ISSN: 2581-3404 (Online)
International Journal of Innovative Research in Technology and Management (IJIRTM), Volume-3, Issue-6, 2019

Reactive Routing Protocol in Mobile Ad Hoc Networks: Survey and Discussions

Nidhi Verma[1], Prakash Mishra[2]

[1]M. Tech Scholar, Department of IT, PCST, Indore (India)

[2]Assistant Professor, Department of CSE, PCST, Indore (India)

ABSTRACT

Mobile ad-hoc network (MANET) is an infrastructure-less, self-organizing and autonomous network with the advantage of being low-cost and having on-demand setup. Its inbuilt unique characteristics like self-organization, frequent topology change, the high mobility of nodes, and resource scarceness make Quality of Service (QoS) routing is an exigent task. In this paper we present a survey on reliability protocols in WSNs. In this paper we discuss about the comparative literature study for the various types of routing protocol and their performances in mobile ad-hoc network.

Keywords:- Mobile ad-hoc networks, Quality of Services(Qos), Dynamic Source Routing(DSR), Ad-Hoc on Demand Distance Vector (AODV).

INTRODUCTION

In Ad Hoc mobile network, due to the features of open wireless channels, multi-hop, free movement, arbitrary joining or changing dynamically, which causes the entire network topology to change dynamically, the routing problems become extreme difficulties for affecting efficiency and reliability. Mobile Ad-hoc Network is dynamic wireless network without infrastructure. The nodes of MANET have the ability to act as a host and a router at the same time, move freely and organize themselves with random manner, resulting in network dynamic topology. Therefore the routing protocols of MANET are different from those in others wireless/wired networks, where they should have the ability to handle this dynamic topology environment.

Routing protocols in MANET are classified into two classes: proactive protocols (e.g. DSDV and WRP) and reactive protocols (e.g. DSR and AODV). Whereas, these routing protocols are multi-hops in their nature, the route selection is based on the minimum number of hops between the source node and the destination node. This metric (hop count) may be resulting in minimum end-to-end delay, but it is not sufficient for constructing a route with high reliability [4].

The performance of a MANET depends on the size, the communication model and radio communication environment of the network. However, the performance of a real MANET is normally low because of its limited power and capacity mobile nodes. In a MANET, nodes must cooperate to transmit packets, routing protocols play a particularly important role in improving the network performance. To meet the requirements of current MANETs, traditional routing protocols such as AODV (Ad-hoc On-demand Distance Vector) and DSR (Dynamic Source Routing) that base on the route hop-count as the unique routing metric is not effective. Research to propose robust, reliable, high-performance routing protocols is a

ISSN: 2581-3404 (Online)
International Journal of Innovative Research in Technology and Management (IJIRTM), Volume-3, Issue-6, 2019

very hot topic and this attracts a special attention of our research community [5].

Ad-hoc wireless networks inherit the traditional problems of wireless communications such as bandwidth optimization, power control and transmission quality enhancement. Additionally, their mobility, multi-hop nature and lack of a fixed infrastructure create a number of complexities and design constraints that are new to mobile ad hoc networks. Some of the major MANET research issues are routing, power/energy constraint, limited bandwidth, dynamic topology, packet losses due to transmission errors, routing overhead, mobility-induced route changes and security threats [6].

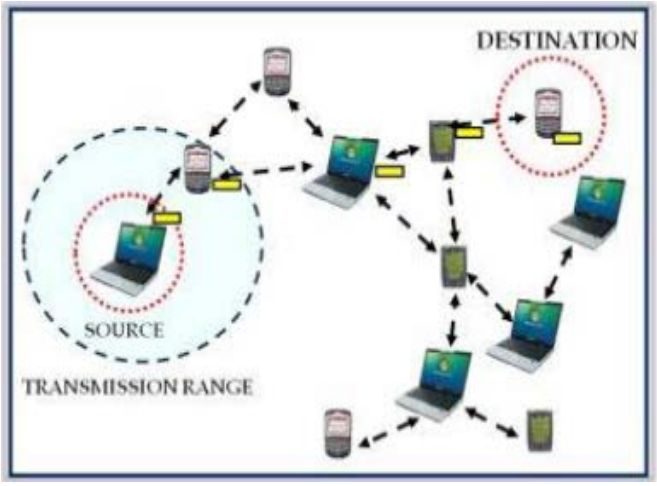

Fig 1: A Mobile ad hoc Network.

Ad hoc On-demand Distance Vector (AODV) is a reactive routing protocol. AODV is loop-free, self-starting, and scales to large numbers of mobile nodes. Its aim is to minimize the requirement of system wide broadcasts. The main difference between the AODV and Dynamic Source Routing (DSR) stems out from the fact that DSR uses source routing in which `a data packet carries the complete path to be traversed. AODV uses a simple request–reply mechanism for the discovery of routes. AODV grants for the construction of routes to specific destinations and does not require that nodes keep these routes when they are not in active communication [7].

Dynamic Source Routing Protocol is an on-demand protocol based on source routing designed to restrict the bandwidth consumed by control packets in ad hoc wireless networks by eliminating the periodic table update messages required in the table-driven approach. The major difference is that it is beacon-less and hence does not require periodic hello packet (beacon) transmissions [7].

Additionally, maintaining an established routing path is also an important issue. Depending on the dynamical state of the network, the established routing path may be blocked. If there is only one routing path from a source node to the destination node, the communication is deemed inflexible. Therefore, numerous Multi-path Routing protocols have been proposed where only the traffic on one routing path is examined, and the traffic load is also not diverted into multiple routes. Also, Multiple Source Routing (MSR) was proposed to distribute the traffic using a weighted heuristic-based strategy. The routing algorithm employs Round Trip Time (RTT) as the criterion. Though RTT is not the only parameter affecting the traffic load, it cannot reflect the real routing state. Therefore, additional parameters such as link stability and load balance have been considered [6].

The rest of this paper is organized as follows in the first section we describe an introduction of about Mobile ad-hoc network and routing protocol. In section II we discuss about the reactive routing protocol. In section III we discuss about the rich literature survey for the reactive routing protocol and their performance, finally in section IV we conclude the about our paper which is based on the literature survey and specify the future scope.

II REACTIVE ROUTING IN MOBILE ADHOC NETWORK

DSR is a reactive routing composed of two parts; route discovery and route maintenance. It is based on source routing which means, a sender node has

ISSN: 2581-3404 (Online)
International Journal of Innovative Research in Technology and Management (IJIRTM), Volume-3, Issue-6, 2019

in the packet header the complete list of the path that the packet must travel to the destination node. That is, each and every mobile node in the path just forwards the data packet to its next hop specified in the header without having to check its routing table as in table-driven routing protocols like DSDV. So, it maintains less overhead than DSDV. Multi-paths are obtained in DSR Routing .AODV routing protocol routes are discovered on demand. AODV protocol also uses the sequence number system to determine the freshness of the received information and uses the same method route discovery like the DSR protocol uses. In Route Discovery mechanism when a source node has a data packet, it searches its routing table for the destination entry. If such an entry is not available in the routing table the source initiates a route discovery process by broadcasting the RREQ message in the network. The RREQ contains the following fields: source_address, source_sequence, Broadcast_id, dest_address, dests_equence, hop_count. Destination itself or any intermediate node who knows the path to the destination node can send Route RREP [2].

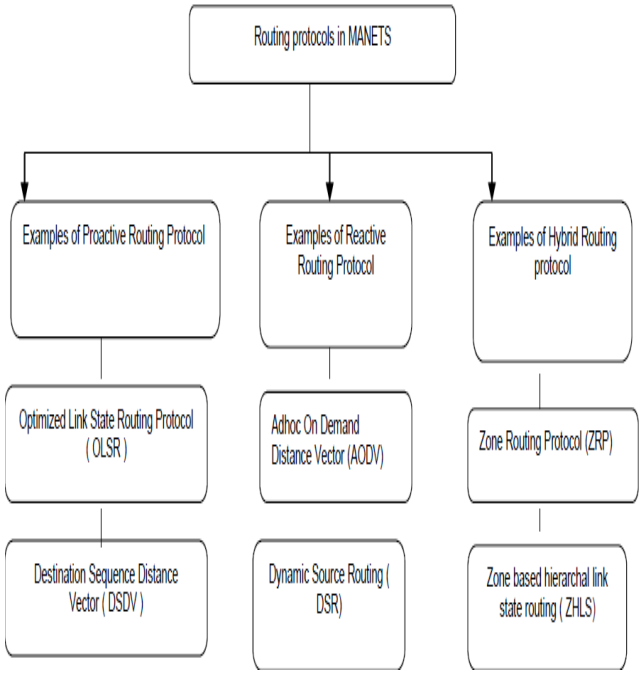

Fig 2: Classification of routing protocol.

III LITERATURE SURVEY

Currently, routing protocols exists different taxonomies depending on different viewpoints. According to the routing mechanism, they are categorized into three types. The first one is Table-driven routing which is also called proactive routing. Proactive routing is a traditional table-based routing method in which nodes update routing information by periodically exchanging routing tables. For example, the Destination Sequence Distance Vector (DSDV) is one of the proactive routing protocols[1]. Another type is On-demand (reactive) routing, reactive routing is an on-demand routing based on request/response. Dynamic Source Routing(DSR) and Ad hoc On-demand Distance Vector(AODV) Routing are the paradigms of the reactive routing protocols. [1] In this paper, the target is to provide a stable routing protocol with high efficiency for these kinds of networks, by improving the DSR routing protocol. In the provided protocol, beside the path stability, the energy of the path nodes and path length will be considered too, in order to discover a path with higher quality and use it. The provided protocol will be called as ST-DSR. The result of stimulation in the NS-2 environment shows that the ST-DSR has a better operation toward the base protocol, meaning DSR. [2] They propose an energy efficient Quality of service (QoS) routing for uninterrupted communication from source to the destination node using Mobile software agent (MSA) paradigm. Software Mobile agents collect and calculate queue length, stability of neighbour nodes, remaining battery power and queuing delay of each node. Finally, the route is calculated based on the estimated parameters. This protocol is highly efficient for balancing load and discovering stable route meeting the delay needs. In this research study, we provide a summary of existing proposal, their key ideas, and our proposal also a simulation study of DSR Routing (Dynamic Source Routing) and modified DSR using Matlab simulator on the basis of shortest path, Path hop and average trust value of path. [3] In this paper they review the current state-of-the-art multipath routing protocols for Ad Hoc networks, and discuss their advantages and disadvantages. The

purpose of all these three protocol is to establish routes that could extend the life time of the network, improve the throughout and minimize the delay of node to node. As is shown in Table 1, the enhanced DSR and FF-AOMDV are on-demand protocols which could establish different routes from source to the destination on demand. Enhanced DSR (PLADSR) modified the traditional single route DSR to make it multi-path and node-disjoint. The main goal is to extend the battery life time because the multipath protocols can balance or optimize the energy consumption. [4] This paper proposes novel routing algorithm that takes into consideration the Cross-Layer Design (CLD) technique to achieve transmission of data with high reliability in MANET. The suggested routing algorithm is enhanced version of original DSR protocol, called Reliable DSR (RDSR). Where, during route discovery phase, route selection is based on the metric of signal strength of received route reply (RREP) packet among the intermediate nodes. Moreover, during route maintenance phase, the signal strength of exchanged data packets among nodes has been used to predict the route failure earlier, and then there an earlier chance for selecting another route before the loss of the exchanged data packets. Performance evaluation and comparison of RDSR against original DSR from point of view of packet delivery fraction, end-to-end delay, routing load and throughput have been carried out by using NS-2 simulator. [5] In this work they have proposed an on-demand routing protocol, namely PRP that enables improvement of network performance for MANETs. A candidate route is selected by PRP when it satisfies simultaneously two conditions: the hop number constraint and the throughput constraint. The throughput constraint means that the throughput of each link must reach a minimum threshold and the throughput of the entire route must be the highest one among candidate routes. The efficiency of the proposed protocol has been proven by simulation using different scenarios. Changes in velocity of network nodes and network traffic have been made for simulation purpose. The simulation results show that performance factors such as throughput, average end-to-end delay, and packet delivery ratio of the network employing PRP are significantly improved (i.e. compared with two traditional protocols for MANETS including AODV and DSR). [6] The proposed Energy Efficient Node Rank Routing (EENRR) algorithm is energy efficient with stable route. It increases the network lifetime and PDR, it also minimizes the control overhead. As this proposed EENRR forwards the RREQ packet within the neighbor nodes based on the better residual energy which is done by comparing with threshold energy and the lesser Node Rank value. It considerably reduces the flooding of the control packets and link failures. Hence the proposed EENRR protocol maximizes the network lifetime and PDR. When the number of nodes increases from 10 to 100 nodes, the proposed EENRR algorithm increases the average residual energy by 31.08% over the existing DSR protocol and 21.26% over the existing EEDTR protocol. [8] In this paper author presents the simulation results in order to choose the best routing protocol to give the highest performance when implement the routing protocols in the target mobile grid application. This simulation gives the results for three ad hoc routing protocols named DSDV, DSR and AODV. In this paper these results are shown or simulated by Network Simulator (NS 2.34).The simulations have shown that the conventional routing protocols like DSR have a dramatic decrease in performance when mobility is high. However the AODV and DSDV are perform very well when mobility is high. [9] In this paper, a cross layer scheme is proposed to accomplish the flow contention of TCP in multi-hop adhoc networks. The proposed scheme collects the useful information from physical and MAC layer for approximation of channel utilization per station. The contention window (CW) has been adjusted to control the competition between stations. The proposed method also achieved the fair channel access by each station to achieve to equivalent throughput. The value of bandwidth allocation to each flow is calculated and sent to the next layer for getting the fair bandwidth allocation to each flow.

IV CONCLUSION NAD FUTURE SCOPE

Mobile Ad-hoc Networks (MANETs) are mobile, multi-hop wireless networks that can be set up anytime, anywhere without the need of pre-existing infrastructure. Due to its dynamic topology the main challenge in such networks is to design dynamic routing protocols, which are efficient in terms of consumption of energy and producing less overhead. The vast majority of studies concentrated on performance parameters based on traditional performance metrics. In this paper we present the literature survey for the routing issues and energy, in future we plan to implement on network simulator and solve this issues using some other reactive routing protocol.

REFERENCES:-

[1] Golsum Najafia, Sajjad Jahanbakhsh Gudakahriz , " A Stable Routing Protocol based on DSR Protocol for Mobile Ad Hoc Networks ", I.J. Wireless and Microwave Technologies, 2018, 3, 14-22 .

[2] Vandna Rani Verma, Dr. D. P. Sharma, Dr. C.S Lamba, "Stable energy proficient and load balancing based QoS routing in mobile Ad-Hoc networks: Mobile software based approach", Malaya Journal of Matematik, 2018, pp 79-83.

[3] Wenyao Yan, Wendong Wang, "Revisiting the Current State-of-the-art Multipath Routing in Ad Hoc Networks", ICNISC2019, pp 1-9.

[4] Mohamed A. Al-Shora, Sayed A. Nouh, Ahmed R. Khalifa, " Reliable Dynamic Source Routing (RDSR) Protocol with Link Failure Prediction for Mobile Ad Hoc Networks (MANET)", Journal of Network Communications and Emerging Technologies, 2018, pp 13-21.

[5] Vu Khanh Quy, Nguyen Dinh Han, Nguyen Tien Ban, "PRP: A High-Performance Routing Protocol for Mobile Ad-Hoc Networks", International Conference on Advanced Technologies for Communications, 2018, pp 226-231.

[6] D. Kothandaraman, C. Chellappan, "ENERGY EFFICIENT NODE RANK-BASED ROUTING ALGORITHM IN MOBILE AD-HOC NETWORKS", International Journal of Computer Networks & Communications, 2019, pp 45-62.

[7] Lubdha M. Bendale, Roshani. L. Jain, Gayatri D. Patil, "Study of Various Routing Protocols in Mobile Ad-Hoc Networks", Int. J. Sci. Res. in Network Security and Communication, 2018, Pp 1-5.

[8] Bal Krishna Saraswat, Manish Bhardwaj, Analp Pathak, "Optimum Experimental Results of AODV, DSDV & DSR Routing Protocol in Grid Environment", Procedia Computer Science, 2015, pp 1359-1366.

[9] Qamar Jabeen, Fazlullah Khan, Shahzad Khan, Mian Ahmad Jan, "Performance Improvement in Multihop Wireless Mobile Adhoc Networks", J. Appl. Environ. Biol. Sci., 2016, pp 82-92.

[10] Fawaz Mahiuob Mohammed Mokbal, Khalid Saeed, Wang Dan, "Energy Consumption Evaluation of AODV and AOMDV Routing Protocols in Mobile Ad-Hoc Networks", International Journal of Advanced Computer Science and Applications,, 2018, pp 278-378.