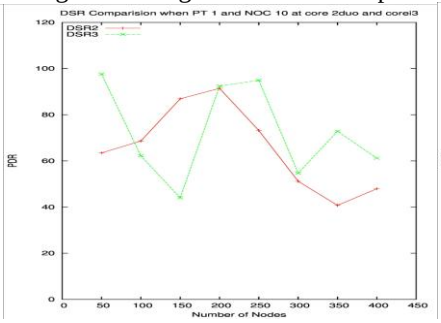

Figure 4: (b)

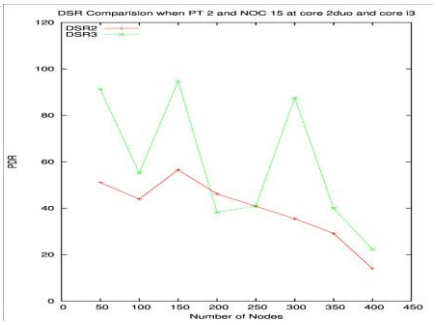

Figure 4: (c)

In figure 4 (c) shows the simulation result for the DSR routing protocol with pause time 2 and numbe of connections 15 with same mobile nodes and core2duo & core i3 processors. When the mobile nodes are increase in DSR routing core i3 gives the best PDR then core2duo. The overall result is that corei3 has more PDR when increase the mobile nodes in DSR routing protocol.

- *Average end to end delay*: - The average end to end mainly shows the average time require for data transmission in the adhoc network. The average end to end delay measure and check the dynamicity of the DSR routing protocol.

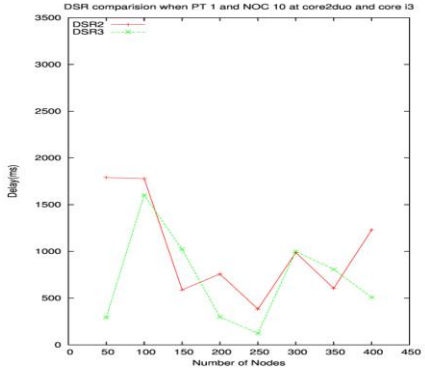

Figure 5:(a)

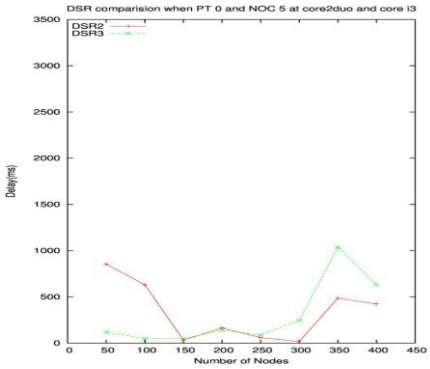

Figure 5: (b)

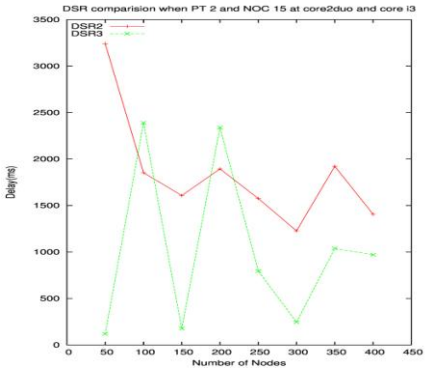

Figure 5: (c)

In figure 5 three images (a), (b) and (c) are shows average end to end delay of DSR routing protocol with pause time, number of connection and varying mobile nodes. In figure 5 (a) consider pause time 0 sec, number of connections 5 and varying mobile nodes 50 to 400 with core2duo and core i3 processors. After simulation with these parameters the average end to end delay in both processors core i3 is less in small and large network. In figure 5 (b) shows average end to end delay with same mobile nodes varying pause time 1 sec and number of connections 10. The DSR routing protocols has less delay in core i3 in small network and for large network core2duo mitigate the delay, after the simulation we analyze that pause time and number of connection also affect the dynamicity of DSR routing protocol. In figure 5 (c) also show the end to end delay with pause time 2 and number of connection 15 with same mobile nodes and processors. By varying these parameters the end to end delay has less in core i3 in small and large network.

VI. CONCLUSION AND FUTURE SCOPE

In this paper we analyze the performance of DSR routing protocol with respect to both hardware and software specification. Routing protocols also vary its dynamicity according to parameters which decide the performance of routing protocol. We compare the performance of DSR routing protocol in two hardware processors core2duo and core i3 respectively in context of packet delivery ratio and average end to end delay. After the simulation we analyzed result that the performance of DSR routing protocol is not decide on the basis of software as we know that software always rely on hardware. In this article both performance metric PDR is best in core I processor and average end to end delay in less in core i3 processor as varying the pause time, number of connections and mobile nodes in mobile adhoc network. Finally we concluded that performance of DSR routing protocol depends on hardware configurations also. The future scope of this paper is that high configure hardware with compatible software measure the energy of nodes, throughput and packet loss by varying the mobility models.

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