

## Comparison of AODV and DSDV protocols along with improvement of AODV

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### Abstract

MANET stands for Mobile ad hoc network and is an infrastructure-less network and MANET having capability to organize itself. It contains wireless mobile nodes that connect with each other without any central point. In MANET dissimilar types of routing protocols are defined. These routing protocols can be characterized into proactive, reactive and hybrid routing protocols. In this paper, AODV and DSDV protocols are studied and compared in terms of packet delivery ratio and end to end delay. The performance of AODV is not better than DSDV in terms of packet delivery ratio and end to end delay. As the DSDV is a proactive routing protocol, it is having a less end to end delay as compared to AODV to overcome these problems we consider a new approach an improved AODV protocol is proposed for MANETS. An improved AODV overcomes the problematic of stale routes, and thus improves the performance of consistent AODV. This proposed new protocol is implemented in NS 3 simulator and performance of AODV, DSDV and improved AODV protocols is compared. The performance parameters are packet-delivery ratio and delay.

**Keyword:** MANET, AODV, DSDV, Reactive and Proactive.

### I. INTRODUCTION

MANET stands for Mobile Ad-hoc network in this system no need of central point. MANET network is not a permanent structure it is a self-adjustable without any topology because MANET is collection of self-determining nodes like mobile, laptops, notepad etc. [1]. Which have restricted battery power consumption and bandwidth, MANET network is freeform topology network that means all nodes in system move dynamically and topology of network is changed. Nodes in mobile ad hoc networks are free to move in the network and they can establish themselves in an arbitrary manner. These elements make MANETs extremely commonsense and its arrangement is simple in spots where existing foundation is not sufficiently proficient to permit correspondence, for example, in a debacle zones, or infeasible to convey areas [2]. Routing protocol is determined by the adeptness of the link metric that works on it. It is a very important value that is relegated to each route path and this value is utilized by the routing procedure to choose one or more routes path, route path is found out by protocol from set of routes. These values

commonly reproduce the cost of using a certain route with respect to some optimization objectives like throughput, delay, energy consumption and data delivery [3]. MANET is useful in many areas like in military. MANET network system is used for transmitting any data from one device to other device node, data can be in any form such as text, audio and video.

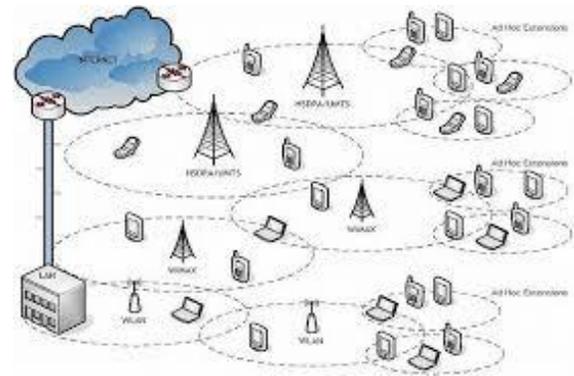


Figure 1 Mobile Ad hoc network

Whenever any information is transmitting from source to destination routing method is used. Routing is transmitting data with no need of access point. When data is transmitting best route path is selected with the help of different parameters. Numbers of hops measurements are used to find out best path. Information of route varies from one direction to next. The most well-known connection metric, least hop count is the conventional routing metric applied in maximum of the common routing protocols like AODV and DSDV, It discovered path with the minimum number of hops. However, new way should quickly be found in situations where paths with least quality could not be found in due time subsequently of high mobility [3]. Directing conventions in MANETs were created in light of the plan objectives of negligible control overhead, negligible processing overhead, dynamic topology maintenance and loop free [4]. Other different methods need to be measured while selecting protocol for MANET is as follows:

**Multicasting:** In this capability to transfer packet to multiple nodes at a time. It is the same broadcasting method. Broadcasting method is completed to every node in

topology. Multicasting is important for transferring packet to every node in network at once and less time saving [5].

**Loop free:** In loop free escape the CPU consumption and consumption of bandwidth. A loop free problem happens when packet is continually routed the same routing path twice before it reach to its final destination node [5].

**Multiple routes:** whenever we are sending packet from one to another node in network topology some node are damaged due to certain reasons like disaster. Data could be transferred through other route node. This is way routing network allow multiple routes [5].

**Distributed operation:** protocol is distributed dynamically with no central access [5].

**Reactive:** it means direction of path is set up only when data packet is sending from source node to final node [5].

**Unidirectional link support:** The radio condition can reason the making of unidirectional connections. Consumption of these connection and bi directional is not only civilizing the protocol performance [5].

**Power conservation:** MANET is collection of self-determining nodes like laptops; cell phones etc. which have restricted battery power consumption and therefore apply various sort of standby mode to save power [5].

Routing protocols categories:

1. Reactive routing protocols
2. Proactive routing protocols
3. Hybrid routing protocols

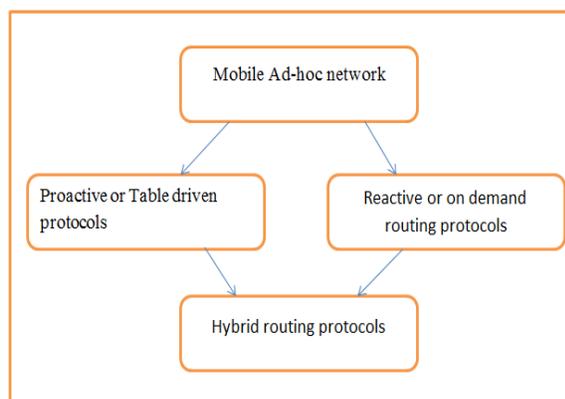


Figure 2 Three major categories of routing protocol

## I. PROACTIVE PROTOCOLS

Table Driven Protocols can be named as proactive protocols[6]. A proactive routing protocol is updated when

topology of network is changed. In proactive protocol network every have advance knowledge of other network. Different routing tables are used for store information about routing. Whenever any change occurred in topology and tables are also updates according to the change. Routing table is updated time by time whenever changes occur in network. The route information is used when any data is sending from node to other node in network.Example protocols: OLSR(Optimized Link State Protocol, WRP (Wireless Routing Protocols) and DSDV (Destination-Sequenced-Distance-Vector)

## II. REACTIVE ROUTING PROTOCOLS

On Demand Routing Protocols can be named as reactive routing protocol [6]. In this protocol between nodes path is defined for transmitting any data. Information is route when nodes are needed. No route information is available for establish route from starting node to target node. Data packet till reach at target node it goes through one network to other network.Example protocols: AODV (Ad Hoc on Demand Distance Vector Routing),DSR (Dynamic Source Routing) and TORA (Temporally Ordered Routing Algorithm).

## III. HYBRID PROTOCOL

Proactive Protocols and Reactive Protocols is mixed together to form Hybrid routing protocol[6]. In this protocol intermediate nodes have information about network and its closest node. Zone radius is used to define the zone size that is defined by number of hop, every node in this network have its own routing zone. Example protocols: ZRP (Zone Routing Protocol) and ZHLS (Zone Based Hierarchical Link State Routing Protocol).

## IV. Related Work

There is a lot of research efforts are carried during last years for comparing the performance of different routing protocols in MANETs. Comparison between these routing protocols is defined with the use of different performance parameters to get best result and best route path from source node to destination node. All routing protocols have their own disadvantages and advantages, some routing protocol use the no. of hop and some routing uses required bandwidth for transmission [7].

This paper compares and study routing protocols that are AODV and DSDV, both AODV and DSDV are different routing protocol. AODV is proactive routing protocol and DSDV is reactive routing protocol. There is a lot of efforts have been completed for deployment and estimating the performance of routing protocols in different network environments, such as DSDV and AODV. Simulation work have been done for other different situations, but our work

is to improve the AODV routing protocol for improve the performance of AODV by decrease the delay and increase the packet delivery ration [8].

**V. Research Methodology**

Ad Hoc on Demand Distance Vector Routing is aDynamic Source Routing and Destination Sequenced Distance Vector Routing Protocols is a mixed together to form AODV. Route Maintenance, sequence numbers methods is follows for Route Discovery. It is used for MANET. AODV is an on-demand routing protocol, this protocol it send the request whenever need. This routing protocol algorithm was interested by the restricted BW that is available in media used for wireless communications. AODV uses the advantageous method from DSR and DSDV algorithms. It is loop free routing protocol and notification to be transfer to affected nodes. It is also capable of multicast and unicast routing [9].

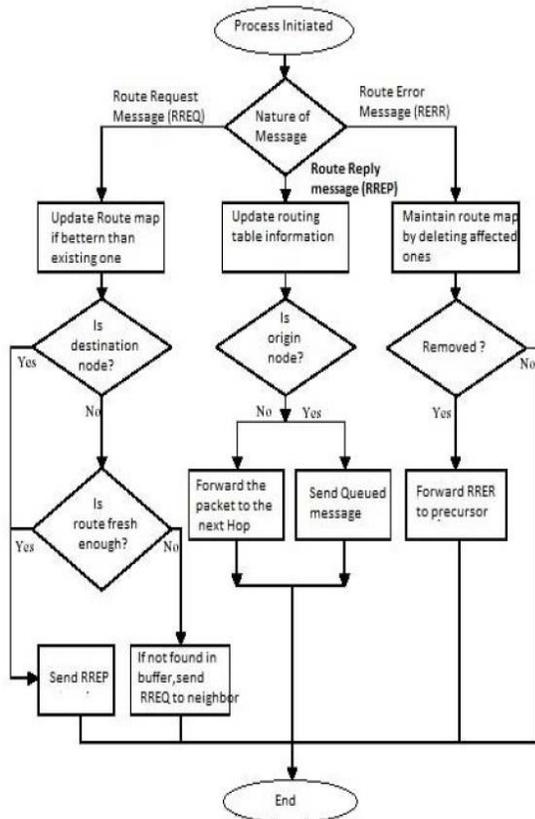


Figure 3 flow chart of AODV

Whenever some node needs to send any data to its destination, it firstly checks the table to decide if it has route to final node, if sure then it transfer the data packet to

next hop node. If not sure then it starts path route detection process [9].Route request (RREQ) packet is broadcasts first. The data packet is broadcast to neighbor nodes until this data packet not reached to defined target node. The address of neighbor node is record when packet is request to intermediate nodes. Routing tables stores that information, for reverse path this information is useful. [9]. Broadcasting of active nodes is done occasionally by hello message. There is no message “hello” communication from neighbor active node informs starting node with an RERR packet and all node is canceled. Begin is completed by source to an alternate course detection phase. Then it will deluge RREQ packet [9].

A. *Destination-Sequenced-Distance-Vector (DSDV):* DSDV is gets the idea and article of bellman ford algorithm. Route path is determined from starting node to target node. Routing tables are maintained by all nodes in network. Routing tables also contain detail information about all nodes such as sequence number that is defined by the target node. This protocol is used for remove the problem of loop [10].

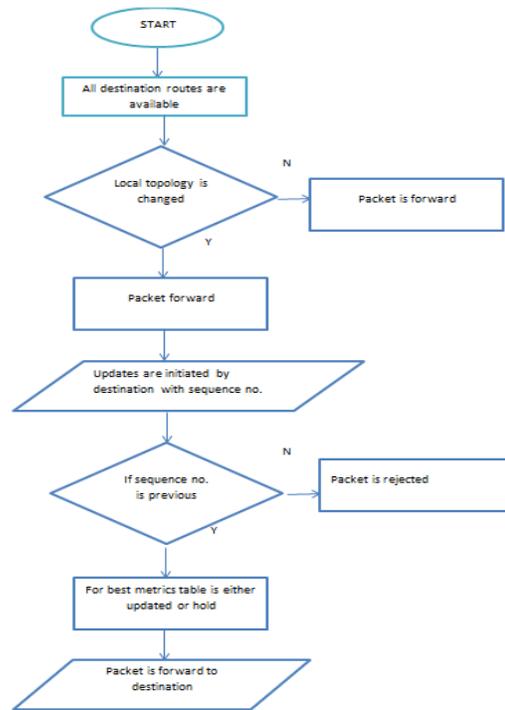


Figure 4 flow chart of DSDV

DSDV routing protocol add attribute and sequence no. for routing tables. This routing table is upheld at each mobile node and this is transfers information packets to other nodes in system topology network. DSDV routing protocol was inspired for the use of records interchange beside with changing and arbitrary routes of interconnection which may not be close to any base station. All node information is defined in destinations and all nodes are required to

transmitting any information data to target node i.e. destination in routing table. Routing entrance is identified with the sequence number. Sequence number is created by the destination station. Every location transfers and changed routing table from time to time. The packets forward between specified positions if defined position is not same then reject the data packet which position is sending and number of hops necessary to reach the desired node position. The data forward by each node will comprehend a novel destination number and sequence number, the number of hops necessary to reach at destination and new sequence number, first marked by the destination in a new route table [5].

Improved AODV uses the Local function for improve the performance of AODV. To establish path between source node and destination node Local function method is used to improve the performance of AODV. That is more efficient for AODV to decrease the delay and increase the packet delivery ratio. In this paper simulation result show that AODV is more delay and less packet delivery ratio, but improved AODV more packet delivery ratio and less delay in network topology. This proposed technique also application for other routing performance metrics such as throughput, overhead, and packet lose etc.

**VI. Simulation Environment and Performance metrics**

The simulations were achieved by using NS 3 Simulator, which is widely used for Mobile ad hoc network. The routing protocols were compared based on the following performance metrics:

- **Packet Delivery Ratio (PDR):** Packet loss or delivery is conveyance is characterized as number of data packets sent and number of data packets lost while transmitting in network [11].  
Packet loss = total no. of packets sent- Total no. of packets received
- **Delay:** Delay is defined as the overall time taken from the moment the data [11].  
Delay = end time – start time

Simulator	NS 3
Node Movement Mode	Constant
Traffic Type	UDP
Distance of node	100
RST range	1500 Bytes
Packet size	200
Number of packet	10000
Number of Node	25,36,64
Simulation Time	50
Connection Type	Grid
Ad hoc Routing	AODV , DSDV
Channel Type	wireless

Table 1 simulation parameters

**VII. SIMULATION RESULTS AND DISCUSSION**

The performance of DSDV, AODV and Improved AODV has been simulated with number of nodes. Table 1 shows the parameters that are used for simulation.

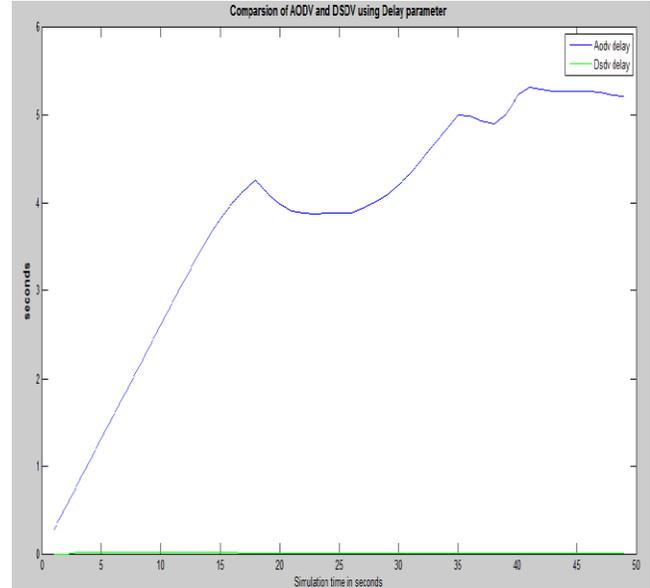


Figure 5 comparisons of AODV and DSDV using Delay parameter

Delay: Delay is defined as the overall time taken from the moment the data. Figure 5 shows the delay by nodes of network in AODV and DSDV. AODV performance is not better as DSDV. In AODV delay is more as compared to DSDV.

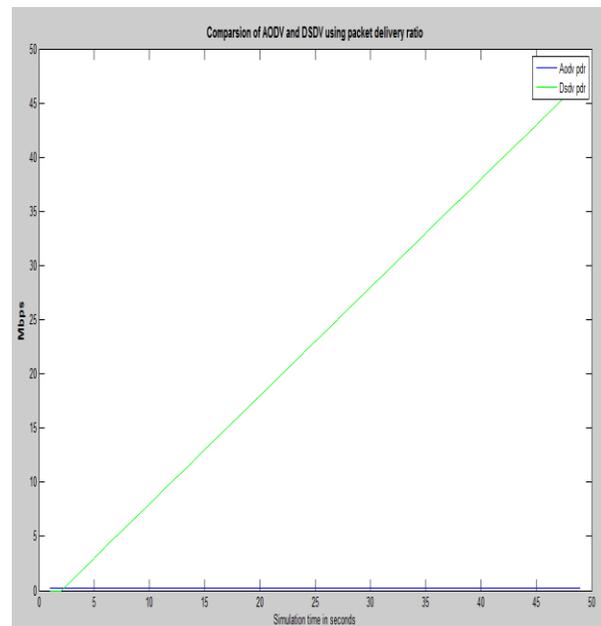


Figure 6 comparisons of AODV and DSDV using packet delivery ratio parameter

Packet Delivery Ratio (PDR): Packet loss or delivery is conveyance is characterized as number of data packets sent and number of data packets lost while transmitting in network. Figure 6 shows the packet delivery ratio by nodes of network in DSDV and AODV. DSDV is better than AODV. In AODV packet delivery ratio is more as compared to DSDV.

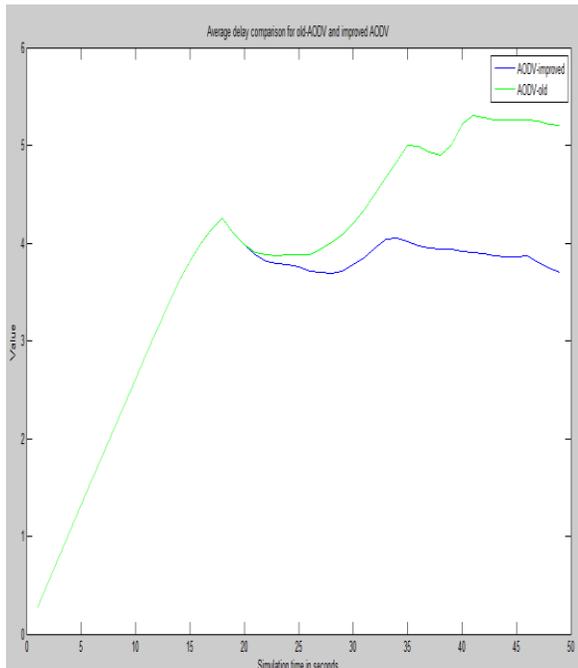


Figure 7 comparison of AODV and improved AODV using Delay parameter

Delay: Delay is defined as the overall time taken from the moment the data. Figure 7 shows the delay by nodes of network in AODV and Improved AODV. AODV performance is not better and delay is more in AODV to overcome that problem improved AODV is implemented. Improved AODV performs better than old AODV and also reduce the delay.

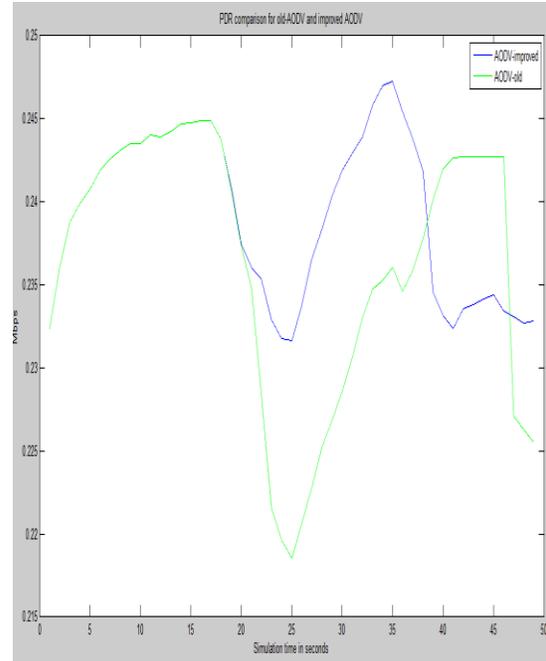


Figure8 comparison of AODV and Improved AODV using packet delivery ratio parameter

Packet Delivery Ratio (PDR): Packet loss or delivery is conveyance is characterized as number of data packets sent and number of data packets lost while transmitting in network. Figure 8 shows the packet delivery ratio by nodes of network in AODV and Improved AODV. AODV performance is not better in packet delivery ratio is more so to overcome that problem improved AODV is implemented. Improved AODV performs better than old AODV and also increase the packet delivery ratio.

### VIII. Conclusion

In this paper presented the performance of AODV, DSDV and An Improved AODV routing protocol are compared in terms of performance metrics such as Delay and Packet delivery ration by using NS 3 simulator. In AODV performs not better in terms of packet delivery ration and delay so to overcome that problem new approach an improved AODV protocol is proposed for MANET. After improvement in AODV we found that AODV perform better than previous performance. The proposed system can successfully reducethe routing Delay and increase the Packet delivery ration.

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## BIOGRAPHIES



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