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"PERFORMANCE ANALYSIS OF REACTIVE ROUTING PROTOCOL IN MOBILE AD-HOC NETWORK"

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ABSTRACT

MANETs are such networks formed temporarily on an ad-hoc basis without fixed infrastructure and centralized administration. As defined by IEEE 802.11 standards, the major difference between MANETs and WLAN is that MANET's are BSS (basic service set) without AP (Access Point) whereas WLANs are BSS with an AP. Applications of MANET includes remote military and emergency operations where it is required to form the instantaneous network. The aim of this paper is to optimize routing in MANETs using dynamic source routing protocol and improved the quality of services.

Keyword: Mobile Ad-hoc network, basic service set, Wireless local area network, Network simulator, Dynamic source routing, Quality of services.

I. INTRODUCTION

Wireless technology may be managed by a core infrastructure that regulates the connections between network nodes, or it may operate as an infrastructure-free system known as an ad hoc network. The mobile ad hoc network (MANET) is a class of wireless ad hoc network (WANET) that provides a large number of applications in various fields. Mobile ad-hoc networks (MANET) are ambiguous networks comprising of mobile stations (MSs) furnished with wireless cellular and network abilities, collaborating without any network's central structure. The presence of this network opens the pat for a great variety of applications scenario like enterprise and home networks, emergency applications, wireless sensors networks, and vehicles communication applications, etc. The main characteristics of MANET include its fast deployable wireless network, and the fact that it is self-organizing as well as infrastructure-less.

As a result, they are incredibly suitable for use in unique outdoor events, communication in areas without a crises, radio infrastructure, natural catastrophes, and military operations, among others. Mobile Ad-hoc Network (MANET) is a collection of mobile nodes that moves arbitrarily without any fixed infrastructure and centralized management. MANET has been beneficially utilized in many domains which are described in Figure 1.

Figure 1: Illustration of the mobile ad hoc network (MANET) structure.

The nodes in MANET can be thought of as either data sources, data destinations, or router nodes. Therefore, generally, a node is capable of delivering a message directly to all of its immediate neighbours or an additional inaccessible node via other intermediary nodes(s). Multi-hopping is the primary mechanism for increasing network capacity and performance. Within the multi-hop paradigm, the source node can communicate with its destination through intermediate nodes as the destination is out of the communication range of the source node. This means that even if the source is not in range, the destination can receive data from the source.

MANET is a collection of mobile nodes that communicate with other nodes in an open environment without the presence of any centralized authority. These networks are extremely versatile and can be used for a wide range of applications because they don't have any pre-existing infrastructure. The limited range of wireless interfaces necessitates the use of intermediary nodes in most cases. This means that each node in multi-hop ad-hoc networks has to act as a router, sender and receiver. Congestion is one of the challenges in the network, and it is not possible to remove congestion from the network. Heavy congestion means more loss of data. The senders are continuously sending the data packets, and the intermediate nodes' responsibility is to forward the data to the next node or destination. The nodes consumes energy for each and every operation, if a data packet is dropped, the data is again retransmitted to the destination. Retransmission means wastage of resources, and energy is a valuable resource for communication. The retransmission consumes bandwidth and affects the performance of new senders. Congestion can be reduced by using a multipath and buffer management scheme. Internal changes in the standardized packet format are required to control loss of resources. In mobile multi-hop ad-hoc networks, finding a route between communication endpoints is a major challenge. A number of approaches to this problem have been proposed in recent years, but no routing algorithm has yet been found that works in all circumstances. The example of MANET is mentioned in below figure.
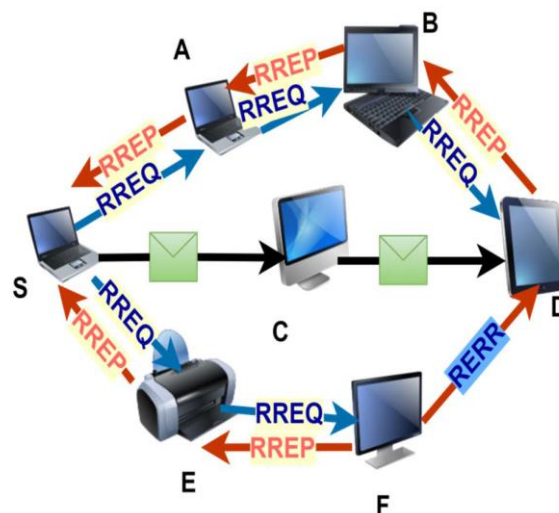

Figure 2: Example of MANET nodes.

The rest of this paper is organized as follows in the first section we describe an introduction of mobile ad-hoc network with example. In section II we discuss mobile ad-hoc network routing protocol and their types. In section III we discuss the experimental result in mobile ad-hoc network, finally in section IV we conclude the about our paper.
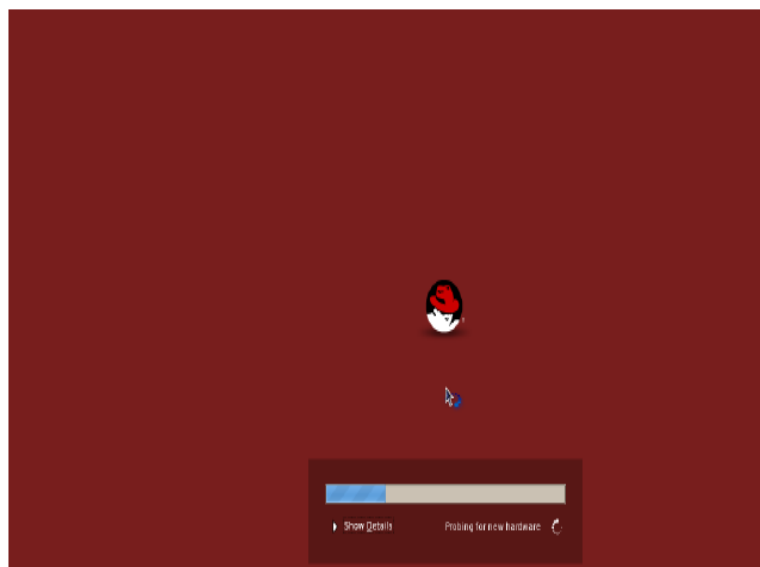
II. MANET ROUTING PROTOCOL

There are three types of MANET routing protocols categorized as proactive, reactive, and hybrid. System wide broadcasts are required for proactive protocols developed from static networks, as they need periodic routing information with neighbor nodes. These protocols refer to storing a routing entry for every possible network destination[5]. A reactive routing protocol builds a route when a network node connects with another node. Node-to-node route discovery occurs anytime a node wishes to go to another location. This approach saves the route when the destination is no longer accessible by all possible routes from the source or if the route is no longer wanted. Routers that use a hybrid protocol have both proactive and reactive features.
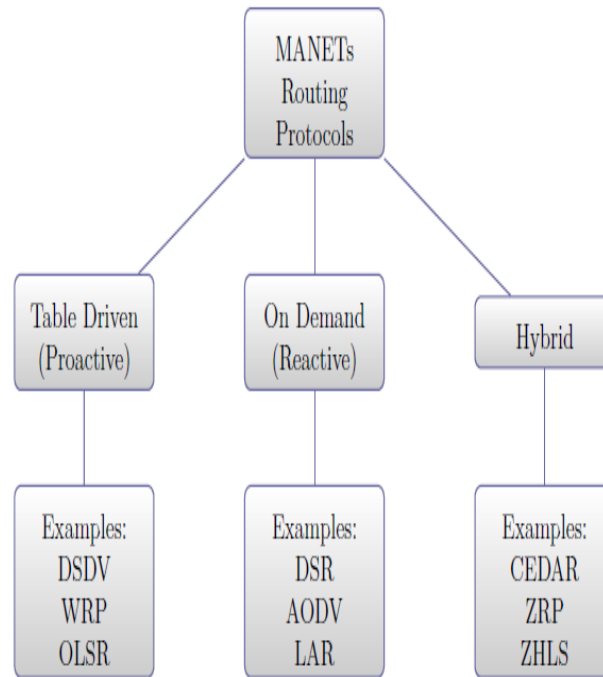
Figure 3: Protocols Categories of MANETs [13].

III. EXPERIMENTAL WORK

Simulation is an experimental process in that process proposed a simulated model for mobile ad-hoc network and put some standard parameter for valuation of result like throughput, packet delivery ratio and delays between the source and destination. In our research work perform comparative study between the existing protocol and proposed work protocol in mobile ad-hoc network. The proposed model written in network simulator version 2.34 with tool command language scripting.

Figure 4: Shows that initially environment with network simulator for the simulation and also present the progress bar.
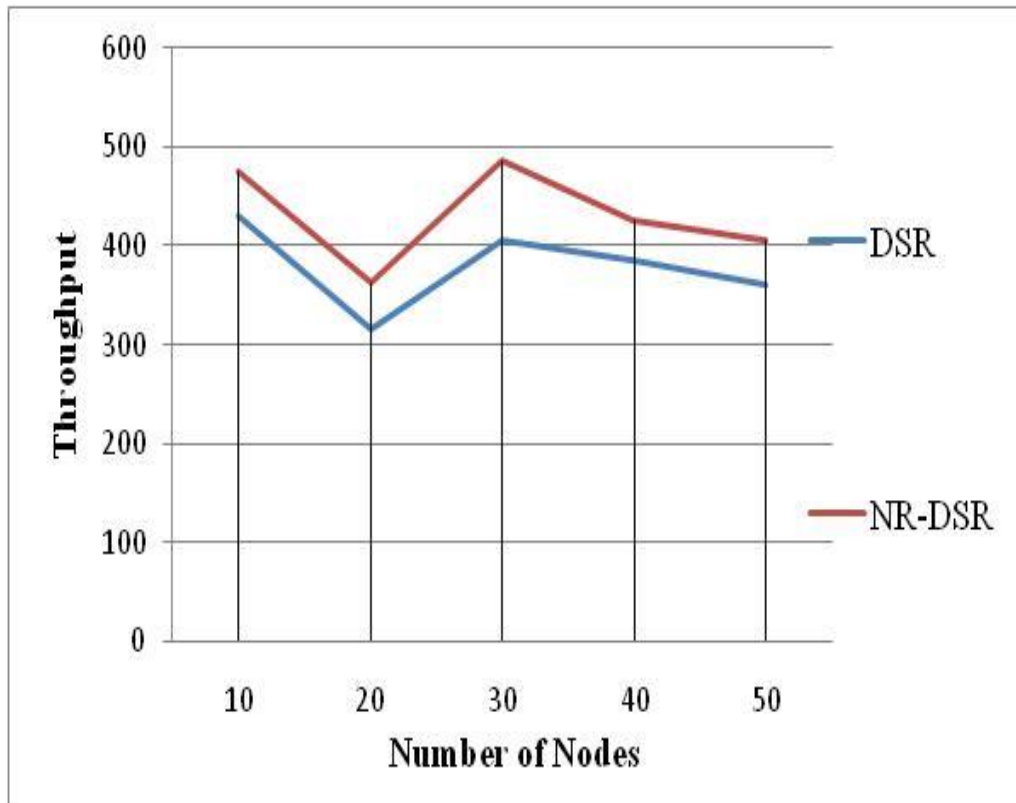
Figure 5: This image show that comparative study between the dynamic source routing protocol and proposed dynamic source routing protocol for throughput.
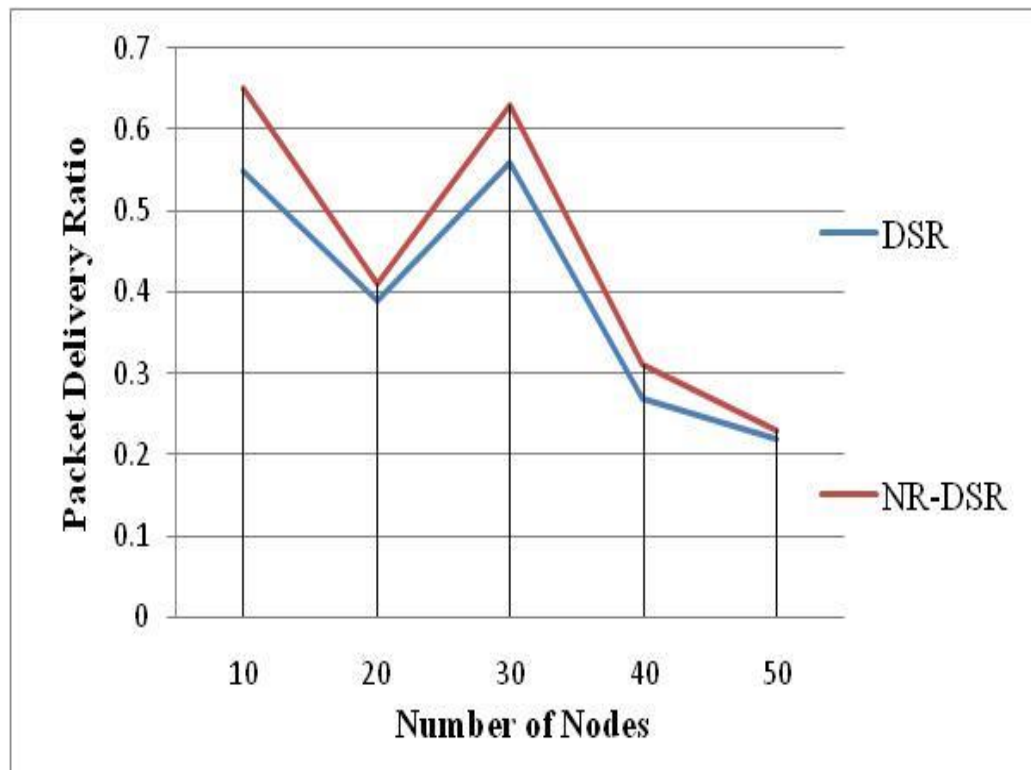

Figure 6: This image show that comparative study between the dynamic source routing protocol and proposed dynamic source routing protocol for packet delivery ratio.

IV. CONCLUSION

MANETs are gaining fame, and their real time and multimedia applications are rising. Mobile ad hoc network has a lot of challenges such as dynamic topology, multi-hop routing, hidden terminal problem, exposed terminal problem, packet loss, mobility, and security threat. Routing protocol defines the set of instructions that directs data packets from one node to another node. The main concern in an ad hoc wireless network is ad hoc routing because of its ad hoc nature, like dynamic (frequently changing) network topology, a shared medium partial bandwidth, and multimode characters, etc. There is a need for an efficient mobility management scheme. In this dissertation work we present dynamic source protocol enhancement to improve quality of services parameters in mobile ad-hoc network, here the parameters are throughput, end to end delay between source and destination and, packet delivery ratio.

REFERENCES

[1] Ahmed Muhi Shantaf, Sefer Kurnaz, Alaa Hamid Mohammed, "Performance Evaluation of Three Mobile Ad-hoc Network Routing Protocols in Different Environments", IEEE 2020, pp. 1-6.

[2] Mohammad A. R. Abdeen, Abdurrahman Beg, "Performance Evaluation of VANET Routing Protocols in Madinah City", Electronics 2022, pp. 1-23.

[3] Ashraf Mohamed Abdelhamid , "Ad-hoc Networks Performance based on Routing Protocol Type", IEEE, 2022, pp. 464-467.

[4] K. Sumathi, " Energy-Efficient Perspicacious Ant Colony Optimization Based Routing Protocol for Mobile Ad-Hoc Network", International Journal of Computer Networks and Applications, 2022, pp. 240-250.

[5] Amit Choksi, Mehul Shah, "Power Constrained Performance Evaluation of AODV, OLSR and DSDV Routing Protocols for Vehicular Ad-Hoc Networks", Springer Nature, 2022, pp. 713-726.

[6] Esmot Ara Tuli, Mohtasin Golam, "Performance Enhancement of Optimized Link State Routing Protocol by Parameter Configuration for UANET", Drones 2022, pp. 1-16.

[7] Mahmood A. Al-Shareeda, "Man-in-the-Middle Attacks in Mobile Ad Hoc Networks (MANETs): Analysis and Evaluation", Symmetry 2022, pp. 1-11.

[8] Baidaa Hamza Khudayer, Lial Raja Alzabin, "An Optimizing Rebroadcast Mechanism for Minimizing the Control Overhead In Mobile Ad-hoc Networks", 2022, pp. 2518-2528.

[9] Madhavi S. Avhankar, Dr. Janardan A. Pawar, "Mobile Ad Hoc Network Routing Protocols -Using OPNET Simulator", International Journal of Scientific and Research Publications, 2022, pp. 28-35.

[10] Mohammed Elaryh Makki Dafalla, Rania A. Mokhtar, "An optimized link state routing protocol for real-time application over Vehicular Ad-hoc Network", Alexandria Engineering Journal, 2022, pp. 4541-4556.

[11] V. Rajesh Kannan, " Node Adjustment for Mobile Ad Hoc Networks", Mathematical tatistician and Engineering Applications", 2022, pp. 2088-2097.

[12] Altaf Hussain, Babar Shah, Tariq Hussain, Farman Ali, Daehan Kwak, "Co-DLSA: Cooperative Delay and Link Stability Aware with Relay Strategy Routing Protocol for Flying Ad-Hoc Network", Human-centric Computing and Information Sciences, 2022, pp. 12-34.

[13] Arun Kumar, R. K. Singh, Sandip Vijay, "Comprehensive Performance Analysis of Energy Efficient Infrastructure-Less Network", Wireless Personal Communications, 2022, pp. 1-14.

[14] V. Thirunavukkarasu, A. Senthil Kumar, P. Prakasam, "Cluster and angular based energy proficient trusted routing protocol for mobile ad-hoc network", Peer-to-Peer Networking and Applications, 2022, pp. 1-13.

[15] Vu Khanh Quy, Vi Hoai Nam, Dao Manh Linh, Nguyen Tien Ban, Nguyen Dinh Han, "Communication Solutions for Vehicle Ad-hoc Network in Smart Cities Environment: A Comprehensive Survey", Wireless Personal Communications, 2022, PP. 2792-2817.

[16] MuthannaJaafar Abbas, Haider Mohammed Turki Alhilfi, "Performance evaluation of two models in the reactive routing protocol in MANET'S", Indonesian Journal of Electrical Engineering and Computer Science, 2021, pp. 391-397.

[17] Sumon Kumar Debnath, "Evaluation of Multicast and Unicast Routing Protocols Performance for Group Communication with QoS Constraints in 802.11 Mobile Ad-hoc Networks", I. J. Computer Network and Information Security, 2021, pp. 1-15.

[18] Ali H. Wheeb, "Performance Analysis of OLSR Protocol in Mobile Ad Hoc Networks", International Journal of Interactive Mobile Technologies, 2022, pp. 106-118.

[19] Ali H. Wheeb, "Flying Ad hoc Networks (FANET): Performance Evaluation of Topology Based Routing Protocols", International Journal of Interactive Mobile Technologies, 2022, pp. 137-150.

[20] Sumendra Yogarayan, "Wireless Ad Hoc Network of MANET, VANET, FANET and SANET: A Review", Journal of Telecommunication, Electronic and Computer Engineering, 2021, pp. 13-18.

[21] Ashraf Mohamed Abdelhamid, "Ad-hoc Networks Performance based on Routing Protocol Type", IEEE, 2022, pp. 464-467.