

A Survey on Routing Protocol for Mobile Ad Hoc Networks

Shweta Thakur¹ Atul Shrivastava²

¹M.Tech. Scholar ²Professor

^{1,2}Department of Computer Science & Engineering

^{1,2}SIRTE, Bhopal (M.P.), India

Abstract— Mobile ad hoc network is a wireless non-centralized network. This network includes a set of distributed nodes with any base or central management, develop a temporary network. An enormous volume of important information communicates over the wireless network using trusted dynamic routing protocol, which is the enhancement of the DSR (Dynamic Source Routing) protocol to improve trust. In this paper we present a survey on reliability protocols in WSNs. We review several protocol and techniques for the ad-hoc network using quality of services parameters and improve the performance of network.
Key words: Dynamic Source Routing, Wireless Sensor Network, AODV, Quality of Service, IEEE

I. INTRODUCTION

A MANET [1] is composed of mobile nodes connected by wireless media without centralized infrastructure. Routing schemes such as Dynamic Source Routing and Ad Hoc On-Demand Distance Vector were implemented to perform basic routing operation like forward data packets from a source to a destination [3], MANETs is an easily deployable [2], self-creating and self-configurable, fault resilient, mobile and flexible type of network and finds its applications in various infrastructure-less environments like the military battlefield, emergency services like search and rescue operations, disaster recovery operations, location aware systems, vehicular networks, multi-player games and teleconferencing (audio/video). An adequate quality of the connection is enviable in all these applications which made QoS concerns mandatory.

Major problems in QoS provisioning in MANETs are highly dynamic network topology, multi-hop routing, energy and bandwidth constraints, transmission errors, latency, security, etc.

Ad-hoc networks are characterized by the need of infrastructure, and by a random and quickly varying network topology; thus for a robust dynamic routing protocol that can accommodate such an environment. Therefore, many routing algorithms have come into existence to satisfy the needs of communications in such networks. To name two routing algorithms are AODV, from the immediate family and DSDV, from the proactive family. Both protocols were simulated using the ns-2 and were compared in terms of average throughput, packet loss ratio, and routing overhead, while changeable number of nodes, speed and pause time. Simulation exposed that although DSDV completely scales to small networks with low node speeds, AODV is favored due to its more efficient use of bandwidth [4].

Ad hoc means “or the purpose”, self-organizing network architecture. There is no requirement of base station. Ad hoc networks are further classified as Mobile Ad hoc Networks (MANETs), Vehicular Ad hoc Networks (VANETs), Wireless Sensor Network (WSN), Wireless Mesh Network (WMN). Here, we focus on routing protocols

for MANETs. Routing protocols for MANETs can be categorized on the basis of mechanism as reactive (routes are created on demand), proactive (pre-determined routes are stored in routing tables and are periodically updated) and hybrid (some nodes have predefined and some have on-demand). In terms of number of destinations, that a protocol can transmit data for a given source, routing can be Unicast (only one destination supported) or Multicast (for group of destinations) [5].

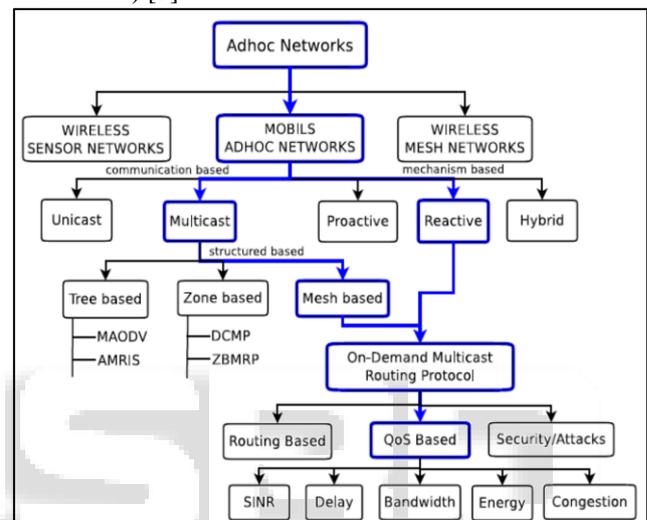


Fig. 1: Taxonomy of Routing Mechanism in MANETs [5]

The rest of this paper is organized as follows in the first section we describe an introduction of about Cloud computing and load balancing. In section II we discuss about the rich literature survey for the load balancing mechanism. In section III we discuss about the cloud computing deployment models, finally in section IV we conclude the about our paper which is based on the literature survey and specify the future scope.

II. DSR PROTOCOL

Dynamic Source Routing Protocol is one of the demand-driven routing protocols based on resource routing. Additionally, nodes do not need to distribute their routing tables to the neighboring nodes, which save a lot of network bandwidth. Another important issue of the DSR protocol is that whenever there is a failure link, the RERR packet is released to the original source, which initiates the path detection process at the new turn. The link cannot be restored locally [1]. Two main phases are considered for this protocol: route detection and path updates. The route discovery phase uses the packets of request and response, and the route update phase uses acknowledgments and link errors. The DSR protocol is a proactive protocol that can manage source routing networks without the need for routing tables and updating them. In the DSR protocol, the sender specifies all of the source paths to the destination and stores all the middle nodes in the packets. This protocol operates on the basis of

link state algorithms, meaning each node can store the best route to the destination. Also, if a change occurs in the network, all network nodes are notified through the general flooding of this change. The DSR protocol includes two major mechanisms. In this type of mobile nodes, you need to provide drafts for the routes, they are aware of. DSR protocol is a loop-based, source-driven and demand-driven protocol.

A. Advantages

- No need to keep routing table to route a given data packet [7].
- Guaranteed loop-free routing.
- Use of only "soft state" in routing.
- Rapid recovery in case of change of routes in the network.

B. Disadvantages

- One of the major disadvantages of DSR protocol is in implementing the route discovery process.
- Scalable to large networks.
- Processing resources
- Required are more in comparison to other protocols

III. RELATED WORK

In recent years many works have done on routing protocol in mobile ad hoc networks. In the following we review some of this works related with our work.

[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] The objective of the present paper is to introduce a QoS aware routing metric that determines a reliable forwarding node based on Link Stability cost Function (LSF). The principle theme underlying our protocol is optimum contention count that can be estimated with the help of received signal strength. Their proposed protocol has been demonstrated on an existing mesh-based Multicast routing protocols, ODMRP. Simulations are carried out on Exata/Cyber simulator, and obtained results are compared with that of ODMRP. The comparative analysis reveals that their protocol is more efficient in contrast to ODMRP, LSMRP and MMRNS, regarding performance parameters like PDR, latency and route lifetime.

[3] They proposed an energy-aware multipath routing scheme based on particle swarm optimization (EMPSO) that uses continuous time recurrent neural network (CTRNN) to solve optimization problems. CTRNN finds the optimal loop-free paths to solve link disjoint paths in a MANET. The CTRNN is used as an optimum path selection technique that produces a set of optimal paths between source and destination. In CTRNN, particle swarm optimization (PSO) method is primly used for training the RNN. The proposed scheme uses the reliability measures such as transmission cost, energy factor, and the optimal traffic ratio

between source and destination to increase routing performance.

[4] They propose an agent based congestion control technique for WANETs. In their technique, the information about network congestion is collected and distributed by wireless agents (WA). A wireless agent based congestion control AODV routing protocol is proposed to avoid congestion in ad-hoc network. Some wireless agents are collected in ad-hoc network, which carry routing information and nodes congestion status. When wireless agent movements happen through the network, it can select a less loaded neighbor node as its next hop and update the routing table according to the node's congestion status.

[5] This paper discusses the state of the art research in mesh based multicast routing protocols in MANETs. From discussions as presented earlier, it can be inferred that selecting QoS metric for the specific problem domain is significant especially in MRP. A suitable QoS metric is useful in assessing "goodness" of a routing solution as per requisite performance. Various enhancements in ODMRP have been discussed on the basis of routing modifications and Quality of Services parameters.

[6] In this paper the performance of five most used routing protocol are compared. The routing protocols consider in this comparative analysis are Dynamic Source Routing (DSR), Destination Sequenced Distance Vector (DSDV), On-Demand Distance Vector (AODV), Zone Routing Protocol (ZRP), and Temporally Ordered Routing Algorithm (TORA). In order to analysis the performance of these protocol, which are implemented with same configuration and performed for same a common objective. Then the performance such as sent packets, received packets, packet delivery ratio, throughput, average end to end delay, packets dropped, sending jitter and receiving jitter are analyzed.

[8] This paper introduced support vector machine based DSR protocol for safeguarding routing in mobile ad-hoc network and it is examining that performance of STDSR increases in some performance indicator such as detection ratio with the variation of mobility and number of malicious nodes, and in future this proposed protocol can be used to show that the performance of STDSR increases in some other parameter such as a packet delivery ratio, average end to end delay, and throughput.

[9] In this paper, a cross layer scheme is proposed to accomplish the flow contention of TCP in multi-hop ad-hoc 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.

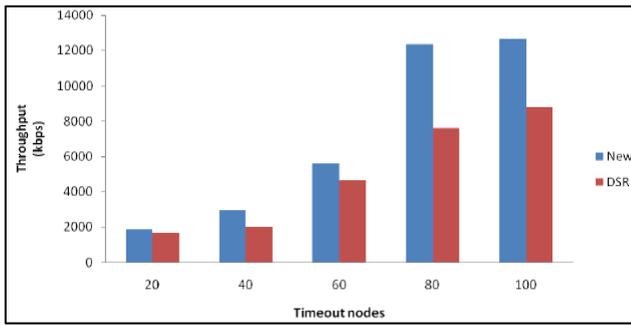


Fig. 2: This Figure shows the throughput with Respect to Number of Nodes

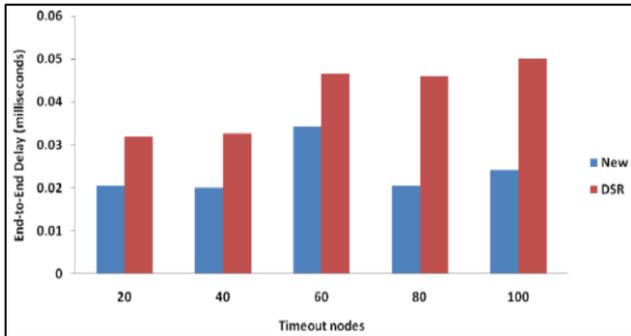


Fig. 3: This Figure Shows the End to end delay (Milliseconds) with Respect to Number of Nodes

IV. CONCLUSIONS AND FUTURE SCOPE

Mobile ad hoc network (MANET) is a dynamic, wireless network that consists of numerous mobile nodes communicating with each other directly or indirectly without any preexistent infrastructure support. In this paper we presents the rich literature survey for the modified Dynamic source routing protocol and increase the performance of overall network. The performance parameters are measured by standard parameter which is used in an ad-hoc network. In future we develop the new modified dynamic source routing protocol in a mobile ad-hoc network, all parameters are compared with the exiting and previous methods and their solutions.

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] Gaurav Singal, Vijay Laxmi, M.S. Gaur, Swati Todi, Vijay Rao, Akka Zemmari, “MCLSPM: Multi-constraints Link Stable Multicast Routing Protocol in Adhoc Networks”, IEEE 2016. Pp 1-6.
- [3] Y. Harold Robinson, M. Rajaram, “Energy-Aware Multipath Routing Scheme Based on Particle Swarm Optimization in Mobile Ad Hoc Networks”, Hindawi Publishing Corporation □e Scientific World Journal Volume 2015, Pp 1-10.
- [4] M. Rajesh, J. M. Gnanasekar, “CONGESTION CONTROL USING AODV PROTOCOLSCHEME FOR WIRELESS AD-HOC NETWORK”, Advances in Computer Science and Engineering, PP 19-37.

- [5] Gaurav Singal, Vijay Laxmi, Manoj S Gaur, D Vijay Rao, Riti Kushwaha, “QoS-aware Mesh based Multicast Routing Protocols in Ad-Hoc Networks: Concepts and Challenges”, QOS-AWARE MESH BASED MULTICAST ROUTING PROTOCOLS IN AD-HOC NETWORKS, 2017. pp 1-20.
- [6] Geetika Dhand, S.S.Tyagi, “Performance Analysis of various Routing Protocols in Mobile Ad-hoc Networks”, International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 10 (2018) pp. 7378-7382.
- [7] Lubdha M. Bendale, Roshani. L. Jain, Gayatri D. Patil, “Study of Various Routing Protocols in Mobile Ad-Hoc Networks”, IJSRNSC, VOL-6, ISSUE-1, 2018.
- [8] Priya Kautoo, Piyush Kumar Shukla, Sanjay Silakari, “Trust Formulization in Dynamic Source Routing Protocol Using SVM”, I.J. Information Technology and Computer Science, 2014, 08, 43-50.
- [9] Qamar Jabeen, Fazlullah Khan, Shahzad Khan, Mian Ahmad Jan, “Performance Improvement in Multihop Wireless Mobile Ad hoc Networks”, J. Appl. Environ. Biol. Sci., 6(4S) 82-92, 2016.