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Data Collection and Performance Analysis of Wireless Communication to improve Quality of Service

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Abstract*: A wirelessly appointed system is an accumulation of progressively framing some of moving hubs or mobile nodes or a transitory non-foundation organize without the utilization of any present system foundation. Because of the constrained range of correspondence between portable hubs in the impromptu organize, a few system expectations might be required to send a packet starting with one hub then onto the next in the wireless system. A scope of particular routing conventions have been depicted in most recent years that address multi-hub wirelessly appointed system and their proficiency issues are examined. In this paper, use the NS2.34 network simulator to compare Mobile Ad-Hoc network routing protocols DSDV, AODV and DSR. In this investigation of the effectiveness of routing conventions in systems when changing association parameters (traffic load, portability, arrange size). This archive experiences broad examination among routing performance for AODV, DSDV, DSR routing. For model, packet delivery ratio, delay, number of packet sent, number of packets received, throughput are analyze and also to look at these conventions to check the best routing conventions for Quality of Service in the network.

Keywords: About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Mobile systems are self-sorting out in Ad-hoc. They make their own system framework. When the wired arrange and moving or versatile hubs are not practical, these advertisement hoc wireless systems are utilized. System with a significant issue in conveying information packets among source and destination. The advancement of self-inspired routing conventions that can adequately find ways flanked by two conveying hubs is a key face in the arrangement of wireless systems. The goal is to lead a deliberate AODV, DSDV, DSR routing convention effectiveness overview for specially appointed systems. Execution appraisal depends on numerical hub reenactments in the chain topology of the Portable Ad Hoc Network.

A.Network Simulator

Network simulator is commonly known as NS, the network simulator version 2 (NS2) to prove the random nature of communication networks. This NS2 instrument is capable of simulating wired and wireless networks with using protocols so all this is achieved using NS2. The NS2 fundamental architecture is provided bellow figure.1 in this NS2 with two main languages, namely C++ and OTcl, due to its smoothness and user interaction NS2 has a steady popularity. In this C++ used for inner object simulation system, the OTcl (Object-oriented tool command language) used to configure and assemble items for simulation.

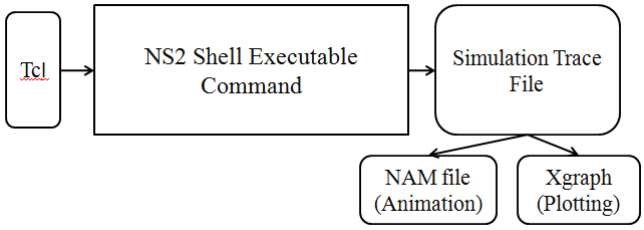

Fig. 1. Basic architecture of NS2

In OTcl's domain a handle like frontend involving users and other OTcl items, it may consider its own processes and enable communication for variables.

II. LITERATURE REVIEW

Searched some of the papers for this project to fit project requirements, such as wireless sensor networks and their applications over the past decades, network security, data collection, deployment techniques, coverage issues and network architecture [1], Proposed new safety in the absence of dedicated routers, high probability of efficient routing, high energy efficiency [2], Protocol implementation and real-time AODV protocol efficiency testing [3], Along with theoretical learning of the features of the AODV protocol, route discovery, path maintenance. DSDV protocol building routing tables, DSR routing protocol working procedure also studded through the information providers, NS2 WSN implementation summary and simple WSN simulation to trace network parameters using trace file [4], NS2 trace analysis in NS2 GUI network performance.

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A. AODV routing protocol overview

AODV is communication that is unicast, broadcast and multicast and its uses tiny delay to set up ON-demand path in network, in this AODV all paths are loop-free due to the use of sequence numbers in network. For data precision, its use of these sequence numbers is inserted from tracking the complete path that it tracks only next loop. Sample of AODV routing protocol illustrated Fig. 2. given bellow

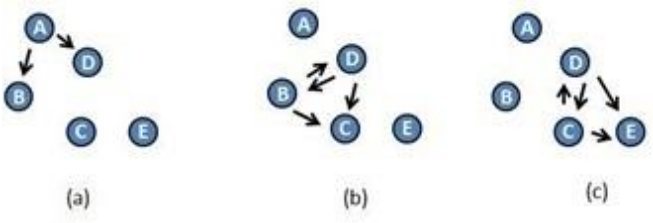

Fig. 2. Illustrated AODV routing

In the instance network (Fig. 2) above, node A requirements to forward the information to node E, node A as created and sent route request with packet to neighbor nodes B and D (a). In this time, A added as a reverse route in B and D routing tables and B and D nodes are forward route request with packet to the nodes (b). B and D nodes are disregarded as duplicates of the packet, this forwarding method proceeds until the information collection path is discovered (c). These duplicates continue to be ignored until the shortest path to node A.

B. DSDV routing protocol overview

Destination sequenced distance vector was one of the essential proactive routing conventions available to Ad Hoc systems In this routing convention each routing table will involve every single open goal, with the related straightaway trust, the related measurement and succession no starting from the objective hub. According to data trade, tables in hubs are refreshed. Every hub will transmit passages in its neighbors. The routes assurance is performed on the estimation and gathering number criteria. Exactly when two same routes are discovered, the one that keeps up the best route plan is used and the other one is dismissed with destruction.

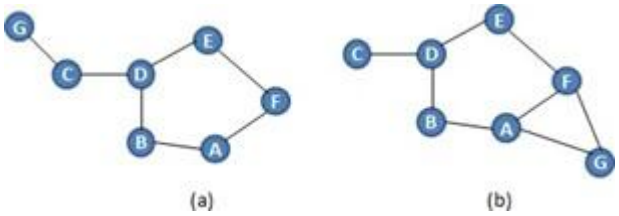

Fig. 3. Illustrated DSDV routing

Consider two topologies (an) and (b) in figure.2 above, when t = 0 system is prearranged as in Fig. 3(a). Assume the system is steady as of now and every hub has a right steering table for all areas. At that point, hub G moves at the snapshot of t+1, this topology is given above Fig. 3(b). A portion of the episodes are recognized as of now and a few measures are taken. At hub c, the hub C association with hub G broken at that point evacuated the course passage and updates sent for hub D and A hub An and F, new passage recognized a crisp association, this new passage is refreshed in the directing table and sent to neighboring hubs. At hub G recognized two associations with An and F are refreshed in the directing table and sent to neighbors, this technique proceeds until the source route to goal is built up.

C. DSR routing protocol overview

This dynamic source routing protocol is a basic and proficient steering convention intended for the utilization of versatile hubs in multi-jump specially appointed remote systems. It permits the system to be completely self-sorted out and designed without any present system association. It requires every node to maintain an all-self route to pairs of destinations then it will send the information to this effort at destination. When the end is not accessible in the cache, a route discovery path to the end node is launched by sending information. In this request, it has the address of the end node, the address of the sender node and an exclusive identification number when path is accessible in route cache but it is not ideal so its initiated route maintenance operation. Destination will invoke a route response or if there are any intermediate nodes in the network.

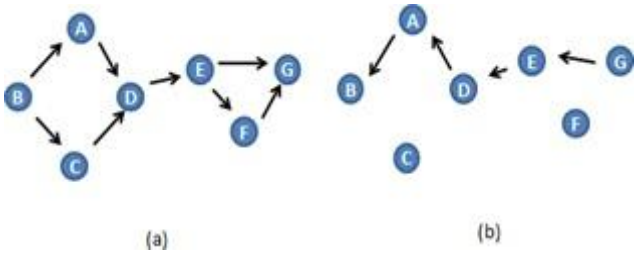

Fig. 4. (a) Discovery of route, (b) Send the route reply using route record (table)

In this above Fig.4, the destination is node G, two routes are requesting node G. Node G selects one path using the route records by sending a response to the incoming packet based on the reverse path to node A (source node), every hop is stored on the best path with less hop. In the above Fig. 4S have route record for node A to node E is A-D-E and node A to node F is A-D-E-F as is every hop and selected path for information collection A-D-E-F-G.

III. SIMULATION PROCEDURE

A. Methodology

NS2 is a freeware simulator used for this research. Based on six performance metrics, performance analysis of three protocols AODV, DSDV, DSR is evaluated. The network area covered with CBR traffic pattern is 800m*800 m. Two Ray Ground propagation model and omni-antenna are used with IEEE 802.11 MAC protocol. The scenario for 10 mobile nodes is created and 50 simulations are carried.

Tcl scripts were executed with the help of NS2 using the scenario described in Table 1. Trace files were obtained using the AWK scripts and data was extracted. The graphs have been generated from the results obtained for the six parameters mentioned above. The parameters are outlined in detail below.

Table- I: Simulation configuration Table

Parameters	Values
Number of Nodes	10
Type of channel	Wireless Channel
Propagation Model (Radio)	Two Ray Ground
Antenna Type	Omni Antenna
Simulations	50
Type of MAC	802_11
Area	800m*800m

B. Procedure

Intended one network for mobile nodes in this project using network simulator 2. This tcl script is nothing but tool command language used for simulation in network simulator 2 to create or designate its need tcl script developed network is provided bellow Fig.5, need to offer ns-2 parameters for simulation to be successful in obtaining one simulation. The required items are the outward show of the network for the entire topology perspective of the mobile network, this is acquired by placing coordinate nodes (x, y, z), it is a mobile network, so you need to speed up the motion and when simulation is started, need to offer the network and network traffic start-up time.

Fig. 5. Created network for simulation

In this simulation it is essential to note which one is the source node and the target node, how the links will be used and what kind of links want to use for the mobile network and need to indicate where to store the outcomes of the simulation that is trace file, NAM file and plot the graphs to observe the outcomes of each simulation. The bellow network is developed by providing parameters such as node positions and motion for mobile nodes and which one is the source node and target node for sending information or collecting information in the network. The network has the necessary parameters or variable functionality for network simulation when the network was operating according to certain simulation circumstances or functionalities with routing protocols, Below Fig.6 is the appearance of the network during network simulation. In figure.4 noted how information will be collected between nodes and motion of mobile nodes in the network and finally received a simulated network trace file.

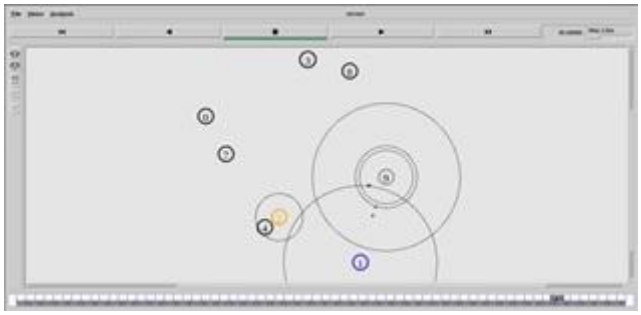

Fig. 6. NAM file of network

Also received animation NAM file and Xgraphs to analyze the performance of the routing protocol using 50 network simulations, and likewise observed three routing protocol performance and evaluated the quality of service in performance for network service in comparison of three routing protocols in simulations of the same network.

C. Comparison of results

Fig. 7. Number of packets sent

The above Fig. 7. is shown number of packets sent in network with different protocols. Number of packets sent means data packets sent by source node to destination.

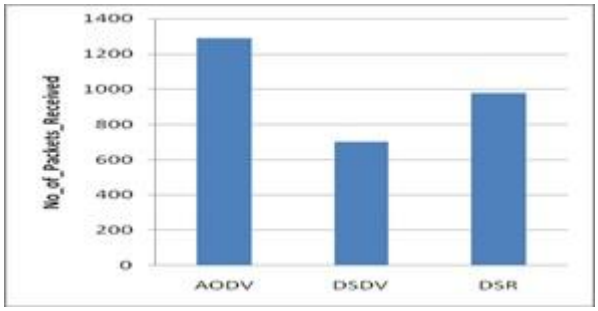

Fig. 8. Number of packets received

Fig. 8 is shown number of packets received means the total number of packets delivered by source node.

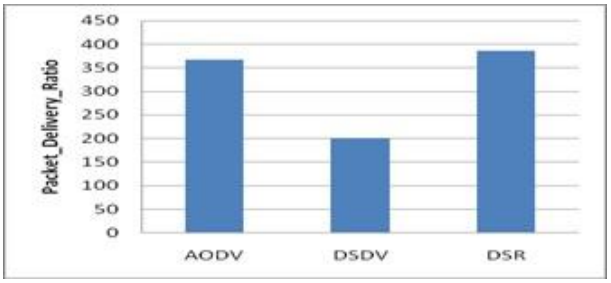

Fig. 9. Packet delivery ratio

Packet delivery ration is ratio of total number of packets sent by source node and total number of packets received by destination. This observations given above Fig. 9.

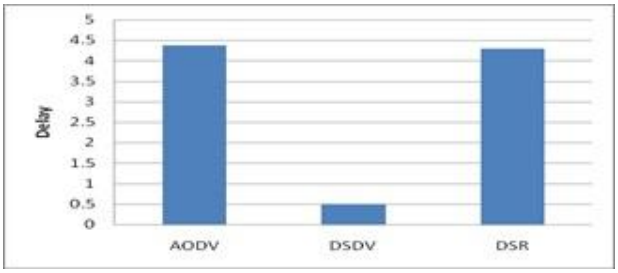

Fig. 10. Delay in routing protocols

Delay is the period of time required by the packet to reach the destination from source, as shown in Fig. 10.

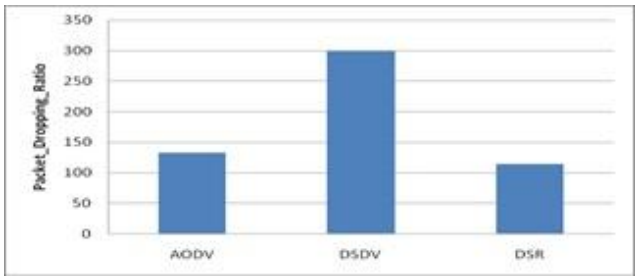

Fig. 11. Packet dropping ratio

Packet dropping ratio is the relative amount of total quantity of data packets dropped to the total quantity of data packets sent from source as shown in Fig.11.

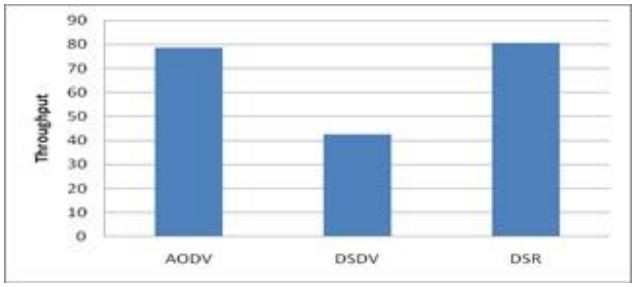

Fig. 12. Throughput in routing protocols

The Fig. 12. depicts about the throughput in routing protocols which is the average number of bits transmitted per unit time.

The statistics above show the network simulation outcomes using three routing protocols are AODV, DSDV, DSR, and in this simulation then received Number of Packets Sent in network, Number of Packets Received in network, Packet Delivery Ratio, Delay in network, Throughput in network Packet Dropping Ratio in network. By comparing the above parameters using three routing protocols. And evaluating the efficiency of each routing protocol and offering the quality of network services in each routing protocol.

IV. CONCLUSION

This research gives performance on the same network to the three routing protocols and evaluates the highest quality of service for the network. Simulated 50 network simulations using three routing protocols, i.e. Network traffic based AODV, DSDV and DSR. Using these routing protocols then obtained Number of Packets Sent, Number of Packets Received, Packet Delivery Ratio, Delay in network, Throughput, Packet Dropping Ratio. These output parameters are obtained through the 50 simulations of each routing protocol and are averaged to analyze the best performance of the routing protocols provided in Fig.7 to Fig.12, so by observing the figure AODV protocol has better efficiency for the specified network in the simulation.

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