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Research paper



Analyzing the performance of DSR protocol on MANET's network models with various scenarios using ViSim

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Abstract

The examination of the effect of MANETs in various applications with the usage of various protocols was important to study the performance of these networks. The DSR protocol was one of the most important protocols in MANETs protocols. Hence, this protocol implementation in these sorts of networks with various numbers of nodes was important. A study has been conducted to study the performance of these networks with various numbers of nodes in the network. The behavior of the network was analyzed with various set of nodes. The analyzing of these networks was done with the help of the ViSim simulator. The number of nodes considered for analyzing the performance of the network was three, ten and twenty nodes. An investigation of the conventions has finished the considered parameters that measure the QoS measurement like end-to-end delay, throughput, jitter, outturn and elective system execution measurements. The considered cases were implemented on three different cases and results were discussed in detail. The results show that the performance of the current considered protocol was excellent in the above considered three scenarios.

Keywords: *DSR, VISIM, Quality of Service (QOS) Metrics, Throughput, Routing Bytes, Routing Load and Jitter.*

1. Introduction

In Mobile Ad-hoc Networks, execution is processed to study the factors like quality, quantifiability and movement of the nodes in the network etc [1], [3]. Here are the default parameters of DSR steering convention in MANET's for finding the effect in QoS Metrics that zone unit was partaking in a crucial part inside the execution of framework less network [4]. Furthermore, conjointly finding the execution varied designs in steering conventions of MANETs in conjunction with differed default parameters come about QoS parameters like throughput, delay and so on. In this paper, the most commitment is to research the execution of responsive directing convention in specially appointed systems underneath entirely different consequences with parameters by ViSim machine [6]. With the kelp of the ViSim machine, the QoS parameters and breaking down the execution of DSR responsive directing convention are changed [7-8]. Portable Ad hoc systems are the remote systems that were used to a great extent of utilization in the current circumstances inside the ongoing scene applications [3-4]. The related systems are the self-designing systems, which can revision the places of the systems and their areas bolstered the necessities of the system and their execution. The cell phones are permitted unreservedly to move tumultuously and combine themselves subjectively [6-8].

2. Routing protocol problems in MANETs

In the current section, several problems to be encountered while working with MANETs in the various scenarios of various numbers of nodes for various routing protocols are discussed.

i) Wireless Links: The preeminent fundamental reason to be pondered at the points is tending to utilize a remote system, especially every one of the hubs inside the gadget organise are working beneath the remote mode. In light, the hubs are associated inside the method of a remote mode, every node of the hubs amid a remote system which was prepared just to be assaulted by various aggressors inside the system. Wired systems cannot get the opportunity to be directed or to be issued because the hubs needn't bother with the physical connection to get to the data from the hubs and subsequently the assaults on the hubs inside the system. Thus, to abuse the remote systems, the data measure should be got the opportunity to be least.

ii) Dynamic Topology: The hubs inside the portable Adhoc systems are dynamic inside the network as far as the topology and their working is considered. The topology of the system and the hubs that have associated inside the system may change now and again. In light of the hubs inside the remote system changes every once in a while, the topology of the system changes and the amount of the heap on the system and conduct of the hubs inside the system in this manner, the execution of the system likewise changes as after effects of the results those occurred. As a result of the

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topology and in this manner the situation of the hubs inside the system changes every once in a while, the assaults on the hubs may also amplify amid a sensible assortment.

3. Simulation tool using ViSim

ViSim is one among the chiefly utilized test systems inside the field of investigation and inside the exchange of nodes in communication networks or the wireless networks. The most explanations behind the distinguished toll are on account of its easy to understand program. So the clients will utilize primarily this simulator and can likewise manufacture the progressions to the conventional system mixtures [1], [5]. Because of these offices, the ViSim could be valuable for specialists, understudies, speakers in their investigation work and for the statement of the scope of remote system inevitabilities on pc screens and its associated client yield gadgets. The use of this machine had turned into the undertaking of reproduction for differed gadgets had made the things, and furthermore, the machine models turn out to be celebrated to a high degree of clear results. The enthusiasm for the clients for using this machine included grown-up parts inside the clients and clients for this machine are very huge in number [9].

At the point, when contrasted with the contrary arrangement of test systems together with the written work order interfaces, the undertakings were turned out to be difficult for the clients. In any case, with the consideration and utilization of those machine models, the delineation and production of changed thoughts and headed conditions for the occasion of systems by exploitation this machine had turned out to be unpleasantly distinguished. These models may be utilized by the more significant part of the clients inside the market nowadays. ViSim is not a recreation motor, to some degree, it calls ns-2 reproduction models inside the foundation and makes the task untroubled for the tip clients to make the reenactment rationally in an extremely Windows surroundings [7-8]. Execution investigation of the system with DSR convention exploitation, ViSim appeared inside the accompanying figures, and it had been dead shifted outcomes of the system and its associated parts. Exploitation of the modern reenactment instrument, the exhibitions of numerous Mobile Ad-hoc Network (MANET) directing conventions was dissected and noted as graphical portrayals, and forbidden arrangements were diagrammatic inside the accompanying charts.

3.1. Implementation of ViSim scenario

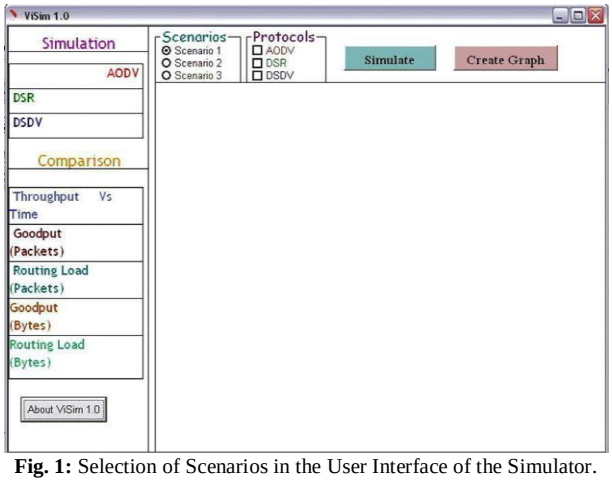


Fig. 1: Selection of Scenarios in the User Interface of the Simulator.

In the above figure, the determination of different and other related things could choose by utilising or making the diverse situations with different limitations. Different situations with the mix of a few conventions in the system with different system execution measurements have chosen from the above-given figure.

3.2. Functional examples

Some of the examples taken for initialization of various scenarios by using the ViSim simulator are represented as follows,

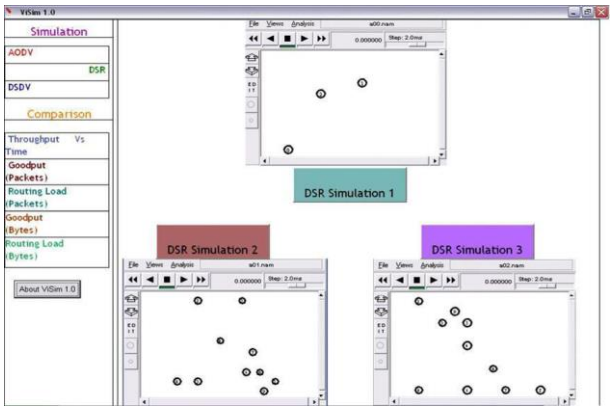


Fig. 2: Creation of Three Scenarios in the User Interface of the Simulator.

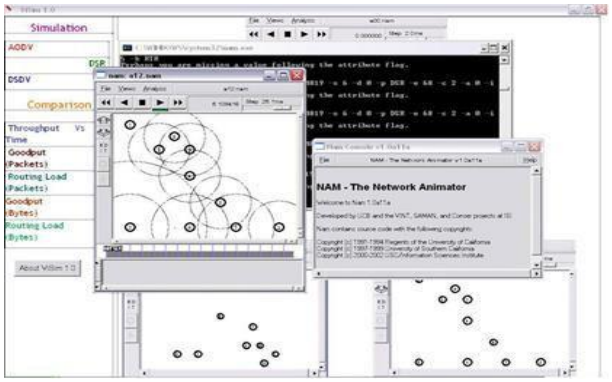


Fig. 3: The Output after Choosing DSR Simulation 3.

From the above figure, the making of a few hubs in the current system with different burdens contemplations and their setups with their heaps of info and yield of the hubs were likewise examined up until now. The figure gives a brief thought of making the gestures and their programming model for the working and executing the procedure of the system show was likewise to be considered and actualized in the accompanying figures 1, 2, 3.

4. Simulation of the [3]scenarios

4.1. Scenario-1(5 nodes)

Various scenarios were taken to analyze the performance of the network with various number of node sin the network. This can be observed form the below figures 2, 3, 4.

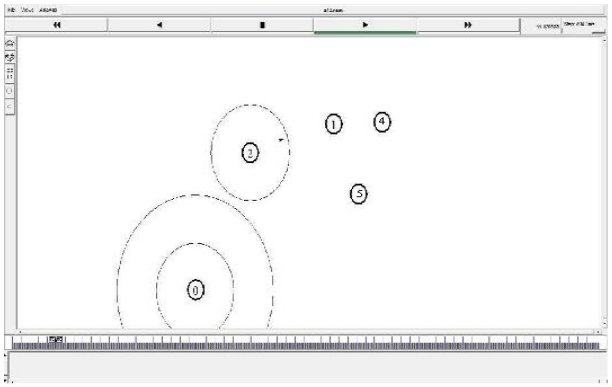


Fig. 4: The Creation of Five Nodes in the Scenario 1.

In the above figure, the creation of the three nodes in the simulator model had displayed.

4.2. Scenario-2(15 nodes)

In the current section, 15 nodes were selected in the network model such that to analyze the performance of the network model and it can be shown as figure 5.

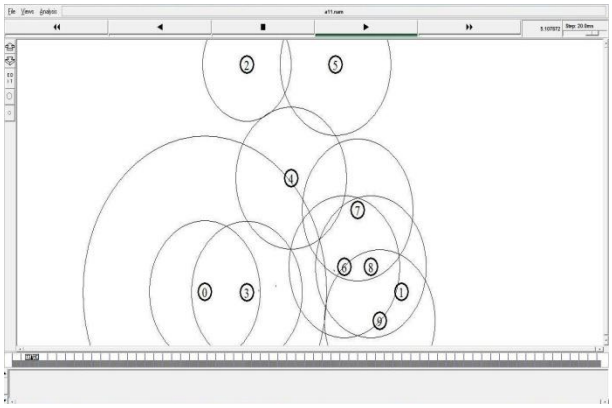


Fig. 5: The Creation of Twenty Nodes in the Scenario 2.

In the above figure, the simulator selected such that to create a set of ten nodes in the wireless network as the scenario 2.

4.3. The throughput of DSR at 5, 15 and 25 nodes

The performance of the network model considered can be shown by various performance metrics. The important metric was the throughput of the network with various set of nodes. This can be observed in the below figure 6.

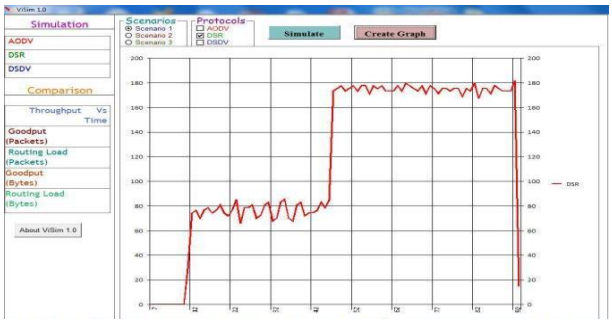


Fig. 6: The Throughput of Five Nodes in the Scenario 1.

In the above figure, the simulator had selected such that the throughput of the network with three set nodes at scenario one was studied and represented. To analyse the performance of the considered network model, the network analysis can be completed or observed by performance metrics like the throughput. The throughput of the network model considered as the above representation. The above figure gives us the throughput of the considered model network at five nodes and the throughput had observed as sharp fall and rise at this juncture of some node in the network.

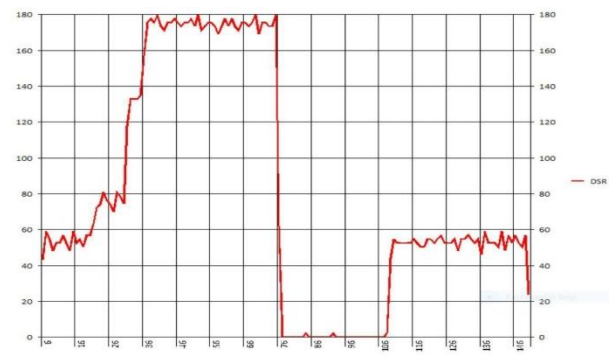


Fig.7: The Throughput of Fifteen Nodes in the Scenario 2.

In the above figure, the simulator had selected such that the throughput of the network with ten nodes in scenario two was studied and represented. To analyse the performance of the considered network model, the network analysis can be completed or observed by performance metrics like the throughput. The above figure gives us the throughput of the considered model network at fifteen nodes and the throughput observed as sharp fall and rose at this juncture of some node in the network.

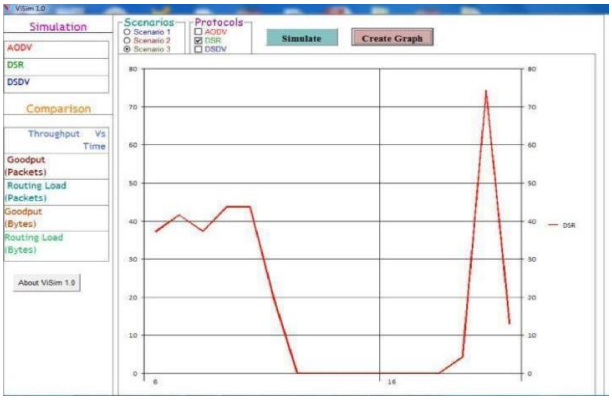
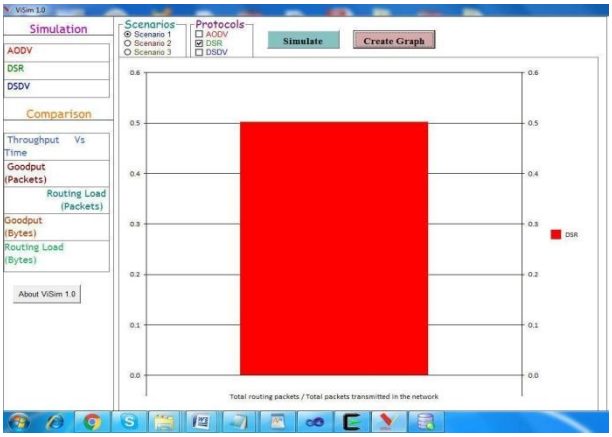


Fig. 8: The Throughput of Twenty-Five Nodes in the Scenario 3.

In the above figure, the simulator had selected such that the throughput of the network with twenty nodes in scenario three was studied and represented. To analyse the performance of the considered network model, the network analysis can be completed or observed by performance metrics like the throughput. The throughput of the current network model considered and represented in the form of above model. The above figure gives us the throughput of the considered model network at twenty-five nodes, and the throughput observed as sharp fall and rose at this juncture of some nodes in the network.

4.4. Routing load packets at 5, 15 and 25 nodes

In the current section, the other performance metric i.e., the load packets was discussed in detail.



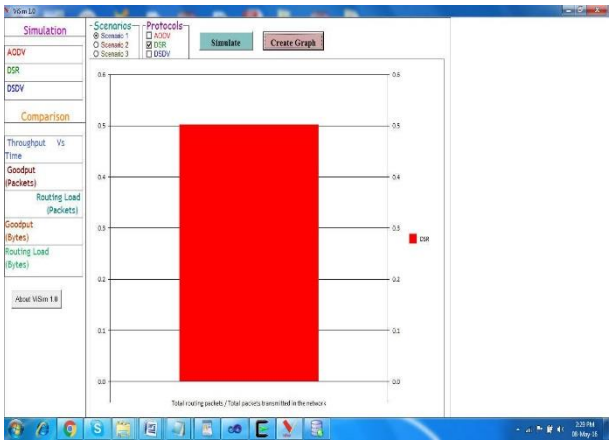


Fig. 9: The Routing Load on the Packets of Five Nodes in the Scenario 1.

In the above figure, the simulator selected such that the routing load on the network analysed with the help of the graphical representation in the above figure 9. The number of nodes that were selected is the five nodes in the network.

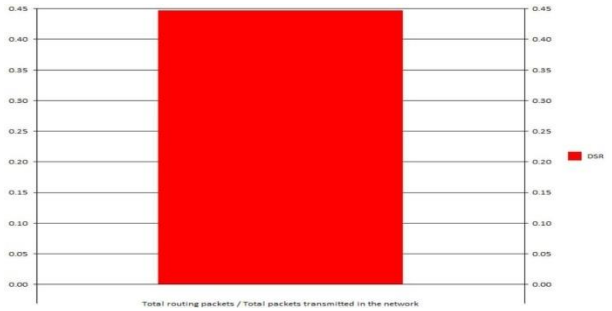


Fig.10: The Routing Load on the Packets Fifteen Nodes in the Scenario 2.

In the above figure, the simulator selected such that the routing load on the network analysed with the help of the graphical representation in the above figure 10. The number of nodes that were selected is the fifteen nodes in the network.

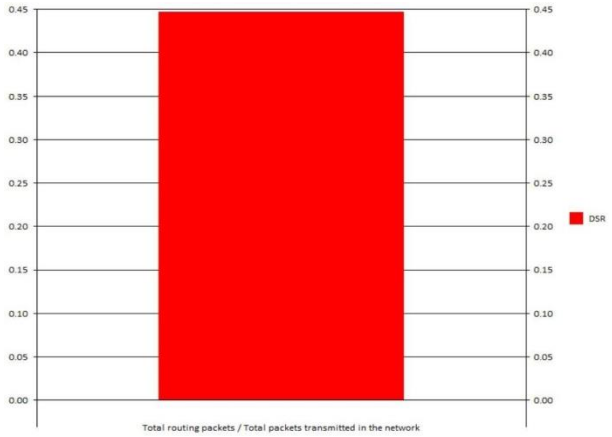


Fig. 11: The Routing Load on the Packets of Twenty-Five Nodes in the Scenario 3.

In the above figure, the simulator selected such that the routing load on the network analysed with the help of the graphical representation in the above figure 11. The number of nodes that were selected is the twenty-five nodes in the network.

4.5. Routing load bytes at 5, 15 and 25 nodes

The another performance metric i.e., the routing load was discussed in the current section as follows,

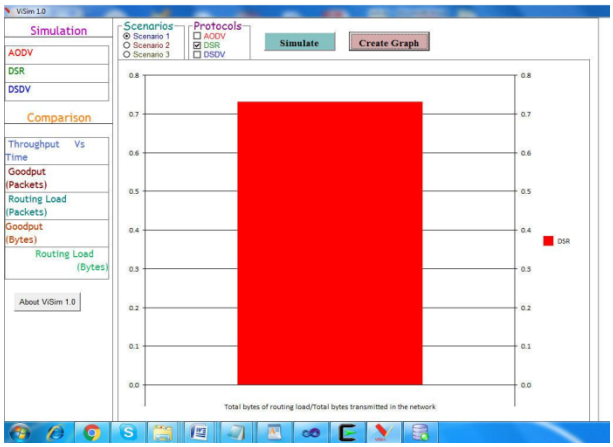


Fig.12: The Routing Load on the Packets of Five Nodes in the Scenario 1.

In the above figure, the simulator selected such that the routing load regarding bytes on the network analysed with the help of the graphical representation in the above figure 12. The number of nodes that were selected is the five nodes in the network.

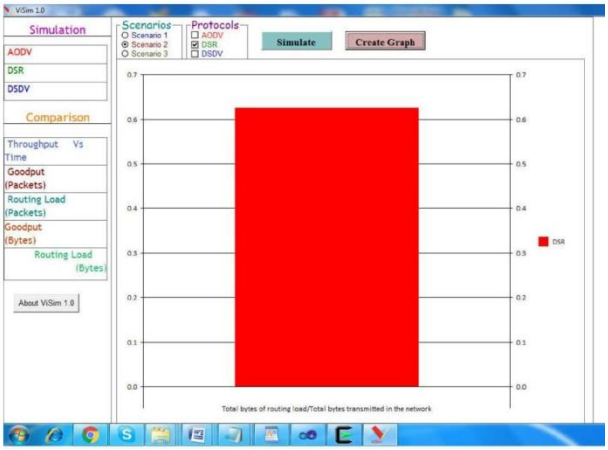


Fig. 13: The Routing Load on the Packets Fifteen Nodes in the Scenario 2.

In the above figure, the simulator selected such that the routing load regarding bytes on the network analysed with the help of the graphical representation in the above figure 13. The number of nodes that were selected is the fifteen nodes in the network. As the nodes are changing from time to time and also to observe the behaviour of the network nodes and the performance of the network model was observed and those nodes have the effect of the performance of the network. The routing load of these network nodes can also be observed and considered as the important for analyzing the performance of the network model.

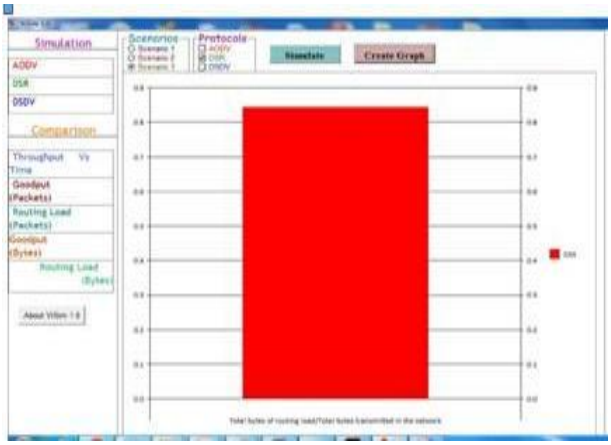


Fig.14: The Routing Load on the Packets of Twenty-Five Nodes in the Scenario 3.

In the above figure, the simulator selected such that the routing load regarding bytes on the network analysed with the help of the graphical representation in the above figure 18. The number of nodes that were selected is the twenty-five nodes in the network. The performance of the considered network or the mobile ad hoc network considered and the performance analysed in the simulator model. The load behaviour of the routers or the routing load behaviour of the network model considered and observed in the graphical representation model.

5. Conclusion

In the current paper, the authors tried to analyze the performance of the MANETs networks routing protocols with the help of simulation mechanism. The simulation process was conducted by the usage of ViSim simulator. The network performance was analyzed for various scenarios f number of nodes. We tried to identify the performance of the network model with three sets of nodes and the performance was represented in the form of graphical representation. In order to identify the performance of the network model with DSRT protocol, we tried to analyze various performance metrics of the network like the throughput of the network, end to end delay of nodes, bandwidth of the nodes, jitter and other metrics. All these metrics are calculated for the three scenarios of the nodes. From the results, it is observed that the performance of the network with the current DSR protocol, the network performance was excellent and the same was shown in the graphical representation for all the performance metrics.

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