

Comparison and Analysis of Reactive Routing Protocols over MANET

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Abstract—Different routing algorithms will be investigated in this research, and their performance in terms of Packet Delivery ratio, Bandwidth, and Round Trip Time would be evaluated by continuous changing input values. We employed Network Simulator-2 to accomplish the architecture (NS-2). In MANET nodes are communicate with each other using wireless transmission media. Because nodes easily flow and can structure themselves randomly, the topology of a MANET is dynamic and can change quickly and nodes in a MANET typically need help from other intermediary nodes to form channels to communicate with destination nodes. As a result, the MANET requires constantly changing topology to establish routing from all these nodes. To achieve this task in this research paper we conducted detailed survey, implemented routing like DSR, DSDV, AODV, and compare results using various quality metrics.

Index Terms— MANET, NS-2, DSDV, DSR, Routing Protocols, PDR, delay, QoS Parameters.

I. INTRODUCTION

There are bunches of examination have been finished in earlier years to look at the execution of various directing conventions in MANET. These steering conventions businesses different methodologies or measurements to pick the best reasonable way between the source hub and the objective hub, some of them use the open bandwidth and a couple of them use the bobbled really look at between the sets. Remote systems administration is another innovation that licenses clients to electronically gain admittance to data and its administrations no matter what their area. Remote organizations are arranged into two sections. Fixed and wired passages are known as framework/organized network. Inside its correspondence span, a versatile organization interfaces with an organization span (called a base station). While conveying, the versatile unit can move about geologically. At the point when one base station's reach is depleted, it will interface with another base station and starts speaking with that station. All hubs in impromptu organizations are allowed to move and can be joined progressively as

per their need. Since each host's remote transmission range is confined, a host should look for the assistance of encompassing hosts for the bundle sending to the objective location to interface with has outside the transmission span. Subsequently, all hubs in this organization act like a switch and find and keep up with the courses to different hubs in an organization. MANETs are a kind of impromptu organization that comprises of a gathering of independent versatile hubs that are associated with each other utilizing radio waves. Versatile hubs inside the radio scope of each other can convey straightforwardly, while different hubs need the help of delegate hubs to course their messages.

The Distance-Vector with an Objective Succession (DSDV) [3], the Bellman- Passage Steering Calculation is a changed form of the Bellman-Portage Directing Calculation. Every single versatile station has a steering table that contains every single imaginable objective, the quantity of bounces should expect to arrive, and the grouping number of objective hubs. The arrangement number is utilized to separate among old and new ways, additionally keeping from circles framing. The stations send directing tables to their closest neighbors consistently. In the event that there has been a fundamental change in a station's directing table since the last update, it will likewise be sent. Accordingly, the update is both occasion driven and time- driven. Dynamic Source Directing (DSR) is a responsive convention. It works out the courses as required and furthermore monitors courses. The principal utilization of source steering is a huge separating component of DSR. They complete different the entire bounce by-jump courses to the objective in source steering. To store these courses course reserve is utilized. The source course is remembered for the bundle header of information parcels.

II. RELATED WORK

Many works have been done in field of routing protocols. Different methods protocols had been compared with help of different types of simulation tools like NS-2, OMNet, and OPNET etc. To investigate the feasibility, quality, reliability performance evaluation performed. Some of recent important studies done recently mentioned below: Performance evaluated by comparing routing protocols AODV, DSDV, and DSR and found that DSDV performance is less than others [1]. In [2] performance comparison performed on reactive category of routing techniques based on metrics like PDR, Throughput, Average end to end delay (AETED) using NS2 simulator, simulation result shows that AODV performed well in some aspects like PDR, and packet loss in DSDV less when compared with AODV. In [3] comparison is done on reactive, cluster based routing protocols and proactive routing protocol. Analysis is includes parameters like PDR, Routing overhead through simulation with help of GLOMOSIM simulator. In [4] comparative investigation performed in three routing protocols and considering metrics like AETED, and throughput to calculate its performance by changing the pause time NS-2.33 was used for analysis and it shows that DSR outperforms the other two protocols for throughput and PDR; and DSDV performed well for end to end delay. In [5] researchers simulated AODV and DSDV, compared results, they analyzed results using all performance evaluation metrics.

III. METHODOLOGY

In this paper we simulated, compared, analyzed three different routing protocols to get the most effective routing protocol by calculating AETED, throughput, PDR, and routing load (RL). Earlier also many works and research done in this field. In this paper we are changing environment every time and then calculating the result according to AETED, throughput, loss of packets, and RL for each protocol. We just comparing and analyzing protocols and accordingly we can select. We've created graphs for different scenarios that include adjusting packet size, timeframe altering between packet transmissions, and modifying motion. After performing experiment we are getting different results while there is any change in packet size, time frame etc., and accordingly we are analyzing and comparing all routing protocols which one is more effective on performance metrics. While changing packet size, or modifying environment (small network/ routing load) different routing protocol performing differently.

Including an OTcL translator serving as a user interface to control and regulate simulation settings, NS-2 is built employing C++. In order to distinguish the base system computing, such as a data network and optimization technique, from the simulated management, NS-2 integrates 2 distinct primary computer languages. This decreases the amount of time needed to process packets and events. C++ is appropriate for activities that demand great performance and minimal alteration, like reduced signal analysis and bandwidth allocation. On the other hand, rapid modification is required for activities like communication network and network generation, necessitating the employment of an adaptable programming language like Tcl. A tracing folder and an auxiliary

filename file are generated during the building of the Tcl script. The raspberry pi is used as a processor in the experimental work and the simulations have been carried out and the resultant values are displayed in graph.

IV. PERFORMANCE EVALUATION

Network throughput alludes to the mean information pace of effective information or message conveyance over a network. It is determined in bits each second (bps). A fundamental confusion about estimating network throughput is that estimating the time taken to transfer or download a huge record is the greatest throughput of an organization. This strategy doesn't consider correspondences above, for example, Organization recipient window size, network idleness, or machine restrictions. Most extreme organization throughput rises to the TCP window size separated by the full circle season of correspondence information parcels. To find throughput a follow record is utilized with a different steering convention for better execution.

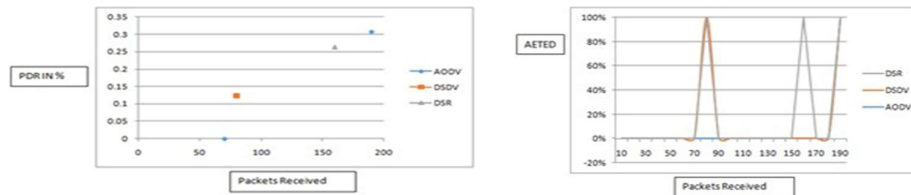
Jitter is an unfortunate impact brought about by the innate affinity of TCP/IP organizations and parts. This subject will portray the circumstances and logical results of jitter. Butterflies are characterized as a distinction in the postponement of gotten bundles. The sending side transmission bundles in a consistent stream and spaces them equitably separated. Because of organization blockage, improper lining, or setup mistakes, the postponement between bundles might change as opposed to stay consistent, as displayed in the figure. This divergence creates some issues for sound playback at the less than desirable end. Playback might experience holes while sitting tight for the appearance of fluidly deferred parcels. To find Jitter a follow record is utilized with a different directing convention for better execution. The start to finish delay is otherwise called one-way delay (OWD). This alludes to the time taken for a bundle to be sent over an organization from source to objective. It is an exceptionally common term in IP network observing and varies from full circle time (RTT).

Parcel misfortune happens when a transmission isn't gotten by its expected objective. In the TCP/IP convention, when parcel misfortune happens, the objective will ask the source to resend the lost bundle. Be that as it may, this can create a setback for correspondence. However, in UDP convention, the misfortune parcel will be disregarded and bring about ill-advised show on the objective area. Bundle misfortune might incorporate unfortunate sign strength at the objective, normal or human-made association, uncontrolled framework commotion, equipment disappointment, programming double dealing, or over-burden network hubs. Follow documents of isolated directing conventions are utilized to track down parcel misfortune for improved results. Follow documents of isolated directing conventions are utilized to track down parcel misfortune for improved results. Simulation setup of proposed techniques is shown in table I.

TABLE I. SIMULATION SETUP

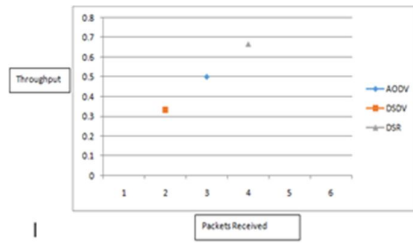
Parameter	Value
Performance parameter	PDR, AETED, throughput (TP), RL, reading load
Protocols	AODV, DSDV, DSR
Number of nodes	20, 80
Number of rows	4
Simulation area	1000 * 1000
Simulation time	15 minutes
Packet size	1024
Propagation	Direct sequence
Start time	80 seconds

Graph 1 displays the effectiveness vector of three methods created following extracting evidence from the simulated labeled dataset. The PDR, the number of packets sent, AETED, TP, and RL for each protocol are shown individually in the table. Likewise, we've created graphs for a variety of scenarios, including adjusting packet size, altering the timeframe between packet transmissions, and modifying motion.

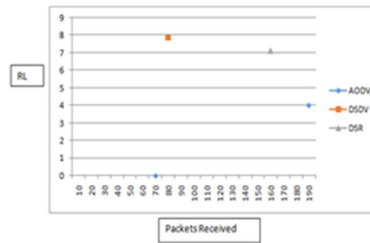


Graph.1.a. PDR

1.b. AETED

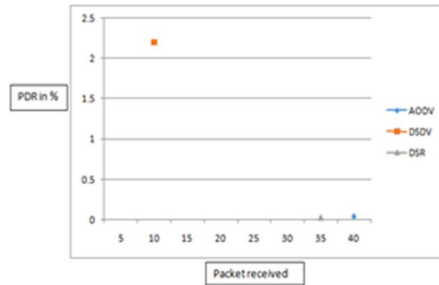


Graph.1.c. TP

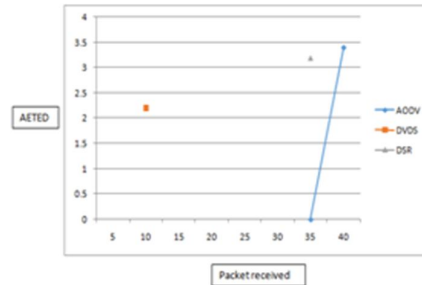


1.d. RL

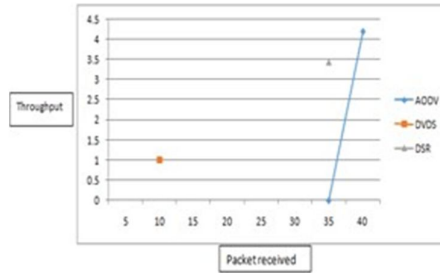
In charts, X-Pivot is showing the recreation time and Y-Hub is showing the quantity of parcels got in every conventions. Comparatively we have created the diagram for various circumstances like by changing bundles size, by changing versatility and time stretch between parcel sending. It is a discrete occasion driven test system implies that it start parcel sending at the predetermined time by us and stop likewise at a predefined time. We have taken 20 hubs and reproduction time=15 min in our situation record. Source hub is 0 and objective hub is 2. Hub 2 is moving in nature so way to Objective is changing like clockwork. Diagram 1 shows information move from source to objective. Dropping parcels in figure shows the bundles lost.



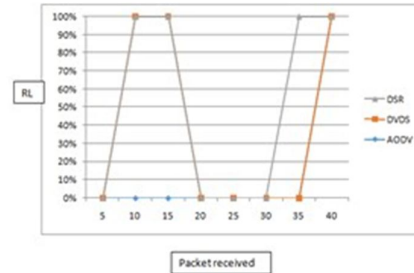
Graph.2.a. PDR



2.b. AETED

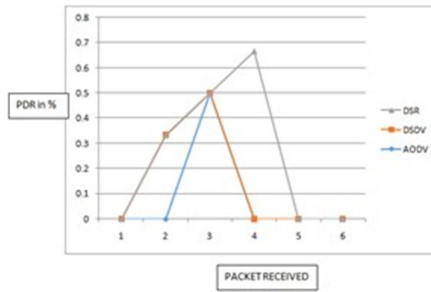


Graph.2.c. TP

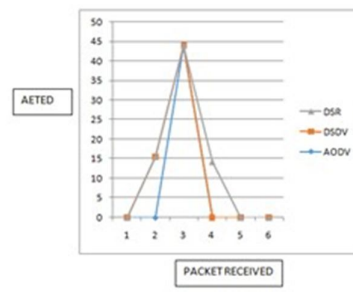


2.d. RL

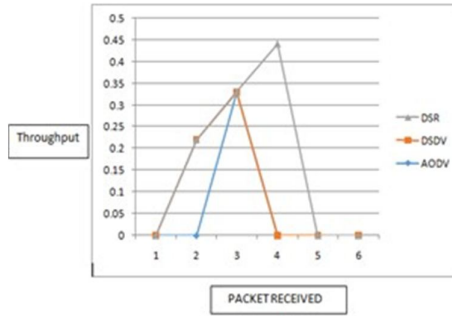
Graph 1 displays the effectiveness vector of three methods created following extracting evidence from the simulated labeled dataset. The PDR, the number of packets sent, AETED, throughput, and RL for each protocol are shown individually in the table. Likewise, we've created graphs for a variety of scenarios, including adjusting packet size, altering the timeframe between packet transmissions, and modifying motion. Graph 2(2a,2b,2c,2d) here also we change the packet size, time frame for packet transmission and we are getting different results according to change in data sets and compare their efficiency accordingly. Same Process is done in graph 3(2a,2b,2c,2d), and as we are increasing time gap in these 3 graphs packet receive no. is decreasing. Graph 4(2.a,2.b,2.c,2.d) , graph 5(2.a,2.b,2.c,2.d), graph 6(2.a,2.b,2.c,2.d), graph 7(2.a,2.b,2.c,2.d), and graph 8(2.a,2.b,2.c,2.d) also demonstrate the results of three methods in various environments. After examining all of the data for various packets, time periods between packet transmission, and mobility, From experimental results DSR shows comparatively better than AODV routing protocol, which performs significantly better than the DSDV protocol. By examining all of the graphs for various packet sizes, and time intervals between mobility and packet transmission, we can conclude that the DSR method performs marginally higher than the AODV protocol, which performs substantially better than the DSDV methodology.



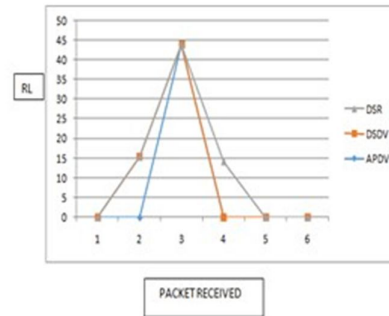
Graph.3.a. PDR



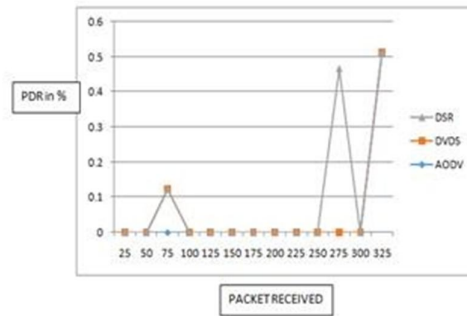
3.b. AETED



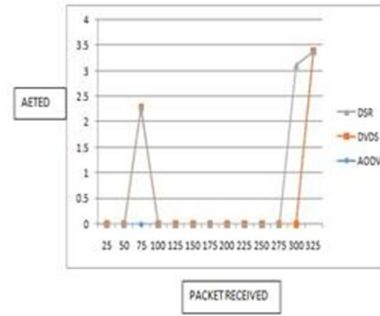
Graph.3.c. TP



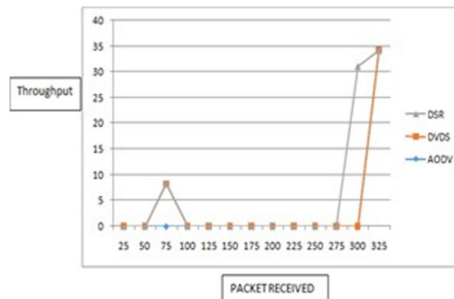
3.d. RL



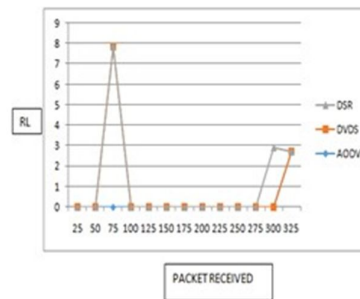
Graph.4.a. PDR



4.b. AETED



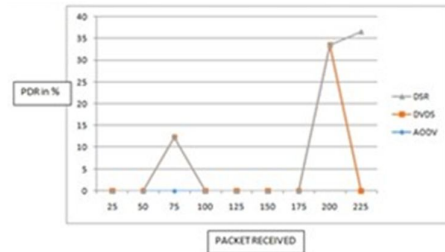
Graph.4.c. TP



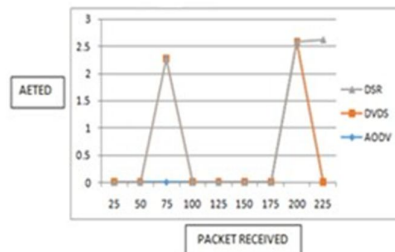
4.d. RL

We can see from graphs 1, graph 2, and graph 3 that as the time gap increases between packets sent, the count of packets received performance at various packet sizes is an essential fact that we have investigated. We may conclude from graphs 1, graph 4, and graph 5 that adjusting packet size has no influence on the DSDV protocol's performance. While rise in packet size, packets intercepted in AODV decreases, lowering PDR. With respect to rising size of packets, the average time between packet sends likewise

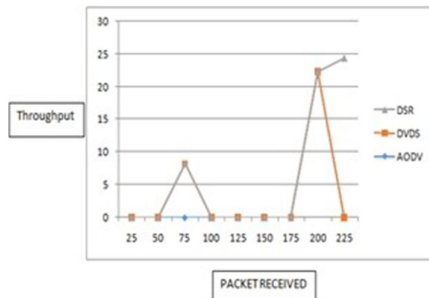
reduces. As the packet size grows larger, so does the throughput. As seen in the performance matrices graph 1, graph 4, and graph 5, the efficiency of the AODV protocol degrades with rising packet size. Graph 1, graph 4, and graph 5 will be used to assess the ability of the DSR protocol at different packet sizes. With rising packet size, we would see that the packet delivery ratio (PDR) drops. As the packet size grows larger, the DSR protocol's throughput drops. With the growth in data packets, so does the routing overhead. When packet size rises the AETED reduces. Except for the RL, the DSR protocol level is higher for smaller packet sizes.



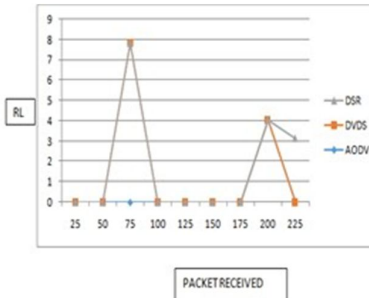
Graph.5.a. PDR



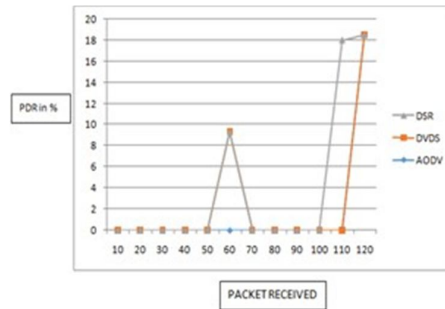
5.b. AETED



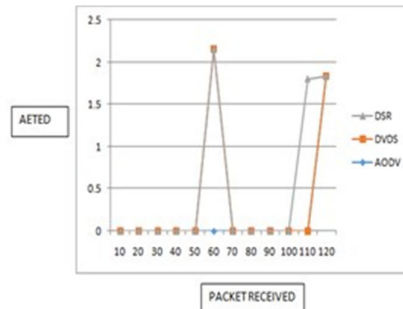
Graph.5.c. TP



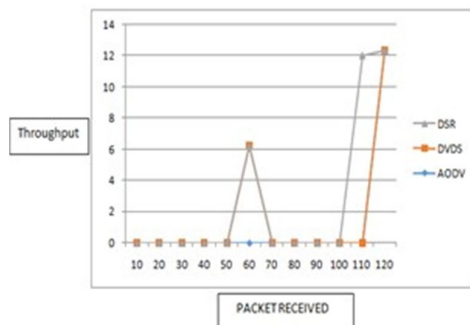
5.d. RL



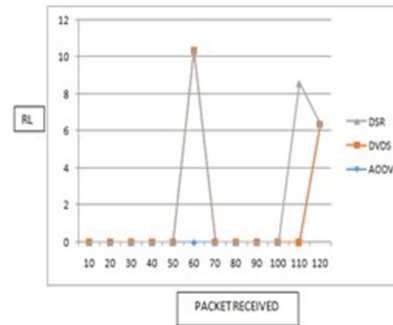
Graph.6.a. PDR



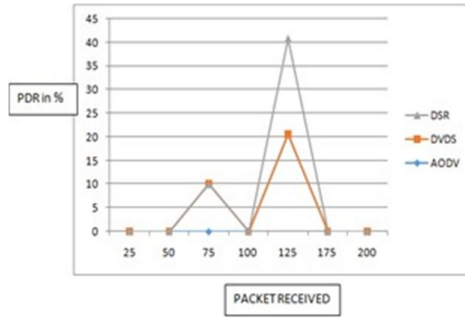
6.b. AETED



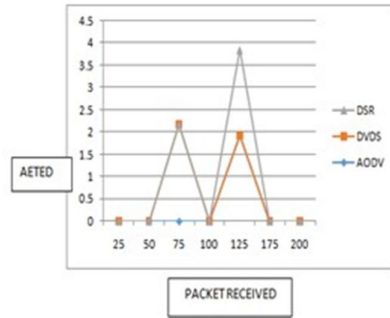
Graph.6.c. TP



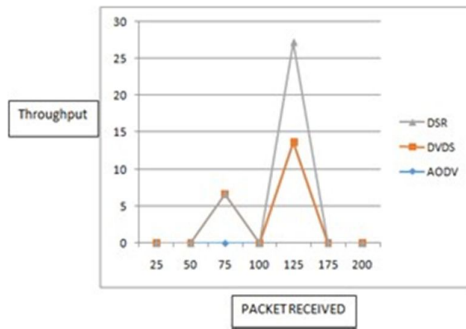
6.d. RL



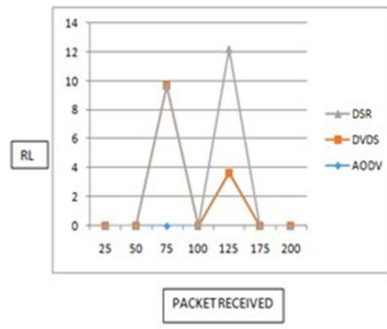
Graph.7.a. PDR



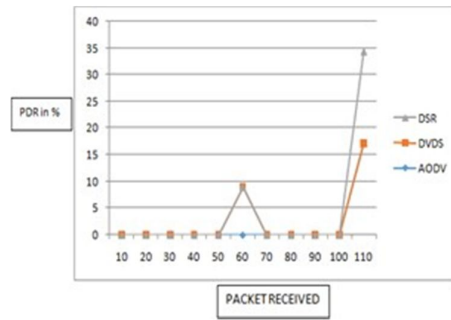
7.b. AETED



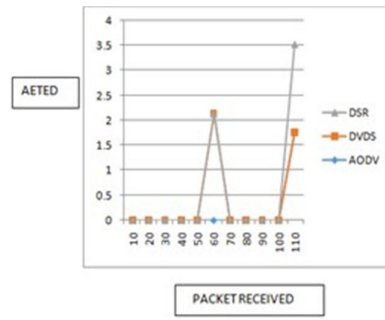
Graph.7.c. TP



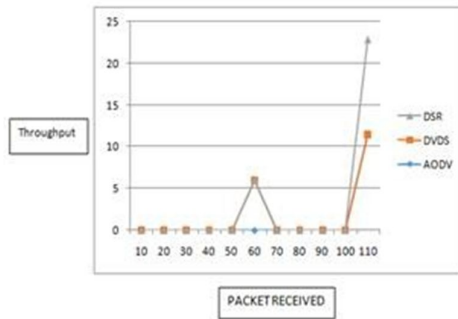
7.d. RL



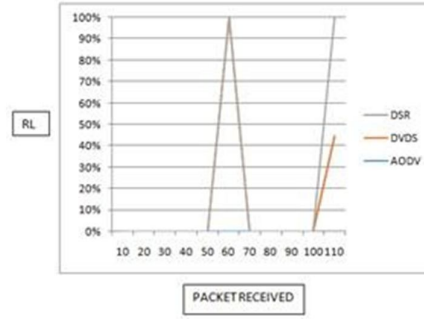
Graph.8.a. PDR



8.b. AETED



Graph.8.c. TP



8.d. RL

V. CONCLUSION

MANET is an assortment of decentralized portable hubs, progressively laying out fleeting organizations without having any fixed or concentrated foundation. In this venture, AODV and DSDV steering conventions are looked at which are proposed for MANETs. In the DSDV steering convention, versatile hubs occasionally communicate their directing data to their neighbors. For every hub, it is vital to keep up with its steering table. AODV convention utilizes the course demand parcel strategy to find its courses when required. And this large number of conventions examination is finished by including a few boundaries, for example, parcel throughput, start to finish delay, conveyance proportion, bundle misfortune rate, and consumed energy. The re-enactment results show that AODV execution is superior to DSDV regarding bundle conveyance proportion and start to finish delay while for parcel misfortune and consumed energy DSDV execution is superior to AODV. For the throughput boundary, the AODV and DSDV execution was almost equivalent. For little organizations, DSDV functions admirably and AODV turns out best for bigger organizations. In light of the charts, we reason that the DSDV standard has unfortunate proficiency, with low throughput and critical steering load when matched to the AODV and DSR strategies. At times, AODV outflanked DSR convention, in spite of the fact that DSR beat AODV convention generally, for example, while contrasting normal end-with end delay. The exhibition of the DSDV strategy is unaffected by bundle size varieties. A more modest parcel estimates, the AODV and DSR conventions perform successfully. As the versatility of hubs develops, the presentation of each of the three conventions reduces.

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