Analysis and Performance Ratio of Various Routing Protocol using NS2

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Abstract— Adhoc network is a collection of wireless mobile nodes, forming a temporary network without a fixed base station infrastructure and centralized management. The typical areas of mobile adhoc network applications include battlefield, emergency, search rescue and data acquisition in remote areas. The network topology changes frequently due to arbitrary movement of mobile nodes which acts as both hosts and routers. the topology of adhoc network depends on the transmission power of the nodes and the location of mobile nodes, which change from time to time. Routing protocols are used to provide connectivity to other nodes and also responsible for communication. Adhoc networks has two major problems, link failure and node mobility. The comparative analysis of various routing protocols is mentioned.

The Adhoc On demand Distance Vector (AODV) routing protocol is one of several published routing protocols for mobile adhoc networking, it is reactive protocol.

Adhoc on demand multipath distance vector (AOMDV) is an extension to the AODV protocol for computing multiple loop free and link disjoint path. It finds multiple roots from source to destination. it chooses the best route which has lower hop count as primary path and rest of the paths are secondary paths for back up.

Destination Sequence Distance Vector (DSDV) is adapted from conventional routing information protocol (RIP) to adhoc network routing. Nodes have routing tables listing the number of hops to each destination. Routing information is broadcasted periodically and incrementally.

Dynamic Source Routing (DSR) is designed for MANETs. DSR doesn't need any network infrastructure. Nodes may easily cache routing information for future use. DSR is simple and efficient routing protocol designed specifically for use in multihop wireless adhoc networks of mobile nodes. DSR allows the network to be completely self organizing and self configuring, without the need for any existing network infrastructure and administration.

Keywords— AODV,AOMDV,DSDV,DSR

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I. INTRODUCTION

An adhoc wireless network consist of mobile networks which creates an underlying architecture for communication without the help of traditional fixed position routers. There are different protocols for handseling the routing in mobile environment. Routing protocols are divided into two categories based on how and when routes are discovered, but both find the shortest path to the destination. The routing protocols for adhoc wireless network should be capable to handle a very large numbers of host with limited resources such as bandwidth and energy. The main challenge for the routing protocols is that they must also deal with the host mobility, meaning that the host can appear and disappear at the various locations. Thus, all the host of the adhoc network acts as routers and must participate in the route discovery and maintenance of the routes to the other host. Routing protocols are divided into two categories namely proactive routing protocol and on demand routing protocol. The routing protocol needs to have following qualities in order to be effective, distributed operation loop freedom, demand based operation, proactive operation, security, and sleep period operation, unidirectional link support.

II. LITERATURE

"Comparing AODV and OLSR routing protocols", Aleksandr Huhtonen, Helsinki University of Technology.

In this paper the characteristics of adhoc network were introduced and was explained how it differs from the original fixed wired network. The characterization was given for the adhoc routing protocols. The comparison chapter were made from the possible protocols advantages. Also, the chapter included some results from the papers which compared various protocols.

"AODV Routing Implementation for scalable wireless Adhoc Networks simulation", Clifton Lin.

One of the goals in simulating AODV is to determine how well it scales. Each AODV router is essentially a state machine that process incoming request from the SWANS network entity. When the network entity needs to send the message to the node, it calls upon AODV to determine next hop.

"Performance evaluation and comparison of AODV and AOMDV", S.R.Biradar, Kaushik Majumdar, Subir Kumar Sarkar, Puttamadappa, Sikkim Manipal Institute Of Technology, Majitar.

This paper evaluated the performance of AODV and AOMDV using NS2 , comparison was based on of packet delivery fraction , routing overhead incurred, average end to end delay and number of packets dropped. We conclude that AOMDV is better than AODV.

"Destination Sequenced Distance Vector(DSDV) protocol", Guoyou He, Networking laboratory Helsinki University of Technology.

DSDV is an adaptation of classical distance vector routing protocol to adhoc networks. In DSDV two routing tables

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are maintained at each of the nodes , one of them is the routing table , which contains a complete list of addresses of all other nodes. Many improvements of DSDV have been developed.

AODV:

Ad Hoc on Demand Distance Vector (AODV): AODV is the on-interest (receptive) topology-based directing convention 9 in which in reverse learning technique is used keeping in mind the end goal to record the past bounce (past sender) in the steering table. In the regressive learning, endless supply of a receipt of a broadcast query (RREQ)10 which contains source and destination address, arrangement quantities of source and destination address11, demand ID and message lifespan, the location of the hub sending the inquiry will be recorded in the steering table. Recording the particulars of past sender hub into the table empowers the destination to send the reply packet (RREP) to the source through the way got from in reverse learning. A full duplex way is set up by flooding inquiry and sending of answer bundles. For whatever length of time that the source utilizes the way, it will be kept up. Source may trigger to build up another question reaction system keeping in mind the end goal to locate another way after getting a link failure report (RERR) message which is sent recursively to the source12. Being on-interest to build up another course from source to destination empowers AODV convention to be used in both unicast and multicast routing13. Figure 1 represents the engendering of RREQ parcel and way of RREP answer bundle to the source.

Various RREP messages might be conveyed to the source through various courses yet overhauling the directing sections will happen under one condition which is if the RREP has the more prominent arrangement number. A message with higher grouping number speaks to the more exact and crisp data. A few upgraded methodologies were proposed to dispose of the substantial overhead and high idleness (End-to-End Delay) which bring about experiencing high measure of parcel misfortune happen in AODV steering convention. Literature14 offers to use some particular parameters, for example, speed and development course that could be acquired by GPS gadget notwithstanding sending of sets of on-board sensors to make the directing stabled. Selecting hubs with more steady connection in course revelation technique at the initial step and selecting the most stable course in course choice method at the second step, could be considered as the two noteworthy strides in AODV upgrade venture. AODV with Broadcasting Data bundle (AODV-BD) 15 is proposed to lessen the end-to-end delay by setting up the course to the destination by having information parcels telecasted to destination. This methodology sets up the directing alongside sending information bundles which diminishes the postponement. Be that as it may, TV information to the destination abuses the respectability of information parcel sending alongside colossal measure of data transmission inhabitance.

Improved AODV (IMAODV)16 is proposed to take out the deferral and directing overhead by enhancing the course disclosure process in AODV steering convention. In IMAODV approach, the AODV course revelation procedure and Dynamic Source Routing (DSR) procedure are combined went with attaching node`s address on RREQ to accomplish less handover inertness.

Literature17 proposed a plan in which every hub is offered to keep up an option course to the predefined destination. Along these lines, upon essential course disappointment, the sender can utilize the option course, by which the end-to-end delay, directing overhead and course disclosure recurrence will be made strides.

A mix of DSR and AOMDV directing conventions is proposed in Sutariya D. what's more, Pradhan S.18 results in proposing another plan called Improved AODV (IAODV) in which source steering is restricted up to two jumps alongside going down course amongst source and destination.

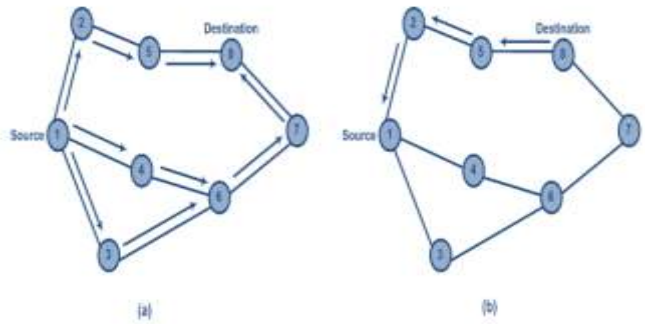

Figure-1
(a) Propagation of the RREQ, (b) RREP Path to the Source

AOMDV:

Specially appointed on-interest Multipath Distance Vector (AOMDV): AOMDV is intended to ascertain various ways amid the course revelation in exceptionally dynamic impromptu systems where the connection breakage happens as often as possible because of high speed of vehicles. In AODV directing convention, a course revelation methodology is required after every connection disappointment. Performing such strategy results in high overhead and inertness. Subsequently, this imperfection is overcome by having different ways accessible. In AOMDV, performing the course revelation strategy will be done after all ways to either source or destination fizzle. In AOMDV steering convention, it is tried to use the directing data effectively accessible in the hidden AODV convention. In any case, minimal extra change is required so as to compute the various ways. The AOMDV convention incorporates two fundamental sup-methodology:

Figuring various circle free ways at every hub: In AODV steering convention, course disclosure system characterizes a substitute way to either source or destination possibly. Every duplicate of the RREQ bundle got by a hub, acquaint a substitute way back with the source. Be that as it may, using all such duplicates to set up courses will bring about directing circles. In this way, so as to overcome such abscond, a comparative invariant is kept up as it is characterized in single way case.

In any case, the real divergence is the different next-jump courses got by various course commercial are acknowledged and kept up the length of the invariant is agreed. A conceivable downside is that different courses to the same destination may have diverse bounce tallies. In this manner, course recognizable proof is required to figure out which of these bounce checks is

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promoted to others because of inconceivable possibility of publicizing diverse hopcount to various neighbors with the same destination succession number.
AOMDV invariant is manufactured in light of new meaning of publicized jump tally. As indicated by the hub i and the destination d, the publicized bounce consider is characterized the most extreme jump number of the numerous ways for d accessible at i. by usage of the most extreme jump check, the promoted bounce tally may not be changed for the same grouping number. Backup courses of action with lower jump checks must be acknowledged by applying this convention which is important to ensure circle free ways. Table 1 delineates the structure of steering table sections for AODV and AOMDV.

DSR
Dynamic Source Routing (DSR): DSR22 is a receptive directing convention in which the essential angle is to store the entire way from source to destination in the steering table as opposed to having the following bounce put away (AODV directing convention). In this way, the parcel header must incorporate all hubs through which the bundle must go to be conveyed to the destination. Like AODV, the RREQ and RREP are utilized to perform the course revelation and conveying the answer message back to the source. In this convention, the RREQ message rebroadcast technique is utilized if the hub getting the RREQ message does not have the destination data in its directing table. Nonetheless, in DSR steering convention, reserve course system is utilized as a part of instance of connection breakage. For example, assume the source hub S has course <S, A, B, C, D> to destination hub D, and the connection <C, D> experienced a disappointment because of node`s development. In such situation, the source hub S turns upward in its store course for another course to destination hub D. It is noticed that different courses to destination hub were kept up in reserve course because of catching the RREQ message by moderate hubs by means of different courses. The store course system results in boosting up the information transmission. After accepting the RERR message by the source hub, the new course disclosure system will be started. The RERR message will be begun and sent to the source by the main hub which is nearer to the source than others. From that point, the source applying piggyback methodology in view of the RERR message got and the new RREQ message will be shown to every one of the hubs used to convey the fizzled join. Figure 2 outlines the transmission of pair of <RREQ, RREP> while performing the course revelation system until accepting the answer message. Dashed lines speak to the course put away in reserve course memory for further use when the connection breakage happens. Allegorically, the measure of the parcels in the DSR directing convention increments because of including any arrived hub details into bundle header. This can be considered as a conceivable downside when the quantity of hubs increments. Another issue that must be considered is being.

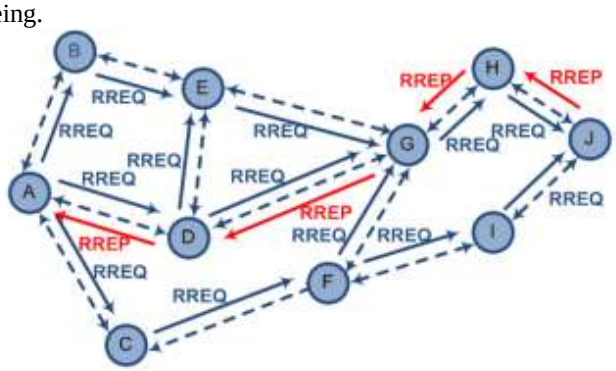

Figure-2
Route Discovery Procedure in DSR Routing Pprotocol

DSDV:
Destination Sequenced Distance Vector (DSDV): The previously stated examined directing conventions are all responsive conventions in which the courses are built up on requests.
DSDV 23 is a proactive directing convention which keeps up the course to the destination before it is required to be set up.
In this way, every hub keeps up a steering table including next jump, cost metric towards the destination hub and the arrangement number produced by the destination hub. Hubs trade their directing tables intermittently or when it is required to be traded. Hence every hub can use the upgraded rundown of hubs to speak with. Because of monitoring the neighbor`s steering table, the most brief way towards the destination could be resolved. In any case, the
DSDV instrument brings about expansive volume of control activity in exceedingly dynamic systems, for example, VANET which results in encountering a lot of transmission capacity devoured.
With a specific end goal to conquer the said inadequacy, two overhaul technique in proposed;

i. Full dump strategy which is infrequently broadcasting the whole routing table, and
ii. Incremental dump which is exchanging the minor changes since the last full dump exchange. Figure 3 and table 4 illustrate the DSDV scenario and the possible routing table to be forwarded towards the neighbors.

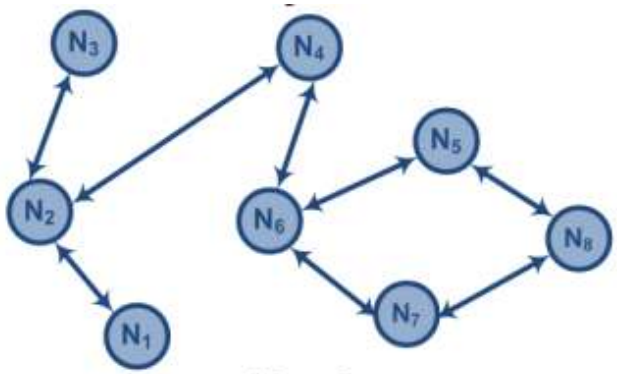

Figure-3
DSDV Structure Scenario

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